BAHAGIAN PENGURUSAN SEKOLAH BERASRAMA PENUH
DAN SEKOLAH KECEMERLANGAN

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MODUL PERFECT SCORE
SEKOLAH BERASRAMA PENUH TAHUN 2013

ADDITIONAL MATHEMATICS

Panel Penyedia:

1	**EN. ABDUL RAHIM BIN BUJANG** SEKOLAH TUN FATIMAH (STF)	7	**EN. JUPRI BIN BASARI** SMS LAHAD DATU (SMSLD)
2	**PN. SARIPAH BINTI AHMAD** SM SAINS MUZAFFAR SYAH, MELAKA (MOZAC)	8	**PN. ROHAIZA BINTI RAMLI** SMS ALAM SHAH (ASIS)
3	**PN. AZIZAH BINTI KAMAR** SEKOLAH BERASRAMA PENUH INTEGERASI SABAK BERNAM (SBPISB)	9	**EN. MOHD NOHARDI BIN MAT JUSOH** SM SAINS SETIU (SAIS)
4	**TN. HJ. MOHD RAHIMI BIN RAMLI** SEK MEN SAINS SULTAN MAHMUD (SESMA)	10	**EN. ABDUL RAHIM NAPIAH** SMS TUN SHEH SYED SHAHABUDIN (SMSTSSS)
5	**PN. SITI AZLINA BINTI HAIRUDIN** SMS TUANKU MUNAWIR (SASER)	11	**PN. ROHAYA BINTI MURAT** SMS TELUK INTAN (SEMESTI)
6	**PN. CHE RUS BINTI HASHIM** SM SULTAN ABDUL HALIM KEDAH (SMSAH)	12	**EN. ALIAKBAR BIN ASRI** SMS LABUAN (SMSL)

The following formulae may be helpful in answering the questions. The symbols given are the ones commonly used.

ALGEBRA

1. $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
2. $a^m \times a^n = a^{m+n}$
3. $a^m \div a^n = a^{m-n}$
4. $(a^m)^n = a^{mn}$
5. $\log_a mn = \log_a m + \log_a n$
6. $\log_a \dfrac{m}{n} = \log_a m - \log_a n$
7. $\log_a m^n = n \log_a m$
8. $\log_a b = \dfrac{\log_c b}{\log_c a}$
9. $T_n = a + (n-1)d$
10. $S_n = \dfrac{n}{2}[2a + (n-1)d]$
11. $T_n = ar^{n-1}$
12. $S_n = \dfrac{a(r^n - 1)}{r - 1} = \dfrac{a(1 - r^n)}{1 - r}$, $r \neq 1$
13. $S_\infty = \dfrac{a}{1 - r}$, $|r| < 1$

CALCULUS

1. $y = uv$, $\dfrac{dy}{dx} = u\dfrac{dv}{dx} + v\dfrac{du}{dx}$
2. $y = \dfrac{u}{v}$, $\dfrac{dy}{dx} = \dfrac{v\dfrac{du}{dx} - u\dfrac{dv}{dx}}{v^2}$
3. $\dfrac{dy}{dx} = \dfrac{dy}{du} \times \dfrac{du}{dx}$
4. Area under a curve
   $= \int_a^b y\,dx$ or
   $= \int_a^b x\,dy$
5. Volume of revolution
   $= \int_a^b \pi y^2\,dx$ or
   $= \int_a^b \pi x^2\,dy$

GEOMETRY

1. Distance $= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
2. Mid point
   $(x, y) = \left(\dfrac{x_1 + x_2}{2}, \dfrac{y_1 + y_2}{2}\right)$
3. Division of line segment by a point
   $(x, y) = \left(\dfrac{nx_1 + mx_2}{m+n}, \dfrac{ny_1 + my_2}{m+n}\right)$
4. Area of triangle
   $= \dfrac{1}{2}\left|(x_1y_2 + x_2y_3 + x_3y_1) - (x_2y_1 + x_3y_2 + x_1y_3)\right|$
5. $\left|\underline{r}\right| = \sqrt{x^2 + y^2}$
6. $\hat{r} = \dfrac{x\underset{\sim}{i} + y\underset{\sim}{j}}{\sqrt{x^2 + y^2}}$

STATISTICS

1. $\bar{x} = \dfrac{\sum x}{N}$

2. $\bar{x} = \dfrac{\sum fx}{\sum f}$

3. $\sigma = \sqrt{\dfrac{\sum (x - \bar{x})^2}{N}} = \sqrt{\dfrac{\sum x^2}{N} - \bar{x}^2}$

4. $\sigma = \sqrt{\dfrac{\sum f(x - \bar{x})^2}{\sum f}} = \sqrt{\dfrac{\sum fx^2}{\sum f} - \bar{x}^2}$

5. $m = \mathrm{L} + \left(\dfrac{\frac{1}{2}N - F}{f_m} \right) C$

6. $I = \dfrac{Q_1}{Q_0} \times 100$

7. $\bar{I} = \dfrac{\sum W_i I_i}{\sum W_i}$

8. ${}^n P_r = \dfrac{n!}{(n-r)!}$

9. ${}^n C_r = \dfrac{n!}{(n-r)!r!}$

10. $\mathrm{P}(A \cup B) = \mathrm{P}(A) + \mathrm{P}(B) - \mathrm{P}(A \cap B)$

11. $\mathrm{P}(X = r) = {}^n C_r \, p^r q^{n-r}$, $p + q = 1$

12. Mean, $\mu = np$

13. $\sigma = \sqrt{npq}$

14. $\mathrm{Z} = \dfrac{X - \mu}{\sigma}$

TRIGONOMETRY

1. Arc length, $s = r\theta$

2. Area of sector, $\mathrm{A} = \dfrac{1}{2} r^2 \theta$

3. $\sin^2 A + \cos^2 A = 1$

4. $\sec^2 A = 1 + \tan^2 A$

5. $\mathrm{cosec}^2 A = 1 + \cot^2 A$

6. $\sin 2A = 2 \sin A \cos A$

7. $\cos 2A = \cos^2 A - \sin^2 A$
   $= 2 \cos^2 A - 1$
   $= 1 - 2 \sin^2 A$

8. $\sin(A \pm B) = \sin A \cos B \pm \cos A \sin B$

9. $\cos(A \pm B) = \cos A \cos B \mp \sin A \sin B$

10. $\tan(A \pm B) = \dfrac{\tan A \pm \tan B}{1 \mp \tan A \tan B}$

11. $\tan 2A = \dfrac{2 \tan A}{1 - \tan^2 A}$

12. $\dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$

13. $a^2 = b^2 + c^2 - 2bc \cos A$

14. Area of triangle $= \dfrac{1}{2} ab \sin C$

UPPER TAIL PROBABILITIES $Q(z)$ OF THE NORMAL DISTRIBUTION N(0,1)

z	0	1	2	3	4	5	6	7	8	9	1 2 3	4 5 6	7 8 9
											SUBTRACT		
0.0	.5000	.4960	.4920	.4880	.4840	.4801	.4761	.4721	.4681	.4641	4 8 12	16 20 24	28 32 36
0.1	.4602	.4562	.4522	.4483	.4443	.4404	.4364	.4325	.4286	.4247	4 8 12	16 20 24	28 32 36
0.2	.4207	.4168	.4129	.4090	.4052	.4013	.3974	.3936	.3897	.3859	4 8 12	15 19 23	27 31 35
0.3	.3821	.3783	.3745	.3707	.3669	.3632	.3594	.3557	.3520	.3483	4 7 11	15 19 22	26 30 34
0.4	.3446	.3409	.3372	.3336	.3300	.3264	.3228	.3192	.3156	.3121	4 7 11	14 18 22	25 29 32
0.5	.3085	.3050	.3015	.2981	.2946	.2912	.2877	.2843	.2810	.2776	3 7 10	14 17 20	24 27 31
0.6	.2743	.2709	.2676	.2643	.2611	.2578	.2546	.2514	.2483	.2451	3 7 10	13 16 19	23 26 29
0.7	.2420	.2389	.2358	.2327	.2296	.2266	.2236	.2206	.2177	.2148	3 6 9	12 15 18	21 24 27
0.8	.2119	.2090	.2061	.2033	.2005	.1977	.1949	.1922	.1894	.1867	3 5 8	11 14 16	19 22 25
0.9	.1841	.1814	.1788	.1762	.1736	.1711	.1685	.1660	.1635	.1611	3 5 8	10 13 15	18 20 23
1.0	.1587	.1562	.1539	.1515	.1492	.1469	.1446	.1423	.1401	.1379	2 5 7	9 12 14	16 19 21
1.1	.1357	.1335	.1314	.1292	.1271	.1251	.1230	.1210	.1190	.1170	2 4 6	8 10 12	14 16 18
1.2	.1151	.1131	.1112	.1093	.1075	.1056	.1038	.1020	.1003	.0985	2 4 6	7 9 11	13 15 17
1.3	.0968	.0951	.0934	.0918	.0901	.0885	.0869	.0853	.0838	.0823	2 3 5	6 8 10	11 13 14
1.4	.0808	.0793	.0778	.0764	.0749	.0735	.0721	.0708	.0694	.0681	1 3 4	6 7 8	10 11 13
1.5	.0668	.0655	.0643	.0630	.0618	.0606	.0594	.0582	.0571	.0559	1 2 4	5 6 7	8 10 11
1.6	.0548	.0537	.0526	.0516	.0505	.0495	.0485	.0475	.0465	.0455	1 2 3	4 5 6	7 8 9
1.7	.0446	.0436	.0427	.0418	.0409	.0401	.0392	.0384	.0375	.0367	1 2 3	4 4 5	6 7 8
1.8	.0359	.0351	.0344	.0336	.0329	.0322	.0314	.0307	.0301	.0294	1 1 2	3 4 4	5 6 6
1.9	.0287	.0281	.0274	.0268	.0262	.0256	.0250	.0244	.0239	.0233	1 1 2	2 3 4	4 5 5
2.0	.0228	.0222	.0217	.0212	.0207	.0202	.0197	.0192	.0188	.0183	0 1 1	2 2 3	3 4 4
2.1	.0179	.0174	.0170	.0166	.0162	.0158	.0154	.0150	.0146	.0143	0 1 1	2 2 2	3 3 4
2.2	.0139	.0136	.0132	.0129	.0125	.0122	.0119	.0116	.0113	.0110	0 1 1	1 2 2	2 3 3
2.3	.0107	.0104	.0102								0 1 1	1 1 2	2 2 2
				.$0^2$990	.$0^2$964	.$0^2$939	.$0^2$914				3 5 8	10 13 15	18 20 23
								.$0^2$889	.$0^2$866	.$0^2$842	2 5 7	9 12 14	16 18 21
2.4	.$0^2$820	.$0^2$798	.$0^2$776	.$0^2$755	.$0^2$734						2 4 6	8 11 13	15 17 19
						.$0^2$714	.$0^2$695	.$0^2$676	.$0^2$657	.$0^2$639	2 4 6	7 9 11	13 15 17
2.5	.$0^2$621	.$0^2$604	.$0^2$587	.$0^2$570	.$0^2$554	.$0^2$539	.$0^2$523	.$0^2$508	.$0^2$494	.$0^2$480	2 3 5	6 8 9	11 12 14
2.6	.$0^2$466	.$0^2$453	.$0^2$440	.$0^2$427	.$0^2$415	.$0^2$402	.$0^2$391	.$0^2$379	.$0^2$368	.$0^2$357	1 2 3	5 6 7	8 9 10
2.7	.$0^2$347	.$0^2$336	.$0^2$326	.$0^2$317	.$0^2$307	.$0^2$298	.$0^2$289	.$0^2$280	.$0^2$272	.$0^2$264	1 2 3	4 5 6	7 8 9
2.8	.$0^2$256	.$0^2$248	.$0^2$240	.$0^2$233	.$0^2$226	.$0^2$219	.$0^2$212	.$0^2$205	.$0^2$199	.$0^2$193	1 1 2	3 4 4	5 6 6
2.9	.$0^2$187	.$0^2$181	.$0^2$175	.$0^2$169	.$0^2$164	.$0^2$159	.$0^2$154	.$0^2$149	.$0^2$144	.$0^2$139	0 1 1	2 2 3	3 4 4
3.0	.$0^2$135	.$0^2$131	.$0^2$126	.$0^2$122	.$0^2$118	.$0^2$114	.$0^2$111	.$0^2$107	.$0^2$104	.$0^2$100	0 1 1	2 2 2	3 3 4
3.1	.$0^3$968	.$0^3$935	.$0^3$904								3 6 9	13 16 19	22 25 28
				.$0^3$874	.$0^3$845	.$0^3$816	.$0^3$789				3 6 8	11 14 17	20 22 25
								.$0^3$762	.$0^3$736	.$0^3$711	2 5 7	10 12 15	17 20 22
3.2	.$0^3$687	.$0^3$664	.$0^3$641	.$0^3$619	.$0^3$598						2 4 7	9 11 13	15 18 20
						.$0^3$577	.$0^3$557	.$0^3$538	.$0^3$519	.$0^3$501	2 4 6	8 9 11	13 15 17
3.3	.$0^3$483	.$0^3$466	.$0^3$450	.$0^3$434	.$0^3$419						2 3 5	6 8 10	11 13 14
						.$0^3$404	.$0^3$390	.$0^3$376	.$0^3$362	.$0^3$349	1 3 4	5 7 8	9 10 12
3.4	.$0^3$337	.$0^3$325	.$0^3$313	.$0^3$302	.$0^3$291	.$0^3$280	.$0^3$270	.$0^3$260	.$0^3$251	.$0^3$242	1 2 3	4 5 6	7 8 9
3.5	.$0^3$233	.$0^3$224	.$0^3$216	.$0^3$208	.$0^3$200	.$0^3$193	.$0^3$185	.$0^3$178	.$0^3$172	.$0^3$165	1 1 2	3 4 4	5 6 7
3.6	.$0^3$159	.$0^3$153	.$0^3$147	.$0^3$142	.$0^3$136	.$0^3$131	.$0^3$126	.$0^3$121	.$0^3$117	.$0^3$112	0 1 1	2 2 3	3 4 5
3.7	.$0^3$108	.$0^3$104	.$0^3$100	.$0^4$96	.$0^4$92	.$0^4$88	.$0^4$85	.$0^4$82	.$0^4$78	.$0^4$75			
3.8	.$0^4$72	.$0^4$69	.$0^4$67	.$0^4$64	.$0^4$62	.$0^4$59	.$0^4$57	.$0^4$54	.$0^4$52	.$0^4$50			
3.9	.$0^4$48	.$0^4$46	.$0^4$44	.$0^4$42	.$0^4$41	.$0^4$39	.$0^4$37	.$0^4$36	.$0^4$34	.$0^4$33			

For negative z use the relation:

$$Q(z) = 1 - Q(-z) = P(-z)$$

Example: if $u \sim$ N (0,1), *find* (*a*) Prob ($u > 2$), (*b*) Prob ($0 < u < 2$), (*c*) Prob ($|u| > 2$), (*d*) Prob ($|u| < 2$). The desired probabilities are (*a*) $Q(2) = .0228$, (*b*) $Q(0) - Q(2) = .5000 - .0228 = .4772$, (*c*) $2Q(2) = .0456$, (*d*) $1 - 2Q(2) = .9544$.

If $v \sim N(\mu,\sigma^2)$, Prob ($v > x$) is given by $Q(z)$ with $z = (x - \mu)/\sigma$.

UPPER QUANTILES $z_{[P]}$ OF THE NORMAL DISTRIBUTION N(0,1)

P	Q	z	P	Q	z	P	Q	z	P	Q	z	Q	z
.50	.50	0.000	.85	.15	1.036	.975	.025	1.960	.990	.010	2.326	.$0^3$4	3.353
.55	.45	0.126	.86	.14	1.080	.976	.024	1.977	.991	.009	2.366	.$0^3$3	3.432
.60	.40	0.253	.87	.13	1.126	.977	.023	1.995	.992	.008	2.409	.$0^3$2	3.540
.65	.35	0.385	.88	.12	1.175	.978	.022	2.014	.993	.007	2.457	.$0^3$1	3.719
.70	.30	0.524	.89	.11	1.227	.979	.021	2.034	.994	.006	2.512	.$0^4$5	3.891
.75	.25	0.674	.90	.10	1.282	.980	.020	2.054	.995	.005	2.576	.$0^4$1	4.265
.76	.24	0.706	.91	.09	1.341	.981	.019	2.075	.996	.004	2.652	.$0^5$5	4.417
.77	.23	0.739	.92	.08	1.405	.982	.018	2.097	.997	.003	2.748	.$0^5$1	4.753
.78	.22	0.772	.93	.07	1.476	.983	.017	2.120	.998	.002	2.878	.$0^6$5	4.892
.79	.21	0.806	.94	.06	1.555	.984	.016	2.144	.999	.001	3.090	.$0^6$1	5.199
.80	.20	0.842	.950	.050	1.645	.985	.015	2.170	.9991	.$0^3$9	3.121	.$0^7$5	5.327
.81	.19	0.878	.955	.045	1.695	.986	.014	2.197	.9992	.$0^3$8	3.156	.$0^7$1	5.612
.82	.18	0.915	.960	.040	1.751	.987	.013	2.226	.9993	.$0^3$7	3.195	.$0^8$5	5.731
.83	.17	0.954	.965	.035	1.812	.988	.012	2.257	.9994	.$0^3$6	3.239	.$0^8$1	5.998
.84	.16	0.994	.970	.030	1.881	.989	.011	2.290	.9995	.$0^3$5	3.291	.$0^9$5	6.109

The tabulated function is $z_{[P]}$: if $u \sim$ N(0,1), Prob ($u < z_{[P]}$) $= P$, Prob ($u > z_{[P]}$) $= 1 - P = Q$, and (for $P > \frac{1}{2}$) Prob ($|u| > z_{[P]}$) $= 2Q$.

Lower quantiles ($P < \frac{1}{2}$) are given by:

$$z_{[P]} = -z_{[1-P]}$$

PROBABILITY DENSITY $\varphi(z)$ OF THE NORMAL DISTRIBUTION N(0,1)

z	0	1	2	3	4	5	6	7	8	9
0.	0.399	.397	.391	.381	.368	.352	.333	.312	.290	.266
1.	0.242	.218	.194	.171	.150	.130	.111	.094	.079	.066
2.	0.0540	.0440	.0355	.0283	.0224	.0175	.0136	.0104	.0079	.0060
3.	0.00443	.00327	.00238	.00172	.00123	.00087	.00061	.00042	.00029	.00020
4.	0.$0^3$134	.$0^3$89	.$0^3$59	.$0^3$39	.$0^4$25	.$0^4$16	.$0^4$10	.$0^5$64	.$0^5$40	.$0^5$24

For $z < 0$ use the relation:

$$\varphi(z) = \varphi(-z)$$

The tabulated functions are defined thus:

$$\varphi(z) = \sqrt{\left(\frac{1}{2\pi}\right)} \exp\left(-\tfrac{1}{2}z^2\right)$$

$$Q(z) = \int_z^\infty \varphi(u)\, du$$

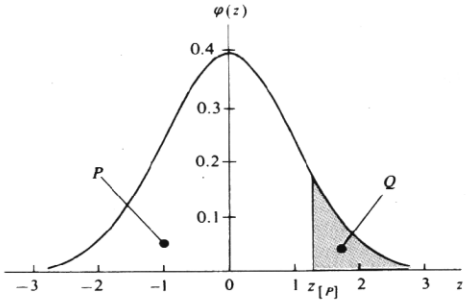
$$\int_{-\infty}^{z_{[P]}} \varphi(u)\, du = P$$

In the figure the probability density is represented by the ordinate of the graph, and the tail probabilities are represented by areas under the graph.

The probability density of the distribution N(μ, σ^2) is

$$f(x) = \frac{1}{\sigma}\varphi(z)$$

with $z = (x - \mu)/\sigma$.



ANALYSIS OF THE SPM PAPERS SIJIL PELAJARAN MALAYSIA

ADDITIONAL MATHEMATICS (2006 – 2012)

PAPER 1

Question	2006	2007	2008	2009	2010	2011	2012
1	*Functions*	Functions	*Functions*	Functions	*Functions*	Functions	Function
2	*Functions*	Functions	*Functions*	Functions	*Functions*	Functions	Function
3	*Quadratic .Equations*	Functions	*Functions*	Functions	*Functions*	Functions	Function
4	*Quadratic Functions*	Quadratic .Equations	*Quadratic .Equations*	Quadratic .Equations	*Quadratic Functions*	Quadratic .Equations	Quadratic .Equations
5	*Quadratic Functions*	Quadratic Functions	*Quadratic Functions*	Quadratic Functions	*Quadratic Functions*	Quadratic Functions	Quadratic .Equations
6	*Indices & logarithms*	Quadratic Functions	*Quadratic Functions*	Quadratic Functions	*Quadratic Functions*	Quadratic Functions	Quadratic Functions
7	*Indices & logarithms*	Indices & logarithms	*Indices & logarithms*	Indices & logarithms	*Indices & logarithms*	Indices & logarithms	Indices & logarithms
8	*Indices & logarithms*	Indices & logarithms	*Indices & logarithms*	Indices & logarithms	*Indices & logarithms*	Indices & logarithms	Indices & logarithms
9	*Progressions*	Progressions	*Progressions*	Progressions	*Indices & logarithms*	Progressions	Progressions
10	*Progressions*	Progressions	*Progressions*	Progressions	*Progressions*	Progressions	Progressions
11	*Linear Law*	Progressions	*Progressions*	Progressions	*Progressions*	Progressions	Progressions
12	*Coordinate Geometry*	Linear Law	*Linear Law*	Circular Measures	*Linear Law*	Linear Law	Linear Law
13	*Vectors*	Coordinate Geometry	*Coordinate Geometry*	Vectors	*Coordinate Geometry*	Coordinate Geometry	Coordinate Geometry
14	*Vectors*	Coordinate Geometry	*Coordinate Geometry*	Vectors	*Coordinate Geometry*	Trigonometric Functions	Coordinate Geometry
15	*Trigonometric Functions*	Vectors	*Vectors*	Coordinate Geometry	*Vectors*	Trigonometric Functions	Vectors
16	*Circular Measures*	Vectors	*Vectors*	Trigonometric Functions	*Vectors*	Vectors	Vectors
17	*Differentiation*	Trigonometric Functions	*Trigonometric Functions*	Trigonometric Functions	*Circular Measures*	Vectors	Trigonometric Functions
18	*Differentiation*	Circular Measures	*Circular Measures*	Differentiation	*Trigonometric Functions*	Circular Measures	Circular Measures
19	*Differentiation*	Differentiation	*Differentiation*	Differentiation	*Integration*	Integration	Differentiation
20	*Integration*	Differentiation	*Differentiation*	Differentiation	*Differentiation*	Differentiation	Differentiation
21	*Integration*	Integration	*Integration*	Integration	*Differentiation*	Integration	Integration
22	*Permutation & Combination*	Statistics	*Statistics*	Permutation & Combination	*Statistics*	Statistics	Statistics
23	*Probability*	Permutation & Combination	*Permutation & Combination*	Probability Distributions	*Permutation & Combination*	Permutation & Combination	Permutation & Combination
24	*Statistics*	Probability	*Probability*	Statistics	*Probability*	Probability	Probability
25	*Probability Distributions*	Probability Distributions	*Probability Distributions*	Probability Distributions	*Probability Distributions*	Probability Distributions	Probability Distributions

PAPER 2

Question	2006	2007	2008	2009	2010	2011	2012
	SECTION A						
1	Simultaneous Equations	Simultaneous Equations	Simultaneous Equations	Simultaneous Equations	Simultaneous Equations	Simultaneous Equations	Simultaneous Equations
2	Functions	Coordinate Geometry	Quadratic Functions	Quadratic Equations & Functions	Trigonometric Functions	Indices & logarithms	Quadratic Equations &
3	Progressions	Trigonometric Functions	Progressions	Differentiation & Integration	Progressions	Progressions	Differentiation & Integration
4	Trigonometric Functions	Differentiation & Integration	Trigonometric Functions	Trigonometric Functions	Integration	Statistics	Statistics
5	Vectors	Statistics	Statistics	Vectors	Coordinate Geometry	Coordinate Geometry	Vector
6	Statistics	Progressions	Vectors	Progressions	Statistics	Trigonometric Functions	Trigonometric Functions
	SECTION B						
7	Linear Law	Linear Law	Integration	Integration	Integration	Linear Law	Linear Law
8	Integration	Vectors	Linear Law	Linear Law	Linear Law	Integration	Differentiation
9	Coordinate Geometry	Circular Measures	Circular Measures	Coordinate Geometry	Vectors	Circular Measures	Circular Measures
10	Circular Measures	Integration	Coordinate Geometry	Circular Measures	Probability Distributions	Vectors	Coordinate Geometry
11	Probability Distributions	Probability Distributions	Probability Distributions	Probability Distributions	Circular Measures	Probability Distributions	Probability Distributions
	SECTION C						
12	Motion Along a Straight Line	Motion Along a Straight Line	Motion Along a Straight Line	Solution of Triangles	Motion Along a Straight Line	Motion Along a Straight Line	Motion Along a Straight Line
13	Solution of Triangles	Index Number	Index Number	Index Number	Solution of Triangles	Index Number	Index Number
14	Linear Programming	Linear Programming	Solution of Triangles	Linear Programming	Linear Programming	Solution of Triangles	Solution of Triangles
15	Index Number	Solution of Triangles	Linear Programming	Motion Along a Straight Line	Index Number	Linear Programming	Linear Programming

SENARAI SEMAK MENJELANG PEPERIKSAAN SPM

Paper 1

Topic	Subtopic	Concept	Check
FUNCTIONS	Relation	Arrow diagram, ordered pairs, graph - Object, image, domain, codomain , range, type of range,	
	Inverse	Comparison	
	Composite function	Comparison , find the function given the composite function	
QUADRATIC EQUATIONS	Root of Quadratic Equation	Find the root using formula	
	Equation of Quadratic Equation	Form quadratic equation (i) given roots (ii) α *and* β	
	Type of Roots	$b^2-4ac<0$, $b^2-4ac=0$, $b^2-4ac>0$,	
QUADRATIC FUNCTION	Completing the square	Graph , maximum / minimum values/point , axis of symmetry Analysis of the graph (comparison with the CT^2)	
	Inequalities	Find the range o	
INDICES & LOGARITHMS	Indices	Solve the equations involving indices : same base, using log, factorisation	
	Logarithm	Solve the equation involving log : same base , different base	
		"express – express" - laws of log	
PROGRESSIONS	AP	n^{th}-term , sum of the terms	
	GP	n^{th}-term, sum of terms, sum of infinity, decimal to fraction	
COORDINATES GEOMETRY		Distance , midpoint, division m:n, area, parallel, perpendicular, equation of straight line, locus	
LINEAR LAW		Comparison linear equation with the graph (log/non log)	
VECTOR	Resultant of Vectors	Collinear, parallel	
	Vectors in Cartesian Plane	State vectors in i and j , column vectors, parallel, collinear, unit vector	
DIFFERENTIATION	Differentiate	Direct/expand, uv , u/v , find the value of the diff , rate , small change, minimum/maximum	
INTEGRATION		How to integrate, properties of integration, area, volume	
CIRCULAR MEASURE		Find the angle (SOH CAH TOA) , arc length (perimeter), area , area of segment	
TRIGO		Equation , ratio (triangle)	
STAT		Mean, mod, median (formula) , Q_1 , Q_3 , IR , variance, standard deviation , effect of +/- or $\times/\div$	
PERMUTATIONS & COMBINATIONS		Permutations and Combinations	
PROBABILITY		Simple Probability	
PROBABILITY DISTRIBUTIONS		Binomial : find the probability , $\mu=np$, $\sigma^2=npq$ Normal : find the probability , standard score , $z=\frac{X-\mu}{\sigma}$. find variable if the probability given.	

Paper 2

Topic	Subtopic	Concept	Check
SECTION A			
SIMULTANEOUS EQUATION		Factorisation / using the formula	
QUADRATIC EQUATION / FUNCTION		CT^2 : express to the form of $a(x+b)^2 + c$; maximum/ minimum value/points , axis of symmetry , sketch the graph, the new equation when reflected x-axis/y-axis	
PROGRESSIONS	AP , GP	n-term, sum of the terms, sum to the infinity	
STATISTICS		- Mean, variance, standard deviation using formula, - Median (Formula) , Q_1 and Q_3 (using formula) , IR (using formula) - Histogram (find the mod)	
TRIGONOMETRI FUNCTION		- prove - graph sine/cosine/tangent ; equation of straight line , no of solution(s)	
DIFFERENTATION		Gradient function , turning point, equation of tangent/normal , equation of the curve by integration	
SECTION B			
LINEAR LAW		with log / without log	
INTEGRATION		Area and volume by integration	
COORDINAT GEOMETRY		Equation of straight line , parallel, perpendicular, area, midpoint, division m:n, equation of locus	
CIRCULAR MEASURE		Angle in radians (SOH CAH TOA or SOT) , arc length , perimeter and area	
VECTOR		parallel, collinear , resultant of the vectors , find the variables	
PROBABILITY DISTRIBUTIONS		Binomial and Normal	
SECTION C			
INDEX NUMBER		Index, composite index , find the price using the index , "three years case"	
SOLUTION OF TRIANGLE		sine rule, cosine rule, area , ambiguous case	
LINEAR PROGRAMMING		Inequalities, graph, maximum/minimum	

INGAT ADD , INGAT A+

Answer **all** *questions.*

1. Diagram 1 shows the relation between set *X* and set *Y* in the arrow diagram form.
Rajah 1 menunjukkan hubungan antara set X dan Set Y dalam bentuk gambarajah anak panah

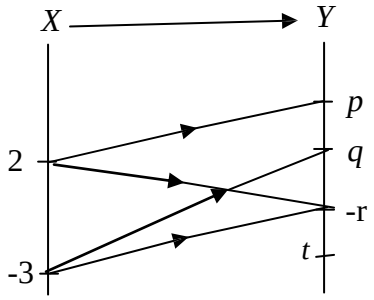


DIAGRAM 1
Rajah 1

State /*Nyatakan*

(a) the relation in form of ordered pairs,
hubungan itu dalam bentuk pasangan tertip

(b) the type of the relation ,
jenis hubungan itu

(c) the range of the relation.
Julat hubungan itu

Answer

---

2. Given the functions $g^{-1}: x \to x+2$ and $f: x \to (3-x)^2 + 4x+1$ Find
Diberi fungsi $g^{-1}: x \to x+2$ *dan* $f: x \to (3-x)^2 + 4x+1$ *Cari*

(a) *g*(x)

(b) *fg*(x)

Answer

3. Given the functions $g : x \to 1-2x$ and $f : x \to kx^2 + m$, where k and m are constants. If the composite function $fg(x)$ is given by $fg : x \to x^2 - x + 5$, find the value of k and of m.

Diberi fungsi $g : x \to 1-2x$ *and* $f : x \to kx^2 + m$, *dimana* k *and* m *ialah pemalar. Jika fungsi gubahan fg(x) diberi sebagai* $fg : x \to x^2 - x + 5$, *cari nilai* k *dan nilai* m.

Answer

---

4. Diagram 4 shows the graph of function $f(x) = a\,(x - b)(x + c)$
Rajah 4 menunjukkan graf fungsi kuadratik $f(x) = f(x) = a\,(x - b)(x + c)$

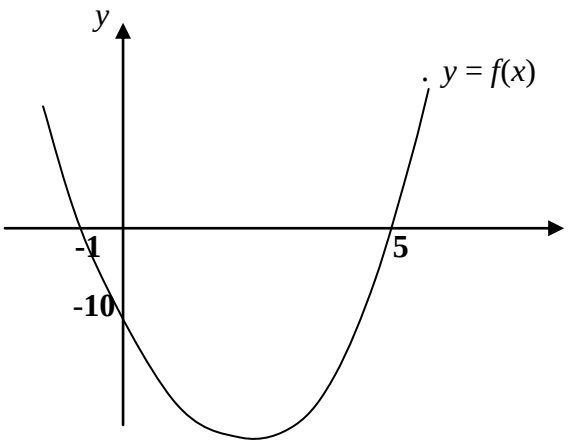


Diagram 4/ Rajah 4

State /*Nyatakan*

(a) the value of a, b and c
nilai a,b dan c

(b) the equation of the axis of symmetry of the curve
persamaan paksi simetri bagi lengkung itu.

Answer

5. The straight line $y = 2x - 4p^2$ is the tangent to the curve $y = x^2 - 4px + 9$. Find the value of p.
Garis lurus $y = 2x - 4p^2$ *ialah tangen kepada lengkung* $y = x^2 - 4px + 9$. *Cari nilai p*
Answer

---

6. The quadratic function $f(x) = -3x^2 + 4x - 5$ can be expressed in form of $f(x) = -3(x - b)^2 + c$ where, b and c are a constant.
Fungsi kuadratik $f(x) = -3x^2 + 4x - 5$ *boleh diungkapkan dalam bentuk* $f(x) = a(x - b)^2 + c$ *dimana b dan c ialah pemalar.*

(a) Find the value of b and c
nilai b dan nilai c

(b) Sketch the graph of the function $f(x)$
Lakar graf fungsi f(x) itu .

Answer

---

7. Solve the equation $4^{3x}.27^{2x} = 12$.
Selesaikan persamaan $4^{3x}.27^{2x} = 12$
Answer

8. Express the equation $\log_4 y - \log_{16} \sqrt{x} = 3$ in the form $y = ax^b$, where a and b are constants.

Ungkapkan persamaan $\log_4 y - \log_{16} \sqrt{x} = 3$ *dalam bentuk* $y = ax^b$, *dimana* a *and* b *ialah pemalar.*

Answer

---

9. The sum of the first n terms of an arithmetic progression, Sn, is given by $S_n = 5n^3 - 3n$.

Hasil tambah n sebutan pertama bagi suatu janjang arithmatik diberi oleh $S_n = 5n^3 - 3n$.

Find

Cari

(a) The sum of the first 6 terms
Hasil tambah enam sebutan pertama

(b) Find the 6^{th} term of the progression.
Sebutam ke 6

Answer

---

10. In a Geometric Progression, all terms are positive. Given that the sum of the first two terms is 5 and the sum to infinity is 9.
Calculate the values of the common ratio and the first term.
Didalam suatu Janjang Geometri , semua sebutan adalah positif. Diberi bahawa jumlah dua sebutan pertama ialah 5 dan hasil tambah ketakterhinggan ialah 9
Kira nisbah sepunya dan sebutan pertama.

Answer

---

11. The sum of the first two terms in a a geometric progression is 30 and the third term exceeds the first term by 15. Find the common ratio and the first term of the geometric progression.

Hasil tambah dua sebutan pertama suatu janjang geometri ialah 30 dan sebutan ketiga melebihi sebutan pertama sebanyak 15. Cari nisbah sepunya dan sebutan pertama janjang geometri tersebut.

Answer:

12. Diagram 12 shows the graph of $\log_3 y$ against $\log_3 x$
Rajah 12 menunjukkan graf $\log_3 y$ against $\log_3 x$

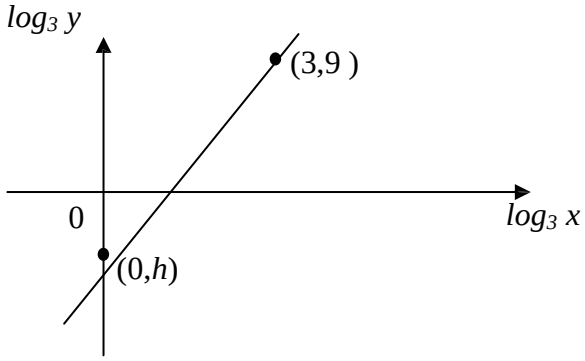


DIAGRAM 12
Rajah 12

The variables x and y are related by the equation $y = kx^4$, where k is a constant.
Find the value of h and of k.
Pembolehubah x *dan* y *dihubungkan oleh persamaan* $y = kx^4$, *dimana* k *ialah pemalar cari nilai* h *dan nilai* k

Answer:

---

13. Diagram 13 shows a straight line PQ, $y = 3x + 2$ intersects the line $x = m$ at point P and y-axis at point Q. Point A is a mid point of PR
Rajah 13 menunjukkan garis lurus PQ, $y = 3x + 2$, *memotong garis* $x = m$ *pada titik* P *dan paksi-y pada titik* Q. Titik A ialah titik tengah PR

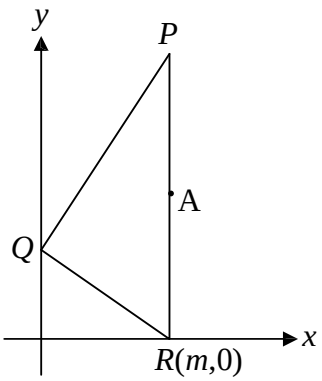


DIAGRAM 13
Rajah 13

If $\angle PQR = 90^0$, find the value of m and the coordinates of P.
Jika $\angle PQR = 90^0$, *cari nilai m dan koordinat titik P.*

Answer :

14. Given point *M* is (1,-3) and point *N* is (6,5). Point *P* moves along the circumference of the circle with diameter *MN*. Find the locus of point *P*
Diberi titik *M* (1,-3) and point *N* is (6,5).Titik P bergerak disepanjang lilitan bulatan dengan diameter *MN*. Cari lokus titik *P*

Answer

---

15 Diagram 15 shows a triangle *OAB*, where *O* is the origin.
Rajah 15 menunjukkan sebuah setiga OAB, dimana O ialah asalan.

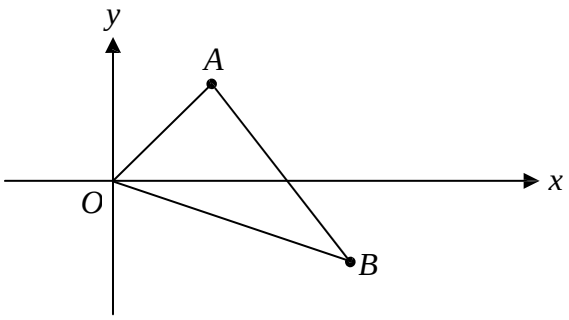


DIAGRAM 15
Rajah 15

It is given that the coordinates of point *A* (3 , 4) and point *B* (5 , -2).
Diberi bahawa koordinat - kordinat titik A (3, 4) dan titik B (5, - 2)

Find
Cari

(a) $\overrightarrow{AB}$,

(b) the unit vectors in the direction of $\overrightarrow{AB}$.
vektor unit dalam arah $\overrightarrow{AB}$.

Answer:

16. The vector $\underset{\sim}{a}$ and $\underset{\sim}{b}$ are non- zero vector and non-parallel. It is given that $(m-2)\underset{\sim}{a}=(2n+3)\underset{\sim}{b}$, where m and n are constants,

Vektor $\underset{\sim}{a}$ *dan* $\underset{\sim}{b}$ *adalah bukan sifar dan tidak selari. Diberi bahawa* $(m-2)\underset{\sim}{a}=(2n+3)\underset{\sim}{b}$,

dengan kaedaan m *dan* n *ialah pemalar,*

Find the value of m and of n.

Cari nilai m dan n

Answer:

---

17. Diagram 17 shows the sector POQ of a circle centre O and radius 10 cm.

Rajah 17 menunjukkan sektor POQ dengan pusat O dan jejari 10 cm.

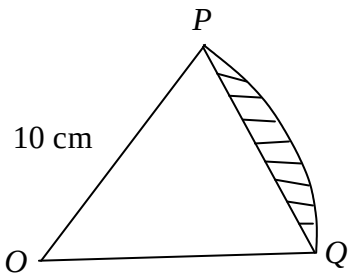


DIAGRAM 17
Rajah 17

It is given that the length of the chord PQ is 12 cm. Find the area, in cm^2, of the shaded segment.

Diberi bahawa panjang perentas PQ ialah 12 cm. Cari luas dalam cm^2 *segmen yang berlorek.*

Answer

---

18. Solve the equation $5\sin\theta+3\cos\theta=0$ for $0^0 \le x \le 360^0$. [3 *marks*]

Selesaikan persamaan $5\sin\theta+3\cos\theta=0$ *untuk* $0^0 \le x \le 360^0$ [3 markah]

Answer:

19. Given that , $y = \frac{2}{3}t^8$ and $t = 4x - 5$. Find $\frac{dy}{dx}$ in term of x

Diberi bahawa $y = \frac{2}{3}t^8$ *dan* $t = 4x - 5$. *Cari* $\frac{dy}{dx}$ *dalam sebutan x.*

Answer

---

20. Find the coordinates of the turning points of the curve $y = 12 - x^3 - \frac{48}{x}$.

Cari koordinat titik pusingan pada lengkung $y = 12 - x^3 - \frac{48}{x}$

Answer :

---

21. Given that $\frac{d}{dx}\left(\frac{x^2-1}{3x+1}\right) = 3f(x)$, find the value of $\int_0^3 f(x)dx$.

Diberi bahawa $\frac{d}{dx}\left(\frac{x^2-1}{3x+1}\right) = 3f(x)$, *cari nilai bagi* $\int_0^3 f(x)dx$.

Answer:

---

22. Diagram 22 shows nine letter cards to be arranged in a row.
Rajah 22 menunjukkan sembilan kad huruf yang disusun dalam satu baris.

E	Q	U	A	T	I	O	N	S

DIAGRAM 22
Rajah 22

Calculate the number of different arrangements of all the letter cards if
Hitung bilangan susunan berlainan kesemua kad, jika

(a) the arrangement start with consonants,
susunan bermula dengan huruf consonants

(b) all the vowels must at the centre.
semua huruf vokal mesti terletak di tengah-tengah.

Answer:

23. A quiz team consists of 6 students. These students are to be chosen from 20 students.
Satu pasukan kuiz terdiri dari 6 orang pelajar. Pelajar tersebut akan dipilih daripada 20 orang pelajar.
Calculate the number of different ways the team can be formed if
Hitung bilangan cara yang berlainan pasukan itu boleh dibentuk jika
(a) there is no restriction,
tiada sebarang syarat.
(b) 2 particular students must be chosen.
2 orang pelajar tertentu mesti dipilih.

Answer :

---

24. A bag contains 8 cards where 3 of the cards are yellow. Three cards are drawn at random from the bag, one after the other without replacement. Calculate the probability that at least two yellow cards are drawn.
Sebuah bag mengandungi 8 kad dimana 3 daripadanya berwarna kuning. Tiga kad ini di ambil secara random satu demi satu tanpa pengembalian. Kira kebarangkalian bahawa sekurang-kurangnya dua kad berwarna kuning dipilih.

Answer :

25. The diameters of the marbles produced by a factory are normally distributed with a mean of 9 mm and a standard deviation of 0.1 mm. Diagram 25 shows the normal distribution graph for the diameter of the marbles, X mm.
Diameter sebiji guli yang dihasilkan oleh sebuah kilang tertabur secara normal dengan min 9 mm dan sisihan piawai 0.1 mm. Rajah 25 menunjukkan graf taburan normal bagi diameter guli , X mm.

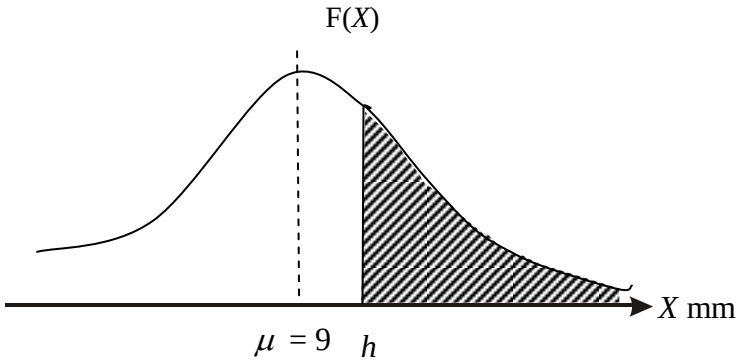


DIAGRAM 25
Rajah 25

It is given that the area of the shaded region is 0.4522. Find the value of h.
Diberi bahawa luas kawasan berlorek ialah 0.4522. Cari nilai h

END OF QUESTION PAPER

SET 2 PAPER 1

http://cikguadura.wordpress.com/

Answer all questions

Jawab semua soalan

1. It is given that the relation between set $X = \{1, 2, 4, 5\}$ and set $Y = \{0.2, 0.25, 0.5, 1, 2\}$ is 'reciprocal of'.

   Diberi bahawa hubungan antara set $X = \{1, 2, 4, 5\}$ *dan set* $Y = \{0.2, 0.25, 0.5, 1, 2\}$ *ialah 'salingan bagi'.*

   (a) Find the object of 0.2.
   Cari objek bagi 0.2.

   (b) State the range of these relations.
   Nyatakan julat bagi hubungan ini.

   Answer/*Jawapan*:

   (a)

   (b)

---

2. It is given that the functions $f(x) = 4 - 3x$ and $g(x) = \frac{2x-7}{4+x}, x \neq p$.

   Diberi bahawa fungsi $f(x) = 4 - 3x$ dan $g(x) = \frac{2x-7}{4+x}, x \neq p$.

   Find the value
   Cari nilai

   (a) p ,

   (b) $g^{-1}f(2)$

Answer/*Jawapan* :

(a)

(b)

3. The inverse function g^{-1} is defined by $g^{-1}(x) = \frac{3}{2-x}$, $x \neq 2$

Fungsi songsang g^{-1} *ditakrifkan* $g^{-1}(x) = \frac{3}{2-x}$, $x \neq 2$

Find / *Cari*

(a) $g(x)$.

(b) the value of x such that $g(x) = -4$.
nilai x dengan keadaan $g(x) = -4$.

Answer/*Jawapan*:

(a)

(b)

---

4. The quadratic equation $2mx^2 + 3mx + m = 1 - x^2$ has two equal roots.
Find the value of m.

Persamaan kuadratik $2mx^2 + 3mx + m = 1 - x^2$ *mempunyai dua punca sama.*
Cari nilai m.

Answer/*Jawapan*:

5. Diagram shows the graph of the quadratic function $f(x) = 2a - 7 - (x - a)^2$, where a is a constant.
Rajah menunjukkan graf fungsi kuadratik $f(x) = 2a - 7 - (x - a)^2$, *dengan keadaan a ialah pemalar.*

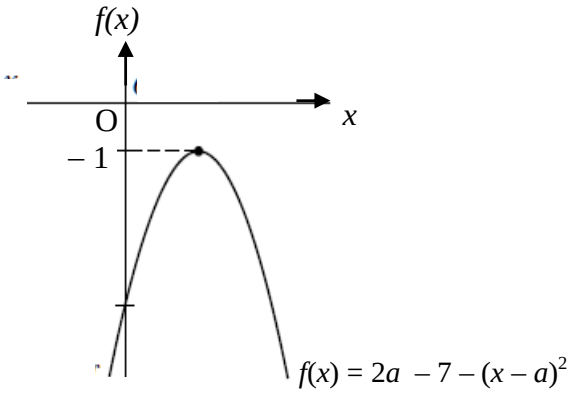


Diagram 5 / *Rajah 5*

(a) Given that the maximum value of the function is – 1, find the value of a.
Diberi nilai maksimum bagi fungsi itu ialah – 1, *cari nilai a.*

(b) State the equation of the axis of symmetry of the curve.
Nyatakan persamaan paksi simetri bagi lengkung itu.

Answer/*Jawapan*:

(a)

(b)

---

6. Find the range of values of x for $2x - 3 \geq 6 + \frac{5}{x}$.

Cari julat nilai x bagi $2x - 3 \geq 6 + \frac{5}{x}$.

Answer/*Jawapan*:

7. Solve the equation $\frac{7^{3x}}{2^x} = 3^{2x+3}$

Selesaikan persamaan $\frac{7^{3x}}{2^x} = 3^{2x+3}$

Answer/*Jawapan*:

---

8. Given that $\log_3 x = p$ and $y = 3^q$, express $\log_3 \frac{x^2}{3y}$ in terms of *h* and *k*.

Diberi $\log_3 x = p$ *dan* $y = 3^q$, *ungkapkan* $\log_3 \frac{x^2}{3y}$ *dalam sebutan h dan k*.

Answer/*Jawapan*:

---

9. It is given that 46, 41, ……..*z*, 6, …, is an arithmetic progression.
Diberi bahawa 46, 41, ……..*z*, 6, …, *ialah satu janjang aritmetik.*

(a) State the value of *z*.
Nyatakan nilai z.

(b) Write the three consecutive terms before z.
Tulis tiga sebutan berturutan sebelum z.

Answer/*Jawapan*:

10. A piece of string of length 12 m is cut into n peaces in such way that the lengths of the pieces are in arithmetic progression. Given the lengths of the longest and the shortest pieces are 1 m and 0.2 m respectively.
Seutas tali panjangnya 12 m dipotong kepada n bahagian sedemikian hingga panjang keratan tali adalah suatu janjang artitmetik. Diberi bahagian terpanjang dan bahagian terpendek masing-masing adalah 1 m dan 0.2 m.

Find the value of n.
Cari nilai n.

Answer/*Jawapan*:

---

11. Given that y, 9, z are the first three terms of a geometric progression and it sum of these three terms is 39. If the common ratio is less than 1, calculate the values of y and of z.

Diberi bahawa y, 9, z ialah tiga sebutan pertama suatu janjang geometri dan hasiltambah tiga sebutan tersebut ialah 39. Jika nisbah sepunya kurang daripada 1, hitungkan nilai y dan nilai z.

Answer/*Jawapan*:

12. The variables *x* and *y* are related by the equation xy - pqx = q, where *p* and *q* is a constant. Diagram 12 shows the straight line by plotting *y* against $\frac{1}{x}$.

Pembolehubah x dan y dihubungkan oleh persamaan xy - pqx = q, dengan keadaan p dan q ialah pemalar. Rajah 12 menunjukkan garis lurus dengan memplot y melawan $\frac{1}{x}$.

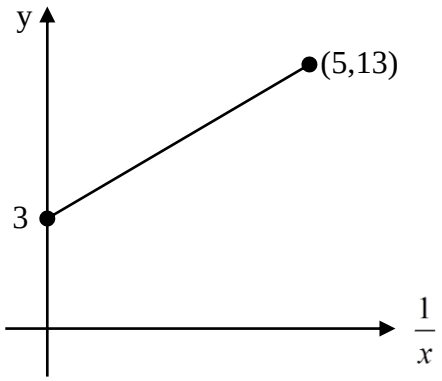


Diagram /*Rajah 12*

(a) Find the values of p and q.
Carikan nilai p dan nilai q.

(b) If the straight line is obtained by plotting x*y* against x, state the gradient of this line.
Jika satu garis lurus diperoleh dengan memplot xy melawan x, nyatakan kecerunan garis ini

Answer/*Jawapan*:

13. A straight line 3x – ay = 6 cuts the *x*-axis at *Q* and *y*-axis at *R*(0,- 3).
Garis lurus 3x – ay = 6 memotong paksi-x di Q dan paksi-y di R(0,-3).
Find / *Cari*

(a) the value of a and point Q.
nilai a dan titik Q.

(b) the equation of the perpendicular bisector of the straight line QR.
persamaan pembahagi dua sama garis lurus QR.

Answer/*Jawapan*:

---

14. Solve the equation 4sin θ cos $\theta = 1$ for $0° \leq \theta \leq 180°$.
*Selesaikan persamaan 4*sin θ kos $\theta = 1$ *untuk* $0° \leq \theta \leq 180°$.

Answer/*Jawapan*:

15. It is given that cos $A = \frac{4}{5}$ and cos $B = \frac{12}{13}$, where A is an acute angle and B is a reflex angle. Without using the calculator, find

Diberi bahawa cos $A = \frac{4}{5}$ dan cos $B = \frac{12}{13}$, dengan keadaan A ialah sudut tirus dan B ialah sudut refleks. Tanpa menggunakan kalkulator, carikan

(a) cosec A.
kosek A.

(b) cos $(A - B)$.

Answer/*Jawapan*:

---

16. Diagram 16 shows a triangle *OAB* drawn on a Cartesian plane.
Rajah 16 menunjukkan sebuah segi tiga OAB dilukis pada suatu satah Cartesan.

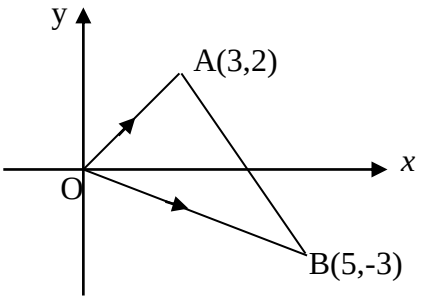


Diagram / *Rajah 16*

It is given that A(3,2) , B(5, - 3), C(p,q) and $\overrightarrow{OA} = \overrightarrow{OC} + \overrightarrow{BO}$.

Diberi bahawa A(3,2) , B(5, - 3), C(p,q) dan $\overrightarrow{OA} = \overrightarrow{OC} + \overrightarrow{BO}$.

Find the value of p and of q
Cari nilai p dan nilai q.

Answer/*Jawapan*:

17. It is given that vector $\overrightarrow{OA} = \begin{pmatrix} 2 \\ 10 \end{pmatrix}$, vector $\overrightarrow{OB} = \begin{pmatrix} k \\ 14 \end{pmatrix}$ and $\underline{c} = \overrightarrow{OA} + \overrightarrow{OB}$ where k is a constant.

Diberi bahawa vektor $\overrightarrow{OA} = \begin{pmatrix} 2 \\ 10 \end{pmatrix}$ *dan vektor* $\overrightarrow{OB} = \begin{pmatrix} k \\ 14 \end{pmatrix}$, *dengan keadaan k ialah pemalar*.

(a) Express the vector $\underline{c}$ in terms of k.

Ungkapkan vektor $\underline{c}$ *dalam sebutan k.*

(b) Given that $|\underline{c}| = 25$ units, find the positive value of k.

Diberi $|\underline{c}| = 25$ *unit, cari nilai positif k.*

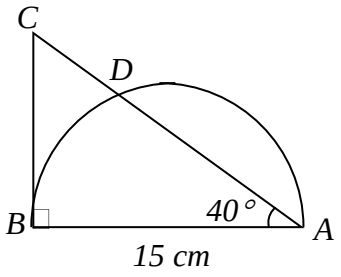
Answer/*Jawapan* :

(a)

(b)

---

18. Diagram 18 shows a right angled triangle *ABC* and a semicircle with AB as its diameter.
Rajah 18 menunjukkan sebuah segitiga bersudut tegak ABC dan sebuah semibulatan dengan garis AB ialah diameternya. Diberi AB = 15 cm, cari panjang lengkok AD.



Diagram/ *Rajah 18*

Given that *AB* = 15 cm, find the length of the arc *AD.*
Diberi AB = 15 cm, cari panjang lengkok AD..
(Use/*Guna* $\pi = 3.142$)

Answer/*Jawapan*:

19. Given $y = \frac{x^2}{2-x}$, find $\frac{dy}{dx}$. Hence find the value of $\int_0^1 \frac{2x(4-x)}{(2-x)^2}\,dx$.

Diberi $y = \frac{x^2}{2-x}$ *, carikan* $\frac{dy}{dx}$. *Seterusnya cari nilai bagi* $\int_0^1 \frac{2x(4-x)}{(2-x)^2}\,dx$.

Answer/*Jawapan*:

---

20. It is given that $y = 5x + \frac{4}{x}$. Find the approximate value in *y*, in terms of *m*, when the value of *x* changes from 2 to 2 + *m*.

Diberi bahawa $y = 5x + \frac{4}{x}$. *Cari nilai hampirbagi y, dalam sebutan m, apabila nilai y berubah daripada* 2 *kepada* 2 + *m.*

Answer/*Jawapan*:

21. Given $\int_{-2}^{k} (1-x)\,dx = 0$, find the value of *k*.

Diberi $\int_{-2}^{k} (1-x)\,dx = 0$, *cari nilai k.*

Answer/*Jawapan*:

---

22 A set of twelve numbers x_1 , x_2 , x_3,..... x_{12} has a variance of 54 and it is given that $\sum x^2 = 3000$.

Suatu set dua belas nombor-nombor x_1 , x_2 , x_3,..... x_{12} *mempunyai varians of 54 dan diberi bahawa* $\sum x^2 = 3000$.

Find
Cari

(a) the value of $\bar{x}$ and $\sum x$,
nilai $\bar{x}$ *dan* $\sum x$,

(b) the new variance for $\frac{2x_1+3}{5}$, $\frac{2x_2+3}{5}$, $\frac{2x_3+3}{5}$,..... $\frac{2x_{12}+3}{5}$.
varians baru untuk $\frac{2x_1+3}{5}$, $\frac{2x_2+3}{5}$, $\frac{2x_3+3}{5}$,..... $\frac{2x_{12}+3}{5}$.

Answer/*Jawapan*:

23. Diagram shows six letter cards.
Rajah menunjukkan enam keping kad huruf.

C	**E**	**R**	**D**	**A**	**S**

Diagram / *Rajah 23*

A six-letter code is to be formed using all of these cards.
Suatu kod enam huruf hendak dibentuk dengan menggunakan semua kad-kad itu.

Find / *Cari*

(a) the number of different six-letter codes that can formed.
bilangan kod enam huruf yang berlainan yang dapat dibentuk.
(b) the number of different six-letter codes which a vowel is saparated.
bilangan kod enam huruf yang berlainan dengan huruf vokal adalah terpisah.

Answer/*Jawapan*:

(a)

(b)

---

24. Given that the probability of Neymar passing Bahasa Melayu, Chemistry and Mathemathics tests are $\frac{1}{5}$, $\frac{1}{2}$ and $\frac{1}{3}$.
Diberi bahawa kebarangkalian Neymar lulus ujian Bahasa Melayu, Kimia dan Matematik adalah $\frac{1}{5}$, $\frac{1}{2}$ *and* $\frac{1}{3}$.

Calculate the probability the probability that
Hitung kebarangkalian bahawa

(a) he passes only two subjects
dia lulus hanya dua mata pelajaran

(b) he passes at least one subject
dia lulus sekurang-kurangnya satu mata pelajaran

Answer/*Jawapan*:

(a)

(b)

25. Diagram 25 shows the graph of a binomial distribution of X.
Rajah 25 menunjukkan graf suatu taburan binomial bagi X.

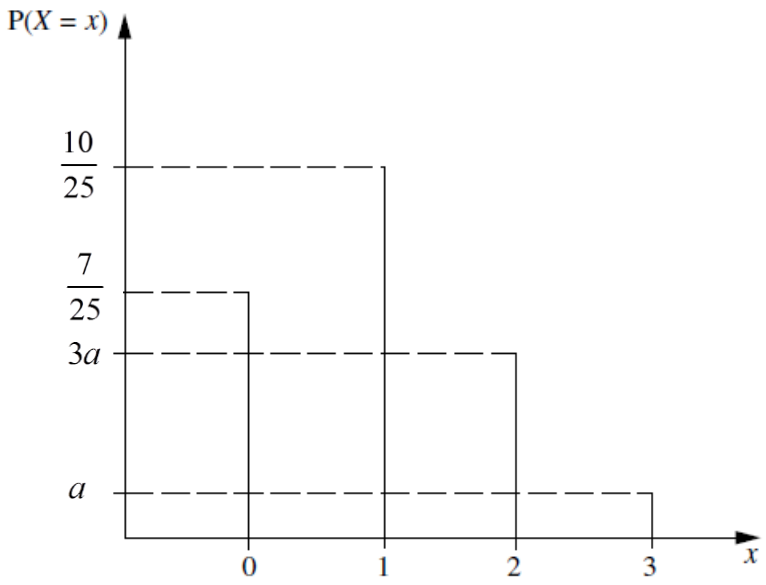


Diagram / *Rajah 25*

Find / *Cari*

(a) $P(X \geq 2)$.

(b) the value of a.
nilai a.

Answer/*Jawapan*:

(a)

(b)

SET 3:Paper 1

http://cikguadura.wordpress.com/

Answer *All* Questions
Jawab **semua** soalan

1

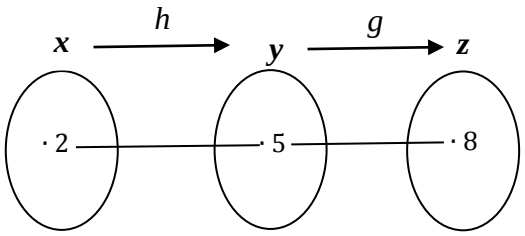


Diagram show function h maps x to y and the function g maps y to z.
Rajah menunjukkan fungsi h memetakan x kepada y dan fungsi g memetakan y kepada z.

Determine
Tentukan

(a) g(5)
(b) $h^{-1}g^{-1}(8)$

Jawapan:
Answer

(a) (b)

---

2 The function *h* is defined by *h*: $x \rightarrow \frac{9}{x-3}$, $x \neq 3$. Express $h^2(x)$ in the form $\frac{ax+b}{c-x}$, state the values of a, b and c.

Fungsi h ditakrifkan oleh h: $x \rightarrow \frac{9}{x-3}$, $x \neq 3$. *Ungkapkan* $h^2(x)$ *dalam bentuk* $\frac{ax+b}{c-x}$,*dengan menyatakan nilai-nilai a, b dan c.*

Answer:
Jawapan:

3. Given the function f : x $\rightarrow |\sqrt[3]{x+4}|$, find the values of x such that f(x) = 5.
Diberi fungsi f : x $\rightarrow |\sqrt[3]{x+4}|$, *cari nilai-nilai x dengan keadaan f(x) = 5.*

Answer:
Jawapan:

---

4 The roots of a quadratic equation $3x^2 + px + p + 2 = 0$ are α and β. If $\alpha^2 + \beta^2 = \frac{5}{3}$. Find the posivite value of p.
Punca-punca persamaan kuadratik $3x^2 + px + p + 2 = 0$ *ialah* α *dan* β. *Jika* $\alpha^2 + \beta^2 = \frac{5}{3}$. *Cari nilai positif p.*

Answer:
Jawapan:

---

5 Form the quadratic equation has the roots $5m$ and $\frac{1}{m}$ in term of *m.*
Bentukkan persamaan kuadratik yang mempunyai punca-punca $5m$ *dan* $\frac{1}{m}$ *, dalam sebutan m.*

Answer:
Jawapan:

6 Write $x^2 + 4kx + 72$ in the form $(x - m)^2 - n$ and hence obtain the expression for m and n in terms of k.
Tulis $x^2 + 4kx + 72$ dalam bentuk $(x - m)^2 - n$ dan seterusnya dapatkan ungkapan bagi m dan n dalam sebutan k.

Answer:
Jawapan:

---

7 Given that $5^{n+1} + 5^{n-1} - 5^n = h(5^n)$,
Diberi $5^{n+1} + 5^{n-1} - 5^n = h(5^n)$,

Find the value of h,
Cari nilai bagi h,

Answer:
Jawapan:

---

8 Solve the equation $\log_3 x = 6 - 3 \log_x 27$
Selesaikan persamaan $\log_3 x = 6 - 3 \log_x 27$
Answer:
Jawapan:

9 The fifth term of an arithmetic progression is 6 and the sum of the first five term is 0. Find
Sebutan kelima bagi suatu janjang arimetik ialah 6 dan hasil tambah bagi lima sebutan yang pertama ialah 0. Cari

(a) The first term and the common difference of the progression,
Sebutan pertama dan beza sepunya bagi janjang tersebut,

(b) The sum of the first 12 terms,
Hasil tambah bagi 12 sebutan pertama,

Answer:
Jawapan:

---

10 A geometric progression has a common ratio of $\frac{1}{4}$ and a sum to infinity of 192, find the value of *n* if the n^{th} term of the progression is $\frac{9}{16}$.
Suatu janjang geometri mempunyai nisbah sepunya $\frac{1}{4}$ *dan hasil tambah ketakterhinggaan 192, cari nilai bagi n jika sebutan ke-n bagi janjang tersebut ialah* $\frac{9}{16}$.

---

11 The first three terms of a geometric progression are 54, *m* and 6. Given that the sum to infinity of the progression is *81*, find

Tiga sebutan pertama bagi suatu janjang geometri ialah 54, m dan 6. Diberi jumlah ketakterhinggaan bagi janjang tersebut ialah 81, cari

(a) The common ratio,
Nisbah sepunya,
(b) The value of *m,*
Nilai bagi m,

Answer:
Jawapan:

12 Diagram 2 shows a straight line graph *of* $\frac{y}{x}$ *against* x^2. *Given* $y = -x^3 + 10x$, find the values of p and q.

Rajah 2 menunjukkan graf garis lurus $\frac{y}{x}$ *melawan* x^2. *Diberi* $y = -x^3 + 10x$, *cari nilai p dan nilai q.*

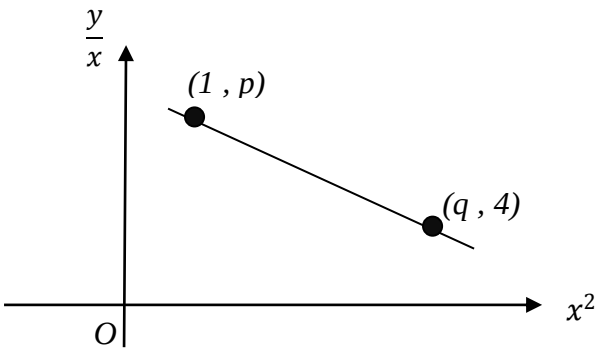


Diagram 2
Rajah 2

Answer:
Jawapan:

---

13 Given $\overrightarrow{OA} = 3a + mb$, $\overrightarrow{OB} = (\sqrt{k} - 1)a - b$ and $\overrightarrow{OC} = 7a + 5b$, where k is a constant. Find the value of *m and k* if the points *O, A, B* and *C* are collinear.

Given $\overrightarrow{OA} = 3a + mb$, $\overrightarrow{OB} = (\sqrt{k} - 1)a - b$ *dan* $\overrightarrow{OC} = 7a + 5b$, *dengan keadaan k ialah pemalar. Cari nilai m dan k jika titik-titik O, A, B dan C adalah segaris*

Answer/*Jawapan*:

14

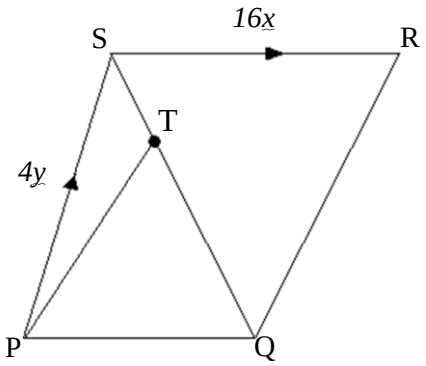


Diagram 3/*Rajah 3*

Diagram 3 shows a quadrilateral *PQRS*. It is given
Rajah 3 menunjukkan sisi empat PQRS. Diberi bahawa

$$SR = \frac{4}{3}\overrightarrow{PQ}, \qquad \overrightarrow{SQ} = 4\overrightarrow{ST}$$

Express the following in terms of x and y :
Ungkapkan yang berikut dalam sebutan x dan y :

(a) $\overrightarrow{SQ}$

(b) $\overrightarrow{PT}$

Answer:
Jawapan:

(a)

(b)

---

15 The coordinates of points *L* and *M* are *(-4 , 5)* and *(6 , -1)* respectively. A point *K moves such that LK* : *KM = 4 : 1.* Find the equation of the locus of point *K*.
Koordinat bagi titik L dan titik M masing-masing ialah (-4 , 5) dan (6 , -1). Satu titik K bergerak dengan LK : KM = 4: 1. Cari persamaan lokus bagi titik K.

Answer:
Jawapan:

16 Solve the equation $1 + \sin 2x = \sin^2 x + 1$ for $0^o \leq x \leq 180^o$.
Selesaikan persamaan $1 + \sin 2x = \sin^2 x + 1$ untuk $0^o \leq x \leq 180^o$.

Answer
Jawapan

---

17 Given that $\cos \theta = -\frac{3}{5}$, where θ is an obtuse angle, find
Diberi kos $\theta = -\frac{3}{5}$, dengan keadaan θ ialah sudut cakah, cari

(a) $\sin 2\theta$
(b) $\tan \frac{\theta}{2}$.

Answer:
Jawapan:

(a) (b)

---

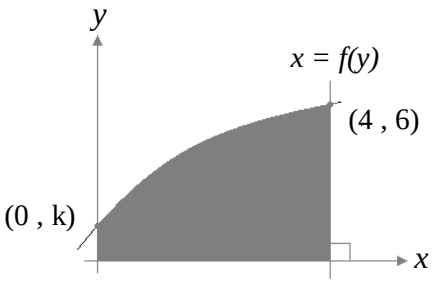
18 Given $\int_k^5 f(x)dx = 4$ and $\int_5^k [f(x) - 3]dx = 5$, find the value of *k*.

Diberi $\int_k^5 f(x)dx = 4$ dan $\int_5^k [f(x) - 3]dx = 5$, cari nilai k.

Answer:
Jawapan:

19 Diagram 4 shows part of a curve *x = f(y)* which passes through the points *(0 , k)* and (*4 ,6).*

Rajah 4 menunjukkan sebahagian daripada lengkung x = f(y) yang melalui titik-titik (0 , k) dan (4,6)



Diagram/Rajah 4

Given the area of the shaded region is 16 unit^2, find the value of $\int_k^6 \frac{3f(y)}{2}\,dy$.

Diberi luas rantau berlorek ialah 16 unit^2, cari nilai $\int_k^6 \frac{3f(y)}{2}\,dy$.

Answer:
Jawapan:

20

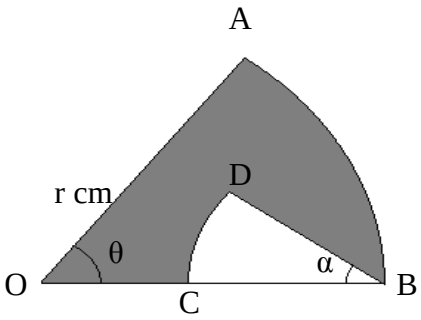


Diagram 5
Rajah 5

Diagram 5 shows a sector *OAB* of a circle with centre *O* and a sector *BDC* of a circle with centre *B*. Given that *2BC* = OA, the area of sector *OAB* is four times the area of sector *BDC* and *OA = r cm*

Rajah 5 menunjukkan satu sektor OAB bagi sebuah bulatan berpusat O dan satu sektor BDC bagi sebuah bulatan berpusat B. Diberi 2BC = OA, luas bagi sektor OAB ialah empat kali ganda luas sektor BDC dan OA = r cm

(a) Express α in terms of θ.
Ungkapkan α dalm sebutan θ.

(b) Find the area of the shaded region in terms of θ and r.
Cari luas bagi rantau berlorek dalam sebutan θ dan r.

Answer:
Jawapan:

21 The gradient of the curve $y = 3(4 - 2x)^3 + p$ at point $(q , -5)$ is 0. Find the value of p and q.
Kecerunan pada titik $y = 3(4 - 2x)^3 + p$ pada titk $(q , -5)$ ialah 0.Cari nilai p dan q.

Answer:
Jawapan:

---

22 Diagram 6 shoes six letter cards.
Rajah 6 menunjukkan enam keping kad huruf.

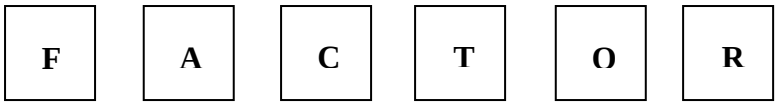


Diagram 6
Rajah 6

A four letter code is to be formed using four of these cards. Find the number of ways
Suatu kad empat huruf hendak dibentuk dengan menggunakan empat daripada kad-kad itu. Cari bilangan cara

(a) the number of different four letter cards thet canformed.
kod empat huruf yang berlainan yang dapat dibentuk.

(b) the number of different four letter cards which begin with vowel and end with a consonant.
kod empat huruf yang berlainan yang bermula dengan huruf vokal dan berakhir dengan huruf konsonan.

Answer:
Jawapan:

23 A set of eight positive numbers has a variance of 12. Given that $\sum x^2 = 488$, find
Satu set yang terdiri daripada lapan nombar positif mempunyai varians 12. Diberi $\sum x^2 = 488$, *cari*

(a) the mean,
min,

(b) the value $\sum x$,
Nilai bagi $\sum x$,

Answer:
Jawapan:

---

24. The probabilities that Amin and Isa are selected to play for team *A* are $\frac{1}{3}$ and $\frac{2}{5}$ respectively. If Amin is selected, the probability that he chosen as captain is $\frac{2}{7}$ whereas if Isa is selected, the probability of him becoming captain is $\frac{4}{9}$. Find the probability that
Kebarangkalian bahawa Amin dan Isa dipilih untuk bermain bagi pasukan A ialah $\frac{1}{3}$ *dan* $\frac{2}{5}$ *masing –masing. Jika Amin dipilih , kebarangkalian bahawa beliau dipilih sebagai ketua ialah* $\frac{2}{7}$ *manakala jika Isa dipilih, kebarangkalian beliau menjadi ketua ialah* $\frac{4}{9}$. *Cari kebarangkalian bahawa*

(a) Both of them are selected to play for team *A*,
Kedua-dua mereka dipilih untuk bermain bagi pasukan A,

(b) None of them becomes captain if both are selected
Tidak seorang pun daripada mereka menjadi ketua jika kedua-dua mereka dipilih.

Answer:
Jawapan:

25 The body mass indices of the form five students of a school are normally distributed with a mean of μ and a variance of 2.25. If the standard score of the body mass index '20' is $-\frac{4}{3}$,

Indeks berat badan murid-murid tingkatan lima sebuah sekolah adalah bertaburan normal dengan min, μ, dan variance 2.25. Jika skor piawai bagi indeks berat badan '20' ialah $-\frac{4}{3}$,

Find/ Cari

(a) the value of μ,
nilai μ,

(b) the probability that a student picked at random will have a body mass index of between 22 and 22.5.
kebarangkalian bahawa seorang murid yang dipilih secara rawak mempunyai indeks berat badan di antara 22 dan 22.5.

Answer:
Jawapan:

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

Section A
Bahagian A

Answer **all** Question .

1. Solve the simultaneous equations:

   Selesaikan persamaan serentak :

   $$\frac{x}{2}-\frac{2}{3}y=2 \quad \text{and / } dan \quad \frac{x}{2y}+\frac{4y}{x}=5$$

   Give your answers correct to four significant figures [5 marks]

   Beri jawapan kamu tepat kepada empat tempat perpuluhan. [5 *markah*]

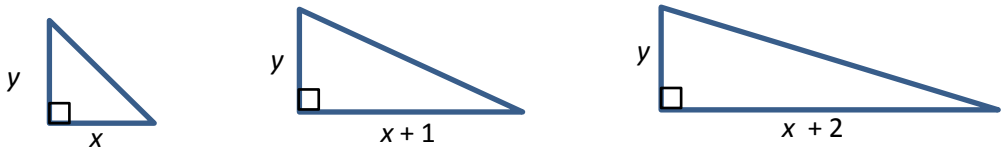
2. (a) Sketch the graph of $y=|2\cos 2x|$ for $0\le x\le \pi$.. [4 marks]

   Lakarkan graf bagi $y=|2\cos 2x|$ *untuk* $0\le x\le \pi$. [4 *markah*]

   (b) Hence, using the same axes, draw a suitable straight line to find the number of solutions for the equation $x|\cos 2x|=\frac{1}{2}$ for $0\le x\le \pi$. State the number of solutions. [4 marks]

   Seterusnya, pada paksi yang sama, lukiskan satu garis lurus yang sesuai untuk mencari bilangan penyelesaian bagi persamaan $x|\cos 2x|=\frac{1}{2}$ *untuk* $0\le x\le \pi$. *Nyatakan bilangan penyelesaiannya.* [4 *markah*]

3. Diagram 3 shows three consecutive triangles with increasing bases but fixed height.
Rajah 3 menunjukkan tiga buah segitiga berturuta yang tapaknya bertambah tetapi tingginya ditetapkan.



   (a) Show that the área of the triangles form an arithmetic progression and state the common difference of the progression. [4 marks]
   Tunjukkan bahawa luas segitiga yang terbentuk merupakan satu janjang aritmetik dan nyatakan beza sepunya janjang itu. [4 *markah*]

   (b) Given that the area of the ninth triangle is 12cm^2 and $x=2y$, calculate the area of the first triangle. [3 marks]
   Diberi luas segitiga yang kesembilan ialah 12cm^2 dan $x=2y$, , *hitung luas segitiga yang pertama.* [3 *markah*]

4. A curve with gradient function $2x-\frac{16}{x^2}$ has a turning point at (*m*, 8).

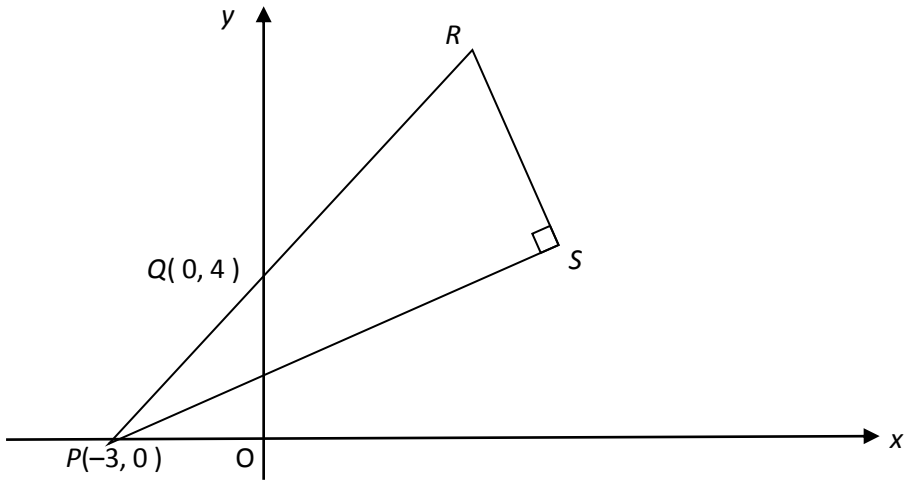
Suatu lengkung dengan fungsi kecerunan $2x-\frac{16}{x^2}$ *dan mempunyai titik pegun pada* (*m*, 8).

(a) Find the value of *m*. [2 marks]
Cari nilai m. . [2 *markah*]

(b) Determine whether the turning point is a maximum or a minimum point. [3 marks]
Tentukan samada titik pegun tersebut titik maksimum atau titik minimum. . [3 *markah*]

(c) Find the equation of the curve. [3 marks]
Cari persamaan lengkung tersebut. . [3 *markah*]

5. In Diagram 5, the straight line *PR* cuts *y*-axis at *Q* such that *PQ : QR* = 2 : 3. The equation of *PS* is $2y = x + 3$.
Dalam rajah 5, garis lurus PR memotong titik Q supaya PQ : QR = 2 : 3. *Persamaan bagi PS ialah* $2y = x + 3$.



(a) Find / Cari
(i) the coordinates of *R*,
koorinat titik R
(ii) the equation of the straight line *RS*,
persamaan garis lurus RS,
(iii) the area ΔPRS.
luas segitiga PRS.

6. Table 6 shows the frequency distribution of the scores of a group of 40 pupils in a quiz.
Jadual 6 *menunjukkan taburan kekerapan bagi skor untuk* 40 *orang pelajar dalam suatu kuiz.*

Score *Skor*	Number of pupils *Bilangan pelajar*
10 – 19	1
20 – 29	2
30 – 39	*h*
40 – 49	12
50 – 59	4
60 – 69	*k*

Table 6
Jadual 6

(a) It is given that the median score of the distribution is 42, find the value of *h* and of *k*.
Diberi skor median bagi taburan itu ialah 42*, carikan nilai h dan nilai k.*

(b) Calculate the variance of the distribution.
Hitungkan nilai varians bagi taburan itu.

Section B
Bahagian B

7. Use graph paper to answer this question.
Gunakan kertas graf untuk menjawab soalan ini.

Table 7 shows the values of two variables, *x* and *y*, obtained from an experiment. Variables *x* and *y* are related by the equation $y = p^2 q^{\sqrt{x}}$, where p and q are constants.

Jadual 7 *menunjukkan nilai-nilai bagi dua pembolehubah, x dan y, yang diperoleh daripada satu eksperimen. Pembolehubah x dan y dihubungkan oleh persamaan* $y = p^2 q^{\sqrt{x}}$, *dengan keadaan p dan q ialah pemalar.*

x	1	4	9	16	25	36
y	1.80	2.70	4.05	6.08	9.11	13.67

Table 7
Jadual 7

(a) Plot $log_{10} y$ against $\sqrt{x}$, using a scale of 2 cm to 1 unit on the $\sqrt{x}$ - axis and 2 cm to 0.1 unit on the $log_{10} y$ - axis . Hence, draw the line of best fit. [5 marks]

Plot $log_{10} y$ *melawan* $\sqrt{x}$ *, dengan menggunakan skala* 2 *cm kepada* 1 *unit pada paksi-*$\sqrt{x}$ *dan* 2 cm *kepada* 0.1 *unit pada paksi-*$\log_{10} y$*. Seterusnya, lukiskan garis lurus penyuaian terbaik.* [5 *markah*]

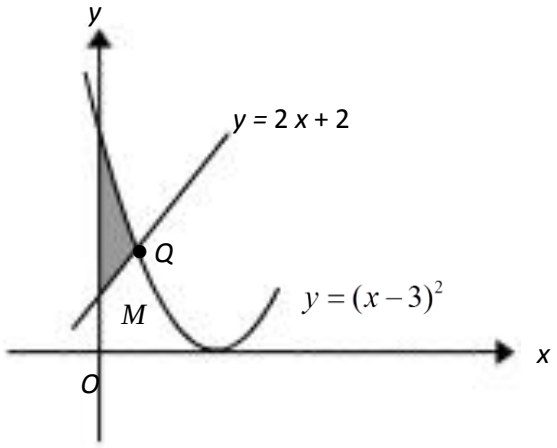
(*b*) Use your graph from 7*(a)* to find the value of
Gunakan graf di 7(*a*) *untuk mencari nilai*

(i) *p*

(ii) *q* [5*marks*]
[5 *markah*]

8. Diagram 8 shows a curve $y = (x-3)^2$ and the straight line $y = 2x + 2$ intersect at point *Q*.

Rajah 8 menunjukkan lengkung $y = (x-3)^2$ *dan garis lurus* $y = 2x + 2$ *yang bersilang pada titik Q.*



Calculate
Hitung

(i) point *Q*, [2 marks]
titik Q, [2 *markah*]

(i) the area of the shaded region, [4 marks]
luas kawasan berlorek, [4 *markah*]

(ii) the volume of revolution, in terms of π, when the region *M* is revolved through 360° about the *x*-axis. [4 marks]
isipadu janaan , dalam sebutan π*, apabila rantau M dikisarkan melalui* 360° *pada paksi-x.* [4 *markah*]

9. Diagram 9 shows *OSR* and *PSQ* are two straight lines.

Rajah 9 *menunjukkan OSR dan PSQ adalah dua garis lurus.*

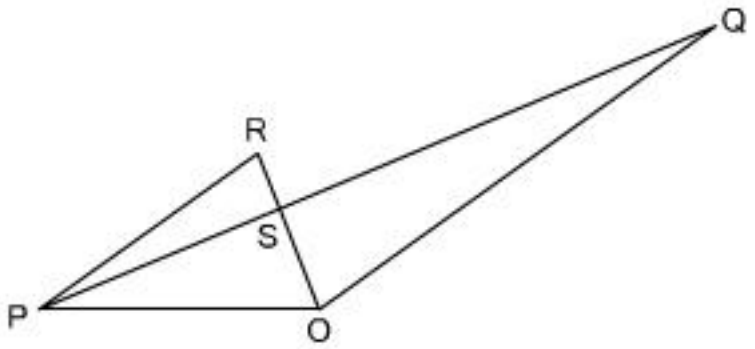


Diagram 2
Rajah 2

Given that $\overrightarrow{OP} = 5\underset{\sim}{p}$, $\overrightarrow{OQ} = 10\underset{\sim}{q}$, $PS : SQ = 2 : 3$, $\overrightarrow{PR} = m\overrightarrow{OQ}$ and $\overrightarrow{OS} = n\overrightarrow{OR}$.

Diberi $\overrightarrow{OP} = 5\underset{\sim}{p}$, $\overrightarrow{OQ} = 10\underset{\sim}{q}$, $PS : SQ = 2 : 3$, $\overrightarrow{PR} = m\overrightarrow{OQ}$ *dan* $\overrightarrow{OS} = n\overrightarrow{OR}$.

(a) Express $\overrightarrow{OR}$ in terms of

Ungkapkan $\overrightarrow{OR}$ *dalam sebutan*

(i) *m*, $\underset{\sim}{p}$ and $\underset{\sim}{q}$, [2 marks]
m, $\underset{\sim}{p}$ *dan* $\underset{\sim}{q}$, [2 *markah*]

(ii) *n*, $\underset{\sim}{p}$ and $\underset{\sim}{q}$. [2 marks]
n, $\underset{\sim}{p}$ *dan* $\underset{\sim}{q}$. [2 *markah*]

(b) Hence, find the value of *m* and of *n*. [3 marks]
Seterusnya, carikan nilai bagi m dan n. [3 *markah*]

(c) If $\left|\underline{p}\right| = 4unit$, $\left|\underline{q}\right| = 3unit$ and area of $\Delta POQ = 154cm^2$, calculate $\angle POQ$. [3 marks]

Jika $\left|\underline{p}\right| = 4unit$, $\left|\underline{q}\right| = 3unit$ *dan luas* $\Delta POQ = 154cm^2$, *hitung* $\angle POQ$. [3 *markah*]

10 (a) The masses of guavas from an orchard have a normal distribution with a mean of 250 g and a standard deviation of 70 g.
Jisim jambu-jambu dari sebuah kebun adalah mengikut satu taburan normal dengan min 250 g dan sisihan piawai 70 g.

i) Find the probability that a guava chosen randomly from this orchard has a mass of more than 185 g. [2 marks]
Cari kebarangkalian bahawa sebiji jambu yang dipilih secara rawak dari kebun ini berjisim melebihi 185 g. [2 *markah*]

ii) A random sample of 400 guavas is chosen. Given that 358 guavas from this sample have a mass of more than *m* g, find the value of *m*. [3 marks]
Satu sampel rawak 400 biji jambu dipilih.Diberi bahawa 358 *biji jambu dari sampel ini mempunyai jisim melebihi m* g,*cari nilai m.* [3 *markah*]

b) The result of a study shows that 30% of the pupils in a school take breakfast. If 10 pupils from the school are chosen at random, calculate the probability that
Keputusan satu kajian menunjukkan bahawa 30% murid dalam sebuah sekolah mengambil sarapan pagi. Jika 10 murid dari sekolah itu dipilih secara rawak, hitungkan kebarangkalian

(i) exactly 2 of them take their breakfast. [2 marks]
tepat 2 *orang mengambil sarapan pagi.* [2 *markah*]

(ii) less than 3 of them take their breakfast. [3 marks]
kurang daripada 3 *orang mengambil sarapan pagi.* [3 *markah*]

11. Diagram11 shows an arc *AXB* of a circle with its centre at *O* and radius 10 cm.
AYB is an arc of a circle with its centre at *P* and radius 5 cm.

Rajah 11 *menunjukkan lengkok AXB sebuah bulatan berpusat O dan berjejari* 10 cm. *AYB ialah sebuah lengkok bulatan berpusat P dan berjejari* 5 *cm.*

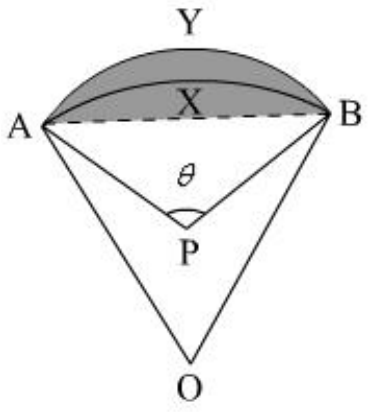


Diagram 11
Rajah 11

Given that $\angle AOB$ = 0.6 radians, and $\angle APB = \theta$, calculate
Diberi bahawa $\angle AOB$ = 0.6 radians, *dan* $\angle APB = \theta$, *hitung*

a) the value of θ in radians, [4 marks]
nilai θ *dalam radian,* [4 *markah*]

b) the length, in cm, of the arc *AYB,* [2 marks]
panjang, dalam cm, lengkok AYB, [2 *markah*]

c) the area, in cm^2, of the coloured region. [4 marks]
luas, dalam cm^2, *kawasan berwarna*. [4 *markah*]

Section C
Bahagian C

12. A particle moves along a straight line and passes through a fixed point *O*. Its displacement, *s* m, is given by $s = 2t^3 - 3t^2 - 12t + 6$, where *t* is the time, in seconds, after passing through *O*.
Suatu zarah bergerak di sepanjang suatu garis lurus dan melalui satu titik tetap O. Sesarannya , *s* m , *diberi oleh* $s = 2t^3 - 3t^2 - 12t + 6$, *dengan keadaan t ialah masa, dalam saat, selepas melalui O.*

[Assume motion to the right is positive.]
[*Anggapkan gerakan ke arah kanan sebagai positif*.]

Find
Cari

(a) the initial position of the particle, in m, [1 mark]
kedudukan awal zarah itu, dalam m , [1 *markah*]

(b) the time interval during which the particle moves to the left, [3 marks]
julat masa apabila zarah bergerak ke sebelah kiri, [3 *markah*]

(c) sketch the velocity-time graph of the motion of the particle for $0 \le t \le 4$. [3 marks]
lakarkan graf halaju melawan masa bagi pergerakan zarah itu untuk $0 \le t \le 4$. [3 *markah*]

(d) total distance travelled by the particle in first four seconds. [3 marks]
jumlah jarak yang dilalui oleh zarah dalam empat saat pertama. [3 *markah*]

13. Ah Choon wants to divide a piece of triangular shaped land *ABC* into three parts as in Diagram13. *AFB*, *AEDC* and *BGC* are straight lines. Given that *BF* = 18 *m*, *AF* = 96 *m*, *AE* = 26 *m*, *CE* = 70 *m* and $\angle BAC = 22.62^0$.

Ah Choon ingin membahagikan sebidang tanahnya yang berbentuk segi tiga ABC kepada tiga bahagian seperti dalam Rajah 13. AFB, AEDC dan BGC ialah garis lurus. Diberi BF = 18 *m, AF* = 96 *m, AE* = 26 *m, CE* = 70 *m dan* $\angle BAC = 22.62^0$.

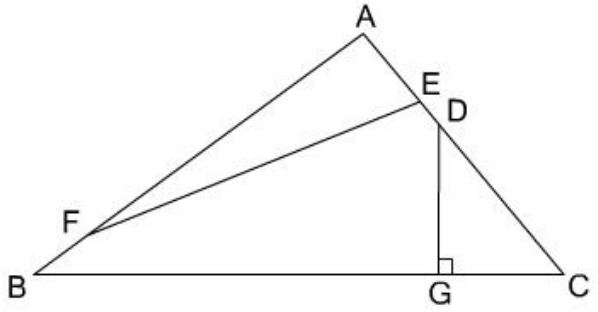


Diagram 13
Rajah 13

(a) Calculate the length of *BC*. [3 marks]
Hitung panjang BC. [3 *markah*]

(b) Calculate $\angle ACB$. [2 marks]
Hitung $\angle ACB$. [2 *markah*]

(c) Find the area of triangle *AEF*. [2 marks]
Cari luas segi tiga AEF. [2 *markah*]

(d) Given the area of triangle *AEF* is equal to the area of triangle *CDG*, calculate the length of *CD*.
Diberi luas segi tiga AEF adalah sama dengan luas segi tiga CDG, hitung panjang CD.
[3 marks]
[3 *markah*]

14. Table 14 shows the prices and price indices for the four ingredients, *A*, *B*, *C* and *D* used in making a type of cake. Diagram 6 is a pie chart which represents the usage of four ingredients, *A*, *B*, *C* and *D* used in the production of this cake.

Jadual 3 *menunjukkan harga dan indeks harga bagi empat bahan yang digunakan untuk membuat sejenis kek. Rajah* 6 *menunjukkan carta pai yang mewakili kuantiti relatif bagi penggunaan bahan A, B, C dan D dalam pembuatan kek ini.*

Ingredients *Bahan*	Price (RM) for the year *Harga (RM) pada tahun*		Price index for the year 2012 based on the year 2010 *Indeks harga pada tahun* 2012 *berasaskan tahun* 2010
	2010	2012	
A	2.00	2.50	*x*
B	5.00	*y*	140
C	1.40	2.10	150
D	*z*	4.00	125

Table 14
Jadual 14

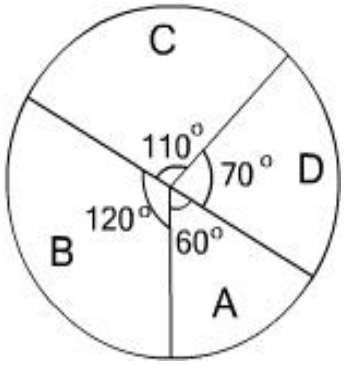


Diagram14
Rajah 14

(a) Find the value
Cari nilai
i) *x*
ii) *y*
iii) *z* [3 marks]
[3 *markah*]

(b) i) Calculate the composite index for the cost of production of this cake in the year 2012 based on the year 2010.

Hitung indeks gubahan bagi kos pembuatan kek tahun 2012 *berasaskan tahun* 2010.

ii) Hence, calculate the cost of the production of this cake in the year 2010 if the cost of the production in the year 2012 was RM20 000.
Seterusnya, hitung kos pembuatan biskut itu pada tahun 2010 *jika kos pembuatannya pada tahun* 2012 *ialah* RM20 000. [5 marks]

[5 *markah*]

(b) The cost of production of this cake is expected to decrease by 15% from the year 2012 to the year 2013. Find the expected composite index for the year 2013 based on the year 2010.
K*os pembuatan kek ini dijangka menurun sebanyak* 15% *dari tahun* 2012 *ke tahun 2013. Cari jangkaan indeks gubahan pada tahun 2013 berasaskan tahun 2010.*

[2 marks]
[2 *markah*]

15. A bakery produces two types of cake, *P* and *Q*. The production of each type of cake involves two processes, mixing and baking. Table below shows the time taken to mix and bake a cake of type *P* and a cake of type *Q*.
Sebuah kedai kek menghasilkan dua jenis kek, P dan Q. Penghasilan setiap jenis kek melibatkan dua proses, menggaul dan membakar. Jadual di bawah menunjukkan masa yang diambil untuk menggaul dan membakar sebji kek P dan sebiji kek jenis Q.

Kek *Cake*	Time taken (minutes) *Masa yang diambil (minit)*	
	Mixing *Menggaul*	Baking *Membakar*
P	15	40
Q	35	40

Table 15
Jadual 15

The bakery produces *x* cakes of type *P* and *y cakes* of type *Q* per day. The production of cakes per day is based on the following constraints:
Kedai kek itu menghasilkan x biji kek jenis P dan y biji kek jenis Q setiap hari. Penghasilan kek – kek itu setiap hari adalah berdasarkan kekangan yang berikut:

I : The minimum total time taken for mixing both type of cakes is 105 minutes.
Jumlah masa yang minimum untuk menggaul kedua-dua jenis kek itu adalah 105 *minit.*

II : The total time taken for baking both type of cakes is at most 320 minutes.
Jumlah masa untuk membakar kedua-dua jenis kek itu adalah selebih-lebihnya 320 *minit.*

III : The number of cakes of type *Q* produces is not more than three times the number of cakes of type *P*.
Bilangan kek jenis Q yang dihasilkan adalah tidak melebihi daripada tiga kali ganda bilangan kek jenis P.

(a) Write three inequalities, other than $x \geq 0$ and $y \geq 0$, which satisfy all the constraints.
Tuliskan tiga ketaksamaan, selain $x \geq 0$ *dan* $y \geq 0$, *yang memuaskan semua kekangan itu*

(b) Using a scale of 2 cm to 2 cakes on the x –axis and 2 cm to 1 cake on the y – axis , construct and shade the region R which satisfies all the constraints.
Dengan menggunkan skala 2 cm *kepada 2 biji kek P pada paksi-x dan* 2 cm *kepada* 1 *biji kek pada paksi-y, bina dan lorek rantau R yang memuaskan semua kekangan itu.*

(c) Using the graph constructed in 15(b), find
Dengan menggunakan graf yang dibina di 15(b), *cari*

(i) the range of the number of cakes of type P produced per day if 3 cakes of type Q are produced per day.
julat bilangan kek jenis P yang dihasilkan setiap hari jika 3 *biji kek jenis Q dihasilkan setiap hari.*

(ii) the maximum total profit per day if the profits from a cake of type P and a cake of type Q are RM3 and RM5 respectively.
jumlah keuntungan maksimum setiap hari jika keuntungan daripada sebiji kek jenis P dan sebiji kek jenis Q masing-masing RM3 *dan* RM5.

[4 *markah*]

Section A

Bahagian A

[40 marks]

[40 *markah*]

Answer **all** questions in this section .

*Jawab **semua** soalan dalam bahagian ini.*

1 Solve the simultaneous equations $2x+y-3=0$ and $3x-y^2-3=0$.
Give your answer correct to three decimal places.. [5 *marks*]

Selesaikan persamaan serentak $2x+y-3=0$ and $3x-y^2-3=0$.
Beri jawapan anda betul kepada tiga tempat perpuluhan.. [5 *markah*]

2 (a) Solve the equation:
Selesaikan persamaan

$$9^x\left(1\frac{1}{9}\right)=648.$$ [3 *marks*]

[3 *markah*]

(b) Given that $\log_a(x-y)=\frac{1}{2}(\log_a x+\log_a y)+\log_a 3.$ Prove that $x^2+y^2=11xy.$

[3 *marks*]

Diberi bahawa $\log_a(x-y)=\frac{1}{2}(\log_a x+\log_a y)+\log_a 3.$ *Buktikan bahawa*

$x^2+y^2=11xy.$ [3 *markah*]

3 Diagram 3 shows the first three triangles in an infinite series of equilateral triangles. The length of the sides of each triangles are shown in the diagram.
Rajah 3 menunjukkan tiga segi tiga pertama dalam satu siri segi tiga sama yang tak terhingga. Panjang sisi setiap segi tiga adalah seperti yang ditunjukkan dalam rajah.

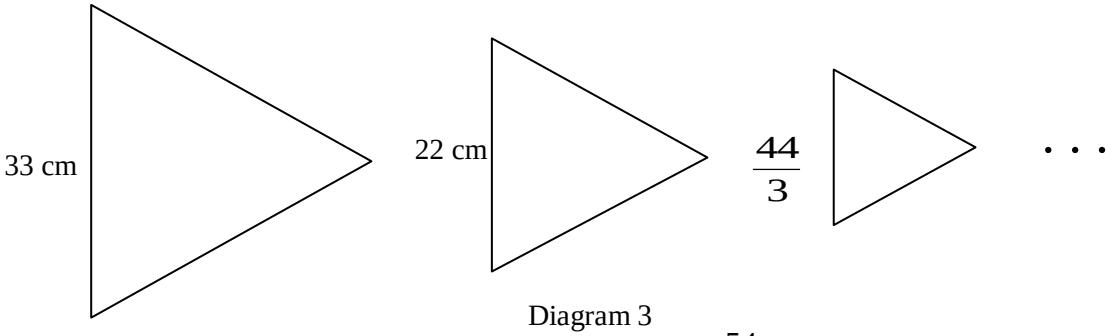


Diagram 3
Rajah 3

(a) Find the perimeter, in cm, of the sixth triangle. [2 *marks*]

Cari perimeter, dalam cm, bagi segi tiga yang keenam. [2 *markah*]

(b) Find the minimum length, in cm, of a wire that can be used to make the infinite series of the triangles above. [2 *marks*]

Cari panjang minimum, dalam cm, dawai yang boleh digunakan untuk membentuk siri segi tiga yang tak terhingga di atas [*2 markah*]

.

(c) Show that the areas of the triangles form a geometric progression and state the common ratio. [2 *marks*]

Tunjukkan bahawa luas segi tiga–segi tiga tersebut membentuk suatu janjang geometri dan nyatakan nisbah sepunya. [2 *markah*]

(d) Find the sum of the area of the first five triangles.. [2*marks*]

Cari jumlah luas lima segi tiga pertama. [2 *markah*]

4. The mean and the standard deviation on the set of *n scores* , $x_1, x_2, x_3 \ldots x_n$, are 8 and 62. Given the sum of the squares, $\sum x_i^2$, of the scores is 23 448.

Min dan sisihan piawai bagi satu set yang mengandungi n skor , $x_1, x_2, x_3 \ldots x_n$, *ialah 8 dan 62. Diberi bahawa hasil tambah bagi kuasa dua skor-skor* , $\sum x_i^2$, *ialah 23 448* .

(a) Find
Cari,

(i) the value of *n*,
nilai n,

(ii) the sum of all the scores, $\sum x_i$
hasil tambah semua skor, $\sum x_i$.

[4*marks*]
[4*markah*]

(b) Hence, calculate the mean and the variance of the following data:

$$3x_1 - 2, 3x_2 - 2, 3x_3 - 2 \ldots 3x_n - 2.$$

Seterusnya, hitungkan mean dan varians bagi data berikut:

$$3x_1 - 2, 3x_2 - 2, 3x_3 - 2 \ldots 3x_n - 2.$$

[3 *marks*]

[3 *markah*]

5. Solution to this question by scale drawing will not be accepted.
Penyelesaian secara luksan berskala tidak diterima.

Diagram 5 shows two straight lines *PQ* and *RS* which are perpendicular to each other and intersect at point *T*. The equation of the straight line *PQ* is $y = 4 - 2x$.

Rajah 5 *menunjukkan dua garis lurus PQ dan RS yang berserenjang dan bersilang di titik T. Persamaan bagi garis lurus PQ ialah* $y = 4 - 2x$.

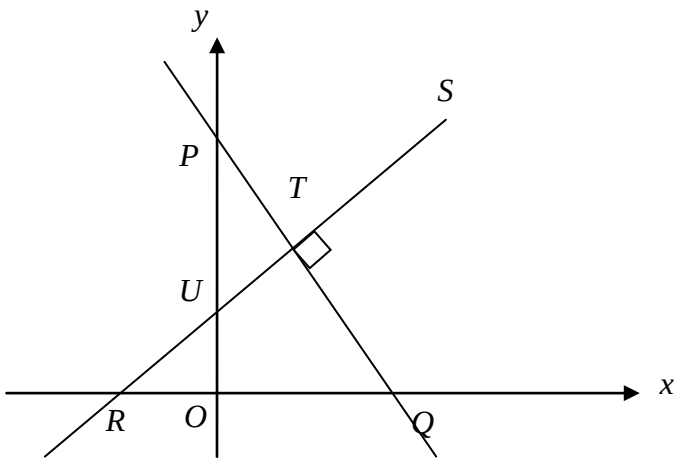


Diagram 5
Diagram 5

(a) Given that *QT : TP* is 3 : 2 .
Diberi bahawa QT: TP adalah 3 : 2.

Find
Cari

(i) the coordinates of *T*, [3 *marks*]
koordinat bagi T, [3 *markah*]

(ii) the equation of the straight line *RS*. [2 *marks*]
persamaan garis lurus RS. [2 *markah*]

(b) The straight line *RS* intersects the *y*-axis at point *U*. Calculate the area of the quadrilateral *OQTU*. [2 *marks*]
Garis lurus RS bersilang dengan paksi-y di titik U. Hitung luas sisi empat OQTU. [*2 markah*]

6 (a) Prove that $\dfrac{1-\tan^2 x}{1+\tan^2 x} = \cos 2x.$ [2 *marks*]

Buktikan bahawa $\dfrac{1-\tan^2 x}{1+\tan^2 x} = \cos 2x.$ [2 *markah*]

(b) Sketch the graph of $y = 1 - \left|-\cos 2x\right|$ for $0 \le x \le \pi$. [3 *marks*]

Lakar graf $y = 1 - \left|-\cos 2x\right|$ *untuk* $0 \le x \le \pi$. [3 *markah*]

(c) Hence, using the same axes, sketch a suitable straight line to find the number of solutions for the equation $1 + \left|\dfrac{1-\tan^2 x}{1+\tan^{2x}}\right| = \dfrac{x}{\pi}$ for $0 \le x \le \pi$.

State the number of solutions. [3 *marks*]

Seterusnya, dengan menggunakan paksi yang sama, lakar satu garis lurus yang sesuai untuk mencari bilangan penyelesaian bagi persamaan $1 + \left|\dfrac{1-\tan^2 x}{1+\tan^{2x}}\right| = \dfrac{x}{\pi}$ *untuk* $0 \le x \le \pi$.

Nyatakan bilangan penyelesaian itu. [3 *markah*]

Section B
Bahagian B
[40 marks]
[40 *markah*]

Answer **four** questions from this section.
Jawab ***empat*** *soalan dalam bahagian ini*

7 Use graph paper to answer this question.
Gunakan kertas graf untuk menjawab soalan ini.

Table 7 shows the values of two variables, x and y obtained from an experiment. Variables *x* and *y* are related by the equation $p(x+y-k)=kx^3$, where *p* and *k* are constants.
Jadual 7 menunjukkan nilai-nilai bagi dua pembolehubah x dan y, yang diperoleh daripada suatu eksperimen. Pembolehubah x dan y dihubungkan oleh persamaan $p(x+y-k)=kx^3$*, dengan keadaan p k ialah pemalar.*

x	0.5	1.0	1.5	2.0	2.3	2.5
y	1.06	1.00	1.69	3.50	5.28	6.81

Table 7
Jadual 7

(a) Based on the Table 7 , construct a table for the value of x^3 and $(x+y)$ [2 *marks*]
Berdasarkan Jadual 7, bina satu jadual bagi nilai-nilai x^3 *dan* $(x+y)$. [2 *markah*]

(b) Plot $(x+y)$ against x^3 using a scale of 2 cm to 2 unit on the x^3-axis and 2 cm to 1 unit on the $(x+y)$–axis.
Hence, draw the line of best fit. [3 *marks*]

Plot $(x+y)$ *melawan* x^3 *dengan menggunakan skala 2 cm kepada 2 unit pada paksi-*x^3 *dan 2 cm kepada 1 unit pada paksi-*$(x+y)$.
Seterusnya, lukis garis penyuaian terbaik. [3 *markah*]

(c) Use the graph in **7** (b) to find the value of
Gunakan graf di **7** *b) untuk mencari nilai*

(i) *p,*
(ii) *k.*

[5 marks]
[5 *markah*]

8 Diagram 8 shows part of the curve $y^2 = x - 4$. The tangent to the curve at point *A* (5,1) intersects the *x*- axis at point *B*.

Rajah 8 *menujukkan sebahagian daripada lengkung* $y^2 = x - 4$. *Tangen kepada lengkung tersebut di titik A* (5,1) *menyilang paksi –x di titik B.*

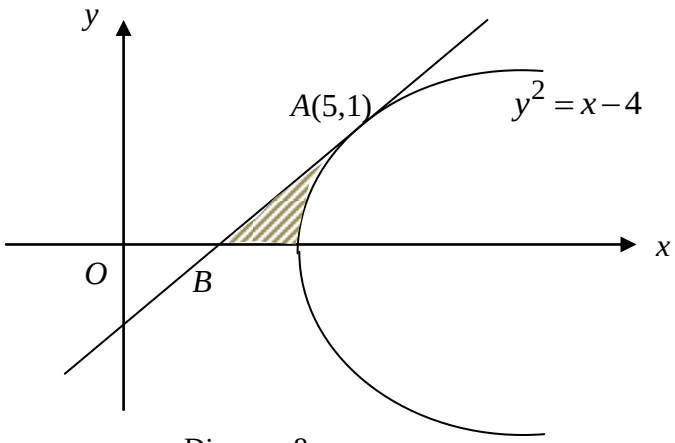


Diagram 8
Rajah 8

(a) Find
Cari

(i) the equation of the straight line *AB*, [3 *marks*]
persamaan garis lurus AB, [3 *markah*]

(ii) the area of the shaded region. [4 *marks*]
luas rantau berlorek. [4 *markah*]

(b) Calculate the volume generated, in terms of π, when the area bounded by the curve and the line $x = 6$ is revolved $180°$ about the *x*-axis. [3 *marks*]

Hitung isipadu janaan, dalam sebutan π *,apabila rantau yand dibatasi oleh lengkung itu dan garis lurus* $x = 6$ *dikisarkan melalui* $180°$ *pada paksi-x.*

[3 *markah*]

9 Diagram 9 shows a semicircle with diameter *AB* , centre *O* and another semicircle with diameter *BC* centre *P*.

Rajah 9 menunjukkan semi bulatan dengan diameter AB, berpusat di O dan satu lagi semi bulatan dengan diameter BC berpusat di P.

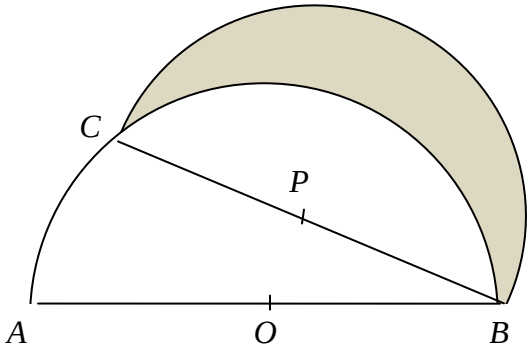


Diagram 9
Rajah 9

Given that *AB*= 8 cm and $\angle ABC = \frac{\pi}{6}$ radian.

Diberi bahawa AB = 8 cm dan $\angle ABC = \frac{\pi}{6}$ *radian.*

[Use / *Guna* π = 3.142]

Find,
Cari,

(a) $\angle$ *BOC* in radians, [1 *mark*]
$\angle$ *BOC dalam radian* [1 *markah*]

(b) the perimeter, in cm, of the shaded region, [4 *marks*]
perimeter, dalam cm, kawasan berlorek , [4 *markah*]

(c) the area, in cm^2 , of the shaded region. [5 *marks*]
luas, dalam cm^2*, rkawasan berlorek.* [5 *markah*]

10 In Diagram 10, *D* is a point on *OB* such that *OD* : *OB* = 1 : 3 and *C* is the midpoint of *AB*.

Dalam Rajah 10, *D adalah satu titik pada OB dengan keadaan OD* : *OB* = 1 : 3 *dan C adalah titik tengah AB.*

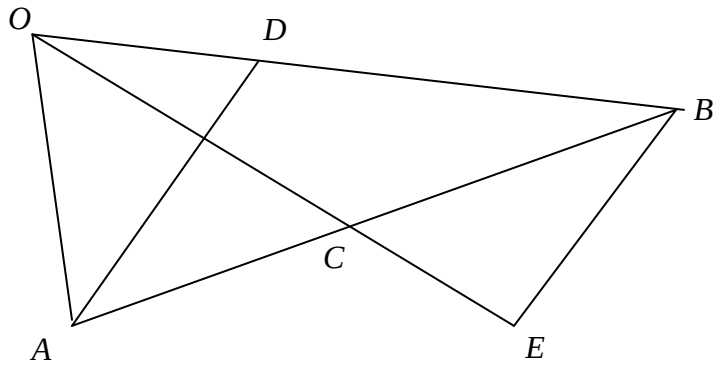


Diagram 10
Rajah 10

Given that $\overrightarrow{OA} = \underline{x}$ and $\overrightarrow{OB} = \underline{y}$.

Diberi bahawa $\overrightarrow{OA} = \underline{x}$ *dan* $\overrightarrow{OB} = \underline{y}$.

(a) Express, in terms of $\underline{x}$ and $\underline{y}$:

Ungkapkan, dalam sebutan $\underline{x}$ *dan* $\underline{y}$:

(i) $\overrightarrow{OC}$

(ii) $\overrightarrow{AD}$

[3 *marks*]
[3 *markah*]

(b) The straight line *OC* is extended to point *E* such that *OC* : *OE* = 1 : *k* ,where *k* is a constant.

Show that $\overrightarrow{BE} = \frac{k}{2}\underline{x} + \left(\frac{k-2}{2}\right)\underline{y}$. [3 marks]

Garis lurus OC dipanjangkan ke titik E dengan keadaan OC : *OE* = 1 : *k dan k ialah pemalar.*

Tunjukkan bahawa $\overrightarrow{BE} = \frac{k}{2}\underline{x} + \left(\frac{k-2}{2}\right)\underline{y}$. [3 *markah*]

(c) Given that $\overrightarrow{BE}$ is parallel to $\overrightarrow{AD}$, find *k*. [4 *marks*]

Diberi bahawa $\overrightarrow{BE}$ adalah selari dengan $\overrightarrow{AD}$, cari *k*. [4 *markah*]

11 (a) Table 11 shows the number of marbles in a box.
Jadual 11 *menunjukkan bilangan biji guli dalam sebuah kotak.*

Colour / *Warna*	White/ *Putih*	Red/ *Merah*	Yellow/ *Kuning*
Number of marbles/ *Bilangan*	7	6	7

A marble is chosen at random and the colour of the marble is recorded. The marble is then returned to the box. The proces is repeated 8 times.

Sebiji guli dipilih secara rawak dari kotak dan warnanya dicatatkan. Guli tersebut kemudiannya dikembalikan semula ke dalam kotak.Proses ini diulang sebanyak lapan kali.

Find,
Cari,

(i) the probability that at least two red marbles are chosen,
kebarangkalian bahawa sekurang-kurangnya dua guli merah dipilih,

(ii) the variance of the number of yellow marbles being chosen.
varians bagi bilangan guli kuning yang dipilih.

[5 *marks*]
[*5 markah*]

(b) The masses of durian collected from an orchard are normally distributed with a mean of 2.2 kg and a variance of 0.81 kg. A durian is graded big if its mass is at least 3.1 kg and is graded small if its mass is less than *m* kg.

Jisim buah durian yang dikutip dari sebuah dusun bertabur secara normal dengan min 2.2 *kg dan dan varians* 0.81.*Sebiji durian digredkan besar jika jisimnya sekurang-kurangnya* 3.1 *kg dan digredkan kecil jika jisimnya kurang daripada m kg.*

(i) Find the probability that a durian chosen at random from the orchid is graded big.
Cari kebarangkalian bahawa sebiji durian yang yang dipilih secara rawak daripada dusun tersebut digredkan besar.

(ii) It is found that 19% of the durians collected are graded small. Find the value of *m*.
Didapati bahawa 19% daripada durian yang dikutip digredkan kecil. Cari nilai m.

[5 *marks*]
[5 *markah*]

Section C
Bahagian C

[20 *marks*]
[20 *markah*]
http://cikguadura.wordpress.com/
Answer **two** questions from this section.
*Jawab **dua** soalan dalam bahagian ini*

12 A particle moves along a straight line and passes through a fixed point O**.** Its velocity, v m s^{-1}, is given by $v = 3kt^2 - 2ht$, where *h* and *k* are constants, and *t* is the time, in seconds, after passing through O. When *t* = 3 s, the particle stops instantenously 1 m on the left of *O*.

Suatu zarah bergerak di sepanjang suatu garis lurus dan melalui satu titik tetap 0. Halajunya, v m s^{-1}, diberi oleh $v = 3kt^2 - 2ht$, dengan keadaan h dan t adalah pemalar, dan t ialah masa, dalam saat, selepas melalui O. Pada ketika t = 3 s, zarah tersebut berhenti seketika 1 m di sebelah kiri O.

[Assume motion to the right is positive.]
[*Anggapkan gerakan ke arah kanan sebagai positif*]

(a) Find
Cari

(i) the value of *h* and of *k*. [4 *marks*]
nilai h dan nilai k. [4 *markah*]

(ii) the time when the velocity of the particle is maximum, [3 *marks*]
masa ketika halaju zarah itu maximum.. [3 *markah*]

(b) Sketch the displacement-time graph of the motion of the particle for $0 \le t \le 6$. Hence, find the total distance, in m, travelled by the particle in the first 6 seconds. [3 *marks*]
Lakarkan graf sesaran-masa bagi pergerakan zarah itu untuk $0 \le t \le 6$. Seterusnya,cari *jumlah jarak, dalam m, yang dilalui oleh zarah itu dalam 6 saat pertama.* [3 *markah*]

13 Table 13 shows the price indices and weightages for four ingredients , *A, B, C* and *D* , used in making a type of cake. The expected increase of the prices of each ingredient from the year 2011 to the year 2013 are also shown .

Jadual 13 menunjukkan indeks harga dan pemberat bagi empat bahan, A, B, C dan D yang digunakan untuk membuat sejenis kek. Jangkaan kenaikan harga bagi setiap bahan dari tahun 2011 *hingga tahun* 2013 *juga ditunjukkan.*

Ingredient *Bahan*	**Price Index in the year 2011 based on the year 2009** *Indeks harga pada tahun* 2011 *berasaskan tahun* 2009	**Weightage** *Pemberat*	**Change in price from 2011 to 2013** *Perubahan harga dari* 2011 *hingga* 2013
A	110	*y*	Increases by *Meningkat sebanyak* 10%
B	80	*2y*	Increases by *Meningkat sebanyak* 10%
C	x	3	No Change *Tiada perubahan*
D	150	2	No Change *Tiada perubahan*

Table 13
Jadual 13

(a) Given the price of ingredient *C* in the year 2009 is RM 8. It increases to RM 20 in the year 2011. Find the value of x. [2 *marks*]

Diberi bahawa harga bahan C pada tahun 2009 *ialah RM 8. Harganya bertambah kepada RM 20 pada tahun* 2011. *Cari nilai x.* [2 *markah*]

(b) Find the value of y if the composite index for the ingredients in the year 2011 based on the year 2009 is 120. [3 *marks*]

Cari nilai y jika indeks gubahan untuk kek ini pada tahun 2011 *berasaskan* 2009 *ialah 120.* [*3 markah*]

(c) Calculate the composite index for the prices of these ingredients in the year 2013 based on the year 2009. [5 *marks*]

Hitung indeks gubahan untuk harga bahan-bahan tersebut pada tahun 2013 *berasaskan tahun* 2009. [5 *markah*]

14 Solution by scale drawing will not be accepted.
Penyelesaian secara lukisan berskala tidak diterima

Diagram 14 shows three triangles *ABC*, *ACD* and *CDE* such that *AE* and *BD* are straight lines.
Rajah 14 *menujukkan tiga segitiga ABC, ACD dan CDE dengan keadaan AE dan BD adalah garis lurus.*

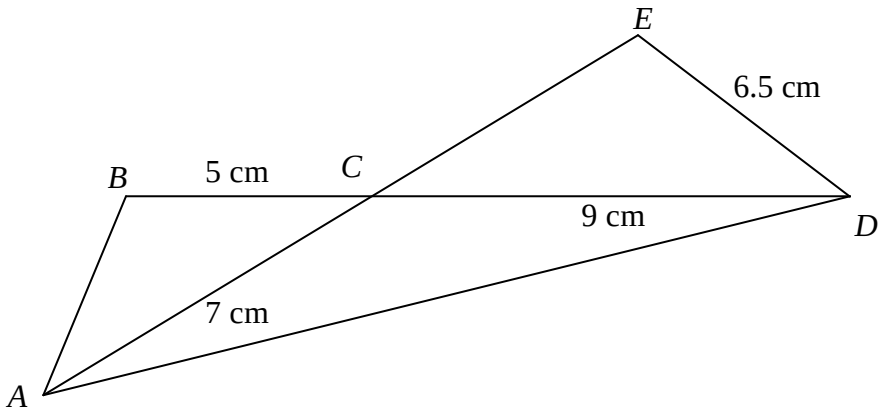


DIAGRAM 14
Rajah 14

Given that $\angle DCE = 34.05^0$ and $\angle CED$ is an obtuse angle.
Diberi bahawa $\angle DCE = 34.05^0$ dan $\angle CED$ *adalah cakah.*

(a) Calculate
Hitungkan

(i) $\angle CED$,

(ii) the length of *AB.*
panjang AB.

[5 *marks*]
[5 *markah*]

(b) Find the area of triangle *AED.* [4 *marks*]
Cari luas segitiga AED. [4 *markah*]

(c) The line *CB* is extended to point *B'* such that *AB = AB'.* Sketch the triangle *AB'C.*
[1*mark*]
Garis lurus AB dipanjangkan ke titik B' dengan keadaan AB = AB'. Lakarkan segitiga AB'C.

[1 *markah*]

15 Use graph paper to answer this question.
Gunakan kertas graf untuk menjawab soalan ini.

A school wants to send ***x*** Form Four students and ***y*** Form Five students to participate in a motivation course.

The number of participants is based on the following constraints:

Sebuah sekolah ingin menghantar x orang pelajar Tingkatan Empat dan y orang pelajar Tingkatan 5 untuk menyertai satu kursus motivasi.Bilangan peserta adalah berdasarkan kekangan yang berikut:

I The total number of the participants is at least 100.
Bilangan peserta adalah sekurang-kurangnya 100.

II The number of Form Four participants exceeds four times the number of the Form Five participants by at most 10.
Bilangan peserta Tingkatan Empat melebihi empat kali bilangan peserta Tingkatan Lima dengan selebih-lebihnya10.

III The fee for each Form Four participant is RM 60 while the fee for each Form Five participant is RM 120. The maximum allocation for the course is RM 12,000.
Yuran bagi setiap peserta Tingkatan Empat ialah RM 60 *manakala yuran bagi setiap peserta Tingkatan Lima ialah* RM 120*. Jumlah maksimum peruntukan bagi kursus tersebut ialah* RM 12 000.

(a) Write three inequalities, other than $x \geq 0$ and $y \geq 0$, which satisfy all the above constraints. [3 marks]
Tulis tiga ketaksamaan, selain daripada $x \geq 0$ *dan* $y \geq 0$, *yang memenuhi semua kekangan di atas.*

[3 *markah*]

(b) Using a scale of 2 cm to 20 participants on the *x*-axis and 2 cm to 10 participants on the y-axis, construct and shade the region *R* that satisfies all the above constraints.

[3 *marks*]

Menggunakan skala 2 cm *kepada 20 peserta pada paksi--x dan* 2 *cm kepada* 10*peserta pada paksi-y, bina dan lorek rantau R yang memenuhi semua kekangan di atas.*

[3 *markah*]

(c) Using the graph constructed in **15**(*b*), find
Menggunakan graf yang dibina di **15**(*b*), *cari*

(i) the range of the number of Form Four participants if the number of Form Five participants is 60.
julat bilangan peserta Tingkatan Empat jika bilangan peserta Tingkatan Lima ialah 60.

(ii) the maximum allocation needed by the school for its students to participate in the course if the number of Form Four participants is equal to the number of Form Five participants.
peruntukan maximum yang diperlukan oleh sekolah itu untuk penyertaan pelajar-pelajarnya dalam kursus tersebut jika bilangan peserta Tingkatan Empat sama dengan bilangan peserta Tingkatan Lima.

[4 *marks*]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

Perfect score Module 3 Paper 2

Section A

[40*marks*]

*Answer **all** questions*

1 Solve the simultaneous equations $2x + 3y + 1 = 0$ and $x^2 + 6xy + 8 = 0$. [5 *marks*]
Selesaikan persamaan serentak $2x + 3y + 1 = 0$ *dan* $x^2 + 6xy + 8 = 0$. [5*markah*]

2. (a) Simplify/*Permudahkan* : [3 *marks*]
$4\ log_9(5x^2 - 8) - 2\ log_3 x$ [3*markah*]

(b) Hence, solve the equation:
Seterusnya, *selesaikanpersamaan*: [3 *marks*]
$4\ log_9(5x^2 - 8) - 2\ log_3 x = 2$ [3*markah*]

3. In a geometric progression in which all the terms are positive and decreasing, Given that the difference between the first term and second term of the progression is -0375 and the sum to infinity of the progression is $13\frac{1}{3}$.
Dalam suatu janjang geometri, dimana semua sebutan adalah positif dan menyusut .Diberi bahawa perbezaan diatara sebutan pertama dan sebutan kedua janjan gtersebut ialah -0.375 *dan jumlah hingga sebutan ketakterhinggan ialah* $13\frac{1}{3}$.

Find/ *cari*

(a) the first term and commom ratio [5*marks*]
sebutan pertama dan nisbah sepunya [5*markah*]

(b) the sum of the 4^{th} term to the 7^{th} term. [2*marks*]
jumlah dari sebutan ketiga hingga sebutan ketujuh [2*markah*]

4. Table 4 shows a set of positive integers arranged in ascending order with the frequency of each integer shown.
Jadual 4 *menunjukkan satu set integer positif yang disusun mengikut tertib menaik dengan kekerapan setiap integer ditunjukkan.*

Number ***Nombor***	3	$k - 3$	6	$k + 1$	10	12
Frequency ***Kekerapan***	2	5	3	4	4	2

Table 4/*Jadual* 4

(a) Express the median in terms of *k*. [1*mark*]
Ungkapkan median dalam sebutan k.

(b) (i) Find the range of *k*.
Cari julat bagi k.
(ii) Find the value of *k* if its median equal to mean
Cari nilai k jika median sama dengan min. [3*marks*]

(c) Using the value of *k* obtained in b(ii), find the vatiance.
Dengan menggunakan nilai k yang diperoleh dalam b(ii) , *cari varian.* [2*marks*]

5. Solution by scale drawing is **not** accepted
Diagram 5 shows a straight line *PQR*. The point *Q* lies on the y-axis.
Rajah5 menunjukkan satu garis lurus PQR. Titik Q terletak pada paksi-y.

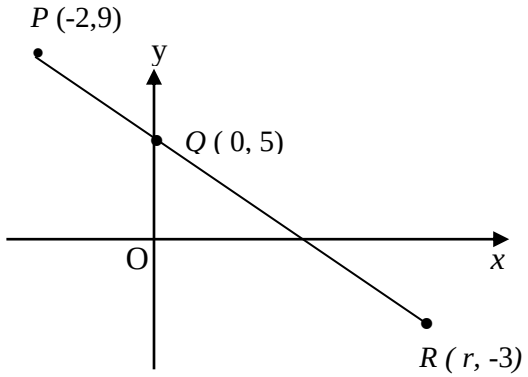


Diagram 5/*rajah 5*

Find/ *Cari*

(a) the value of *r* [2 marks]
nilai bagi r [2 *markah*]

(b) The equation of straight line that passes through point *R* and perpendicular to line *PQR*. [3 *marks*]
persamaan garislurus yang melaluititik R danberserenjang dengan garisPQR. [3 *markah*]

(c) Given that a ratio *PQ : QR = m :n,* find the value of *m* and value of *n* [3 *marks*]
Jika nisbah PQ : QR= m:n, cari nilai bagi m dan nilai bagi n [3 *markah*]

6. (a) Prove that $\frac{2\tan x}{1-\tan^2 x}=\tan 2x$ [2 *marks*]

Buktikan $\frac{2\tan x}{1-\tan^2 x}=\tan 2x$ [2*markah*]

(b) Sketch the graph of $y=3+\tan\frac{3}{2}x$ for $0\le x\le 2\pi$ [4*marks*]

Lakarkan graf $y=3+\tan\frac{3}{2}x$ *untuk* $0\le x\le 2\pi$ [4*markah*]

(c) Hence, using the same axes, draw a straight line $3+\tan\frac{3}{2}x=k$, for $0\le x\le 2\pi$ Find the value of *k* if the number of solutions is 4, [3*marks*]

Seterusnya, dengan menggunakanpaksi yang sama, lukiskan satu garis lurus $3+\tan\frac{3}{2}x=k$, *untuk* $0\le x\le 2\pi$ *cari nilai k jika bilangan penyelesaian bagi persamaan ialah* 4. [3 *markah*]

Section B

[40*marks*]

*Answer **all** questions*

7. *Use the graph paper to answer this question.*

Table 7 shows the values of two variables, *x* and *y*, obtained from an experiment.

The variable *x* and *y* are related by the equation $y = px + \frac{1}{2}kx^2$ where *p* and*k* are constants.

Jadual 7 menunjukkan nilai-nilai bagi dua pembolehubah, x dan y, yang diperoleh daripada satu eksperimen.

Pemboleh ubah x dan y dihubungkan oleh persamaan $y = px + \frac{1}{2}kx^2$, *di mana p dan k adalah pemalar.*

x	1	2	3	4	5	6
y	6.8	17.2	31.8	48	70	94.8

Table 7*/ jadual7*

(a) Based on table 7 , construct a table for value of $\frac{y}{x}$ [1 *mark*]

Berdasarkan jadual 7, bina satu jadual bagi nilai $\frac{y}{x}$ [1*markah*]

(b) Plot $\frac{y}{x}$against x , by using a scale of 2 cm to 1 units on x - axis and 2cm to 2 unit on the $\frac{y}{x}$ – axis , Hence, draw the line of best fit. [3 *marks*]

Plot $\frac{y}{x}$ *melawan x, dengan menggunakan skala 2 cm kepada 1 unit pada paksi - x dan 2 cm kepada 2 unit pada* $\frac{y}{x}$*-paksi, Seterusnya, lukiskan garis lurus penyuaian terbaik.* [3 *markah*]

(c) Use the graph from 7(b) to find the value of

Gunakan graf dari 7 (b) untuk mencari nilai

(i) *p*

(ii) *k*

(iii) *y* when *x* = 3.2 [6 *marks*]

[6 *markah*]

8 Diagram 8 shows part of the curve $y = f(x)$ which passes through A (1, 8).
Rajah 8 menunjukkan sebahagian daripada lengkung $y = f(x)$ yang melalui A (1,8).

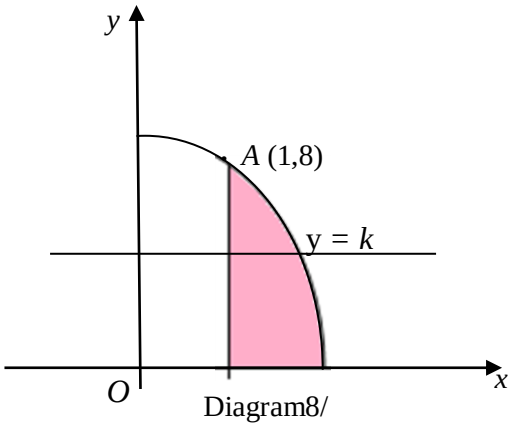


Diagram8/
Rajah 8

The curve has a gradient function of $-2x$.
Fungsi kecerunan bagi lengkung tersebut ialah $-2x$

Find/ *cari*

(a) the equation of the curve. [3 *marks*]
Persamaan lengkung tersebut. [3 *markah*]

(b) The area of the shaded region, [4 *marks*]
Luas rantau berlorek. [4 *markah*]

(c) The value of k if the volume of revolution is 12.5π unit^2, when the region bounded by the curve, y - axis and the straight line $y = k$ is rotated through 360° about the y-axis. [3 *marks*]
nilai bagi k jika isipadu janaan ialah ialah 12.5 π *apabila rantau yang dibatasi oleh paksi –y dan garis lurus* $y = k$ *diputar* 360^o *pada paksi- y*

9 Diagram 9 shows two sector, sector AOC with centre O and radius 5 cm and sector APD with centre P and radius 7 cm.
Rajah 9 menunjukkan dua sektor, iaitu sector AOC dengan pusat O dan berjejari 5 *cm dan sektor APD sektor dengan pusat P dan berjejari* 7 *cm.*

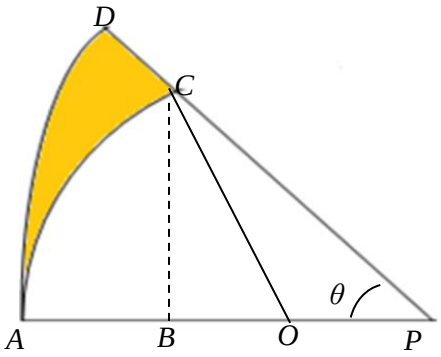


Diagram 9/ *Rajah 9*

It is given that B is a midpoint of AO and the line BC is perpendicular to AOP.
Diberi bahawa B adalah titik tengah bagi OA dan garis BC adalah berserenjang dengan AOP.

[Use/ *guna* $\pi = 3.142$]

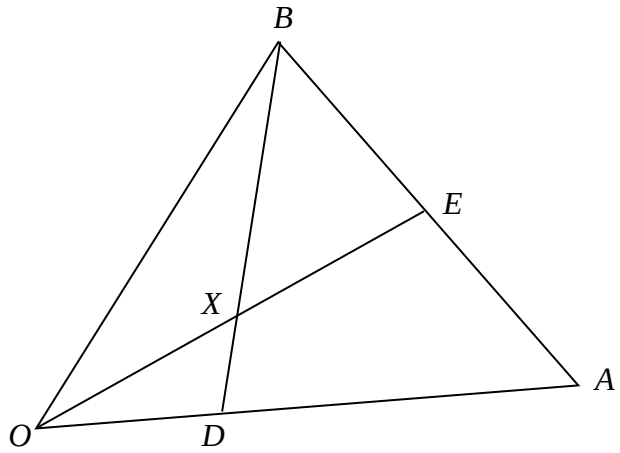
Calculate,

(a) the angle, θ , in radian. [4*marks*]
sudut θ *dalam radian* [4*markah*]

(b) the perimeter in cm, of the shaded region [3*marks*]
Perimeter kawasan berlorek dam cm [3*markah*]

(c) the area , in cm² , of the shaded region. [3*marks*]
Luas kawasan berlorek dalam cm^2 [3 *markah*]

10 Diagram 10 shows a triangle *OAB*. The straight line *BD* intersects the straight line *OE* at *X*.
Rajah 10 menunjukkan sebuah segitiga OAB. Garis lurus BD menyilang garis lurus OE pada X



It is given that $OX = \frac{2}{5}OE$, $XB = \frac{4}{5}DB$, $\overrightarrow{OA} = \underline{x}$ and $\overrightarrow{OB} = \underline{y}$
Diberi bahawa $OX = \frac{2}{5}OE$, $XB = \frac{4}{5}DB$, $\overrightarrow{OA} = \underline{x}$ and $\overrightarrow{OB} = \underline{y}$

(a) Express in term of *x* and/ or y vector $\overrightarrow{AB}$ [2*marks*]
Nyatakan dalam sebutan x dan/ atau y vektor $\overrightarrow{AB}$ [2*markah*]

(b) (i) Given that $\overrightarrow{AE} = m\overrightarrow{AB}$, state $\overrightarrow{OX}$ in term of *m*, $\underline{x}$ and *y*. [3*marks*]
Diberi bahawa $\overrightarrow{AE} = m\overrightarrow{AB}$ *, nyatakan* $\overrightarrow{OX}$ *dalam sebutan m,* $\underline{x}$ *dan y.* [3*markah*]

(ii) Given that $\overrightarrow{OD} = k\overrightarrow{OA}$, state $\overrightarrow{DX}$ in term of *k,* $\underline{x}$ and *y*. [2*marks*]
Diberi bahawa $\overrightarrow{OD} = k\overrightarrow{OA}$*, nyatakan* $\overrightarrow{DX}$ *dalam sebutan k,* $\underline{x}$ *dan y.* [2*markah*]

(c) Using $\overrightarrow{OX}$ and $\overrightarrow{DX}$ from (b) find the value of *m* and of *k*. [3*marks*]
Dengan menggunakan $\overrightarrow{OX}$ *dan* $\overrightarrow{DX}$ *daripada (b) cari nilai bagi m dan nilai bagi k.* [3*markah*]

11 (a) In a game the probability of winningis 0.25. A series of *n* games were played and it was found that the probability of winning once in the game is equal to 8 timesthe probability of losing in all games.

Dalam sesuatu permainan, kebarangkalian untuk menang ialah 0.25. Satu siri n permainan telah dimainkan dan didapati bahawa kebarangkalian untuk menang satu kali dalam permaianan itu adalah 8 kali kebarangkalian kalah dalam semua permainan

Find /*cari*

(i) the value of *n*.
nilai n.

(ii) the probability that winning exactly two games [5 *marks*]
kebarangkalian bahawa tepat memenangi dua permainan [5 *markah*]

(b) A group of workers are given medical check up. The blood pressure of a worker has a normal distribution . It is found that 12% of the workers have a blood pressure less than 110 mm Hg and 35% have a blood pressure more than 125mmHg.

Sekumpulanpekerja diberi pemeriksaan perubatan. Tekanan darahseseorang pekerja adalah bertaburan secara normal.Di dapati bahawa12% daripada pekerja mempunyai tekanan darah yangkurang daripada110 mmHgdan 35%mempunyai tekanan darahlebih daripada125 mmHg.

(i) Find mean and standard deviation of blood pressure of the workers.
Cari min dan sisihan piawai tekanan darahpekerja.

(ii) Blood pressure that is more than 140 mmHg is classified as "high blood pressure".
Find the probability that the worker has a high blood pressure. [5 *marks*]
Tekanan darah yang lebih daripada 140mm Hg diklasifikasikan sebagai "tekanan darah tinggi".Cari kebarangkalian untuk seorang pekerja mempunyai tekanan darah tinggi [5 *markah*]

Section C

[20*marks*]

Answer ***all*** *questions*

12. Diagram 12.1,shows Δ*PST* and Δ*RST*.

Rajah 12.1 *menunjukkan* Δ*PST dan* Δ*RST*.

.

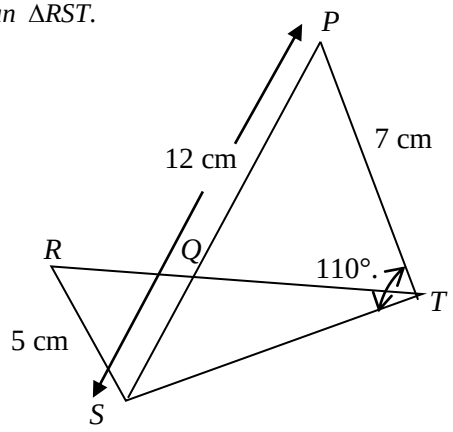


Diagram 12.1

Rajah 12.1

It is given that *PS* = 12cm ,*PT*= *PQ* = 7cm , RS = 5cm and ∠ *PTS* = 110°.

Diberi bahawa PS = 12*cm* ,*PT*= *PQ* = 7*cm* , RS = 5*cm dan* ∠ *PTS* = 110°.

(a) Find/ *cari*

(i) ∠*PST*

(ii) the length, in cm of side *ST*
Panjang, dalam cm sisi ST

(iii) the area , in cm^2, of Δ*QST* [7 *marks*]

Luas dalam cm^2, Δ*QST* [7 *markah*]

(b) In Diagram 11.2 , Δ *STU* is the image of Δ *QST* under the reflection in the line *ST*
Rajah 12.2 Δ *STU adalah imej bagi* Δ *QST dibawah satu pantulan pada garis ST*

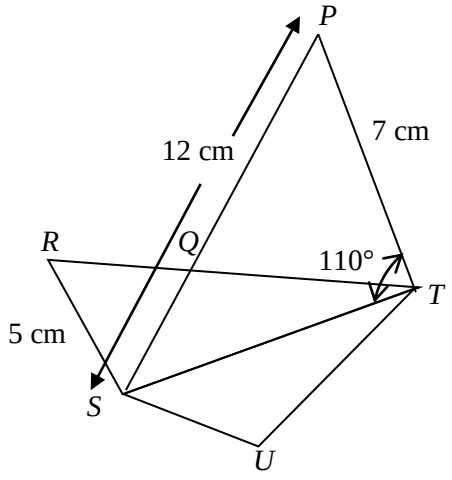


Diagram 12.2

Find the length, in cm of *RU*. [3*marks*]

Cari panjang dalam cm RU [3*markah*]

13. The table 12shows the prices , price indices and percentage expenditure for four types of ingredients, *A* , *B, C* and *D* needed in production of a type of medicine.
Jadual 12 menunjukkanharga,indeks harga danperatusan perbelanjaanuntuk empatjenis bahan, A, B, C dan D yang diperlukan dalampengeluaransejenisubat.

Ingredients *Bahan-bahan*	Price (RM) per gram *Harga(*RM*) segram*		Price indices in the year 2007 based on the year 2005 *Indek harga pada tahun 2007 berasaskantahun 2005*	Percentage expenditure(%) *peratusperbelanjaan*
	2005	2007		
A	10.00	13.00	*X*	*15*
B	7.50	12.00	160	12
C	9.00	*Y*	95	45
D	*z*	25.00	125	28

Table 12

(a) Find the values of *x* , *y* and *z.* [3 *marks*]
Cari nilai x, y dan z

(b) (i) Calculate the composite index for the cost of producing the medicine in the year 2007 based on the year 2005,
Kira indeks gubahan bagi kos menghasilkan perubatan pada tahun2007 berasaskan tahun 2005.

(ii) Calculate the cost of producing this medicine in the year 2005 if its corresponding cost of production in the year 2007 was RM 1350. [4 *marks*]
Kira kos pengeluaran ubat ini pada tahun 2005*jika kos yang sepadan pengeluaran pada tahun2007 adalahRM1350.*

(c) If the cost of all ingredients increase by 15% from the year 2007 to the year 2009. Find the composite index for the year 2009 based on the year 2005. [3 *marks*]
Jika kossemua bahan-bahanmeningkat sebanyak 15% dari tahun 2007 hingga tahun 2009.Cari indeks gubahan pada tahun 2009berasaskan tahun2005.

14 A particle moves along a straight line from fixed point *O*, with a velocity of 25 ms^{-1}. Its acceleration, *a* ms^{-2} $a = 5 - 4t$, where *t* is the time, in seconds , after leaving the point *O*. The particles stop after *k* s. (Assume motion to the right is positive)

Suatu zarah bergerak di sepanjang suatu garis lurus dari titik tetap O, dengan halaju 25 ms^{-1}, *Pecutan a* ms^{-2}, $a = 5 - 4t$ *di mana t ialah masa, dalam saat, selepas meninggalkan titik O. Z arah berhenti selepas k s.*
(*Andaikan gerakan ke kanan adalah positif*)

Find/*cari*

(a) the initial acceleration.
Pecutan awal.
(b) the maximum velocity of the particle,
halaju maksimum zarah,
(c) the value of *k*
nilai k
(d) Calculate the total distance traveled during the second 5 seconds after leaving O. [10*marks*]
Kira jumlah jarak yang dilalui 5 saat kedua selepas melalui O. [*10 markah*]

15 A training centre offers two courses, *A* and *B*. The number of participants for course *A* is *x* and the number of participants for course *B* is *y*. The intake of the participants is based on the following constraints:

I The minimum number of participants is 40

II The maximum total fees collected per courses is RM 7200, if the monthly fees per participants for course *A* is RM 120 and for course *B* is RM80.

III The number of participants for course *A* is at most two times the number of participants for course *B*.

(a) Write three inequalities, other than $x \geq 0$ and $y \geq 0$, which satisfy all the above constraints.

(b) Using a scale of 2 cm to 10 participants on both axes, construct and shade the region *R* which satisfies all the above constraints.

(c) Using the graph constructed in 8(b), find

(i) The maximum number and minimum number of participants for course *B* if the number of participants for course *A* is 10.

(ii) The minimum cost for these courses [10 *marks*]

Sebuah pusat latihan menawarkan dua kursus, A dan B. Bilangan peserta kursus untuk kursus A ialah x dan bilangan peserta untuk kursus B ialah y. Pengambilan peserta adalah berdasarkan kekangan berikut:

I *Bilangan minimum peserta adalah 40*

II *jumlah maksimum yuran yang dikutip setiap kursus adalah RM 7200, jika bayaran bulanan setiap peserta kursus ialah RM 120 dan bagi kursus B ialah RM80.*

III *Bilangan peserta untuk kursus A adalah selebih-lebihnya dua kali bilangan peserta kursus B.*

(a) *Tuliskan tiga ketaksamaan selain daripada $x \geq 0$ dan $y \geq 0$, yang memenuhi semua kekangan di atas.*

(b) *Dengan menggunakan skala 2 cm kepada 10 peserta pada kedua-dua paksi, bina dan lorek rantau R yang memuaskan semua kekangan di atas.*

(c) *Menggunakan graf yang dibina di 8 (b), cari*

(i) bilangan maksimum dan bilangan minimum peserta untuk kursus B jika bilangan peserta untuk kursus A ialah 10.

(ii) Kos minimum untuk mengadakan kursus tersebut. [10 *markah*}

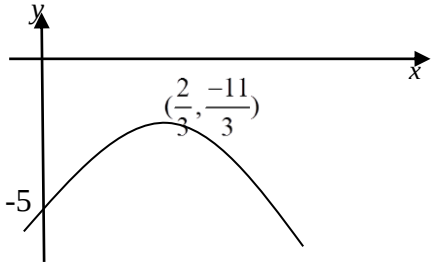
THE END

Answer Set 1 P1 PS 2013

1. (a) { (2,*p*) , (2,-*r*) ,(-3,*q*), (-3 , - *r*) }
   (b) many – to - many
   (c) { *p* , *q* , -*r* }

2. (a) g(*x*) = *x* – 2
   (b) *fg*(*x*) = x^2 –6 x + 18

3. (a) *k* = ¼ *m* = $^{19}/4$
4. (a) b = 5, c = 1 , a = 2 (b) x = 2
5. *p* = 2
6. (a) *b = 2/3* (b) = - $^{11}/_3$
   (b)



7. *x* = 0.2311
8. $y = 64x^{\frac{1}{4}}$
9. (a) S_6 = 1062 (b) T_6 = 452
10. $r = \pm\frac{2}{3}$, *a* = 3 , *a* = 15
11. $r = \frac{3}{2}$, *a* =12
12. $k = \frac{1}{27}$, *h* = -3
13. *m* =6 , *P* (6,20)
14. $x^2 + y^2 – 7x – 2y – 9 = 0$
15. a) $\overrightarrow{AB} = 2\mathbf{i} – 6\,\mathbf{j}$ b) $\hat{AB} = \frac{1}{\sqrt{40}}(2i – 6j)$
16. $m = 2$, $n = -\frac{3}{2}$
17. 16.35 cm^2
18. 149.04^o , 329.04^o
19. $\frac{dy}{dx} = \frac{64}{3}(4x – 5)^7$
20. (2, -20) , (-2,44)
21. $\frac{3}{5}$
22. a) 4 x 8! = 161,280 b) 5! x 4! = 2880
23. a) 38760 (b) 3060
24. $\frac{2}{7}$
25. *h* = 9.012

Answer : Set 2 Paper 1

1. (a) 5 (b) {0.2, 0.25, 0.5, 1}	7. 1.1182
2. (a) p=-4 (b) -1/4	8. $\log_3 x^2 - \log_3 3y$ $2p - 1 - q$
3. (a) $g(x) = \frac{2x-3}{x}$ (b) $2x - 3 = -4x$; $x = 0.5$	9. (a) 46, 41, ……..*z*, 6 ; d = - 5 z = 11 (b) 26, 21, 16
4. $(3m)^2 - 4(1 + 2m)(m - 1) = 0$ $m^2 + 4m + 4 = 0$ m = - 2	10. n = 20
5. (a) $2a - 7 = -1$; a = 3 (b) x = 3	11. y = 27 z = 3
6. $2x^2 - 9x - 5 \geq 0$ $(2x + 1)(x - 5) \geq 0$ $x \leq -\frac{1}{2}$; $z \geq 5$	12. (a) $y = q(\frac{1}{x}) + pq$; q = 2 p = $\frac{3}{2}$ (b) gradient = 3
13. (a) a = 2 Q(2,0) (b) $y + \frac{3}{2} = -\frac{2}{3}(x - 1)$; $6y = -4x - 5$	19. $\frac{dy}{dx} = \frac{x(4-x)}{(2-x)^2}$; $\int_0^1 \frac{2x(4-x)}{(2-x)^2}\,dx = 2\int_0^1 \frac{x(4-x)}{(2-x)^2}\,dx$ $= 2\left[\frac{x^2}{2-x}\right]_0^1 = 2$
14. $2\sin\theta\cos\theta = 0.5$ $\sin 2\theta = 0.5$ $2\theta = 30°, 150°$; $\theta = 15°, 75°$	20. $12+4m$
15. (a) $\frac{5}{3}$ (b) $(\frac{3}{5})(-\frac{5}{13}) + (\frac{4}{5})(\frac{12}{13}) = \frac{33}{65}$	21. k = 4
16. p = 8 q = -1	22. $(a)\ \bar{x} = 14$, $\sum x = 168$ $(b)\ 8.64$
17. (a) $\underline{\mathbf{c}} = (2+k)\underline{\mathbf{i}} + (24)\underline{\mathbf{j}}$ (b) $(2+k)^2 + (24)^2 = (25)^2$; k = 5	23. (a) 6! = 720 (b) 6! – 5!2! = 480
18. 13.09 cm	24. (a) $\frac{7}{30}$ (b) $\frac{11}{15}$
	25. (a) 1 – P(x < 2) = 1 - 17/25 = 8/25 (b) 4a = 8/25 ; a = 2/25

1. (a) 8
   (a) 2
2. $a = 3\,, b = -9\,, c = 6$
3. $x = 121\,,\ x = -129$
4. $p = 9$
5. $mx^2 - (5m^2 + 1)x + 5m = 0$
6. $m = -2k\,, n = 4k^2 - 72$
7. $n = \frac{21}{5}$
8. $x = 27$
9. *(a)* $a = -6\,, d = 3$
   (b) 126
10. $n = 5$
11. *(a)* $r = \frac{1}{3}$ *(b)* $m = 18$
12. *p = 9 and q = 6*
13. $k = \frac{4}{25}\,, m = \frac{15}{7}$
14. *a)* $12\underline{x} - 4\underline{y}$
    b) $3\underline{x} + 3\underline{y}$
15. $15x^2 + 15y^2 - 200x + 42y + 551 = 0$
16. $0^o, 63.44^o, 180^o$

17. *(a)* $-\frac{24}{25}$ *(b)* $-\frac{1}{2}$, *2*
18. *k =2*
19. *12*
20. *a)* $\alpha = \theta$
    b) $A = \frac{3r^2\theta}{8}$
21. *p = -5 q= 2*
22. *a) 360*
    b) 96

23. *(a) 7 (b) 56*

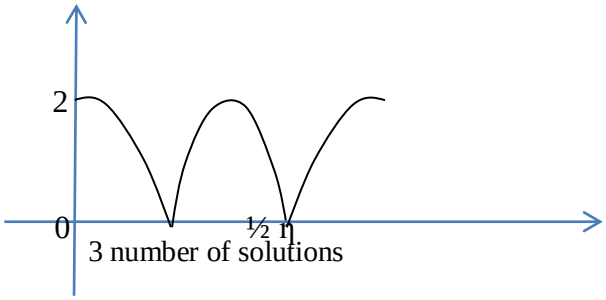
24 *(a)* $\frac{2}{15}$ (b) $\frac{29}{63}$

24. *(a)22*
(b) 0.1304

1. $y = 0.5135,\ -8.763$

$x = -7.685,\ 4.685$

2.(a)



$(b)\ y = \dfrac{1}{x}$ 3 number of solutions

3.$(a) A_1 = \dfrac{1}{2}xy \quad A_2 = \dfrac{1}{2}(x+1)y \quad A_3 = \dfrac{1}{2}(x+2)y$

$d = A_2 - A_1 = \dfrac{y}{2} \quad d = A_3 - A_2 = \dfrac{y}{2}$

(b) $A_1 = 4cm^2$

4.(a) $m = 2$ (b) $(2,8)$ *is a minimum point* (c) $y = x^2 + \dfrac{16}{x} - 4$

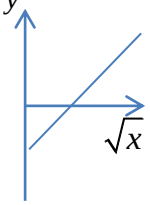
5. (a) $R\left(\dfrac{9}{2}, 10\right)$ (b) $y = -2x + 19$ (c) $S(7,10)$ Area=17.5 unit^2

6. (a) $h = 14 \quad k = 7$ (b) $\sigma^2 = 156.94$

7. (a)

(b)

$\sqrt{x}$	1	2	3	4	5	6
$\log_{10} y$	0.2553	0.4314	0.6075	0.7839	0.9595	1.136



$log_{10}\, \boldsymbol{y} = (log_{10}\, \boldsymbol{q})\sqrt{\boldsymbol{x}} + log_{10}\, \boldsymbol{p}^2$, $\boldsymbol{q} = 1.493 \pm 0.01$, $\boldsymbol{p} = 1.109 \pm 0.01$

8. (a) Q(1, 4) (b) $3\dfrac{1}{3}\boldsymbol{unit}^2$ (c) Volume = 15.73

9.(a)(i) $\overrightarrow{OR} = 10m\underline{q} + 5\underline{p}$ (ii) $\overrightarrow{OS} = 3\underline{p} + 4\underline{q}$, $\overrightarrow{OR} = 3n\underline{p} + 4n\underline{q}$ (b) $n = \dfrac{5}{3}, m = \dfrac{2}{5}$

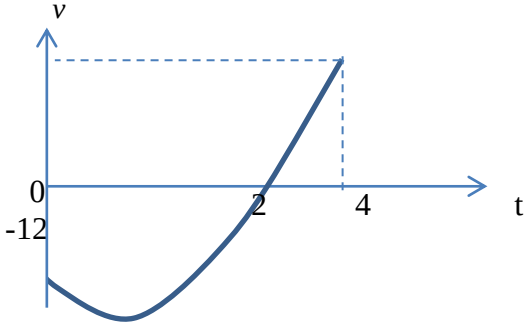
(c) $\angle POQ = 149.1^0$

10. (a)(i) 0.82345 (ii) m = 162.29 (b)(i) 0.2335 (ii) 0.3828

11. (a) $\theta = 72.46^o$ =1.265 rad (b) 6.323 (c) 3.892 unit^2

12. (a) 6 (b) $0 \le t < 2$ (d) 72 m

(c)



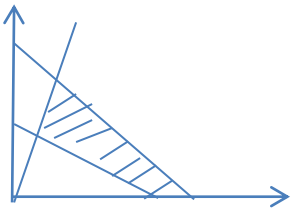
13. (a) BC = 44.81cm (b) $\angle ACB = 78.09^0$ (c) 480cm^2 (d) CD = 68.95cm

14. (a) x = 125 , y = 7 , z = 3.20 (b) 137.64 (c) $Q_0 = 14530.66$ (d) 116.99 @ 117

15.(a) $15x + 35y \geq 105$ or $3x + 7y \geq 21$

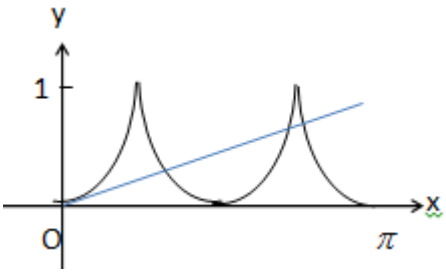
$40x + 40y \leq 320$ or $x + y \leq 8$

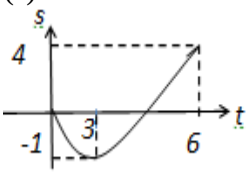
$y \leq 3x$



(c)(i) $1 \leq x \leq 5$ (ii) Maximum profit = RM3(2) + RM5(6) = RM36

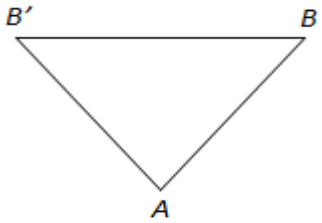
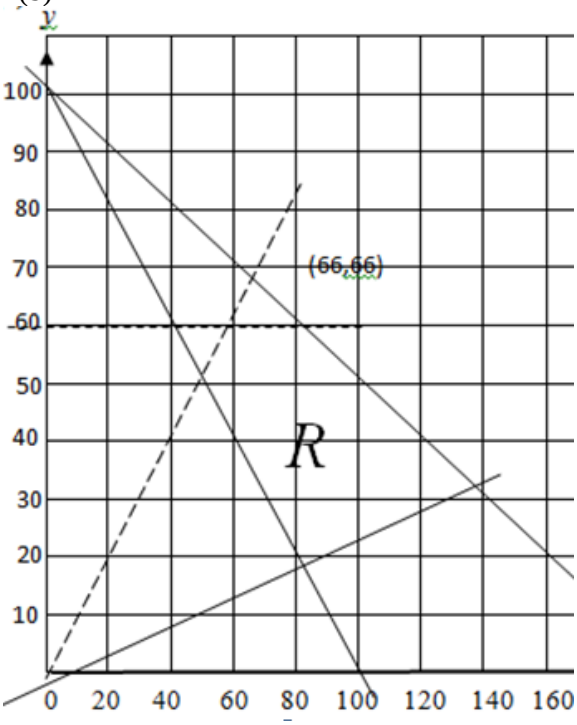
ANSWER (SET 2) (PAPER 2)

NO	ANSWER	NO	ANSWER
1	x =1.157, 2.593 y = 0.686, -2.186	2	(a) 2.898
3	(a) $13\frac{1}{27}$ (b) 297 (c) $r = \frac{4}{9}$ (d) 834.07	4	(a) (i) N = 6 (ii) 48 (b) mean = 22 variance = 34 596
5	$(a)\ (i)\quad T = \left(\frac{4}{5}, \frac{12}{5}\right)$ (ii) $2y = x + 4$ $(b)\ \frac{16}{5}$	6	(a)  $(b)\quad y = \frac{x}{\pi}$, 4 solutions
7	<table><tr><td>x^3</td><td>0.125</td><td>1</td><td>3.38</td><td>8</td><td>12.17</td><td>15.63</td></tr><tr><td>$x + y$</td><td>1.56</td><td>2</td><td>3.19</td><td>5.5</td><td>7.58</td><td>9.31</td></tr></table> $(c)\quad x + y = \frac{k}{p}x^3 + k$ $p = 3, \quad k = 1.5$	8	(a) (i) $2y = x - 3$ (ii) $\frac{1}{3}$ (b) 2π
9	$(a)\ \angle BOC = \frac{2}{3}\pi rad\ //\ 0.095 rad$ (b) 19.26 cm (c) 9.018 cm^2	10	$(a)(i)\ \overrightarrow{QC} = \frac{1}{2}\underline{x} + \frac{1}{2}\underline{y}$ $(ii)\ \overrightarrow{AD} = -\underline{x} + \frac{1}{3}\underline{y}$ $(c)\quad k = \frac{3}{2}$
11	(a) (i) 0.7477 (ii) 1.82 (b) (i) 0.1587 (ii) 1.4098 // 1.1	12.	$(a)\quad k = \frac{2}{27}, h = \frac{1}{3}$ (b) $t = \frac{3}{2}s$

<table>
<tr><th>NO</th><th>ANSWER</th><th>NO</th><th>ANSWER</th></tr>
<tr><td></td><td></td><td></td><td>(c)
 

S= 1+1+4= 6m</td></tr>
<tr><td>13</td><td>(a) 250
(b) 5
(c) 126.75</td><td rowspan="2">14</td><td rowspan="2">(a) (i) $\angle CED = 129.17^o$

(ii) 4 cm

(b) 26.08 cm^2
(c)
 
</td></tr>
<tr><td>15</td><td>(a) $x + y \geq 100$
$x - 4y \leq 10$
$60x + 120y \leq 12000$
(b)
 
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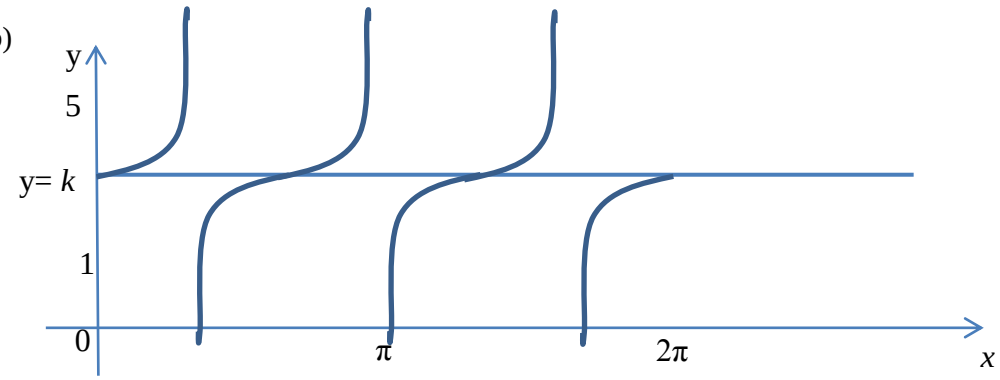
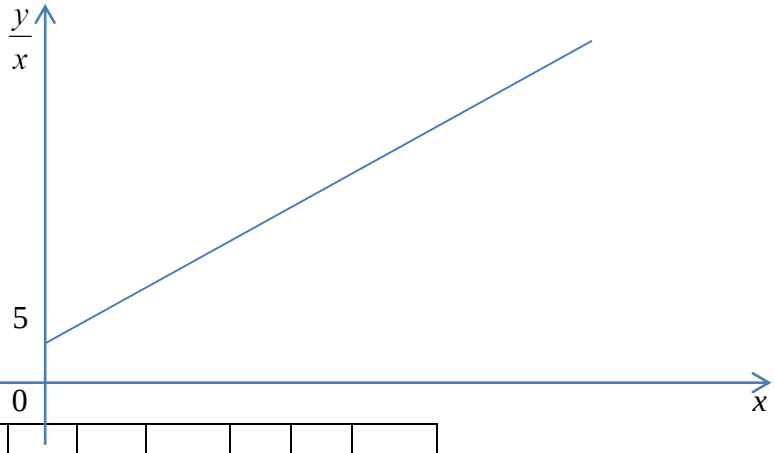
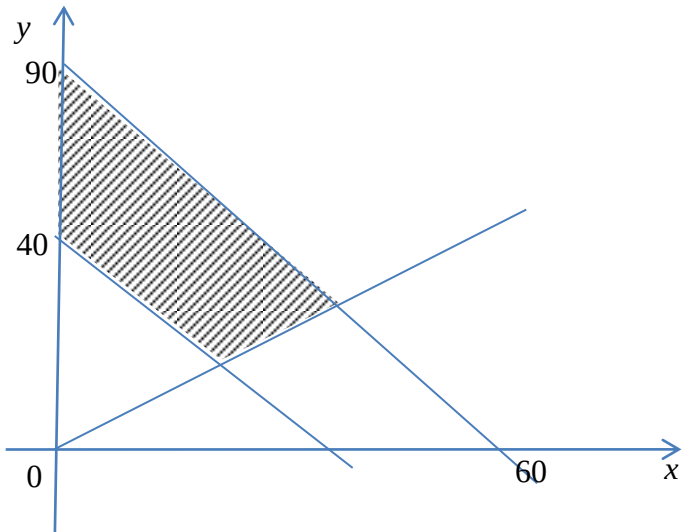
</table>

ANSWER SET 3 Paper 2

1	$x = 1\frac{1}{3}, -2 \qquad y = \frac{-11}{9},\ 1$
2	$(a) \log_3 \left(\frac{5x^2 - 8}{x} \right)^2 \qquad (b)\ x = \frac{8}{5}$
3	$(a)\ \ a = 2.236\ , r = 0.8323 \quad (b)\ \ 3.998$

4	$(a)\ \frac{k+7}{2}$ $(b)\ (i)\ 5<k<9$ $(ii)\ k=7$ $(c)\ \sigma^2 = 8.5$
5	(a) $r=4$ $(b)\ y=\frac{1}{2}x-5$ $(c)\ m = 1, n = 2$
6	(b)  k= 3
7	 $\frac{y}{x}$: 6.8, 8.6, 10.6, 12, 14, 15.8 (c) (i) $p = 5$ (ii) $k = 3$ (iii) 34.56
8	$(a)\ y=\int -2x$ $=-x^2+c$ $8=-(1)^2+c$ $y=-x^2+9$ $(b)\ \frac{28}{3}$ $(c)\ k=4$

9	(a) 0.7663 or 0.7662 (b) 11.35 (c) 1.354
10	(a) $-\underline{x}+\underline{y}$ (b) (i) $\overrightarrow{OX}=\frac{2}{5}(1-m)x+\frac{2}{5}my$ (ii) $\overrightarrow{DX}=-\frac{1}{5}kx+\frac{1}{5}y$ (c) $m=\frac{1}{2}$ $k=\frac{1}{4}$
11	$(a)(i)$ $n=24$ (ii) 0.03077 $(b)(i)$ $P\left(z<\frac{110-\mu}{\sigma}\right)=0.12$ $P\left(z>\frac{1125-\mu}{\sigma}\right)=0.35$ $\frac{110-\mu}{\sigma}=-1.175$ $\frac{1125-\mu}{\sigma}=0.385$ $\sigma = 9.615$, $\mu = 121.301$ (ii) 0.0259
12	(a) (i) $P\hat{S}T=33.24$ (ii) 7.642 (iii) 10.47 (b) RU = 7.839
13	(a) x =130, y =RM8.55, z = RM20 (b) (i) 116.45 (ii) 1159.30 (c) 133.92
14	(a) 5 (b) v = 5t – $2t^2$ +25 $v=28\frac{1}{8}$ (c) k = 5 (d) 270.84 also accept 270.83, 1625/6, 270 5/6
15	$x+y \geq 40$ $120x+80y \leq 7200$ $x \leq 2y$  (d) 30, 75 RM3200

BAHAGIAN PENGURUSAN SEKOLAH BERASRAMA PENUH
DAN SEKOLAH KECEMERLANGAN
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MODUL X A-PLUS
SEKOLAH BERASRAMA PENUH TAHUN 2013

ADDITIONAL MATHEMATICS

Panel Penyedia:

1	**EN. ABDUL RAHIM BIN BUJANG** SEKOLAH TUN FATIMAH (STF)	7	**EN. JUPRI BIN BASARI** SMS LAHAD DATU (SMSLD)
2	**PN. SARIPAH BINTI AHMAD** SM SAINS MUZAFFAR SYAH, MELAKA (MOZAC)	8	**PN. ROHAIZA BINTI RAMLI** SMS ALAM SHAH (ASIS)
3	**PN. AZIZAH BINTI KAMAR** SEKOLAH BERASRAMA PENUH INTEGERASI SABAK BERNAM (SBPISB)	9	**EN. MOHD NOHARDI BIN MAT JUSOH** SM SAINS SETIU (SAIS)
4	**TN. HJ. MOHD RAHIMI BIN RAMLI** SEK MEN SAINS SULTAN MAHMUD (SESMA)	10	**EN. ABDUL RAHIM NAPIAH** SMS TUN SHEH SYED SHAHABUDIN (SMSTSSS)
5	**PN. SITI AZLINA BINTI HAIRUDIN** SMS TUANKU MUNAWIR (SASER)	11	**PN. ROHAYA BINTI MURAT** SMS TELUK INTAN (SEMESTI)
6	**PN. CHE RUS BINTI HASHIM** SM SULTAN ABDUL HALIM KEDAH (SMSAH)	12	**EN. ALIAKBAR BIN ASRI** SMS LABUAN (SMSL)

The following formulae may be helpful in answering the questions. The symbols given are the ones commonly used.

ALGEBRA

1. $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
2. $a^m \times a^n = a^{m+n}$
3. $a^m \div a^n = a^{m-n}$
4. $(a^m)^n = a^{mn}$
5. $\log_a mn = \log_a m + \log_a n$
6. $\log_a \dfrac{m}{n} = \log_a m - \log_a n$
7. $\log_a m^n = n \log_a m$
8. $\log_a b = \dfrac{\log_c b}{\log_c a}$
9. $T_n = a + (n-1)d$
10. $S_n = \dfrac{n}{2}[2a + (n-1)d]$
11. $T_n = ar^{n-1}$
12. $S_n = \dfrac{a(r^n - 1)}{r - 1} = \dfrac{a(1 - r^n)}{1 - r}$, $r \neq 1$
13. $S_\infty = \dfrac{a}{1 - r}$, $|r| < 1$

CALCULUS

1. $y = uv$, $\dfrac{dy}{dx} = u\dfrac{dv}{dx} + v\dfrac{du}{dx}$
2. $y = \dfrac{u}{v}$, $\dfrac{dy}{dx} = \dfrac{v\dfrac{du}{dx} - u\dfrac{dv}{dx}}{v^2}$
3. $\dfrac{dy}{dx} = \dfrac{dy}{du} \times \dfrac{du}{dx}$
4. Area under a curve
   $= \int_a^b y\,dx$ or
   $= \int_a^b x\,dy$
5. Volume of revolution
   $= \int_a^b \pi y^2\,dx$ or
   $= \int_a^b \pi x^2\,dy$

GEOMETRY

1. Distance $= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
2. Mid point
   $(x, y) = \left(\dfrac{x_1 + x_2}{2}, \dfrac{y_1 + y_2}{2}\right)$
3. Division of line segment by a point
   $(x, y) = \left(\dfrac{nx_1 + mx_2}{m+n}, \dfrac{ny_1 + my_2}{m+n}\right)$
4. Area of triangle
   $= \dfrac{1}{2}\left|(x_1y_2 + x_2y_3 + x_3y_1) - (x_2y_1 + x_3y_2 + x_1y_3)\right|$
5. $\left|\underline{r}\right| = \sqrt{x^2 + y^2}$
6. $\hat{r} = \dfrac{x\underset{\sim}{i} + y\underset{\sim}{j}}{\sqrt{x^2 + y^2}}$

STATISTICS

1. $\bar{x} = \dfrac{\sum x}{N}$

2. $\bar{x} = \dfrac{\sum fx}{\sum f}$

3. $\sigma = \sqrt{\dfrac{\sum (x - \bar{x})^2}{N}} = \sqrt{\dfrac{\sum x^2}{N} - \bar{x}^2}$

4. $\sigma = \sqrt{\dfrac{\sum f(x - \bar{x})^2}{\sum f}} = \sqrt{\dfrac{\sum fx^2}{\sum f} - \bar{x}^2}$

5. $m = \mathrm{L} + \left(\dfrac{\frac{1}{2}N - F}{f_m} \right) C$

6. $I = \dfrac{Q_1}{Q_0} \times 100$

7 $\bar{I} = \dfrac{\sum W_i I_i}{\sum W_i}$

8 ${}^{n}P_r = \dfrac{n!}{(n-r)!}$

9 ${}^{n}C_r = \dfrac{n!}{(n-r)!r!}$

10 $\mathrm{P}(A \cup B) = \mathrm{P}(A) + \mathrm{P}(B) - \mathrm{P}(A \cap B)$

11 $\mathrm{P}(X = r) = {}^{n}C_r \, p^r \, q^{n-r}$, $p + q = 1$

12 Mean, $\mu = np$

13 $\sigma = \sqrt{npq}$

14 $\mathrm{Z} = \dfrac{X - \mu}{\sigma}$

TRIGONOMETRY

1. Arc length, $s = r\theta$
2. Area of sector, $\mathrm{A} = \dfrac{1}{2} r^2 \theta$
3. $\sin^2 A + \cos^2 A = 1$
4. $\sec^2 A = 1 + \tan^2 A$
5. $\mathrm{cosec}^2 A = 1 + \cot^2 A$
6. $\sin 2A = 2 \sin A \cos A$
7. $\cos 2A = \cos^2 A - \sin^2 A$
   $= 2\cos^2 A - 1$
   $= 1 - 2\sin^2 A$
8. $\sin(A \pm B) = \sin A \cos B \pm \cos A \sin B$
9. $\cos(A \pm B) = \cos A \cos B \mp \sin A \sin B$
10. $\tan(A \pm B) = \dfrac{\tan A \pm \tan B}{1 \mp \tan A \tan B}$
11. $\tan 2A = \dfrac{2\tan A}{1 - \tan^2 A}$
12. $\dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$
13. $a^2 = b^2 + c^2 - 2bc \cos A$
14. Area of triangle $= \dfrac{1}{2} ab \sin C$

UPPER TAIL PROBABILITIES $Q(z)$ OF THE NORMAL DISTRIBUTION N(0,1)

z	0	1	2	3	4	5	6	7	8	9	1 2 3	4 5 6	7 8 9
											SUBTRACT		
0.0	.5000	.4960	.4920	.4880	.4840	.4801	.4761	.4721	.4681	.4641	4 8 12	16 20 24	28 32 36
0.1	.4602	.4562	.4522	.4483	.4443	.4404	.4364	.4325	.4286	.4247	4 8 12	16 20 24	28 32 36
0.2	.4207	.4168	.4129	.4090	.4052	.4013	.3974	.3936	.3897	.3859	4 8 12	15 19 23	27 31 35
0.3	.3821	.3783	.3745	.3707	.3669	.3632	.3594	.3557	.3520	.3483	4 7 11	15 19 22	26 30 34
0.4	.3446	.3409	.3372	.3336	.3300	.3264	.3228	.3192	.3156	.3121	4 7 11	14 18 22	25 29 32
0.5	.3085	.3050	.3015	.2981	.2946	.2912	.2877	.2843	.2810	.2776	3 7 10	14 17 20	24 27 31
0.6	.2743	.2709	.2676	.2643	.2611	.2578	.2546	.2514	.2483	.2451	3 7 10	13 16 19	23 26 29
0.7	.2420	.2389	.2358	.2327	.2296	.2266	.2236	.2206	.2177	.2148	3 6 9	12 15 18	21 24 27
0.8	.2119	.2090	.2061	.2033	.2005	.1977	.1949	.1922	.1894	.1867	3 5 8	11 14 16	19 22 25
0.9	.1841	.1814	.1788	.1762	.1736	.1711	.1685	.1660	.1635	.1611	3 5 8	10 13 15	18 20 23
1.0	.1587	.1562	.1539	.1515	.1492	.1469	.1446	.1423	.1401	.1379	2 5 7	9 12 14	16 19 21
1.1	.1357	.1335	.1314	.1292	.1271	.1251	.1230	.1210	.1190	.1170	2 4 6	8 10 12	14 16 18
1.2	.1151	.1131	.1112	.1093	.1075	.1056	.1038	.1020	.1003	.0985	2 4 6	7 9 11	13 15 17
1.3	.0968	.0951	.0934	.0918	.0901	.0885	.0869	.0853	.0838	.0823	2 3 5	6 8 10	11 13 14
1.4	.0808	.0793	.0778	.0764	.0749	.0735	.0721	.0708	.0694	.0681	1 3 4	6 7 8	10 11 13
1.5	.0668	.0655	.0643	.0630	.0618	.0606	.0594	.0582	.0571	.0559	1 2 4	5 6 7	8 10 11
1.6	.0548	.0537	.0526	.0516	.0505	.0495	.0485	.0475	.0465	.0455	1 2 3	4 5 6	7 8 9
1.7	.0446	.0436	.0427	.0418	.0409	.0401	.0392	.0384	.0375	.0367	1 2 3	4 4 5	6 7 8
1.8	.0359	.0351	.0344	.0336	.0329	.0322	.0314	.0307	.0301	.0294	1 1 2	3 4 4	5 6 6
1.9	.0287	.0281	.0274	.0268	.0262	.0256	.0250	.0244	.0239	.0233	1 1 2	2 3 4	4 5 5
2.0	.0228	.0222	.0217	.0212	.0207	.0202	.0197	.0192	.0188	.0183	0 1 1	2 2 3	3 4 4
2.1	.0179	.0174	.0170	.0166	.0162	.0158	.0154	.0150	.0146	.0143	0 1 1	2 2 2	3 3 4
2.2	.0139	.0136	.0132	.0129	.0125	.0122	.0119	.0116	.0113	.0110	0 1 1	1 2 2	2 3 3
2.3	.0107	.0104	.0102								0 1 1	1 1 2	2 2 2
				.$0^2$990	.$0^2$964	.$0^2$939	.$0^2$914				3 5 8	10 13 15	18 20 23
								.$0^2$889	.$0^2$866	.$0^2$842	2 5 7	9 12 14	16 18 21
2.4	.$0^2$820	.$0^2$798	.$0^2$776	.$0^2$755	.$0^2$734						2 4 6	8 11 13	15 17 19
						.$0^2$714	.$0^2$695	.$0^2$676	.$0^2$657	.$0^2$639	2 4 6	7 9 11	13 15 17
2.5	.$0^2$621	.$0^2$604	.$0^2$587	.$0^2$570	.$0^2$554	.$0^2$539	.$0^2$523	.$0^2$508	.$0^2$494	.$0^2$480	2 3 5	6 8 9	11 12 14
2.6	.$0^2$466	.$0^2$453	.$0^2$440	.$0^2$427	.$0^2$415	.$0^2$402	.$0^2$391	.$0^2$379	.$0^2$368	.$0^2$357	1 2 3	5 6 7	8 9 10
2.7	.$0^2$347	.$0^2$336	.$0^2$326	.$0^2$317	.$0^2$307	.$0^2$298	.$0^2$289	.$0^2$280	.$0^2$272	.$0^2$264	1 2 3	4 5 6	7 8 9
2.8	.$0^2$256	.$0^2$248	.$0^2$240	.$0^2$233	.$0^2$226	.$0^2$219	.$0^2$212	.$0^2$205	.$0^2$199	.$0^2$193	1 1 2	3 4 4	5 6 6
2.9	.$0^2$187	.$0^2$181	.$0^2$175	.$0^2$169	.$0^2$164	.$0^2$159	.$0^2$154	.$0^2$149	.$0^2$144	.$0^2$139	0 1 1	2 2 3	3 4 4
3.0	.$0^2$135	.$0^2$131	.$0^2$126	.$0^2$122	.$0^2$118	.$0^2$114	.$0^2$111	.$0^2$107	.$0^2$104	.$0^2$100	0 1 1	2 2 2	3 3 4
3.1	.$0^3$968	.$0^3$935	.$0^3$904								3 6 9	13 16 19	22 25 28
				.$0^3$874	.$0^3$845	.$0^3$816	.$0^3$789				3 6 8	11 14 17	20 22 25
								.$0^3$762	.$0^3$736	.$0^3$711	2 5 7	10 12 15	17 20 22
3.2	.$0^3$687	.$0^3$664	.$0^3$641	.$0^3$619	.$0^3$598						2 4 7	9 11 13	15 18 20
						.$0^3$577	.$0^3$557	.$0^3$538	.$0^3$519	.$0^3$501	2 4 6	8 9 11	13 15 17
3.3	.$0^3$483	.$0^3$466	.$0^3$450	.$0^3$434	.$0^3$419						2 3 5	6 8 10	11 13 14
						.$0^3$404	.$0^3$390	.$0^3$376	.$0^3$362	.$0^3$349	1 3 4	5 7 8	9 10 12
3.4	.$0^3$337	.$0^3$325	.$0^3$313	.$0^3$302	.$0^3$291	.$0^3$280	.$0^3$270	.$0^3$260	.$0^3$251	.$0^3$242	1 2 3	4 5 6	7 8 9
3.5	.$0^3$233	.$0^3$224	.$0^3$216	.$0^3$208	.$0^3$200	.$0^3$193	.$0^3$185	.$0^3$178	.$0^3$172	.$0^3$165	1 1 2	3 4 4	5 6 7
3.6	.$0^3$159	.$0^3$153	.$0^3$147	.$0^3$142	.$0^3$136	.$0^3$131	.$0^3$126	.$0^3$121	.$0^3$117	.$0^3$112	0 1 1	2 2 3	3 4 5
3.7	.$0^3$108	.$0^3$104	.$0^3$100	.$0^4$96	.$0^4$92	.$0^4$88	.$0^4$85	.$0^4$82	.$0^4$78	.$0^4$75			
3.8	.$0^4$72	.$0^4$69	.$0^4$67	.$0^4$64	.$0^4$62	.$0^4$59	.$0^4$57	.$0^4$54	.$0^4$52	.$0^4$50			
3.9	.$0^4$48	.$0^4$46	.$0^4$44	.$0^4$42	.$0^4$41	.$0^4$39	.$0^4$37	.$0^4$36	.$0^4$34	.$0^4$33			

For negative z use the relation:

$$Q(z) = 1 - Q(-z) = P(-z)$$

Example: if $u \sim$ N (0,1), *find* (*a*) Prob ($u > 2$), (*b*) Prob ($0 < u < 2$), (*c*) Prob ($|u| > 2$), (*d*) Prob ($|u| < 2$). The desired probabilities are (*a*) $Q(2) = .0228$, (*b*) $Q(0) - Q(2) = .5000 - .0228 = .4772$, (*c*) $2Q(2) = .0456$, (*d*) $1 - 2Q(2) = .9544$.

If $v \sim N(\mu,\sigma^2)$, Prob ($v > x$) is given by $Q(z)$ with $z = (x - \mu)/\sigma$.

UPPER QUANTILES $z_{[P]}$ OF THE NORMAL DISTRIBUTION N(0,1)

P	Q	z	P	Q	z	P	Q	z	P	Q	z	Q	z
.50	.50	0.000	.85	.15	1.036	.975	.025	1.960	.990	.010	2.326	.$0^3$4	3.353
.55	.45	0.126	.86	.14	1.080	.976	.024	1.977	.991	.009	2.366	.$0^3$3	3.432
.60	.40	0.253	.87	.13	1.126	.977	.023	1.995	.992	.008	2.409	.$0^3$2	3.540
.65	.35	0.385	.88	.12	1.175	.978	.022	2.014	.993	.007	2.457	.$0^3$1	3.719
.70	.30	0.524	.89	.11	1.227	.979	.021	2.034	.994	.006	2.512	.$0^4$5	3.891
.75	.25	0.674	.90	.10	1.282	.980	.020	2.054	.995	.005	2.576	.$0^4$1	4.265
.76	.24	0.706	.91	.09	1.341	.981	.019	2.075	.996	.004	2.652	.$0^5$5	4.417
.77	.23	0.739	.92	.08	1.405	.982	.018	2.097	.997	.003	2.748	.$0^5$1	4.753
.78	.22	0.772	.93	.07	1.476	.983	.017	2.120	.998	.002	2.878	.$0^6$5	4.892
.79	.21	0.806	.94	.06	1.555	.984	.016	2.144	.999	.001	3.090	.$0^6$1	5.199
.80	.20	0.842	.950	.050	1.645	.985	.015	2.170	.9991	.$0^3$9	3.121	.$0^7$5	5.327
.81	.19	0.878	.955	.045	1.695	.986	.014	2.197	.9992	.$0^3$8	3.156	.$0^7$1	5.612
.82	.18	0.915	.960	.040	1.751	.987	.013	2.226	.9993	.$0^3$7	3.195	.$0^8$5	5.731
.83	.17	0.954	.965	.035	1.812	.988	.012	2.257	.9994	.$0^3$6	3.239	.$0^8$1	5.998
.84	.16	0.994	.970	.030	1.881	.989	.011	2.290	.9995	.$0^3$5	3.291	.$0^9$5	6.109

The tabulated function is $z_{[P]}$: if $u \sim$ N(0,1), Prob ($u < z_{[P]}$) $= P$, Prob ($u > z_{[P]}$) $= 1 - P = Q$, and (for $P > \frac{1}{2}$) Prob ($|u| > z_{[P]}$) $= 2Q$.

Lower quantiles ($P < \frac{1}{2}$) are given by:

$$z_{[P]} = -z_{[1-P]}$$

PROBABILITY DENSITY $\varphi(z)$ OF THE NORMAL DISTRIBUTION N(0,1)

z	0	1	2	3	4	5	6	7	8	9
0.	0.399	.397	.391	.381	.368	.352	.333	.312	.290	.266
1.	0.242	.218	.194	.171	.150	.130	.111	.094	.079	.066
2.	0.0540	.0440	.0355	.0283	.0224	.0175	.0136	.0104	.0079	.0060
3.	0.00443	.00327	.00238	.00172	.00123	.00087	.00061	.00042	.00029	.00020
4.	0.$0^3$134	.$0^4$89	.$0^4$59	.$0^4$39	.$0^4$25	.$0^4$16	.$0^4$10	.$0^5$64	.$0^5$40	.$0^5$24

For $z < 0$ use the relation:

$$\varphi(z) = \varphi(-z)$$

The tabulated functions are defined thus:

$$\varphi(z) = \sqrt{\left(\frac{1}{2\pi}\right)} \exp\left(-\tfrac{1}{2}z^2\right)$$

$$Q(z) = \int_z^\infty \varphi(u)\, du$$

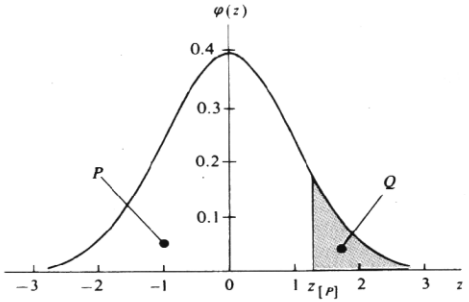
$$\int_{-\infty}^{z_{[P]}} \varphi(u)\, du = P$$

In the figure the probability density is represented by the ordinate of the graph, and the tail probabilities are represented by areas under the graph.

The probability density of the distribution N(μ, σ^2) is

$$f(x) = \frac{1}{\sigma}\varphi(z)$$

with $z = (x - \mu)/\sigma$.



SET 1, PAPER 1

Answer all questions
Jawab semua soalan
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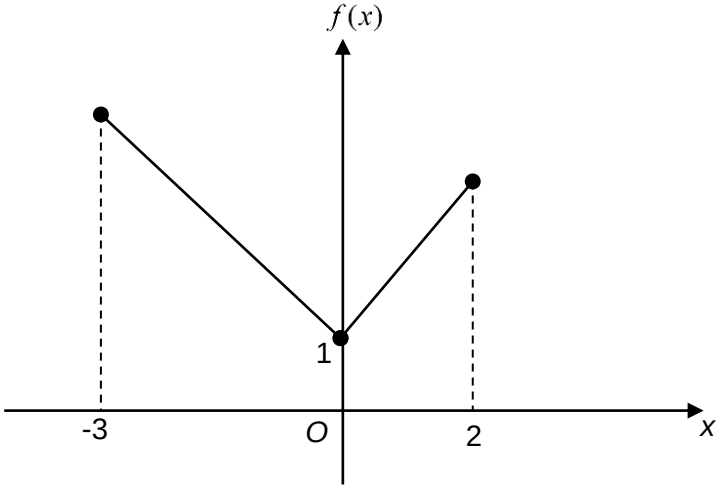
1 Diagram 1 shows part of a graph of a function $f : x \to |2x| + p$, where p is constant for the domain $-3 \le x \le 2$.
Rajah 1 menunjukkan sebahagian dari graf untuk fungsi $f : x \to |2x| + p$, *dengankeadaan p ialah pemalar untuk domain* $-3 \le x \le 2$.



Diagram/*Rajah* 1

State
Nyatakan

(a) the value of p,
nilai p,

(b) the range.
julat.

Answer/*Jawapan* :

(a)

(b)

2 A function f is defined as $h: x \to \frac{p+x}{3+2x}, x \neq k$ and p is a constant.

Satu fungsi ditakrifkan sebagai $h: x \to \frac{p+x}{3+2x}, x \neq k$ *dan* p *ialah pemalar.*

(a) Determine the value of k,
Nyatakan nilai k,

(b) Given value 2 is mapped to itself by the function f, find the value p and another value of x which is mapped to itself.
Diberi 2 memetakan kepada dirinya sendiri dibawah fungsi f, *cari nilai p dan nilai x yang satu lagi yang memetakan kepada dirinya sendiri.*

Answer/*Jawapan* :

(a)

(b)

---

3 Given functions $f: x \to 2x+5$ and $fg: x \to 13-2x$.
Diberi fungsi $f: x \to 2x+5$ *dan* $fg: x \to 13-2x$.

Find
Cari

(a) gf,

(b) the values of x if $gf(x^2+1) = 5x-6$.
nilai-nilai x *jika* $gf(x^2+1) = 5x-6$.

Answer/*Jawapan* :

(a)

(b)

4 The function $y = x^2 - 4px + 5p^2 + 1$ has a minimum value $2q + q^2$, where p and q are constant.
Express p in term of q.

Satu fungsi $y = x^2 - 4px + 5p^2 + 1$ *mempunyai nilai minimum* $2q + q^2$*, dengan keadaan p dan q adalah pemalar.*
Ungkapkan p dalam sebutan q.

Answer/*Jawapan* :

---

5 Given α and β are the roots of the equation $x^2 - 2x + k = 0$, whereas 2α and 2β are the roots of the equation $x^2 + mx + 9 = 0$.
Calculate the possible values for k and m.

Diberi α *dan* β *ialah punca-punca bagi persamaan* $x^2 - 2x + k = 0$*, manakala* 2α *dan* 2β *ialah punca-punca bagi persamaan* $x^2 + mx + 9 = 0$.
Kira nilai-nilai yang mungkin bagi k dan m

Answer/*Jawapan* :

---

6 Find the range of values of x if $x \leq \dfrac{-3}{1-2x}$.

Cari julat nilai-nilai x jika $x \leq \dfrac{-3}{1-2x}$.

Answer/*Jawapan* :

7 Solve the equation $3^{n+2} - 3^n + 27(3^{n-1}) = 34$.

Selesaikan persamaan $3^{n+2} - 3^n + 27(3^{n-1}) = 34.$

Answer/*Jawapan* :

8 Given $\log_9 y = P$ and $\log_{27} 3y = Q$,express P in term of Q.

Diberi $\log_9 y = P$ *dan* $\log_{27} 3y = Q$ *, ungkapkan* P *dalam* Q .

Answer/*Jawapan* :

9 The sum of 14 terms in an arithmetic progression is 224 and the sum of the odd terms is 105. Find the first term and the common different of the progression.

Jumlah 14 sebutan satu janjang aritmetik ialah 224. Hasil tambah bagi sebutan-sebutan ganjilnya ialah 105.
Cari sebutan pertama dan beza sepunya janjang.

Answer/*Jawapan* :

10 Given the first term of a geometric progression is $\frac{1}{2}p^2$ and the fourth term is $\frac{27}{128}p^2$.

Find the sum to infinity of this progression.

Diberi sebutan pertama satu janjang geometri ialah $\frac{1}{2}p^2$ *dan sebutan keempatnya ialah* $\frac{27}{128}p^2$.

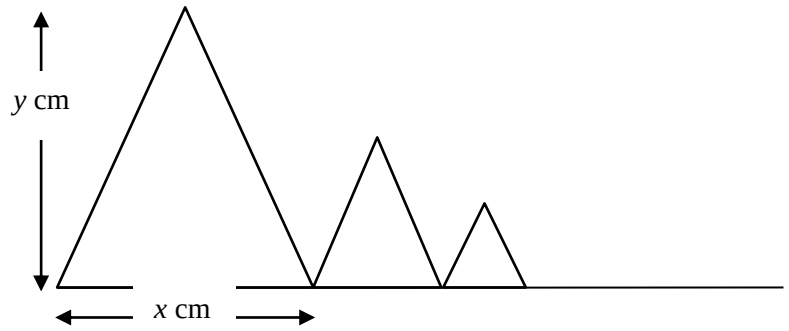
Cari hasil tambah hingga ketakterhinggan janjang ini.

Answer/*Jawapan* :

---

11 Diagram 11 shows the arrangement of the first three triangles for an infinite series of similar triangles.

Rajah 11 menunjukkan susunan tiga segitiga-segitiga serupa sehingga ketakterhinggaan



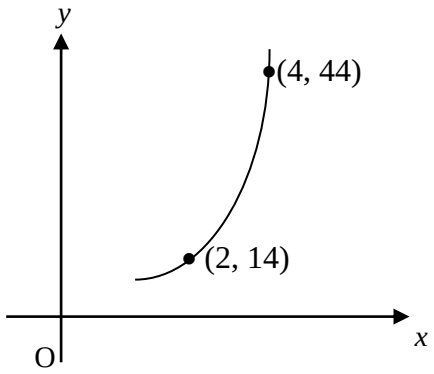
Diagram/*Rajah* 11

The first triangle has a base of measurement *x* cm and height *y* cm. The measurements for the base and height of the following triangle is half of the measurements of the base and the height of the previous triangle.
It is given that $x = 80\ cm$ and $y = 120\ cm$, find, in cm^2, the sum all of the five triangles after the third triangle.

Segitiga yang pertama berukuran tapak x cm dan tinggi y cm. Ukuran-ukuran tapak dan tinggi makin berkurangan separuh daripada ukuran-ukuran segitiga-segitiga yang sebelumnya. Diberikan $x = 80\ cm$ *dan* $y = 120\ cm$, *cari , dalam* cm^2 *, jumlah lima segitiga selepas segitiga yang ketiga..*

Answer/*Jawapan* :

12 Diagram 12 shows part of the curve *y* against *x*.
Rajah 12 menunjukkan sebahagian dari lengkung y melawan x.



Diagram/*Rajah* 12

It is known that *x* and *y* are related by the linear equation $\frac{y}{x} = kx + h$, where *h* and *k* are constants.

Diketahui x dan y dihubungkan oleh persamaan linear $\frac{y}{x} = kx + h$ *,dengan keadaan h dan k adalah pemalar.*

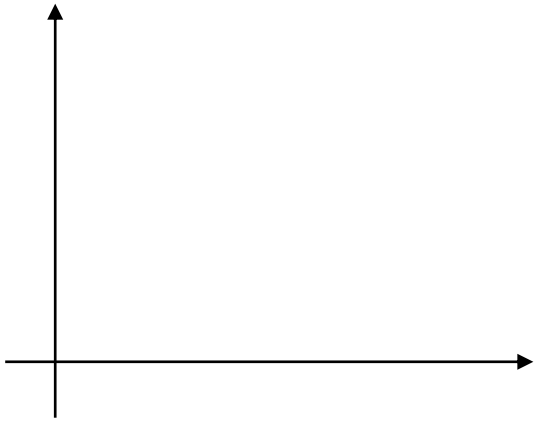
(a) Sketch the straight line graph for the equation $\frac{y}{x} = kx + h$.

Lakar garis lurus untuk persamaan $\frac{y}{x} = kx + h$

(b) Find the value of *h* and of *k*.
Cari nilai h dan dan k.

Answer/*Jawapan* :

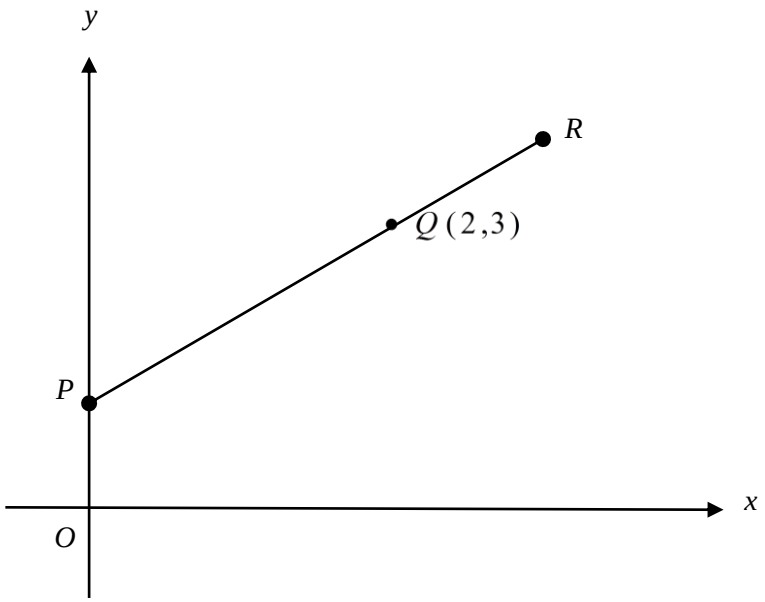
(a)



(b)

13 Diagram 13 shows *P, Q,* and *R* are three points on the straight line $2y = x + 4$ such that $PQ : PR = 4 : 5$.

Rajah 12 menunjukkan P, Q dan R adalah tiga titik di atas garis lurus $2y = x + 4$ *dengan keadaan* $PQ : PR = 4 : 5$



Diagram/*Rajah* 12

Find the equation of the straight line which passes through the point *R* and perpendicular to *PQR*.

Cari persamaan garis lurus yang melalui titik R dan berserenjang dengan garis lurus PQR

14

$ABCD$ is a parallelogram. T is the midpoint of BC. Given $\overrightarrow{AB} = 2\mathbf{i} + 3\mathbf{j}$ and $\overrightarrow{AT} = \frac{3}{2}\mathbf{i} + \mathbf{j}$, where **i** and **j** are unit vector unit parallel to x-axis and y-axis.

*$ABCD$ ialah sisiempat selari. T ialah titik tengah BC. Diberi $\overrightarrow{AB} = 2\boldsymbol{i} + 3\boldsymbol{j}$ dan $\overrightarrow{AT} = \frac{3}{2}\boldsymbol{i} + \boldsymbol{j}$, dengan keadaan **i** dan **j** ialah vektor unit yang selari dengan paksi-x dan paksi- y*

Find
Cari

(a) $\overrightarrow{AD}$, in terms of **i** and/or **j**.
$\overrightarrow{AD}$, *dalam sebutan* ***i*** *dan/atau* **j.**

(b) the length of DT.
panjang DT.

Answer/*Jawapan* :

(a)

(b)

15 *Solution to this question by scale drawing will not be accepted.*
Jawapan secara berskala tidak diterima untuk soalan ini.

Given $\mathbf{a} = 2\mathbf{i} - \mathbf{j}$, $\mathbf{b} = \mathbf{i} + 3\mathbf{j}$, $P(1, -2)$ and $Q(5, 3)$. If $\overrightarrow{PQ} = m\mathbf{a} + n\mathbf{b}$ where m and n are constants, find

Diberi $\boldsymbol{a} = 2\boldsymbol{i} - \boldsymbol{j}$, $\boldsymbol{b} = \boldsymbol{i} + 3\boldsymbol{j}$, *P(1, –2) dan Q(5, 3). Jika* $\overrightarrow{PQ} = m\boldsymbol{a} + n\boldsymbol{b}$ *dengan keadaan m dan n ialah pemalar, cari*

(a) the value of m and of n,
nilai m dan n,

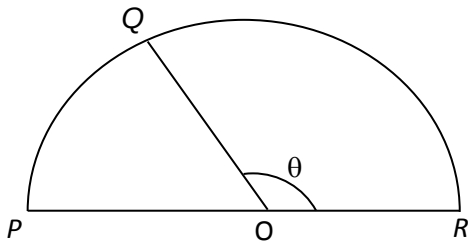
(b) the unit vector in the direction of $\overrightarrow{PQ}$.
vektor unit dalam arah $\overrightarrow{PQ}$.

Answer/*Jawapan* :

(a)

(b)

16 Diagram 16 shows a semicircle PQR with center O.
Rajah 16 menunjukkan sebuah semibulatan PQR berpusat O.



Diagram/ *Rajah 16*

It is given that the radius of the semicircle is 10 cm and the area of the sector QOR is 85.6 cm^2.
Diberi bahawa jejari semibulatan ialah 10 cm dan luas sektor QOR ialah 85.6 cm^2.
[Use / *Guna* π = 3.142]

Find
Cari

(a) the value of θ in radian ,
nilai θ *dalam radian*,

(b) perimeter, in cm , of sector *POQ*.
perimeter , dalam cm , sektor POQ.

Answer/*Jawapan* :

(a)

(b)

17 Given $\cos 15^o = a$ and $\sin 35^o = b$, express $\cos 50^o$ in terms of a and/ or b.
Diberi $kos 15^o = a$ *and* $\sin 35^o = b$, *ungkapkan* $kos\ 50^o$ *dalam sebutan* a *dan/atau* b.

Answer/*Jawapan* :

---

18 Solve the equation $\frac{1}{\tan^2 \theta} + \cos ec^2\ \theta - 3 = 0$ for $0^0 \le \theta \le 360^0$.
Selesaikan persamaan $\frac{1}{\tan^2 \theta} + \cos ec^2\ \theta - 3 = 0$ *untuk* $0° \le \theta \le 360°$.

Answer/*Jawapan* :

---

19 Given $\frac{d^2y}{dx^2} = 4x^3 + 1$, if $x = -1$, $y = \frac{1}{2}$ and $\frac{dy}{dx} = 3$, find the value of y when $x = 5$.
Diberi $\frac{d^2y}{dx^2} = 4x^3 + 1$, *jika* $x = -1$, $y = \frac{1}{2}$ *dan* $\frac{dy}{dx} = 3$, *cari nilai* y *apabila* $x = 5$.

Answer/*Jawapan* :

20 Given the function of the graph $f(x) = px^3 + \frac{q}{x^2}$, which has a gradient function of $f'(x) = 3x^2 - \frac{96}{x^3}$, where p and q are constant.

Diberi fungsi suatu graf $f(x) = px^3 + \frac{q}{x^2}$, *dengan keadaan fungsi kecerunannya ialah* $f'(x) = 3x^2 - \frac{96}{x^3}$, *dengan keadaan* p *dan* q *adalah pemalar.*

Find
Cari

(a) the value of p and the value of q,
nilai p *dan nilai* q

(b) the coordinate point of the turning point of the graph.
koordinat titik penukaran graf tersebut.

Answer/*Jawapan* :

---

21 The total surface area of a solid, $L\ cm^2$, is given by the equation $L = 3\pi\left(x^2 + \frac{16}{x}\right)$.

Calculate the minimum value of the surface area of the solid.

Luas permukaan satu pepejal , $L\ cm^2$, *diberi oleh persamaan* $L = 3\pi\left(x^2 + \frac{16}{x}\right)$.

Kira nilai minimum luas permukaan pepejal tersebut.

Answer/*Jawapan* :

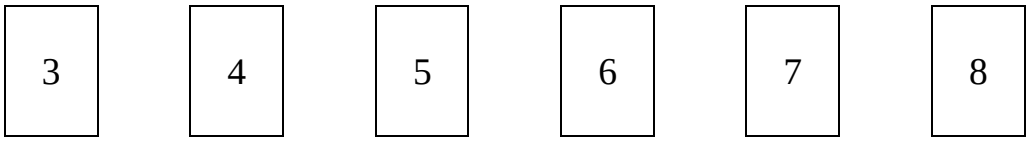
22 A mean of the set of numbers $6,\ 2,6,\ 2,2,\ 10,\ x,\ y$ is 5. Given the standard deviation of the set of the numbers is $\frac{1}{2}\sqrt{37}$, find the values of x.

Purata satu set nombor-nombor $6,\ 2,6,\ 2,2,\ 10,\ x,\ y$ *ialah 5. Diberi sisihan piawai nombor-nombor itu ialah* $\frac{1}{2}\sqrt{37}$ *, cari nilai-nilai of* x.

Answer/*Jawapan* :

---

23 Diagram 23 shows six numbered cards.
Rajah 23 menunjukkan enam keeping kad nombor.



Diagram/*Rajah* 23

A four-digit number is to be formed by using four these cards.
Satu nombor empat digit hendak dibentuk dengan menggunakan empat daripada kad-kad ini.

How many
Berapa banyak

(a) different numbers can be formed ?
nombor yang berlainan yang dapat dibentuk?

(b) different number greater than 6500 can be formed?
nombor yang berlainan yang lebih lebih besar dari 6500 yang dapat dibentuk ?

Answer/*Jawapan* :

(a)

(b)

24 A box contains *n* red marbles and 6 blue marbles. Two balls are picked simultaneously at random. Find the value of *n* if the probability of getting two blue marbles is $\frac{1}{3}$.

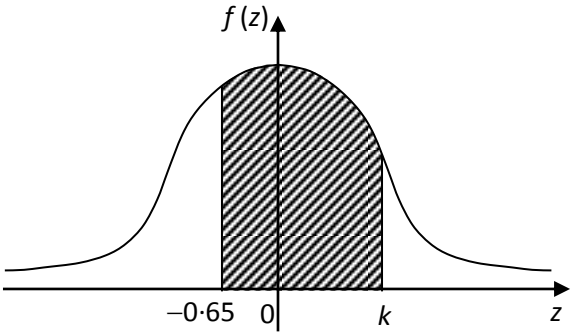
Satu kotak mengandungi n biji guli dan 6 biji guli biru. Dua biji guli dikeluarkan secara serentak secara rawak. Cari nilai n jika kebarangkalian mendapat dua biji guli biru ialah $\frac{1}{3}$.

Answer/*Jawapan* :

---

25 Diagram 25 shows a standard normal distribution graph. The probability represented by the area of the shaded region is 0·7038.

Rajah 25 menunjukkan graf taburan normal. Kebarangkalian yang ditunjukkan dengan kawasan berlorek ialah 0·7038.



Diagram/*Rajah* 25

(a) Find $P(z \geq k)$
Cari $P(z \geq k)$

(b) X is a continuous random variable which normally distributed , $N(82,5)$, find the value of nilai X when the $z-$score is *k*.
X ialah pemboleh ubah rawak selanjar bertaburan normal , $N(82,5)$, cari nilai X apabila skor-z ialah *k*.

Answer/*Jawapan* :

(a)

(b)

SET 2, PAPER 1

Answer *All* Questions
Jawab **semua** soalan

1 Diagram 1 shows an arrow diagram of the given function
Rajah 1 menunjukkan gambarajah anak panah untuk fungsi yang diberi

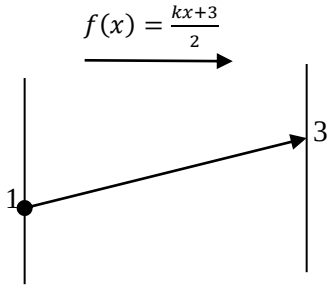


DIAGRAM 1/Rajah 1

(a) Find the value of k,
Carikan nilai k

(b) From the value of k in (a) , find f(5)
Dari nilai k dalam (a), carikan f(5)

Answer:
Jawapan:

---

2 The function *f* is defined by $f: x \to rx^2 + s$ and the function g^{-1} is defined by $g^{-1}: x \to \frac{x-1}{2}$. Given the composite function *fg* is $fg: x \to x^2 + x + 6$, find the values of *r* and s.
Fungsi-fungsi f dan g^{-1} ditakrifkan sebagai $f: x \to rx^2 + s$ dan $g^{-1}: x \to \frac{x-1}{2}$.
Diberi fungsi gubahan $fg: x \to x^2 + x + 6$, cari nilai –nilai of r and *s*

Answer:
Jawapan:

3. Given the function $h(x) = 6x + 1$ and $h^{-1}g(x) = \frac{1-x}{3}$. Find

Diberi fungsi $h(x) = 6x + 1$ *dan* $h^{-1}g(x) = \frac{1-x}{3}$. *Cari*

(a) $h^{-1}(5)$

(b) $gh^{-1}(x)$

Answer:
Jawapan:

---

4 Find the range of the values of x such that $2x(x - 1) \geq 3x+3$.
Cari julat nilai x bagi $2x(x - 1) \geq 3x+3$.
Answer:
Jawapan:

---

5 Given the quadratic equation $(p+1)x^2 + 2q\,x + 1 - 2q^2 = 0$, where p and q are constants, has equal roots, express p in terms of q.
Diberi persamaan kuadratik $(p+1)x^2 + 2qx + 1 - 2q^2 = 0$, *dengan keadaan p dan q ialah pemalar mempunyai punca-punca sama, ungkapkan p dalam sebutan q.*

Answer:
Jawapan:

6 The quadratic function $f(x) = mx^2 - 6mx - 4m^2 - 1$, has a maximum point (n, 1), where *m and n* are constant Find the values of *m* and the value of *n*
Fungsi kuadratik $f(x) = mx^2 - 6mx - 4m^2 - 1$, mempunyai titik maksimum (n,1) di mana m dan n adalah pemalar.Carikan nilai-nilai m dan nilai n

Answer:
Jawapan:

---

7 Given the equation $7^{2m-p} = \frac{1}{\sqrt[3]{49^{p-3}}}$, express m in terms of p.
Diberi persamaan $7^{2m-p} = \frac{1}{\sqrt[3]{49^{p-3}}}$, ungkapkan m dalam sebutan p
Answer:
Jawapan:

---

8 Given $\log_x 625 = \log_5 x$, find the values of *x*.
Diberi $\log_x 625 = \log_5 x$, cari nilai-nilai bagi x.
Answer:
Jawapan:

9 The *n* terms of an arithmetic progression is given by $T_n = 6n - 29$
Sebutan ke n bagi suatu janjang aritmetik diberi oleh Tn = 6n - 29.
Find
Carikan

(a) the 9th terms.
sebutan ke 9.

(b) the sum of the first 8 terms.
hasil tambah 8 sebutan pertama.

Answer:
Jawapan:

---

10 In a geometric progression, the first term is 423. Given that the sum to infinity of this progression is $634\frac{1}{2}$, find the common ratio of the geometric progression.
Dalam suatu janjang geometri, sebutan pertama ialah 423. Diberi hasil tambah hingga ketakterhinggaan bagi janjang ini ialah $634\frac{1}{2}$, cari nisbah sepunya janjang geometri ini.

Answer:
Jawapan:

---

11 The first three terms of a arithmetic progression are 5h, h -2, $6 - h^2$.
Find the values of *h*..
Tiga sebutan pertama suatu janjang aritmetik ialah 5h, h -2, $6 - h^2$.
Cari nilai- nilai bagi x.

Answer:
Jawapan:

12 The variables x and y are related by the equation $py^2 = qx^3 + pq$.
Diagram 12 shows the straight line graph obtained by plotting y^2 against x^3.
Pemboleh ubah x dan y dihubungkan oleh persamaan $py^2 = qx^3 + pq$.
Rajah 2 menunjukkan graf garis lurus yang diperoleh dengan memplot y^2 *melawan* x^3.

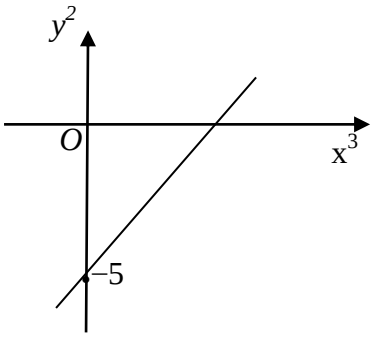


Diagram 12
Rajah 12

Given the gradient of the straight line is 4, find the value of p and q.
Diberi kecerunan garis luus itu ialah 4, cari nilai p dan q.

Answer:
Jawapan:

---

13 Given the area of a triangle with vertices $K(-2, 5)$, $L(-3, -2)$ and $M(p, -1)$ is 17 unit^2. Find the possible values of p.
Diberi luas segi tiga dengan bucu-bucu $K(-2, 5)$, $L(-3, -2)$ *dan* $M(p, -1)$ *ialah 17 unit*^{2}. *Carikan nilai yang mungkin bagi p.*
Answer:
Jawapan:

14 Find the equation of the locus of moving point Q such that its distances from $P(2, 7)$ and R(-2, 3) are in the ratio 2 : 3.
Carikan persamaan lokus bagi titik bergerak Q di mana jaraknya dari P(2, 7) dan R(-2, 3) adalah dalam nisbah 2 : 3.
Answer:
Jawapan:

---

15 Given that $\underset{\sim}{x} = 2\underset{\sim}{i} - 3\underset{\sim}{j}$, $\underset{\sim}{y} = 3\underset{\sim}{i} - 5\underset{\sim}{j}$, and $\left| h\underset{\sim}{x} - \underset{\sim}{y} \right| = 5$. Find the values of h

Diberi $\underset{\sim}{x} = 2\underset{\sim}{i} - 3\underset{\sim}{j}$, $\underset{\sim}{y} = 3\underset{\sim}{i} - 5\underset{\sim}{j}$, dan $\left| h\underset{\sim}{x} - \underset{\sim}{y} \right| = 5$. Cari nilai-nilai bagi h

Answer:
Jawapan:

---

16 Diagram 16 shows a triangle PQR.
Rajah 16 menunjukkan sebuah segi tiga PQR.

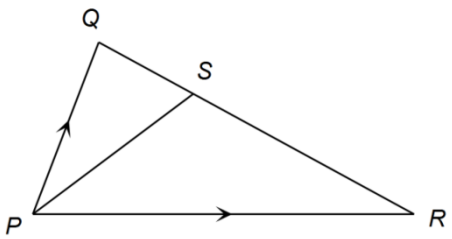


Diagram 16
Rajah 16

It is given that $\overrightarrow{PR} = 6\underset{\sim}{i}$, $\overrightarrow{PQ} = 9\underset{\sim}{j}$ and the point S lies on QR such that $QS : SR = 1 : 2$.
Diberi bahawa $\overrightarrow{PR} = 6\underset{\sim}{i}$, $\overrightarrow{PQ} = 9\underset{\sim}{j}$ dan titik S terletak di atas QR dengan keadaan QS : SR = 1 : 2.

Express in terms of $\underset{\sim}{i}$ and $\underset{\sim}{j}$
Ungkapkan dalam sebutan $\underset{\sim}{i}$ dan $\underset{\sim}{j}$

(a) $\overrightarrow{SR}$

(b) unit vector in direction $\overrightarrow{RS}$

vektor unit dalam arah $\overrightarrow{RS}$

Answer
Jawapan

17 Diagram 17 shows sector *OPQ* with centre *O* , sector YOZ with centre O and sector *PXY* with centre *P* .
Rajah 17 menunjukkan sektor OPQ dengan pusat O, sector YOZ dengan pusat O and sektor PXY dengan pusat P.

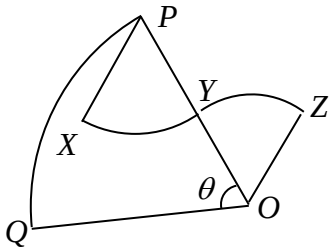


DIAGRAM 17
Rajah 17

Given that OQ = 15 cm , PY = 9 cm , $\angle XPY = \angle YOZ$ = 1.15 radians and the length of arc PQ = 10.5 cm , Calculate
Diberi bahawa OQ = 15 cm , PY = 9 cm , $\angle XPY = \angle YOZ$ = 1.15 radian dan panjang lengkok PQ = 10.5 cm, Kirakan

(a) the value of θ, in radian ,
nilai θ, dalam radian

(b) the perimeter, in cm, of the whole diagram .
perimeter dalam cm, keseluruhan rajah

Answer:
Jawapan:

:

---

18 Given that $\cos \theta = p$, where p is a constant and $180° \leq \theta \leq 360°$.
Diberi $\cos \theta = p$, dengan keadaan p ialah pemalar dan $180° \leq \theta \leq 360°$.

Find in terms of p
Cari dalam sebutan p

(a) $\sec \theta$
sek θ

(b) $\tan 2\theta$

Answer:
Jawapan

19 Given $\frac{d}{dx}\left(\frac{5x}{7-x}\right) = 5g(x)$, find $\int_1^3 g(x)dx$

Diberi $\frac{d}{dx}\left(\frac{5x}{7-x}\right) = 5g(x)$,*cari* $\int_1^3 g(x)dx$

Answer:
Jawapan:

---

20 The normal to the curve $y = x^2 - 7x + 10$ at a point *P* is parallel to the straight line $y = \frac{1}{3}x + 6$. Find the equation of the normal to the curve at point P.

Garis normal kepada lengkung $y = x^2 - 7x + 10$ *pada titik P adalah selari dengan garis lurus* $y = \frac{1}{3}x + 6$. *Cari persamaan garis normal kepada lengkung itu pada titik P.*

.
Answer:
Jawapan:

---

21 Given $y = 16x^3 - 1$. If y decrease at a constant rate of 24 units per second when y = 1, find the rate of change of x.

Diberi $y = 16x^3 - 1$ *. Jika y berkurang dengan kadar 24 unit sesaat apabila y = 1, carikan kadar perubahan untuk x.*

Answer:
Jawapan:

22 The Interquartile range of the set of numbers 4, 3*n* - 2, 3*n*, 10, 13, 4n + 3, 18 which are arranged in ascending order is 8. Find the mean for the set of numbers .
Julat antara kuartil set 4, 3n - 2, 3n, 10, 13, 4n + 3, 18 yang telah disusun mengikut susunan menaik ialah 8 . Carikan min bagi set nombor tersebut .

Answer:
Jawapan:

---

23 (a) How many 4-digit even numbers can be formed from the digits , 4, 5, 6, 7 and 8
Berapakah nombor 4-digit nombor genap boleh dibentuk daripada digit-digit 4, 5, 6, 7 dan 8

(b) Hence, find the probability that the 4- digit number formed are odd numbers
seterusnya, cari kebarangkalian bahawa nombor 4 digit yang dibentuk adalah nombor ganjil

Answer:
Jawapan:

---

24. Table 24 shows the number of marbles in a box.
Jadual 24 menunjukkan bilangan guli dalam sebuah kotak.

Colour/*War*	Number of marbles/*Bilangan guli*
Red/*Merah*	2
Green/*Hijau*	5
Blue/*Biru*	3

Table 24 / *Jadual 24*

Three marbles are drawn at random from the box. Find the probability that
tiga biji guli dikeluarkan secara rawak daripada kotak itu. Cari kebarangkalian bahawa

(a) all are same colour,
kesemuanya sama warna

(b) all are different colour.
Kesemuanya berbeza warna.

Answer:
Jawapan:

25 In an Additional Mathematics test, 55% of the students score A. If a sample of 5 students is randomly selected, find
Dalam suatu ujian Matematik Tambahan, 55% murid skor A. Jiaka satu sampel 5 orang murid dipilih secara rawak, cari

(a) the probability that 3 students from a sample do not score A,
kebarangkalian bahawa 3 orang murid daripada sampel itu tidak skor A,

(b) the standard deviation of the students score A if the total number of students taken the test are 100.
Sisihan piawai murid yang skor A jika murid yang mengambil ujian itu ialah 100 orang.

Answer:
Jawapan:

(a)

(b)

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

SET 3, PAPER 1

1. Its is given that the relation between set A={8, 15, 21} and set B={2, 3 ,5, 7} is "factor of " .

Diberi bahawa hubungan antara set A={8, 15, 21} *dan se t*B={2, 3 ,5, 7*} ialah* "*faktor kepada*".

(*a*) Find the object of 3

Cari objek bagi 3

(*b*) Express the relation in the form of ordered pairs

Ungkapkan hubungan itu dalam bentuk pasangan tertib.

Answer/*Jawapan* :

(*a*)

(*b*)

---

2. Given the function $g : x \to \frac{4}{x} - 3, x \neq 0$ and $fg : x \to \frac{3}{x}, x \neq 0$, find the value of $gf^{-1}(3)$.

Diberi fungsi $g : x \to \frac{4}{x} - 3, x \neq 0$, *dan* $fg : x \to \frac{3}{x}, x \neq 0$, cari nilai bagi $gf^{-1}(3)$

Answer/*Jawapan* :

3. The inverse function f^{-1} is defined by $f^{-1}: x \to \frac{3}{4x-1} - 2, x \neq \frac{1}{4}$,

Fungsi songsang f^{-1} *ditakrifkan sebagai* $f^{-1}: x \to \frac{3}{4x-1} - 2, x \neq \frac{1}{4}$,

Find

Cari

(*a*) the function $f(x)$

fungsi bagi $f(x)$

(*b*) the value of *x* if $f(x)$ map to itself.

nilai bagi x jika f(x) memetakan kepada dirinya sendiri.

Answer/*Jawapan* :

(*a*)

(*b*)

---

4. Given the quadratic functions $f(x) = x^2 + (mx+1)^2 - 2x + 4(mx+1)$. Find the range of values of m if $f(x)$ always positive.

Diberi fungsi kuadratik $f(x) = x^2 + (mx+1)^2 - 2x + 4(mx+1)$. *Cari julat nilai-nilai bagi* m *jika* $f(x)$ *sentiasa positif.*

5. Diagram 5 shows the graph of a quadratic function for $f(x) = a(x+k)^2 + c$ has the minimum point(k, -3) and y-intercept -2 .

Rajah 5 *menunjukkan graf fungsi kuadratik bagi* $f(x) = a(x+k)^2 + c$ *yang mempunyai titik minimum* (k, -3) *dan pintasan-y -2.*

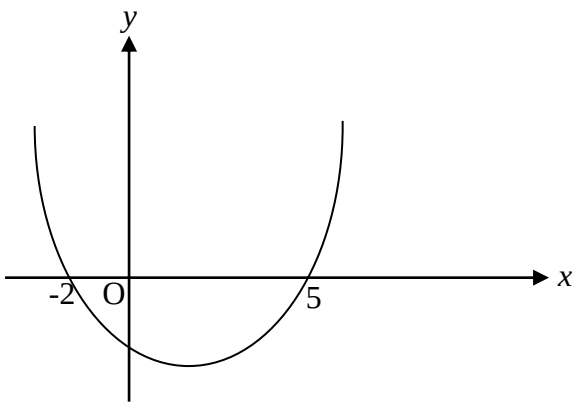


Diagram 6
Rajah 6

Find

Cari

(a) the value of a,and of k
nilai a dan nilai k.

(b) the coordinates of the minimum point.
koordinat bagi titik minimum.

Answer/*Jawapan* :

(a)

(b)

6. Find the range of values of x for $\frac{x-5}{2} \leq \frac{5x-x^2}{3}$

Cari julat nilai x bagi $\frac{x-5}{2} \leq \frac{5x-x^2}{3}$

Answer/*Jawapan* :

---

7. Solve the equation $3^{x+2} = \frac{27^x}{\sqrt{9^{x+1}}}$

Selesaikan persamaan $3^{x+2} = \frac{27^x}{\sqrt{9^{x+1}}}$

Answer/*Jawapan* :

8. Given that $\log_3 x = p$ and $\log_3 y = q$ express $\log_9 \frac{x}{27y^3\sqrt{x}}$ in terms of p and q.

Diberi $\log_3 x = p$ *dan* $\log_3 y = q$ *ungkapkan* $\log_9 \frac{x}{27y^3\sqrt{x}}$ *dalam sebutan p dan q.*

Answer/*Jawapan* :

---

9. It is given that $k, k+l, k+2l, ...$ are the first three terms of an arithmetic progression where the seventh terms is 74 and the sum of the first five terms is 290.
Diberi bahawa $k, k+l, k+2l, ...$ *adalah empat sebutan pertama bagi suatu janjang aritmetik di mana sebutan ke tujuh ialah 74 dan jumlah hasil tambah lima sebutan pertama ialah 290.*

Find the value of k and of l.
Cari nilai bagi k dan l.

Answer/*Jawapan* :

10 In arithmetic progression, the sum of first *n* term is given by $S_n = \frac{n}{4}[9 + \frac{3}{2}n]$.

Dalam satu janjang arithmetik ,hasil tambah n sebutan pertama diberi oleh $S_n = \frac{n}{4}[9 + \frac{3}{2}n]$

Calculate,

Hitung,

(*a*) the first term and the common difference,

Sebutan pertama dan beza sepunya,

(*b*) the sum of all the terms from sixth terms to twentieth term .

hasiltambah semua sebutan dari sebutan keenam hingga sebutan ke-20

Answer/*Jawapan* :

(*a*)

(*b*)

11 In a geometric progression, given that the sum of third terms and the fourth terms is 20 and the sum of the fourth terms and the fifth terms is -10.

Dalam satu janjang geometri, diberi bahawa hasil tambah sebutan ketiga dan sebutan keempat ialah 20 dan hasil tambah sebutan keempat dan sebutan kelima ialah -10.

Find

Cari

(a) the value of first term.

nilai bagi sebutan pertama.

(b) the sum to infinite of the geometric progression.

hasil tambah sehingga ketakterhinggaan bagi janjang geometri .

Answer/*Jawapan* :

(a)

(b)

12 The variables x and y are related by the equation $y = 10^{\frac{2}{m}} x^{2k-2} + 1$ where m and k are constants. Diagram 12 shows the straight line obtained by plotting $\log_{10}(y-1)$ against $\log_{10} x^2$.

Pembolehubah x dan y dihubungkan oleh persamaan $y = 10^{\frac{2}{m}} x^{2k-2} + 1$ *dengan keadaan m dan k adalah pemalar. Rajah* 12 *menunjukkan graf garis lurus diperolehi dengan memplotkan* $\log_{10}(y-1)$ *melawan* $\log_{10} x^2$.

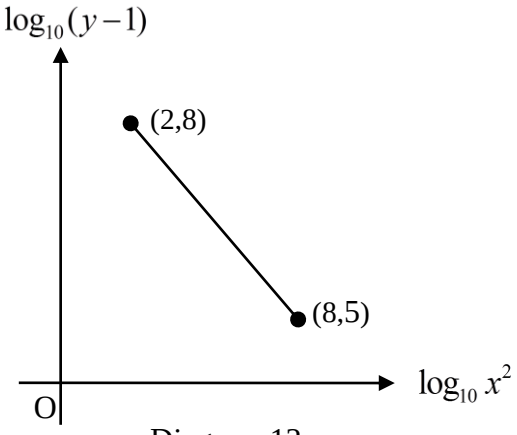


Diagram 12

Rajah 12

Find the value of m and k.

Cari nilai m dan nilai k.

Answer/*Jawapan* :

13. Given that the straight line $\frac{x}{3}-\frac{y}{r}=1$ intersect the *x*-axis at point *P* and intersect the *y*-axis at point *Q*. Point *R* lies on the line *PQ* such that *PR*:*RQ* = 2:3 and $PQ=5$.

Diberi bahawa persamaan garis lurus $\frac{x}{3}-\frac{y}{r}=1$ *menyilang paksi-xdi titik P dan menyilang paksi-y di titik Q. Titik R terletak di atas garis PQ dengan keadaan PR*:*RQ* = 2:3 *dan* $PQ=5$.

Find
Cari

(*a*) the value of *r* and point *R*.
nilai bagi r dan titik R

(*b*) the equation of the straight line that passes through point *R* and perpendicular to the line *PQ*.
persamaan garis lurus yang melalui titik R dan berserenjang dengan garis PQ.

Answer/*Jawapan* :

14.

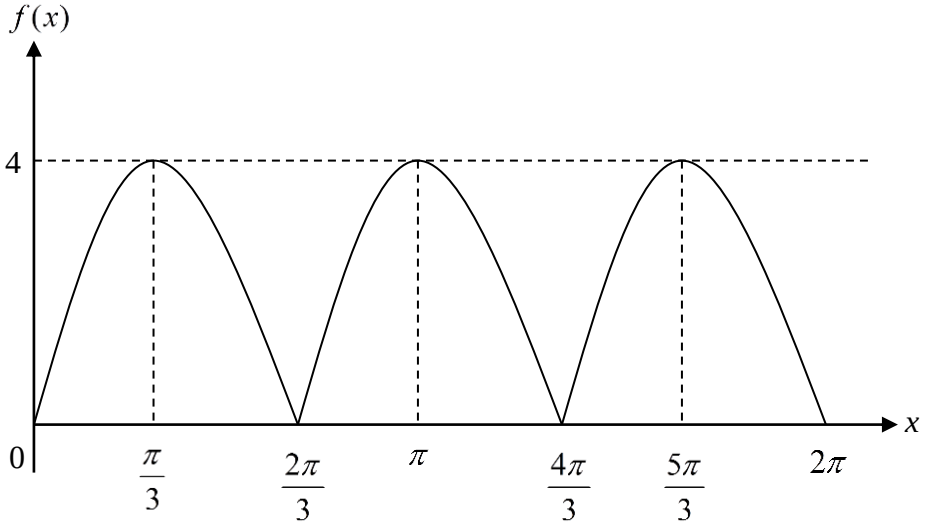


Diagram 14
Rajah 14

Diagram 14 above shows the graph for the function *f(x)* . State the above function.
Rajah 14 *di atas menunjukkan graf bagi function f(x). Nyatakan fungsi tersebut.*

---

15. It is given that $\sin A = -\frac{5}{13}$ and $\cos B = \frac{8}{17}$, where *A* and *B* are in the same quadrant.

Diberi bahawa $\sin A = -\frac{5}{13}$ dan $\cos B = \frac{8}{17}$, di mana *A* dan *B* adalah dalam sukuan yang sama.

Find
Cari

(*a*) $\cot^2 A$

(*b*) $\sin(A + B)$

Answer/*Jawapan* :

(*a*)

(*b*)

16. Diagram 16 shows a triangle *OAB* . Given that $\overrightarrow{OA} = \underline{a}$ and $\overrightarrow{OB} = 3\underline{b}$

Rajah 16 menunjukkan segitiga OAB.Diberi bahawa $\overrightarrow{OA} = \underline{a}$ *dan* $\overrightarrow{OB} = 3\underline{b}$.

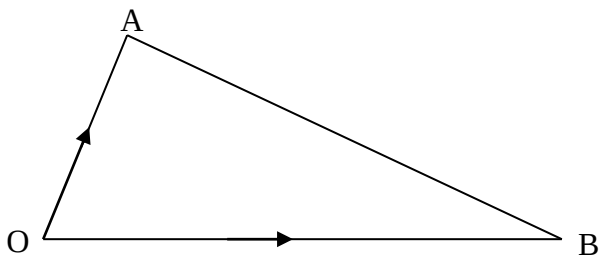


Diagram 16

Rajah 16

Point *P* lies on *AB* such that *AP*:*PB* = 2:1.

Titik P terletak di atas garis AB supaya AP:PB = 2:1.

Find the value of*h* and of*k* if $4k\overrightarrow{OA} + \overrightarrow{OB} = 3h\overrightarrow{OP}$.

Cari nilai h dan nilai k jika $4k\overrightarrow{OA} + \overrightarrow{OB} = 3h\overrightarrow{OP}$.

Answer/*Jawapan* :

17. It is given that vector $\underline{U} = \begin{pmatrix} p \\ 2 \end{pmatrix}$, and vektor $\underline{V} = \begin{pmatrix} -3 \\ 4 \end{pmatrix}$ where p is aconstant.

Diberi bahawa vektor $\underline{U} = \begin{pmatrix} p \\ 2 \end{pmatrix}$, *dan vektor* $\underline{V} = \begin{pmatrix} -3 \\ 4 \end{pmatrix}$ *di mana p ialah pemalar*.

Find the value of p

Cari nilai bagi p .

(*a*) if vector $\underline{U}$ and vector $\underline{V}$ are parallel

jika vector $\underline{U}$ dan vektor $\underline{V}$ *adalah selari*

(b) $|\underline{U} + 2\underline{V}| = 10$

Answer/*Jawapan*
(a)

(b)

18. Diagram 18 showsa circle with centre *O*. It is given that $\angle ADE = 30^0$ and $AB = 14cm$.

Rajah 18 *menunjukkan satu bulatan yang berpusat O.Diberi bahawa* $\angle ADE = 30^0$ *dan* AB = 14 *cm*.

[Use/Guna $\pi = 3.142$]

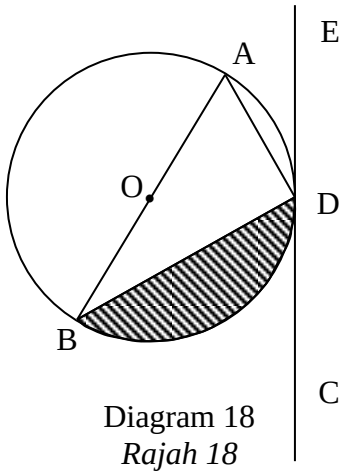


Diagram 18
Rajah 18

Find,
Cari, :

(*a*) $\angle BOD$, in radian,

$\angle BOD$, *dalam radian,*

(*b*) the area ,in cm^2 shaded region.

luas,dalam cm^2 *kawasan berlorek.*

Answer/*Jawapan*

(*a*)

(*b*)

19. Given $\frac{d}{dx}\left(\frac{x^2}{2x-3}\right)=\frac{2}{3}f(x)$, determine the value of k if $\int_0^1 (3k-f(x))dx = 7k$

Diberi $\frac{d}{dx}\left(\frac{x^2}{2x-3}\right)=\frac{2}{3}f(x)$, *cari nilai bagi k jika* $\int_0^1 (3k-f(x))dx = 7k$

Answer/*Jawapan* :

---

20. Given that the radius of a sphere decrease from 2 *cm* to 1.98 *cm.*

Diberi bahawa jejari sebuah sfera berkurang dari 2cm kepada 1.98 *cm.*

Find approximate change in surface area of sphere.

Cari perubahan hampir bagi luas permukaan sfera.

Answer/*Jawapan* :

21. Given that $\int_1^m \left(\frac{1}{m} - \frac{2}{x^2}\right) dx = 5$

Diberi bahawa $\int_1^m \left(\frac{1}{m} - \frac{2}{x^2}\right) dx = 5$

Find the value of *m*.
Cari nilai bagi m.

Answer/*Jawapan* :

---

22. It is given that a set of numbers 10 ,7 ,5 ,2*k* ,2 ,1 . The numbers of the set are arranged in desending order.If each of number is added by 3 and multiple by 2 the median of the new set of numbers becomes 15.

*Diberi satu set nombor*10 ,7 ,5 ,2*k* ,2 ,1. *Set nombor-nombor itu disusun secara menurun. Jika setiap nombor itu ditambah dengan 3 dan didarab dengan 2 nilai median bagi data baru menjadi 15.*

Find
Cari,

(*a*) the value of *k.*
nilai bagi k.

(*b*) variance for the new set of number.
varians, bagi set nombor baru..

Answer/*Jawapan* :

(*a*)

(*b*)

23. How many numbers greater than 150 can be formed using the number 1,2,3,4 and 5 without repetition.
Berapa carakah nombor yang lebih besar dari 150 boleh dibentuk menggunakan nombor-nombor 1,2,3,4 dan 5 tampa ulangan.

Answer/*Jawapan* :

---

24. Table 24 shows the number of male and female students in class 5 Ibnu Battuta and 5 Ibnu Haitham at SMK Sri Setiu in the year 2013.

Jadual 24 *menunjukkan bilangan pelajar lelaki dan perempuan daripada Kelas* 5 *Ibnu Battuta dan* 5 *Ibnu Haitham di SMK Sri Setiu pada tahun* 2013.

Class *Kelas*	Number of students *Bilangan pelajar*	
	Male *Lelaki*	Female *Perempuan*
5 Ibnu Battuta	10	20
5 Ibnu Haitham	13	17

A fair coin is tossed to choose a student in Chess Competition. If tail is obtained, a student from 5 Ibnu Battuta will be chosen.
Sekeping syiling adil di lambung untuk memilih seorang pelajar dalam pertandingan catur. Sekiranya kepala muncul, seorang pelajar daripada kelas 5 *Ibnu Battuta akan dipilih.*
Calculate the probability that
Hitung kebarangkalian bahawa
(*a*) a female student from 5 Ibnu Battuta is chosen,
seorang pelajar perempuan daripada 5 *Ibnu Battuta akan dipilih,*
(*b*) a male student is chosen.
seorang pelajar lelaki akan dipilih.
Answer/*Jawapan* :

(*a*)

(*b*)

25. Report from a particular driving school shown that there will be 5 out of every 7 students past in driving test.

Laporan dari sekolah memandu tertentu menunjukkan bahawa 5 daripada 7 pelajar lulus dalam ujian memandu.

If *n* students are chosen randomly from that driving school, the probability that exactly a student past in the driving test is 5 times the probability of fail in the driving test . Find the value of *n*.

Jika n pelajar dipilih secara rawak daripada sekolah memandu dan kebarangkalian bahawa tepat seorang pelajar lulus ujian memandu ialah 5kali tiada pelajar yang lulus dalam ujian memandu.. Cari nilai n.

Answer/*Jawapan* :

SET 1, PAPER 2

Section A
Bahagian A
[40 *marks*]
[40 *markah*]
Answer **all** questions.
Jawab **semua** *soalan.*

1 Solve the simultaneous equations $2x-y=3$ and $x^2-xy+y^2=10$. Give your answers correct to three decimal places. [5 *marks*]
Selesaikan persamaan serentak $2x-y=3$ *dan* $x^2-xy+y^2=10$. *Beri jawapan anda betul kepada tiga tempat perpuluhan*. [5 *markah*]

2 (*a*) Prove that $\dfrac{\sin 2x}{1-\cos 2x}=\cot x$ [2 *marks*]

Buktikan $\dfrac{\sin 2x}{1-\cos 2x}=\cot x$ [2 *markah*]

(*b*) (i) Sketch the graph of $y=1-\cos 2x$ for $0\le x\le 2\pi$. [4 *marks*]
Lakarkan graf $y=1-\cos 2x$ *untuk* $0\le x\le 2\pi$. [4 *markah*]

(ii) Hence, using the same axes, draw a suitable straight line to find the number of solutions to the equation $\pi(\sin 2x\tan x)=x$. State the number of solutions.
[2 *marks*]
Seterusnya, dengan menggunakan paksi yang sama, lukiskan satu garis lurus yang sesuai untuk mendapatkan bilangan penyelesaian bagi persamaan $\pi(\sin 2x\tan x)=x$. *Nyatakan bilangan penyelesaian itu..* [2 *markah*]

3 The first three terms of a geometric progression are also the first, ninth and eleventh terms, respectively of an arithmetic progression.
Tiga sebutan pertama dalam suatu janjang geometri adalah juga masing-masing sebutan pertama, kesembilan dan kesebelas bagi suatu janjang aritmetik.

(*a*) Given that all the term of the geometric progressions are different, find the common ratio.
[3 *marks*]
Diberi kesemua sebutan-sebutan dalam janjang geometri tersebut adalah berlainan, cari nisbah sepunya. [3 *markah*]

(*b*) If the sum to infinity of the geometric progression is 8, find
Jika hasil tambah hingga ketakterhinggaan janjang geometri itu ialah 8, *cari*

(i) the first term,
sebutan pertama,

(ii) the common difference of the arithmetic progression. [4 *marks*]
beza sepunya bagi janjang aritmetik tersebut. [4 *markah*]

4 Diagram 4 shows the curve $y = 2x^2 + 7$. P and Q are two points on the curve such that at P, $x = 1$ and at Q, $x = 0.947$.

Diagram 4 *shows the curve* $y = 2x^2 + 7$. *P and Q are two points on the curve such that at P,* $x = 1$ *and at Q,* $x = 0.947$.

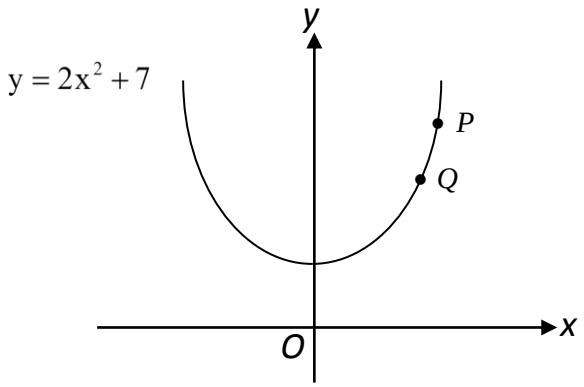


Diagram 4
Rajah 4

(a) Find the value of $\frac{dy}{dx}$ at P. [1 *mark*]

Cari nilai $\frac{dy}{dx}$ *di P.* [1 *markah*]

(b) Find the equation of the tangent at point P. [3 *marks*]
Find the equation of the tangent at point P. [3 *markah*]

(c) By using the method of differentiation, find the approximate value of y at Q. [3 *marks*]

Dengan menggunakan kaedah pembezaan, cari nilai hampir bagi y di Q. [3 *markah*]

5 Solution by scale drawing is not accepted.
Penyelesaian secara lukisan berskala tidak diterima.

Diagram 5 shows the straight line *JK* which intersect the y-axis at *J* (0, -5) and passes through point *K* (8, -1).
Rajah 5 *menunjukkan garis lurus JK yang bersilang pada paksi-y di J* (0, -5) *dan melalui titik K* (8, -1).

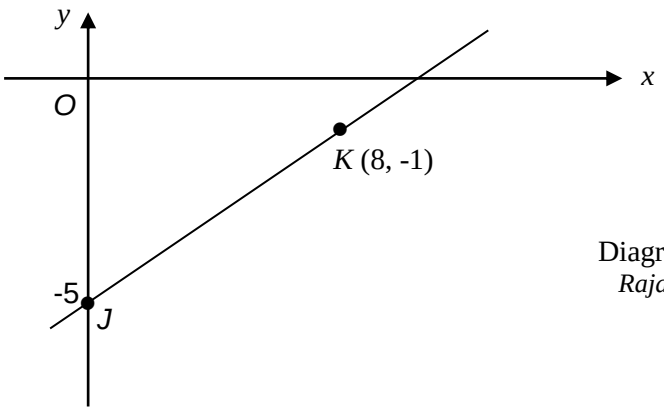


Diagram 5
Rajah 5

Find
Cari

(a) the equation of the straight line that passes through *K* and perpendicular to *JK*,
[3 *marks*]
cari persamaan garis lurus yang melalui titik K dan berserenjang dengan JK,
[3 *markah*]

(b) the area of triangle *OJK*, and hence find the perpendicular distance from *O* to the straight line *JK*.
[4 *marks*]
luas segitiga OJK, dan seterusnya cari jarak tegak dari O ke garis lurus JK.
[4 *markah*]

6 Set *A* has 20 numbers with mean 12 and standard deviation 3. The numbers in set *B* are 5, 8, 10, 11 and 14. All the numbers in set A and set B are combined to form a new set, *C*.
Set A has 20 *numbers with mean* 12 *and standard deviation* 3. *The numbers in set B are* 5, 8, 10, 11 *and* 14. *All the numbers in set A and set B are combined to form a new set, C.*

Calculate
Hitungkan

(a) the mean,
min,

(b) the standard deviation,
sisihan piawai,

for set *C*. [6 *marks*]
bagi set C. [6 *marks*]

Section B
Bahagian B
[40 *marks*]
[40 *markah*]
Answer **four** *questions from this section.*
Jawab **empat** *soalan daripada bahagian ini.*

7 Use graph paper to answer this question.
Gunakan kertas graf untuk menjawab soalan ini.

Table 7 shows the values of two variables, x and y obtained from an experiment. Variable *x* and *y* are related by the equation $y = 10^{-A}b^{x}$, where *A* and *b* are constants.
Jadual 7 menunjukkan nilai-nilai bagi dua pembolehubah, x dan y, yang diperoleh daripada satu eksperimen. Pembolehubah x dan y dihubungkan oleh persamaan $y = 10^{-A}b^{x}$*, dengan keaadaan A dan b adalah pemalar.*

x	15	20	25	30	35	40
y	0.15	0.38	0.95	2.32	5.90	14.80

Table 7
Jadual 7

(a) Based on Table 7, construct a table for the values of $\log_{10} y$. [1 *mark*]
Berdasarkan Jadual 7, bina satu jadual bagi nilai-nilai $\log_{10} y$. [1 *markah*]

(b) Plot $\log_{10} y$ against *x*, using a scale of 2 cm to represent 5 units on the *x*-axis and 2 cm to represent 0.5 units on the $\log_{10} y$-axis.
Hence, draw the line of best fit. [3 *marks*]
Plot $\log_{10} y$ *melawan x, dengan menggunakan skala 2 cm kepada 5 unit pada paksi-x dan 2 cm kepada 0.5 unit pada paksi-*$\log_{10} y$.
Seterusnya, lukis garis lurus penyuaian terbaik. [3 *markah*]

(c) Use your graph in 7(a) to find the value of
Gunakan graf anda di 7(a) *untuk mencari nilai*

(i) *A*,

(ii) *b*,

(iii) *x* when *y* = 10 [6 *marks*]
x apabila y = 10 [6 *markah*]

8 Given that $\int_2^0 (f(x)-8)\,dx = 4$, where *f*(*x*) is a linear function.

Diberi $\int_2^0 (f(x)-8)\,dx = 4$, *dimana f(x) adalah fungsi linear.*

(a) Find the value of $\int_2^0 f(x)\ dx$. [2 *marks*]

Cari nilai bagi $\int_2^0 f(x)\ dx$. [2 *markah*]

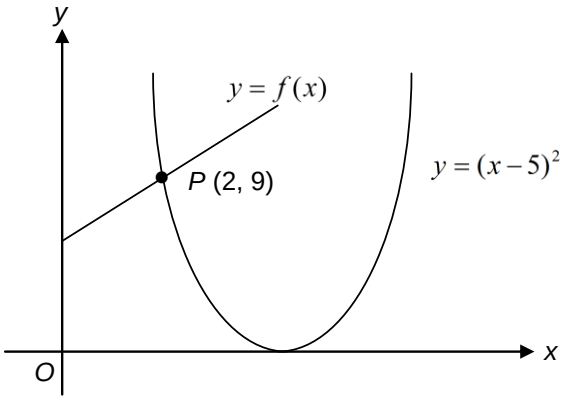


Diagram 8
Rajah 8

Diagram 8 shows the graph of the straight line $y = f(x)$ which intersects the curve $y = (x-5)^2$ at point *P* (2, 9).
Rajah 8 *menunjukkan graf garis* $y = f(x)$ *yang bersilang dengan lengkung* $y = (x-5)^2$ *pada titik P* (2, 9).

(b) Find the area bounded by the straight line $y = f(x)$, the curve $y = (x-5)^2$, the *x*-axis and the *y*-axis. [4 *marks*]
Cari luas yang dibatasi oleh garis lurus $y = f(x)$, *lengkung* $y = (x-5)^2$, *paksi-x dan paksi-y.* [4 *markah*]

(c) Calculate the volume generated in term of π, when the area bounded by the line *OP* , the curve $y = (x-5)^2$ and the *x*-axis is revolved through 360° about the x-axis. [4 *marks*]
Hitung isipadu yang dijanakan dalam sebutan π, *apabila rantau yang dibatasi oleh garis lurus OP , lengkung* $y = (x-5)^2$ *dan paksi-x dikisar melalui* 360° *pada paksi-x.* [4 *markah*]

9 Diagram 9 shows *ODC*, *OEA*, *BDE* and *ACB* are straight lines.
Rajah 9 *menunjukkan ODC, OEA, BDE dan ACB adalah garis-garis lurus.*

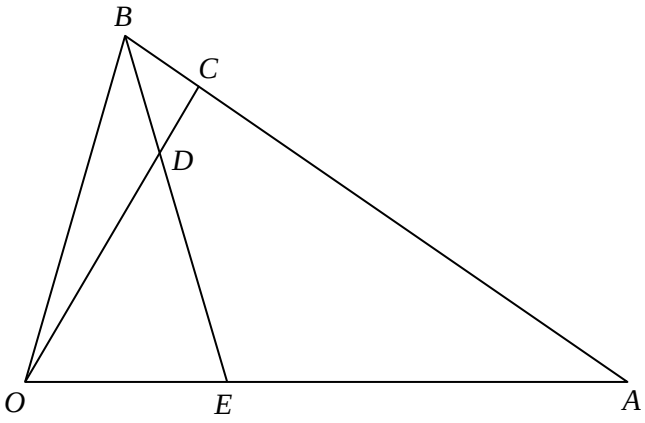


Diagram 9
Rajah 9

Given $\overrightarrow{OA} = 6\underline{x}$, $\overrightarrow{OB} = 3\underline{y}$, *OE* : *OA* = 1 : 3, and *DE* = 3*BD*.
Diberi $\overrightarrow{OA} = 6\underline{x}$, $\overrightarrow{OB} = 3\underline{y}$, *OE* : *OA* = 1 : 3, and *DE* = 3*BD*.

(a) Express in terms of $\underline{x}$ and $\underline{y}$
Ungkapkan dalam sebutan $\underline{x}$ *dan* $\underline{y}$

(i) $\overrightarrow{AB}$
(ii) $\overrightarrow{OD}$

[3 *marks*]
[3 *markah*]

(b) If $\overrightarrow{OC} = m\overrightarrow{OD}$ and $\overrightarrow{BC} = n\overrightarrow{BA}$, where *m* and *n* are constants, find the value of *m* and *n*.
[5 *marks*]
Jika $\overrightarrow{OC} = m\overrightarrow{OD}$ *dan* $\overrightarrow{BC} = n\overrightarrow{BA}$, *dimana m dan n adalah pemalar, cari nilai bagi m dan n.*
[5 *markah*]

(c) Given that $|\underline{x}| = 4$ units and the area of the triangle *OBE* is 20 unit^2. Find the perpendicular distance from *B* to *OA*. [2 *marks*]
Diberi bahawa $|\underline{x}| = 4$ *unit dan luas segitiga OBE ialah 20 unit*^{2}*. Kira jarak serenjang dari B ke OA.* [2 *markah*]

10 Diagram 10 shows a circle with centre C and of a radius r cm inscribed in a sector OAB of a circle with centre O and of radius 42 cm. [Use $\pi = 3.142$]
Rajah 10 *menunjukkan sebuah bulatan berpusat C dengan jejari r* cm *terterap dalam sektor bulatan OAB yang berpusatkan O dengan jejari* 42 cm. [*Gunakan* $\pi = 3.142$]

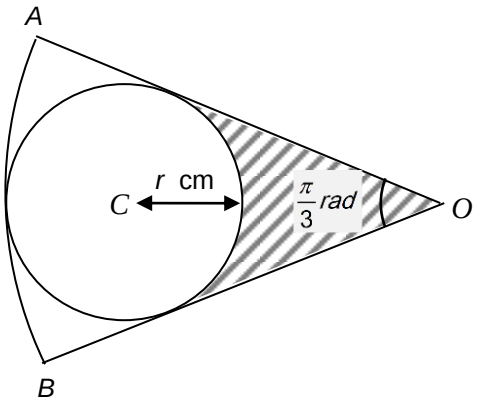


Diagram 10
Rajah 10

Given that $\angle AOB = \frac{\pi}{3}$ *rad*, find
Diberi $\angle AOB = \frac{\pi}{3}$ *rad, hitung*

(a) the value of r, [2 *marks*]
nilai r, [2 *markah*]

(b) the perimeter, in cm, of the shaded region, [4 *marks*]
perimeter, dalam cm, *kawasan berlorek,* [4 *markah*]

(c) the area, in cm^2, of the shaded region. [4 *marks*]
luas, dalam cm^2, *kawasan berlorek.* [4 *markah*]

11 (*a*) A factory produces socks. It was found that 2% of the socks are not up to the standard.
Sebuah kilang menghasilkan stokin. Didapati 2% *daripada stokin yang dihasilkan tidak mencapai tahap piawaian.*

(i) If 5 pairs of socks are chosen at random from the factory, find the probability that none is faulty,
Jika 5 pasang stokin diambil secara rawak dari kilang itu, cari kebarangkalian tiada sepasang pun daripada stokin itu rosak.

(ii) If the factory produces 1500 pairs of socks, calculate the mean and the standard deviation for the number of faulty socks. [5 *marks*]
Jika kilang itu menghasilkan 1500 pasang stoking, kira min dan sisihan piawai bagi bilangan stokin yang rosak. [5 *markah*]

(*b*) The mass of packets of chocolates produced from a chocolate factory is normally distributed with a standard deviation of 50 g. It is found that 3.14% of the packets of chocolates produced have masses less than 400 g.
Berat paket coklat yang dihasilkan oleh sebuah kilang coklat adalah mengikut taburan normal dengan sisihan piawai 50 g. *Didapati* 3.14 % *daripada paket coklat yang dihasilkan itu mempunyai berat kurang dari* 400 g.

Find,
Hitung,

(i) the mean mass of packets of chocolates produced.
min berat paket coklat yang dihasilkan.

(ii) the probability that the mass of the packets of chocolates is between 480 g to 550g. [5 *marks*]
kebarangkalian berat paket coklat itu berada di antara 480 g *hingga* 550 g.
[5 *markah*]

Section C
Bahagian C
[20 *marks*]
[20 *markah*]
Answer **two** *questions from this section.*
Jawab **dua** *soalan daripada bahagian ini.*

12 A particle moves in a straight line and passes through point *O*. Its velocity, $v\ ms^{-1}$, is given by $v = t^2 - 7t + p$, where t is the time in seconds after leaving *O* and p is a constant.
Suatu zarah bergerak di sepanjang suatu garis lurus dan melalui satu titik tetap O. Halajunya, $v\ ms^{-1}$, diberi oleh $v = t^2 - 7t + p$, dengan keadaan t ialah masa, dalam saat, selepas melalui O dan p adalah pemalar.
[Take the motion to the right as the positive direction]
[*Gerakan ke kanan adalah positif*]

(*a*) Given the initial velocity of the particle is $10\ ms^{-1}$, find,
Diberi halaju awal zarah ialah $10\ ms^{-1}$*, cari,*

(i) the value of p
nilai p

(ii) the range of values of t during which the particle moves to the left
julat masa t apabila zarah tersebut bergerak ke kiri.

(iii) the range of values of t during which the particle accelerates.
julat masa t ketika pecutan zarah tersebut.

[5 *marks*]
[5 *markah*]

(*b*) (i) Sketch the velocity-time graph of the motion of the particle for $0 \leq t \leq 5$.
Lakar graf halaju melawan masa bagi pergerakan zarah itu untuk $0 \leq t \leq 5$.

(ii) Calculate the total distance travelled by the particle in the first 4 second after leaving *O*.
Hitung jumlah jarak yang dilalui dalam 4 saat pertama selepas melalui O.

[5 *marks*]
[5 *markah*]

13 Diagram 13 shows a pyramid with an isosceles triangle *KLM* as the base placed on a horizontal floor. It is given that $\angle MLN = 50^\circ$, *LN* = *KN* = 30 cm, *LM* = *MK* = 10 cm, *KL* = 16 cm and $\angle KMN$ is an obtuse angle.

Rajah 14 *menunjukkan sebuah pyramid dengan segitiga kaki sama KLM sebagai tapak yang terletak di atas lantai ufuk. Diberi bahawa* $\angle MLN = 50^\circ$, *LN* = *KN* = 30 *cm, LM* = *MK* = 10 *cm, KL* = 16 *cm dan* $\angle KMN$ *adalah sudut cakah.*

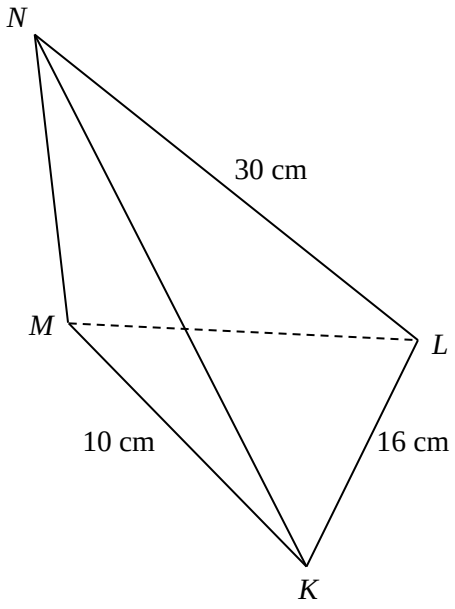


Diagram 13
Rajah 13

Calculate
Hitung

(a) the length, in cm, of *MN*, [2 *marks*]
panjang, dalam cm, bagi MN, [2 *markah*]

(b) the angle between plane *KLM* and plane *KLN*, [3 *marks*]
sudut di antara satah KLM dan satah KLN, [3*markah*]

(c) the total area, in cm^2, of the slanting surfaces, [3 *marks*]
jumlah luas, dalam cm^2, *bagi permukaan-permukaan condong,* [3*markah*]

(d) the vertical distance, in cm, from the vertex *N* to the floor. [2 *marks*]
jarak tegak, dalam cm, dari bucu N ke lantai. [2 *markah*]

14 Mathematics Society organizes a visit to National Science Centre by renting x buses and y vans. The rental for a bus is RM750 and the rental for a van is RM250. The rental for the vehicles is based on the following constraints :
Persatuan Matematik menganjurkan lawatan ke Pusat Sains Negara dengan menyewa x buah bas and y buah van. Sewaan sebuah bas ialah RM750 *dan sewaan sebuah van ialah* RM250. *Sewaan kenderaan adalah berdasarkan kekangan berikut :*

I : The total number of vehicles to be rented is not more than 8.
Jumlah kenderaan yang disewa adalah tidak melebihi 8 *buah.*

II : The ratio of the number of vans to the number of buses is at least 1 : 2.
Nisbah bilangan van kepada bas sekurang-kurangnya 1 : 2.

III : The maximum allocation for the rental of the vehicles is RM3 000.
Peruntukan maksimum untuk sewaan kenderaan ialah RM3 000.

(a) Write three inequalities, other than $x \geq 0$ and $y \geq 0$ which satisfy all the above constraints. [3 *marks*]
Tulis tiga ketaksamaan, selain $x \geq 0$ *dan* $y \geq 0$ *yang memenuhi semua kekangan di atas.* [3 *markah*]

(b) Using scale of 2 cm to 1 vehicle on both axes, construct and shade the region R which satisfies all the above constraints. [3 *marks*]
Dengan menggunakan skala 2 *cm kepada* 1 *kenderaan kepada kedua-dua paksi, bina dan lorek rantau R yang memenuhi kesemua kekangan di atas*. [3 *markah*]

(c) Using the graph constructed in 14(*b*), find
Gunakan graf yang dibina di 14(*b*) *untuk mencari*

(i) the maximum number of vans rented if 3 buses are rented
bilangan maksimum van yang disewa jika 3 *buah bas disewa.*

(ii) the maximum number of members that can be accommodated into the rented vehicles if a bus can accommodate 50 passengers and a van can accommodate 20 passengers. [4 *marks*]
Bilangan maksimum ahli yang boleh dimuatkan ke dalam kenderaan yang disewa jika sebuah bas boleh dimuatkan dengan 50 *penumpang dan sebuah van boleh dimuatkan dengan* 20 *orang penumpang.* [4 *markah*]

15 Table 15 shows the prices of four different components in the years 2010 and 2013 based on the year 2005.
Jadual 15 *menunjukkan harga bagi empat komponen berlainan pada tahun 2010 dan 2013 berasaskan tahun 2005.*

Components *Komponen*	Price Index *Indeks Harga*		Weightage *Pemberat*
	Year 2010 *Tahun* 2010	Year 2013 *Tahun* 2013	
P	140	150	3
Q	135	*x*	5
R	110	120	2
S	120	123	2

Table 15
Jadual 15

(a) Find the value of *x* if the price of component *Q* in the year 2005 is RM130 and in the year 2013 is RM158. [2 *marks*]
Cari nilai x jika harga komponen Q pada tahun 2005 *ialah* RM130 *dan pada tahun* 2013 *ialah* RM158. [2 *markah*]

(b) Calculate the price index for each component for the year 2013 based on the year 2010. [4 marks]
Hitung indeks harga bagi setiap komponen bagi tahun 2013 *berasaskan tahun* 2010. [4 *markah*]

(c) Calculate the composite index for all components in the year 2013 based on the year 2010. [2 marks]
Hitung indeks gubahan bagi semua komponen pada tahun 2013 *berasaskan tahun* 2010. [2 *markah*]

(d) The cost of all components is expected to increase 30% from the year 2013 to the year 2014. Find the expected composite index for the year 2014 based on the year 2010. [2 marks]
Kos bagi semua komponen dijangkakan meningkat 30% *dari tahun* 2013 *ke tahun* 2014. *Cari indeks gubahan bagi tahun* 2014 *berasaskan tahun* 2010. [2 *markah*]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

SET 2, PAPER 2

SECTION A

1. Solve the simultaneous equations $x + \frac{y}{3} = 1$ and $\frac{2}{3x} + \frac{1}{y} = 2$

Selesaikan persamaan serentak berikut : $x + \frac{y}{3} = 1$ dan $\frac{2}{3x} + \frac{1}{y} = 2$

2. A curve with the gradient function $\frac{x^3-1}{x^2}$ has a turning point at (p,2).

Suatu lengkung dengan fungsi kecerunan $\frac{x^3-1}{x^2}$ *mempunyai titik pusingan di (p,2)*

a) Find the value of p.
Cari nilai p

b) Determine if the turning point is a maximum or minimum point.
Tentukan sama ada titik pusingan itu adalah titik maksimum atau titik minimum.

c) Find the equation of the curve.
Cari persamaan lengkung itu.

3. a) Sketch the graph of $y = \left|2\cos\frac{3}{2}x\right|$ for $0 \le x \le 2\pi$.

Lakarkan graf bagi $y = \left|2\cos\frac{3}{2}x\right|$ *untuk* $0 \le x \le 2\pi$.

b) Hence, using the same axes, sketch a suitable straight line to find the number of solution for the equation $3 + \frac{x}{\pi} = 4\left|\cos\frac{3}{2}x\right|$ for $0 \le x \le 2\pi$. State the number of solutions.

Seterusnya, dengan menggunakan paksi yang sama, lakarkan satu garis lurus yang sesuai untuk mencari bilangan penyelesaian bagi $3 + \frac{x}{\pi} = 4\left|\cos\frac{3}{2}x\right|$ *untuk* $0 \le x \le 2\pi$. *Nyatakan bilangan penyelesaian.*

4. A Trading company X calculates its annual net profit for the year on each 31 December and projects the profit to be 6 % higher than the previous year. On 31 December 2004, company X's annual net profit for the year was RM300 000.

Sebagai syarikat Perniagaan X mengira keuntungan bersih tahunannya pada setiap 31 Disember dan keuntungan ini diunjurkan sebagai 6 % lebih tinggi daripada tahun yang lepas. Pada 31 Disember 2004, keuntungan bersih tahunansyarikat X bagi tahun itu adalah RM 300000.

Calculate, *Hitung*

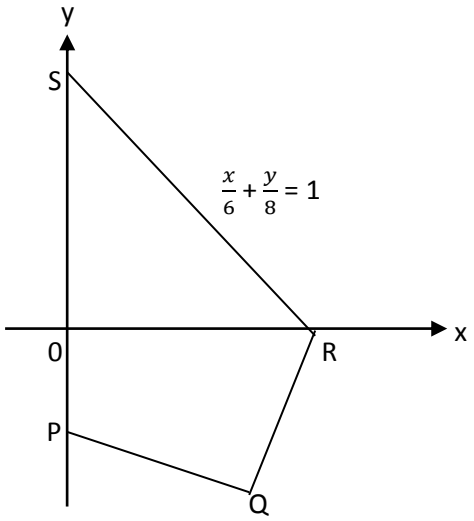
a) The company's annual net profit, to the nearest RM, for the year ending 31 December 2008.
Keuntungan bersih tahunan syarikat itu, ke RM terdekat, bagi tahun berakhir 31 Desember 2008.

b) The least value of n such that this company's annual net profit in the n^{th} year will exceed RM500 000.
Nilai n yang paling kecil dengan keuntungan bersih tahunan syarikat itu pada tahun ke –n akan melebihi RM500 000.

c) The total annual net profit of company X, to the nearest RM, for the first six years since 1 January 2004.
Jumlah keuntungan bersih tahunan syarikat X, kepada RM terdekat, bagi enam tahun bermula dari 1 January 2004.

5. Diagram shows a quadrilateral PQRS in the shape of a kite.

Gambarajah menunjukkan sisiempat PQRS dalam bentuk lelayang.



The straight line $\frac{x}{6}+\frac{y}{8}=1$ intersects the y-axis at point S and the x-axis at point R. Diagonal PR divides diagonal SQ in the ratio 3: 1. Find

Garis lurus $\frac{x}{6}+\frac{y}{8}=1$ bersilang dengan paksi-y di titik S dan pada paksi-x di titik R. Pepenjuru PR membahagi pepenjuru SQ dengan nisbah 3 : 1. Cari

a) The coordinates of point P
Koordinat titik P

b) The coordinates of point Q
Koordinat titik Q

c) The equation of the line PQ
Persamaan garis lurus PQ

6. Table shows the cumulative frequency distribution for the marks of 40 students in a Mathematics test.

Jadual menunjukkan taburan kekerapan longgokan bagi markah 40 orang pelajar dalam satu ujian Matematik.

Marks *Markah*	< 20	< 40	< 60	< 80	< 100
Number of students *Bilangan pelajar*	5	11	21	33	40

a) Based on table above, copy and complete the table below.
Berdasarkan jadual di atas, salin dan lengkapkan jadual di bawah.

Marks Markah	0 – 19	20 - 39	40 - 59	60 - 79	80 – 99
Number of students Bilangan pelajar					

b) Without drawing an ogive, find the interquartile range of the distribution.
Tanpa melukis ogif, carikan julat antara kuartil bagi taburan itu.

SECTION B

7. Table shows the values of two variables, x and y, obtained from an experiment. Variables x and y are related by the equation $y + 10 = Ak^x$, where A and k are constants.

Jadual menunjukkan nilai-nilai bagi dua pembolehubah, x dan y, yang diperoleh daripada satu eksperimen. Pembolehubah x dan y dihubungkan oleh persamaan $y + 10 = Ak^X$, di mana A dan k adalah pemalar.

x	0.5	2.2	4.0	5.9	7.8	9.0
y	-7.5	-4.4	3.1	22.4	68.2	121.8

a) Plot log (y + 10) against x, using the a scale of 2 cm to 1 unit on the x –axis and 2 cm to 0.2 unit on the log (y + 10)-axis.
Lukiskan graf log (y+10) melawan x, menggunakan skala 2 cm kepada 1 unit untuk paksi-x dan 2 cm kepada 0.2 unit untuk paksi- log (y + 10)

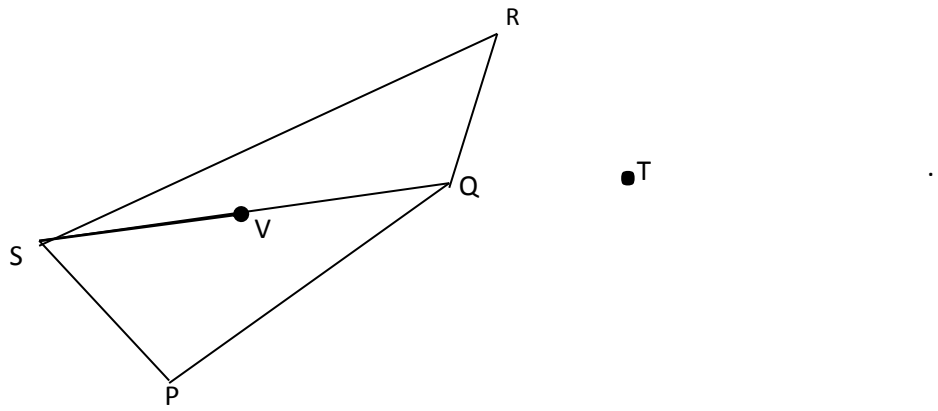
b) Use your graph from (a) to find
Menggunakan graf dari a) untuk mencari

(i) the value of A and of k
mencari nilai bagi A dan nilai k

(ii) the value of x when y = 0.
mencari nilai bagi x bila y = 0

8. Diagram show a quadrilateral PQRS. T is a point that lies outside the quadrilateral.

Rajah menunjukkan sisiempat PQRS. T ialah titik yang terletak di luar sisiempat.



It is given that $\overrightarrow{PQ} = 3x + 3y, \overrightarrow{QR}$ = x + 3y, $\overrightarrow{PS}$ = -x + y and V is midpoint of SQ.
Diberi $\overrightarrow{PQ} = 3x + 3y, \overrightarrow{QR} = x + 3y, \overrightarrow{PS} = -x + y$ *dan V ialah titik tengah bagi SQ.*

a) Express $\overrightarrow{PR}$ and $\overrightarrow{SV}$ in terms of x and y
Nyatakan $\overrightarrow{PR}$ *and* $\overrightarrow{SV}$ *dalam sebutan x dan y*

b) It is given that $\overrightarrow{PT}$ = k(5x + 4y)
Diberi $\overrightarrow{PT} = k(5x + 4y)$

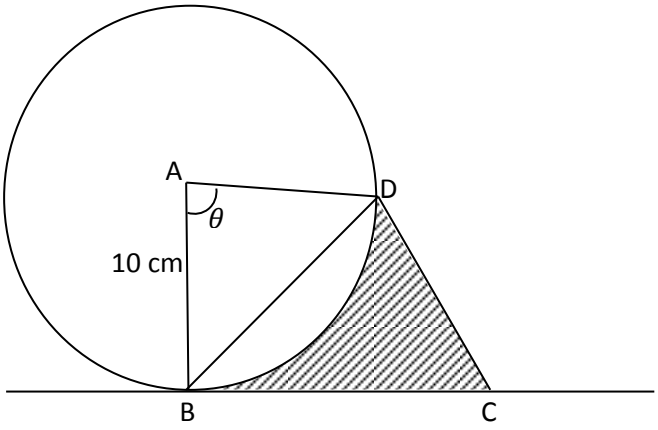
(i) Find $\overrightarrow{QT}$ in term of k , x and y
Cari $\overrightarrow{QT}$ *dalam sebutan k , x dan y*

(ii) If T , Q and V are collinear points, find the value of k. Hence, show that Q divides ST in the ratio 2 : 1.

Jika T , Q and V adalah titik koolinear, cari nilai bagi k. Seterusnya, tunjukkan bahawa Q membahagi ST dengan ratio 2:1.

9. Diagram shows a circle with centre A and radius 10 cm. BC is a tangent to the circle at B. Area of the minor sector ABD is 45 cm^2. The length of the arc BD is equal to the length of BC.

Gambarajah menunjukkan suatu bulatan berpusat di A dengan jejarinya 10 cm. BC ialah tangent kepada bulatan pada titik B. Luas bagi sector minor ABD ialah 45 cm ^{2}. Panjang lengkok BD adalah sama dengan panjang BC.



Find, *Cari*

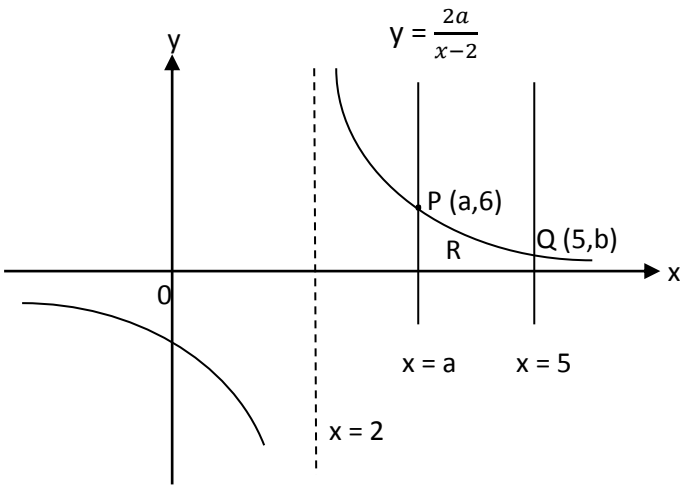
a) The value of θ in radians
Nilai θ dalam radian.

b) The length of the chord BD
Panjang perentas bagi BD

c) The area of the shaded region
Luas kawasan yang berlorek.

10. Diagram shows a curve y = $\frac{2a}{x-2}$, where a is a positive constant. The point P (a,6) and Q (5,b) lie on this curve.

Rajah menunjukkan lengkung y = $\frac{2a}{x-2}$, dengan keadaan a ialah satu pemalar positif. Titik P (a,6) dan Q (5,b) terletak pada lengkung ini.



a) Shows that a = 3 and b = 2.
Tunjukkan bahawa a = 3 dan b = 2.

b) Hence, without carrying out any integration, shows that $\int_3^5 \frac{2a}{x-2}\, dx < 8$.
Seterusnya, tanpa melakukan pengamiran, tunjukkan bahawa $\int_3^5 \frac{2a}{x-2}\, dx < 8$.

c) The region R, which is bounded by the curve with the x-axis from x = a to x = 5, is revolved completely about the x-axis. Calculate, in term of π, the volume of revolution.

Rantau R yang dibatasi oleh lengkung itu dan paksi-x dari x=a ke x = 5, diputarkan selengkapnya pada paksi-x. Hitungkan dalam sebutan π isipadu kisaran.

11. Table shows the average marks obtained by students for a Mathematics test. The marks are graded A, B,C or D.

Jadual menunjukkan markah purata yang diperoleh sekumpulan pelajar bagi satu ujian Matematik. Markah-markah itu diberikan gred A, B , C and D.

Grade *Gred*	A	B	C	D
Average marks,x *Markah purata , x*	$x \geq a$	$57.0 \leq x < a$	$c \leq x < 57.0$	$x < c$

The average marks are distributed normally with a mean of 56.8 marks and a standard deviation of 9.6 marks. It is found that 18 % of the students obtain Grade A and 15 % of the students obtain Gred C for this Mathematics test.

Markah purata itu mempunyai taburan normal dengan min 56.8 markah dan sisihan piawai 9.6 markah. Didapati bahawa 18 % daripada pelajar itu mendapat Gred A dan 15 % daripada pelajar mendapat gred C bagi ujian matematik itu.

a) Find the value of a and of c .
Cari nilai bagi a dan c.

b) Hence, if 500 students take the Mathematics test, find the number of students who obtain
Seterusnya, jika 500 orang pelajar mengambil ujian Matematik itu, cari bilangan pelajar yang mendapat

(i) Grade B
Gred B

(ii) at least 55.0 marks
Sekurang-kurangnya 55.0 markah

SECTION C

12. Table shows the prices of four items A, B , C and D, used to make a type of chocolate cake.

Jadual menunjukkan harga bagi empat jenis bahan A, B, C dan D yang digunakan untuk membuat kek coklat.

Item *Bahan*	Price (RM) per 500 g for the year *Harga (RM) untuk 500 g untuk setahun*	
	2011	2012
A	2.00	Z
B	4.00	4.60
C	2.50	3.25
D	X	y

a) The price index of item A in the year 2012 based on the year 2011 is 114. Calculate the value of z.
Indeks harga bagi bahan A dalam tahun 2012 berasaskan tahun 2011 ialah 114 . Hitungkan nilai bagi z.

b) The price index of item D in the year 2012 based on the year 2011 is 120. The price of the item D in the year 2012 is RM1.50 more than its corresponding price in the year 2011. Calculate the value of x and y.
Indeks harga bagi bahan D pada tahun 2012 berasaskan tahun 2011 ialah 120. Harga bahan D pada tahun 2012 ialah RM 1.50 lebih daripada harganya yang sepadan pada tahun 2011. Hitungkan nilai bagi x dan y.

c) (i) Using the prices of the items in the year 2011 as weightage, calculate the composite index for the four items in the year 2012 based on the year 2011.
Dengan menggunakan harga bahan bagi tahun 2011 sebagai pemberat, hitungkan indeks gubahan untuk keempat-empat bahan bagi tahun 2012 berasaskan tahun 2011.

(ii) Hence, given that the price of a box of the chocolate cake in the year 2011 is RM50.00, calculate its corresponding price in the year 2009 if the rise in price from the year 2009 to the year 2012 is 45 %.
Seterusnya, diberi harga bagi sekotak kek coklat bagi tahun 2011 ialah RM 50.00, hitungkan harga yang sepadan untuk tahun 2009 jika harga itu meningkat sebanyak 45% dari tahun 2009 ke tahun 2012.

13. A particle moves in a straight line and passes through a fixed point O. Its velocity, v ms^{-1}, at time t seconds after leaving O is given by $v = 7t - 6 - t^2$.

Suatu zarah bergerak disepanjang garis lurus melalui satu titik tetap O. Halaju zarah itu, v ms^{-1}, pada masa t saat selepas melalui O, diberi oleh $v = 7t - 6 - t^2$.

[Assume motion to the right is positive]

[Anggapkan pergerakan kea rah kanan sebagai positif]

a) Find, *Cari*
(i) the initial velocity of the particle
Halaju awal zarah itu.

(ii) the time interval during which the particle moves towards the right.
Selang masa apabila zarah itu bergerak ke arah kanan.

(iii) the time interval during which the acceleration of the particle is positive.
Selang masa apabila pecutan zarah itu adalah positif.

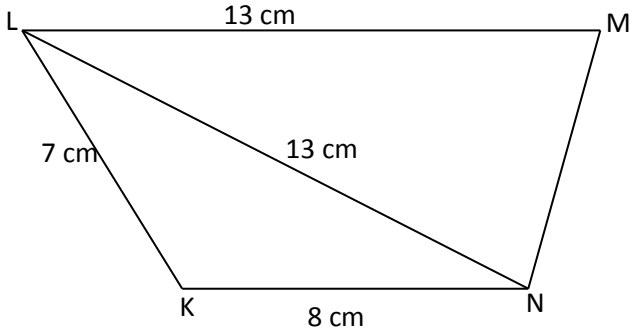
b) Sketch the velocity-time graph of the motion of the particle for the first seven seconds.
Lakarkan graf halaju-masa bagi pergerakan zarah itu bagi tempoh 7 saat pertama.

c) Hence, by using the graph, or otherwise, calculate
Seterusnya, dengan menggunakan graf atau dengan cara lain, hitung
(i) the maximum velocity of the particle
Halaju maksimum zarah itu.

(ii) the total distance travelled by the particle during the first 6 seconds after leaving O.
Jumlah jarak yang dilalui oleh zarah itu dalam masa 6 saat selepas melalui O.

14. Diagram show a trapezium KLMN, where KL = 7 cm, KN = 8 cm, LM = LM = 13 cm and KN is parallel to LM.

Rajah menunjukkan sebuah trapezium KLMN, dengan keadaan KL = 7 cm, KN = 8 cm, LM = LN = 13 cm dan KN adalah selari dengan LM.



Calculate

Hitung,

a) $\measuredangle NKL$ and $\measuredangle KNL$

b) The perpendicular distance between the parallel side KN and LM
Jarak serenjang di antara sisi-sisi selari KN dan LM

c) The area in cm^2, of
Luas dalam cm^2, luas bagi

(i) the area of triangle LMN

Luas bagi segitiga LMN

(ii) the area of trapezium KLMN
Luas bagi trapezium KLMN

15. Table gives the average price and the average profit from each non – fiction book and fiction book sold by a bookshop.

Jadual menunjukkan purata harga dan purata keuntungan dari setiap buku bukan fiksyen dan buku fiksyen yang dijual di sebuah kedai buku.

	Non-fiction book *Buku bukan fiksyen*	Fiction book *Buku fiksyen*
Average price of book *Purata harga setiap buku*	RM 32.00	RM 28.00
Average profit per book *Purata keuntungan dari setiap buku*	*RM 8.00*	*RM 10.00*

The bookshop sell x non ficyion books and y fiction books per day. Tha daily sales of the bookshop satisfies the following constraints.

Kedai buku itu menjual x buah buku bukan fiksyen dan y buah buku fiksyen sehari. Jualan harian kedai buku itu memuaskan kekangan berikut:

I: The maximum number of fiction and non –fiction books sold each day is not more than 75 books.

Bilangan maksimum buku fiksyen dan buku bukan fiksyen yang dijual sehari tidak melebihi 75 buah buku.

II:The total sales for each day does not exceed RM 2240.00

Jumlah jualan setiap hari tidak lebih daripada RM 2240.00.

III: The total profit for each day is a least RM 120.00.

Jumlah keuntungan yang diperoleh setiap hari sekurang-kurangnya RM 120.00.

a) Write down three inequalities, other than $x \geq 0$ and $y \geq 0$, which satisfy all the above constrains:
Tuliskan tiga ketaksamaan, selain daripada $x \geq 0$ dan $y \geq 0$, yang memenuhi semua kekangan di atas.

b) By using a scale of 2 cm to 10 books on both axes, construct and shade the region R that satisfies all the above conditions.
Dengan menggunakan skala 2 cm kepada 10 buah buku pada kedua-dua paksi, bina dan lorekkan rantau dengan R yang memenuhi semua kekangan di atas.

c) Using the graph constructed in above, find
Menggunakan graf yang dibina di atas, cari

(i) The maximum sales of a day if the number of fiction books sold is twice the number of non-fiction books.
Jumlah jualan maksimum diperoleh sehari jika bilangan buku fiksyen dijual adalah dua kali bilangan buku bukan fiksyen yang dijual.

(ii) The minimum and maximum number of fiction books sold if five non-fiction books were sold on that day.
Bilangan minimum dan maksimum buku fiksyen yang dijual pada sehari apabila lima buah buku bukan fiksyen dijual.

SET 3, PAPER 2

Section A
***Bahagian* A**

[40 marks]
[40 *marks*]

Answer **all** questions.
Jawab ***semua*** *soalan.*

1. Solve the simultaneous equations $3x - 2y = 4$ and $3x^2 - 2y^2 - xy = 6$. [5 marks]
Give your anwers correct to three decimal places.
Selesaikan persamaan serentak $3x - 2y = 4$ *dan* $3x^2 - 2y^2 - xy = 6$. [5 *markah*]
Beri jawapan betul kepada tiga tempat perpuluhan.

2. (a) Express y in terms of x for the following:
Nyatakan y *dalam sebutan* x *bagi yang berikut:*

(i) $9(3^x) = 27^y$,

(ii) $\log_x y = \log_y x$, where $\log_x y$ is positive.
$\log_x y = \log_y x$, *yang mana* $\log_x y$ *adalah positif.*

[4 marks]
[4 *markah*]

(b) Hence, given that $9(3^x) = 27^y$ and $\log_x y = \log_y x$ where $\log_x y$ is positive, calculate the values of x and of y. [2 marks]
Seterusnya, diberi bahawa $9(3^x) = 27^y$ *dan* $\log_x y = \log_y x$ *yang mana* $\log_x y$ *adalah positif, kirakan nilai bagi* x *dan* y. [2 *markah*]

3. A pendulum is swung and the angle swiped by the pendulum is recorded for every complete oscillation. Based on observation, the angle swiped by the pendulum in any oscillation is 60% of that in the previous oscillation.
Satu bandul diayunkan dan sudut yang dilalui oleh bandul tersebut dicatatkan untuk setiap ayunan yang lengkap. Berdasarkan pemerhatian, sudut yang dilalui oleh bandul itu dalam mana-mana ayunan ialah 60% *daripada yang ada pada ayunan sebelumnya.*

Given that the pendulum is seen to stop oscillating after swiping total angle of 540°, calculate
Diberi bahawa bandul itu kelihatan berhenti berayun selepas melalui jumlah sudut 540°, *kirakan*

(a) the angle swiped by the pendulum in the first oscillation, in degree, [2 marks]
sudut yang dilalui oleh bandul itu pada ayunan pertama, dalam darjah, [2 *markah*]

(b) the angle swiped by the pendulum in the 5^{th} oscillation, in degree, [2 marks]
sudut yang dilalui oleh bandul itu dalam ayunan ke-5, dalam darjah, [2 *markah*]

(c) the total angle swiped by the pendulum starting the 6^{th} oscillation till it is seen to stop oscillating. [3 marks]
jumlah sudut yang dilalui oleh bandul itu bermula dari ayunan ke-6 sehingga ia kelihatan berhenti berayun. [3 *markah*]

4. Table 4 shows the marks obtained by students in a test.
Jadual 4 menunjukkan markah yang dicapai oleh pelajar-pelajar dalam satu ujian.

Marks *Markah*	Number of students *Bilangan pelajar*
40 – 49	4
50 – 59	7
60 – 69	13
70 – 79	x
80 – 89	y
90 – 99	1

Table 4
Jadual 4

It is known that the modal class is $70 - 79$ and the mean is 65.5.
Diketahui bahawa kelas mod ialah $70 - 79$ *dan min ialah* 65.5.

(a) State the minimum possible value for x. [1 mark]
Nyatakan nilai minimum yang mungkin bagi x. [1 *markah*]

(b) Using a table of values or otherwise, calculate the values of x and of y. [4 marks]
Dengan menggunakan jadual nilai-nilai atau selainnya, kirakan nilai bagi x *dan* y. [4 *markah*]

(c) Hence, calculate the variance of the students' marks. [3 marks]
Seterusnya, kirakan varians bagi markah pelajar. [3 *markah*]

5. Solutions by scale drawing will **not** be accepted.
Penyelesaian secara lukisan berskala ***tidak*** *akan diterima.*

Diagram 5 shows a triangle ABC.
Rajah 5 *menunjukkan segi tiga* ABC.

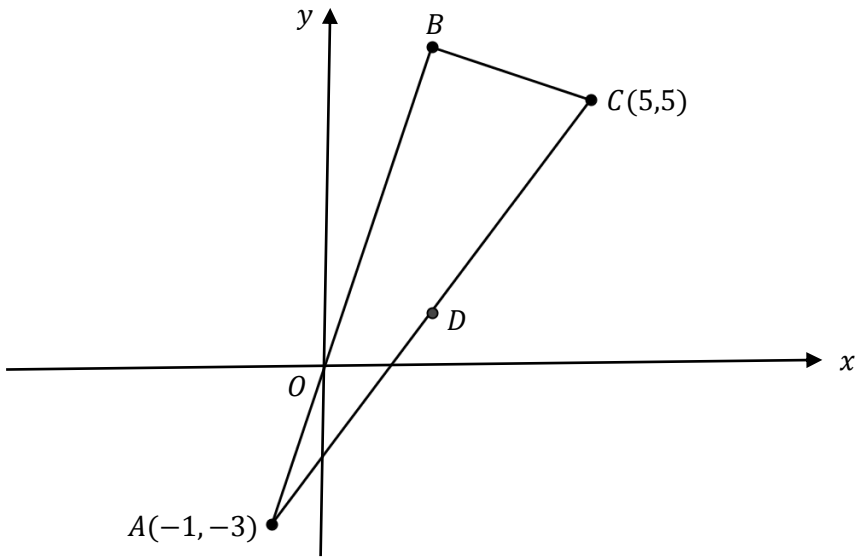


Diagram 5
Rajah 5

Point D is the midpoint of line AC. The equation of line AB is $y = 3x$.
Titik D *ialah titik tengah bagi garis* AC. *Persamaan bagi garis* AB *ialah* $y = 3x$.

(a) State the coordinates of point D. [1 mark]
Nyatakan koordinat bagi titik D. [1 *markah*]

A point P moves in such a way that its distance from point D is always the same as the distance between points A and D.
Satu titik P bergerak dengan keadaan jaraknya daripada titik D adalah sentiasa sama dengan jarak antara titik A dan D.

(b) Find the locus of point P. [3 marks]
Carikan lokus bagi titik P. [3 *markah*]

(c) Given that point B lies on the locus of point P, find the equation of line BC. [3 marks]
Diberi titik B terletak pada lokus bagi titik P, carikan persamaan bagi garis BC. [3 *markah*]

6. (a) Sketch the graph of $y = |2\sin 2x + 1|$ for $0 \leq x \leq 2\pi$. [4 marks]
Lakarkan graf $y = |2\sin 2x + 1|$ bagi $0 \leq x \leq 2\pi$. [4 *markah*]

(b) Hence, on the same axes, sketch a suitable curve to find the number of solutions for the equation $\left|2\sin 2x+1\right| - \dfrac{\pi}{2x} = 0$ for $0 \leq x \leq 2\pi$.
State the number of solutions. [3 marks]
Seterusnya, pada paksi yang sama, lakarkan lengkung yang sesuai untuk mencari bilangan penyelesaian bagi persamaan $\left|2\sin 2x+1\right| - \dfrac{\pi}{2x} = 0$ bagi $0 \leq x \leq 2\pi$.
Nyatakan bilangan penyelesaian tersebut. [3 *markah*]

Section B
Bahagian B

[40 marks]
[40 *markah*]

Answer any **four** questions from this section.
*Jawab mana-mana **empat** soalan daripada bahagian ini.*

7. Use graph paper to answer this question.
Gunakan kertas graf untuk menjawab soalan ini.

Table 7 shows the values of two variables, x and y, obtained from an experiment. The variables are related by the equation $y^p = q10^x$, where p and q are constants.
Jadual 7 menunjukkan nilai-nilai bagi dua pembolehubah, x dan y, yang diperoleh daripada satu eksperimen. Pembolehubah-pembolehubah itu dihubungkan melalui persamaan $y^p = q10^x$, di mana p dan q adalah pemalar.

x	1	2	3	4	5	6
y	3.554	12.292	19.343	45.124	105.266	245.566

Table 7
Jadual 7

It is suspected that one of the values of y is wrongly recorded.
Disyaki bahawa salah satu daripada nilai-nilai y tersalah catat.

(a) Based on Table 7, construct a table for the values of $\log_{10} y$. [1 mark]
Berdasarkan Jadual 7, bina satu jadual bagi nilai-nilai $\log_{10} y$. [1 *markah*]

(b) Plot $\log_{10} y$ against x, using the scale of 2 cm to 1 unit on x-axis and 2 cm to 0.2 unit on $\log_{10} y$-axis.
Hence, draw the line of best fit. [3 marks]
Plotkan $\log_{10} y$ *melawan* x*, dengan menggunakan skala 2 cm kepada 1 unit pada paksi-*x *dan 2 cm kepada 0.2 unit pada paksi-*$\log_{10} y$.
Seterusnya, lukiskan garis lurus penyesuaian terbaik. [3 *markah*]

(c) Use the graph in 7(b) to find
Gunakan graf dalam 7(b) untuk mencari

(i) the correct value of y which is wrongly recorded,
nilai yang betul bagi y yang tersalah catat,

(ii) the value of p,
nilai bagi p,

(iii) the value of q.
nilai bagi q.

[6 marks]
[6 *markah*]

8. Diagram 8 shows the part of the curve $y = x^k + x$, where k is a constant, and the straight line $y = -2x + 4$.
Rajah 8 menunjukkan sebahagian daripada lengkung $y = x^k + x$, yang mana k ialah satu pemalar, dan garis lurus $y = -2x + 4$.

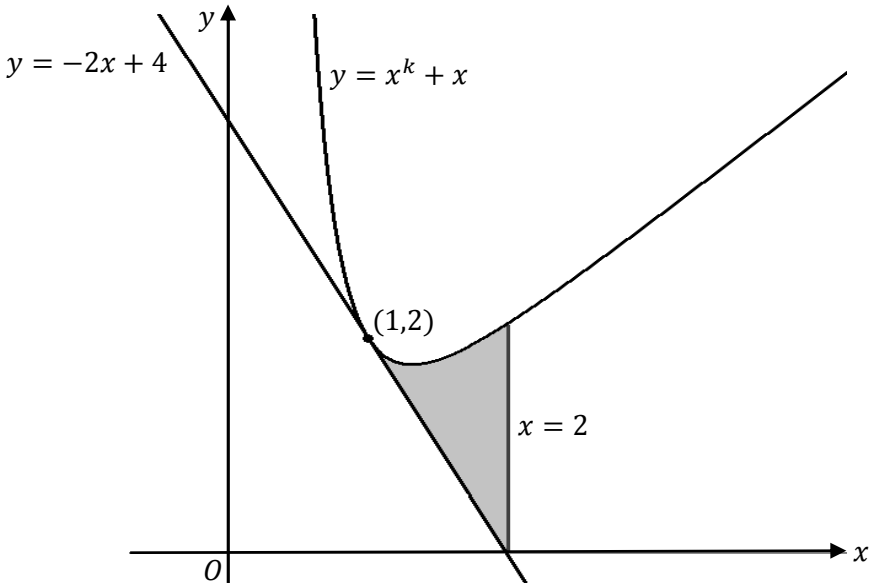


Diagram 8
Rajah 8

The straight line $y = -2x + 4$ is tangent to the curve at point $(1,2)$.
Garis lurus $y = -2x + 4$ ialah tangen kepada lengkung itu pada titik $(1,2)$.

Calculate
Kirakan

(a) the value of k, [3 marks]
nilai bagi k, [3 *markah*]

(b) the area of shaded region, [4 marks]
luas bagi rantau berlorek, [4 *markah*]

(c) the volume generated, in term of π, when the region bounded by the curve, line $x = 1$, line $x = 2$ and x-axis is rotated through $360°$ about the x-axis. [3 marks]
isipadu yang dijana, dalam sebutan π, apabila rantau yang terbatas oleh lengkung itu, garis $x = 1$, garis $x = 2$ dan paksi-x diputarkan melaluli $360°$ pada paksi-x. [3 *markah*]

9. In Diagram 9, OAB is a sector of a circle with centre O and radius 9 cm, and $PBCD$ is a semicircle with centre P and radius 3 cm.
Dalam Rajah 9, OAB ialah sektor bagi satu bulatan dengan pusat O dan jejari 9 cm, dan $PBCD$ ialah separa bulatan dengan pusat P dan jejari 3 cm.

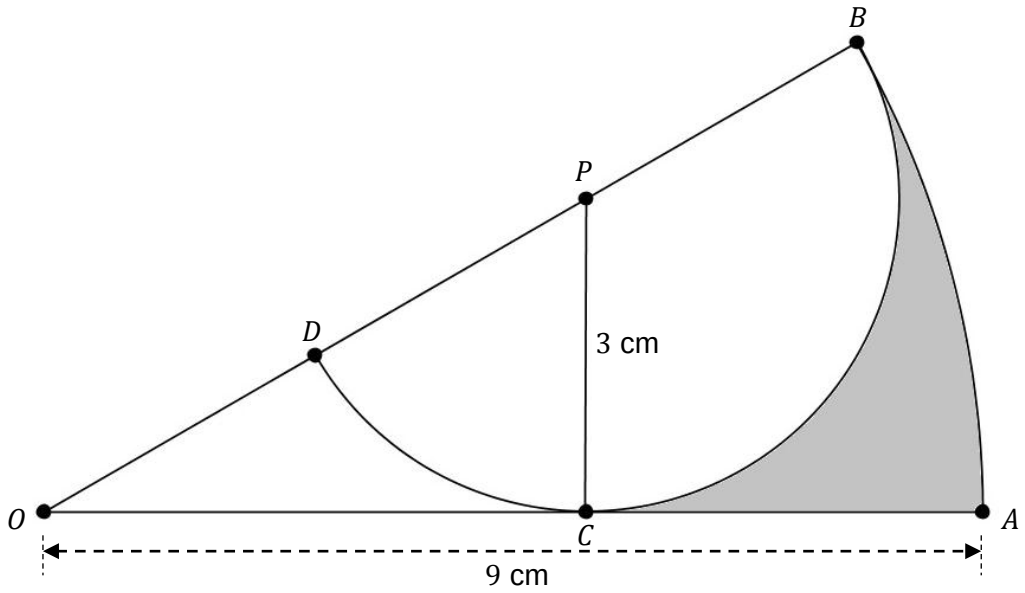


Diagram 9
Rajah 9

It is given that line OA is tangent to the semicircle $PBCD$ at point C.
Diberi bahawa garis OA ialah tangen kepada separa bulatan $PBCD$ pada titik C.

[Use $\pi = 3.142$]
[*Gunakan* $\pi = 3.142$]

Calculate
Kirakan

(a) the angle $\angle AOB$, in radians, [2 marks]
sudut $\angle AOB$, dalam radian, [2 *markah*]

(b) the perimeter of the shaded region, in cm, [4 marks]
perimeter bagi rantau berlorek, dalam cm, [4 *markah*]

(c) the area of the shaded region, in cm². [4 marks]
luas bagi rantau berlorek, dalam cm². [4 *markah*]

10. Diagram 10 shows a triangle OPQ.
Rajah 10 menunjukkan satu segi tiga OPQ.

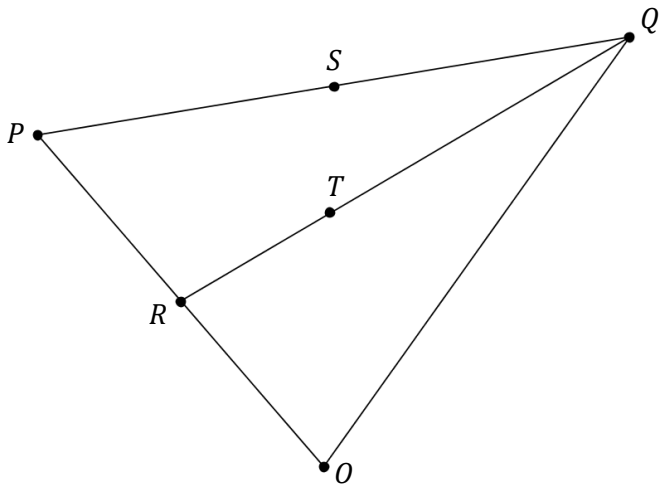


Diagram 10
Rajah 10

Point R lies on line OP such that $OR:OP = k:2$, where k is a constant. Point S is the midpoint of line PQ. Point T lies on line QR such that $QT:RT = 2:1$.
It is given that $\overrightarrow{OP} = \underline{p}$ and $\overrightarrow{OQ} = \underline{q}$.
Titik R terletak pada garis OP dengan keadaan $OR:OP = k:2$, yang mana k ialah satu pemalar. Titik S ialah titik tengah bagi garis PQ. Titik T terletak pada garis QR dengan keadaan $QT:RT = 2:1$.
Diberi bahawa $\overrightarrow{OP} = \underline{p}$ dan $\overrightarrow{OQ} = \underline{q}$.

(a) Express, in terms of k, $\underline{p}$ and $\underline{q}$,
Nyatakan, dalam sebutan k, $\underline{p}$ dan $\underline{q}$,

(i) $\overrightarrow{RS}$,

(ii) $\overrightarrow{OT}$.

[3 marks]
[3 *markah*]

(b) Given that $\overrightarrow{RS}$ is parallel to $\overrightarrow{OQ}$, find the value of k.
Hence, state the ratio $\overrightarrow{RS}:\overrightarrow{OQ}$. [4 marks]
Diberi bahawa $\overrightarrow{RS}$ adalah selari kepada $\overrightarrow{OQ}$, carikan nilai bagi k.
Seterusnya, nyatakan nisbah $\overrightarrow{RS}:\overrightarrow{OQ}$. [4 *markah*]

(c) Prove that points O, S and T are collinear. [3 marks]
Buktikan bahawa titik-titik O, S dan T adalah segaris. [3 *markah*]

11. (a) A teacher predicts that the probability that any student of his class obtains A in an upcoming test is p, where p is a constant.
The teacher then produces a sketch of the graph of probability distribution for the number of students obtaining A in that test for a random group of five students in the class, as shown in Diagram 11.
Seorang guru meramalkan bahawa kebarangkalian bahawa mana-mana pelajar kelasnya mendapat A dalam ujian yang akan datang ialah p, yang mana p ialah satu pemalar.
Guru itu kemudiannya menghasilkan satu lakaran graf bagi taburan kebarangkalian untuk bilangan pelajar yang mendapat A dalam ujian itu untuk satu kumpulan bagi 5 orang pelajar secara rawak dalam kelas itu, seperti yang ditunjukkan dalam Rajah 11.

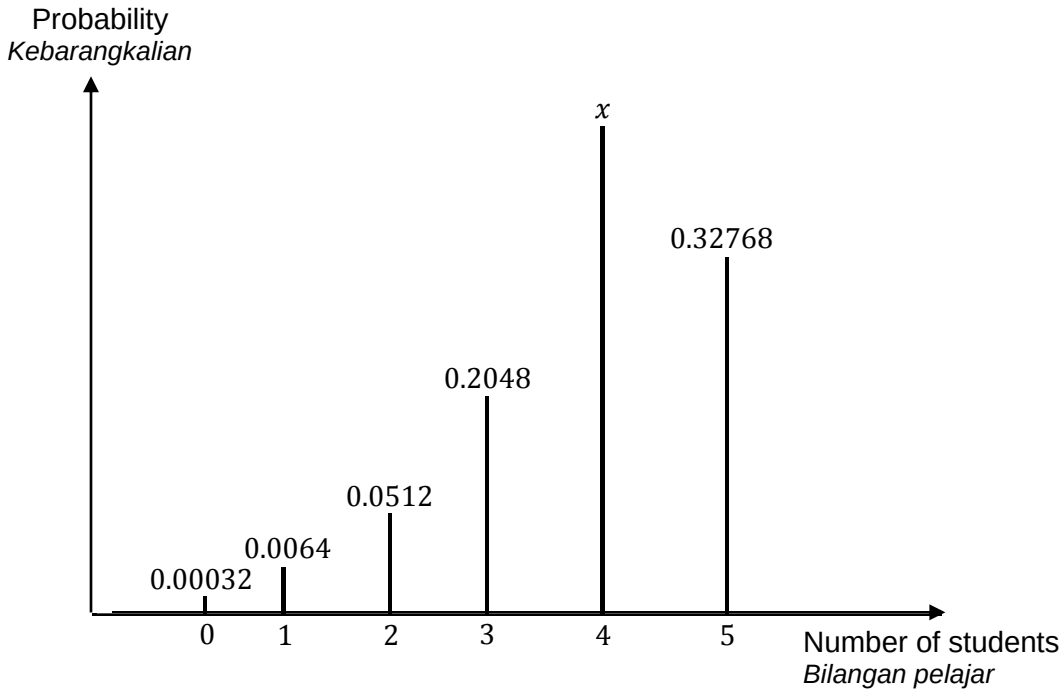


Diagram 11
Rajah 11

(i) Find the values of p and of x.
Carikan nilai bagi p dan x.

(ii) Calculate the mean number of students obtaining A in the test for a random group of five students based on the prediction.
Kirakan min bilangan pelajar yang mendapat A dalam ujian itu untuk satu kumpulan pelajar berlima yang rawak berdasarkan ramalan itu.

[6 marks]
[6 *markah*]

(b) The weight of an apple in an orchard is distributed normally with mean of 150 g and standard deviation of 20 g.
An apple with weight of more than $(150 + w)$ g is labelled to be overweight while an apple with weight less than $(150 - w)$ g is labelled to be underweight.
Berat bagi sebiji epal di dalam sebuah dusun bertabur secara normal dengan min 150 *g dan sisihan piawai* 20 *g.*
Epal yang mempunyai berat lebih daripada $(150 + w)$ *g dilabelkan sebagai terlebih berat manakala epal yang mempunyai berat kurang daripada* $(150 - w)$ *g dilabelkan sebagai kurang berat.*

If 80% of the apples in the orchard are neither overweight nor underweight, find the value of w. [4 marks]
Jika 80% *daripada epal-epal di dalam dusun itu tidak terlebih berat mahupun kurang berat, carikan nilai bagi* w. [4 *markah*]

Section C
Bahagian C

[20 marks]
[20 *markah*]
http://cikguadura.wordpress.com/
Answer any **two** questions from this section.
*Jawab mana-mana **dua** soalan daripada bahagian ini.*

12. Two particles A and B move along a straight line.
The velocity, v m s^{-1}, of particle A is given by $v = kt + 6$, where t is time in second and k is a constant. Particle B moves with a fixed velocity of 2 m s^{-1}.
Dua zarah A dan B bergerak sepanjang satu garis lurus.
Halaju, v m s^{-1}, bagi zarah A diberi sebagai $v = kt + 6$, yang mana t ialah masa dalam saat dan k ialah satu pemalar. Zarah B bergerak dengan halaju tetap 2 $m\ s^{-1}$.

Diagram 12 shows the positions of particles A and B at time $t = 0$ s, with respect to a fixed point O.
Rajah 12 menunjukkan kedudukan zarah A dan B pada masa $t = 0$ s, dengan merujuk kepada titik tetap O.

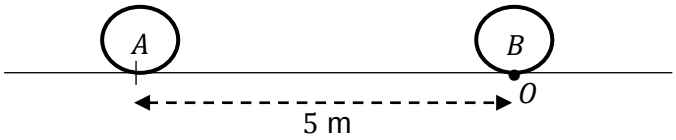


Diagram 12
Rajah 12

[Assume that motion to the right is positive.]
[*Anggapkan bahawa pergerakan ke kanan adalah positif.*]

(a) Given that the acceleration of particle A is -2 m s^{-2}, state the value of k . [1 mark]
Diberi bahawa pecutan bagi zarah A ialah $-2\ m\ s^{-2}$, nyatakan nilai bagi k. [1 *markah*]

(b) Find displacement, in m, of particle A, at time t s, with respect to point O. [2 marks]
Carikan sesaran, dalam m, bagi zarah A, pada masa t s, dengan merujuk kepada titik O.
[2 *markah*]

(c) Show that both particles A and B will never collide. [3 marks]
Tunjukkan bahawa kedua-dua zarah A dan B tidak akan berlanggar. [3 *markah*]

(d) Hence, find the time, in s, in which the distance between particles A and B is the shortest. State the shortest distance, in m, between both particles. [4 marks]
Seterusnya, carikan masa, dalam s, yang mana jarak antara zarah A dengan B adalah yang paling pendek.
Nyatakan jarak yang paling pendek, dalam m, bagi kedua-dua zarah itu. [4 *markah*]

13. Table 13 shows four ingredients P, Q, R and S, along with the prices for the years 2012 and 2013, the price indices in the year 2013 based on the year 2012 and the percentages of usage in preparing a type of food.
Jadual 13 menunjukkan empat bahan P, Q, R dan S, beserta harga untuk tahun 2012 dan 2013, indeks harga pada tahun 2013 berdasarkan tahun 2012 dan peratusan penggunaan dalam menyediakan sejenis makanan.

Ingredient *Bahan*	Price per unit (RM) *Harga seunit (RM)*		Price index in year 2013 based on year 2012 *Indeks harga pada tahun 2013 berdasarkan tahun 2012*	Percentage of usage (%) *Peratusan penggunaan (%)*
	2012	2013		
A	2.50	2.00	80	$x + 15$
B	0.75	y	120	$2x + 5$
C	z	1.20	60	$2x - 5$
D	2.50	2.50	100	$x - 5$

Table 13

(a) State the values of x, y and z. [3 *marks*]
Nyatakan nilai bagi x, y dan z. [3 *markah*]

(b) Calculate the composite index for the food in the year 2013 based on the year 2012. [2 marks]
Kirakan indeks gubahan bagi makanan itu pada tahun 2013 berdasarkan tahun 2012. [2 *markah*]

It is known that the cost of preparing the food increases by 0.1% from the year 2011 to 2013.
Diketahui bahawa kos untuk menyediakan makanan itu meningkat sebanyak 0.1% *dari tahun 2011 ke tahun 2013.*

(c) Calculate the composite index for the food in the year 2012 based on the year 2011. [3 *marks*]
Kirakan indeks gubahan bagi makanan itu pada tahun 2012 berdasarkan tahun 2011. [3 *markah*]

(d) Hence, find the cost of preparing the food in the year 2011 if it costs RM4.40 in the year 2012. [2 *marks*]
Seterusnya, carikan kos untuk menyediakan makanan itu pada tahun 2011 jika kos pada tahun 2012 ialah RM4.40 [2 *markah*]

14. Solutions by scale drawing will **not** be accepted.
*Penyelesaian secara lukisan berskala **tidak** akan diterima.*

Diagram 14 shows triangles ABC and BCD inscribed in semicircle $OABC$ with centre O.
Rajah 14 menunjukkan segi tiga ABC dan BCD yang terterap dalam separa bulatan OABC dengan pusat O.

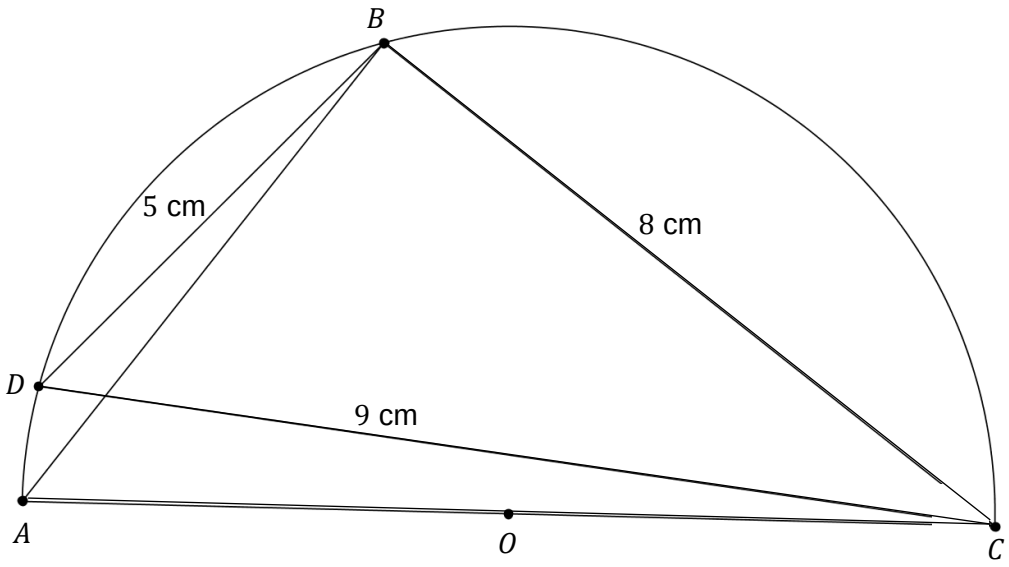


Diagram 14
Rajah 14

It is given that $BC = 8$ cm, $BD = 5$ cm and $CD = 9$ cm.
Diberi bahawa $BC = 8$ cm, $BD = 5$ cm dan $CD = 9$ cm.

(a) Find the angle $\angle BDC$. [2 marks]
Carikan sudut $\angle BDC$. [2 *markah*]

(b) Calculate the radius of the semicircle $OABC$, in cm. [3 marks]
Kirakan jejari bagi separa bulatan $OABC$, dalam cm. [3 *markah*]

A point D' lies on line CD such that $BD' = 5$ cm.
Satu titik D' terletak pada garis CD dengan keadaan $BD' = 5$ cm.

(c) Find the length of CD', in cm. [3 marks]
Carikan panjang bagi CD', dalam cm. [3 *markah*]

(d) Calculate the area of triangle BCD', in cm^2. [2 marks]
Kirakan luas bagi segi tiga BCD', dalam cm^2. [2 *markah*]

15. Use graph paper to answer this question.
Gunakan kertas graf untuk menjawab soalan ini.

A shopkeeper is planning to buy two brands of breads, which are *Xtra* and *Yummy*. The numbers of *Xtra* and *Yummy* breads which are to be bought are x units and y units respectively. The number of breads must fulfil the following constraints:
Seorang pekedai bercadang untuk membeli dua jenama roti, iaitu Xtra dan Yummy. Bilangan roti Xtra dan Yummy yang bakal dibeli ialah masing-masing x unit dan y unit. Bilangan roti-roti itu mesti memenuhi kekangan-kekangan yang berikut:

I : The total number of breads must not exceed 80 units.
Jumlah bilangan roti mestilah tidak melebihi 80 *unit.*

II : The total price of buying the breads must be at least RM150, given that an *Xtra* bread costs RM1 while a *Yummy* bread costs RM3.
Jumlah harga untuk membeli roti-roti itu mestilah sekurang-kurangnya RM150*, diberi bahawa satu roti Xtra berkos* RM1 *manakala satu roti Yummy berkos* RM3.

III : The ratio of the number of *Xtra* breads to the number of *Yummy* breads must not be less than $\frac{1}{3}$.
Nisbah bagi bilangan roti Xtra kepada bilangan roti Yummy mestilah tidak kurang daripada $\frac{1}{3}$.

(a) Write three inequalities, other than $x \geq 0$ and $y \geq 0$, which satisfy all constraints stated above. [3 marks]
Tuliskan tiga ketaksamaan, selain daripada $x \geq 0$ *dan* $y \geq 0$*, yang memenuhi kesemua kekangan yang dinyatakan di atas.* [3 *markah*]

(b) Using a scale of 2 cm to 10 units on both axes, construct and shade the region R which satisfies all constraints stated above. [3 marks]
Dengan menggunakan skala 2 cm kepada 10 unit pada kedua-dua paksi, bina dan lorekkan rantau R yang memenuhi kesemua kekangan yang dinyatakan di atas. [3 *markah*]

(c) Use the graph in 15(b) to find:
Gunakan graf dalam 15(b) untuk mencari:

(i) the range of number of *Yummy* breads if the number of *Xtra* breads bought is 30 units,
julat bagi bilangan roti Yummy jika bilangan roti Xtra yang dibeli ialah 30 *unit,*

(ii) the maximum profit obtained by the shopkeeper if the profits of selling an *Xtra* bread and a *Yummy* bread are 20 sen and 10 sen respectively.
keuntungan maksimum yang diperoleh oleh pekedai itu jika keuntungan menjual satu roti Xtra dan satu roti Yummy ialah masing-masing 20 *sen dan* 10 *sen.*

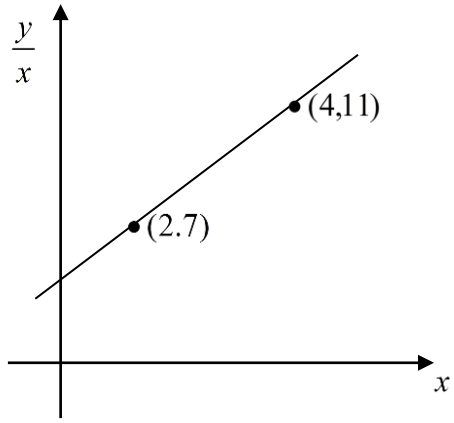
[4 marks]
[4 *markah*]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

ANSWERS : X-A PLUS

PAPER 1, SET 1

http://cikguadura.wordpress.com/

1	(a) 1 (b) $1 \le f(x) \le 7$	13	$4y = -8x + 83$
2	$(a) \quad -\frac{3}{2} \quad (b) \quad p = 12 \qquad \therefore x = -3$	14	$(a) \quad = -\underset{\sim}{i} - 4\underset{\sim}{j} \qquad (b) 5.590$
3	$(a) -1 - 2x$ $(b) \qquad x = -3 \,,\; x = \frac{1}{2}$	15	$(a)\ m = 1 \;,\; n = 2 \qquad (b)\ \frac{4\underset{\sim}{i} + 5\underset{\sim}{j}}{\sqrt{41}}$
4	$p = q + 1$	16	$(a)\ \theta = 1.712\ rad \qquad (b)\ 34.30$
5	$m = -4 \quad , \quad k = \frac{9}{4}$	17	$a\sqrt{1-b^2} - b\sqrt{1-a^2}$
6	$x \le -1 \;,\; x \ge \frac{3}{2}$	18	$45^o, 135^o, 225^o, 315^o$
7	$n = 0.6309$	19	655.7
8	$P = \frac{3Q - 1}{2}$	20	$(a)\ p = 1 \quad q = 48 \qquad (b) \quad (2,20)$
9	$d = 2 \,,\; a = 3$	21	40.97π
10	$2p^2$	22	$x = 3 \,,\; x = 9$
11	$99\frac{231}{256}$	23	$(a)\ 360 \qquad (b) 132$
12	 $(b) \quad h = 3 \quad , \quad k = 2$	24	$n = 4$
		25	$(a)\ 0.0384 \qquad (b)\ 83.72$

PAPER 1, SET 2

http://cikguadura.wordpress.com/

1	(a) 3 (b) 9	14	$5x^2 + 5y^2 - 52x - 102y + 425 = 0$
2	$k = \frac{1}{4}, \quad p = \frac{23}{4}$	15	$h = 3 \text{ or } \frac{3}{13}$
3	(a) 2/3 (b) $\frac{10-x}{3}$	16	(*a*) $\overrightarrow{SR} = 4i - 6j$ (*b*) $\overrightarrow{SP} = -\frac{2}{\sqrt{13}}\underset{\sim}{i} + \frac{3}{\sqrt{13}}\underset{\sim}{j}$ $\underset{\sim}{i} + \frac{3}{\sqrt{13}}\underset{\sim}{j}$
4	. $x \le -\frac{1}{2}$ or $x \ge 3$	17	*(a) 0.7 rad (b) 47.4*
5	$p = \frac{3q^2 - 1}{1 - 2q^2}$	18	(a) sec θ = $\frac{1}{p}$ (b) $\frac{-2p\sqrt{1-p^2}}{2p^2 - 1}$
6	*m* = -2 or -1/4 and n = 3	19	7/12
7	$m = \frac{p+6}{6}$	20	$y = \frac{1}{3}x - \frac{2}{3}$
8	*x* = 25 or x = 1/25	21	-2
9	*(a) 25 (b) -16*	22	10.86
10	$r = \frac{1}{3}$	23	*(a) 72 (b) 0.4*
11	5 or -2	24	(a) 11/120 (b) 1/4
12	$p = -\frac{5}{4}$ and *q* = -5	25	(a) 0.2757 (b) 4.9749
13	p=2 or p= -54/7		

PAPER 1, SET 3

http://cikguadura.wordpress.com/

1(a) 15 and 21

(b) {(8.2),(15,3),(15,5),(21,3),(21,7)}

2 1

3(a) $f(x)=\frac{x+5}{4x+8}, x\neq -2$

(b) $0.5447, -2.2947$

4 $-\frac{1}{2}\leq m\leq 2$

5(a) $k=\frac{3}{2}, a=\frac{4}{9}$

(b) $\left(\frac{3}{2}, -3\right)$

6 $-\frac{3}{2}\leq x\leq 5$

7 $x=3$

8 $\frac{1}{4}p-\frac{3}{2}q-\frac{3}{2}$

9 $k = 50$ and $l = 4$

10(a) $a=\frac{21}{8}, d=\frac{3}{4}$

(b) $\frac{1395}{8}$/174.375

11(a) a = 160

(b) $S\infty=\frac{320}{3}$

12(a) $m=\frac{2}{9}, k=\frac{1}{2}$

13(a) $r=4, R(\frac{9}{5}, -\frac{8}{5})$

(b) $y=-\frac{3}{4}x-\frac{1}{4}$

14 $f(x)=4\left|\sin\frac{3}{2}x\right|$

15(a) $\frac{144}{25}$

(b) $-\frac{171}{\cancel{300}\ 221}$

16 $k=\frac{1}{8}, h=\frac{1}{2}$

17(a) $p=\frac{-3}{2}$

(b) $p=6$

18(a) 2.095

(b) 30.11

19 $k=\frac{3}{8}$

20 -0.32π

21 $m=\frac{1}{6}$

22(a) *k=2*

(b) *36.76*

23 291

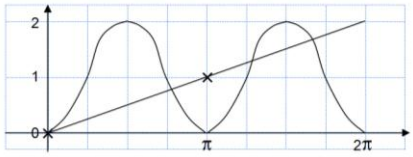
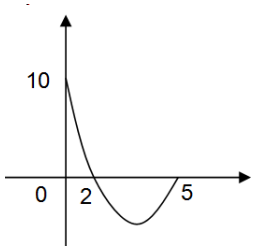
24(a) $\frac{1}{3}$

(b) $\frac{23}{60}$

25(a) *n = 2*

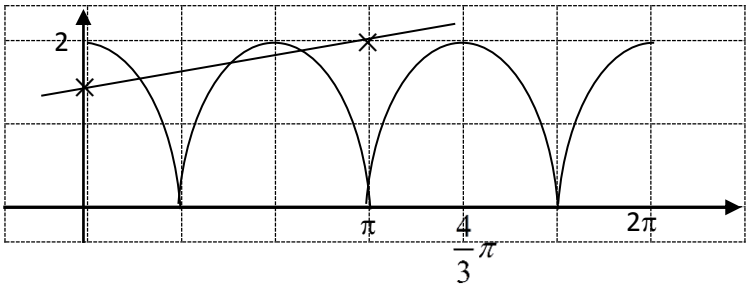
PAPER 2, SET 1

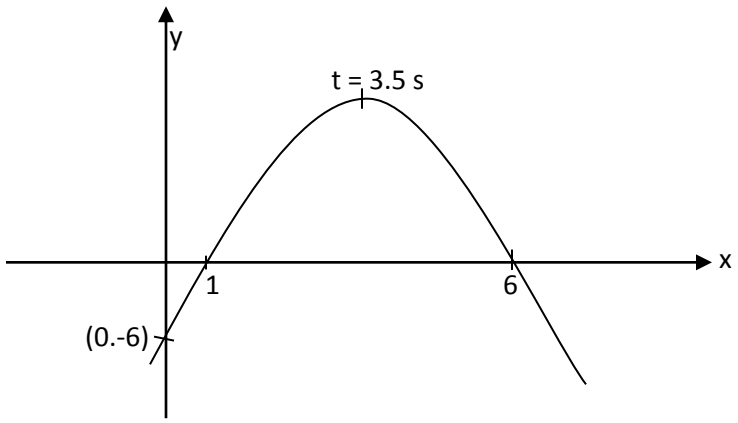
http://cikguadura.wordpress.com/

1	$x = 3.107, -0.107$ $y = 3.214, -3.214$	11ai aii bi bii	P (X = 0) = 0.9039 $\mu = 30, \quad \sigma = 5.422$ $\mu = 493$ 0.47543
2b i, ii iii	 No of solution = 4	12ai ii iii bi bii	$p = 10$ $2 < t < 5$ $t > \frac{7}{2}$  12
3a bi bii	$r = \frac{1}{4}$ a = 8(1-1/4) = 6 $d = -\frac{9}{16}$		
4a b c	$\frac{dy}{dx} = 4$ $y = 4x + 5$ $y_Q = 8.7889$		
5a b	$y = -2x + 15$ $\frac{1}{2}\begin{vmatrix} 0 & 0 & 8 & 0 \\ 0 & -5 & -1 & 0 \end{vmatrix} = 20$ $h = 4.4721$	13a b c d	$NM = 24.79$ $\angle NPM = 42.1^\circ$ 461.1 $h = 19.38$
6a b	$\bar{X}_C = 11.52$ $\sigma_C = 3.151$	14a b ci cii	$x + y \le 8$ $y \ge \frac{1}{2}x$ $y \le 12 - 3x$ *graph* 3 *vans* 220 *members* , 3 vans
7ci cii ciii	$A = 2.05$ $b = 1.2$ 37.5		
8a b c	-12 21 102.6π		
9a b c	$\overrightarrow{AB} = -6\underline{x} + 3\underline{y}$ $\overrightarrow{OD} = \frac{1}{2}\underline{x} + \frac{9}{4}\underline{y}$ $n = \frac{1}{10} \quad m = \frac{6}{5}$ $h = 5$	15a b c d	121.54 $I_P = 107.14, I_Q = 90.03,$ $I_R = 109.09, I_S = 102.5$ $\bar{I}_{13/10} = 99.56$ $x = 129.43$
10a b c	$r = 14$ *perimeter* $= 77.823$ *Area* $= 134.209$		

PAPER 2, SET 2

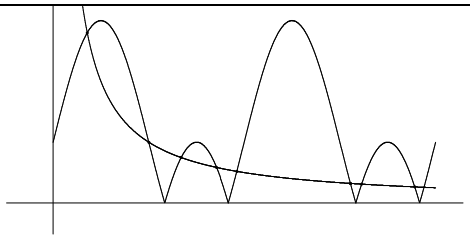
http://cikguadura.wordpress.com/

No	Soalan
1	x = 2/3 , ½ dan y = 1 , 3/2
2	a) $p = 1$ b) (1,2) minimum point b) y = $\frac{x^2}{2} + \frac{1}{x} + \frac{1}{2}$
3	 No of solution = 3
4	a) RM 378743 b) n = 10 c) 2 092 596
5	a) (0,-2) b) (4,-4) c) y = $-\frac{1}{2}$ x – 2
6	interquartile range = 38.33
7	(a) table (b) graph (i) A = 1.995 k = 1.585 (ii) ∴ x = 3.4
8	a) $\overrightarrow{PR}$ = 4x + 6y $\overrightarrow{SV}$ = 2x + y b) (i) $\overrightarrow{QT}$ = (5k – 3)x + (4k – 3)y (ii) k = 1 ∴ SQ : QT = 2 : 1
9	a) θ = 0.9 rad b) BD = 8.698 c) 10.615 cm^2
10	(a) shown (b) shown (c) 24 π

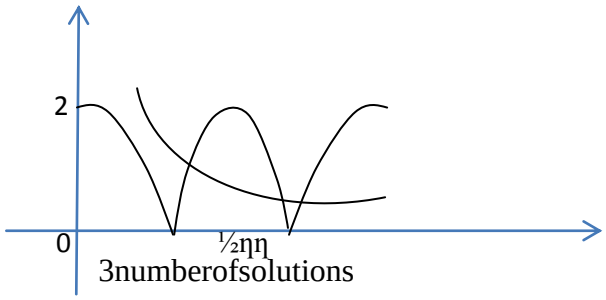
11	a) $a = 65.584$ c = 46.51 b) (i) 156 (ii) 287
12	a) P = 2.28 b) x = 7.5 and y = 9 c) (i) 119.56 (ii) x = 41.23
13	a) (i) v -6 (ii) 1 < t < 6 (iii) 0 < t < 3.5  c. (i) v = 6.25 (ii) Jarak = 2(17/6) + 18 = 71/3
14	a) $\measuredangle NKL$ = 120 $\measuredangle KNL$ = 27.78 b) PN = 6.0622 (c)(i) Area of triangle LMN = 42.91 cm^2 (ii) Area of trapezium KLMN = 69.32 cm^2
15	c(i)maximum sales = 2200 (ii) Minimum number of fiksyen books = 8 ,Maximum number of fiction books = 70

PAPER 2, SET 3

http://cikguadura.wordpress.com/

1	x = 3.219, y= 2.823 x= 1.451, y = 0.177 or y= 2.829, x = 3.215 y= 0.177, x= 1.451	8	a) $k = -3$ b) $\frac{7}{8}$ c) $3\frac{253}{480}\pi$
2	a) i) $y = \frac{x+2}{3}$ ii) $y = x$ b) $x = y = 1$	9	a) 0.5237 rad b) 14.80 c) 3.990
3 a	b) $a = 216°$ c) $T_5 = 27.99°$ d) $41.99°$	10	a) $\overrightarrow{RS} = \frac{1-k}{2}\underline{p} + \frac{1}{2}\underline{q}$ $\overrightarrow{OT} = \frac{k}{3}\underline{p} + \frac{1}{3}\underline{q}$ b) K = 1 , $\overrightarrow{RS} : \overrightarrow{OQ} = 1:2$ c) **OT**= $\frac{2}{3}$**OS** or **OT** = 2**TS** or **OS** =3**TS**
4	a) 14 b) $x = 14, y = 1$ c) 124		
5	a) (2,1) b) $x^2 - 4x + y^2 - 2y - 20 = 0$ c) $y = -\frac{1}{3}x + \frac{20}{3}$		
6	 Number of solution = 9	11	a) i) P =0.8 , x =0.4096 ii) Mean = 4 b) $w = 25.62 // 25.64$
		12	a) k=-2 b) $s = -t^2 + 6t - 5$ c) Show d) t=3 , d =2 m
7	a) Table and graph b) $y = 8.32$ $(7.95 \leftrightarrow 8.71)$ c) $p = 2.72$ $(2.71 \leftrightarrow 2.73)$ $q = 3.14$ $(3.00 \leftrightarrow 3.20)$	13	a) x= 15, y= 0.9 , z = 2.00 b) 91 c) 110 d) RM 4.00
		14	a) $\angle BDC = 62.18° // 62°10'$ b) $r = 4.523$ c) $CD' = 4.333$ d) 9.580
		15	a) inequalities b) Graph c) i) $40 \le y \le 50$ ii)RM 12.30

Answer PS SET1 Paper 2
http://cikguadura.wordpress.com/

Number	*Solution and marking scheme*
1	$x = 4 + \frac{4}{3}y$ *or equivalent* $\left(4 + \frac{4}{3}y\right)^2 + 8y^2 = 10y\left(4 + \frac{4}{3}y\right)$ $y = \frac{-(-177) \pm \sqrt{(177)^2 - 4(52)(144)}}{2(52)}$ $y = 3.771$ *or* $y = -0.3671$ $x = 9.028$ *or* $y = 3.5105$
2	(a)  $(b)\, y = \frac{1}{x}$ 3numberofsolutions
3	(a) $A_1 = \frac{1}{2}xy \quad A_2 = \frac{1}{2}(x+1)y \quad A_3 = \frac{1}{2}(x+2)y$ $d = A_2 - A_1 = \frac{y}{2} \quad d = A_3 - A_2 = \frac{y}{2}$ $T_9 = \frac{1}{2}xy + 8(\frac{y}{2}) = 12$ (b) (b) $y^2 + 4y - 12 = 0$ $y = 2, x = 4$ $A_1 = 4cm^2$
4	$(a)\frac{dy}{dx} = 2x - \frac{16}{x^2} = 0$ $2x^3 - 16 = 0$ $x = 1$ $m = 1$ $(b)\frac{d^2y}{dx^2} = 2 + \frac{32}{x^3}$ $x = 1, \quad \frac{d^2y}{dx^2} = 2 + \frac{32}{(1)^3} > 0$ $\therefore (1,8)$ *is a minimum point* $(c)\, y = \int 2x - 16x^{-1}dx$ $y = x^2 + \frac{16}{x} + c$ $8 = (1)^2 + \frac{16}{1} + c$ $c = -9 \quad \therefore y = x^2 + \frac{16}{x} - 9$

5

$(a)\ 2x-9=0$

$x=\frac{9}{2}$

$2y=20$

$y=10$

$\therefore R\left(\frac{9}{2},10\right)$

$(b) m_1=\frac{1}{2}$

$m_2=-2$

$10=-2\left(\frac{9}{2}\right)+c$

$y=-2x+19$

(c) *Koordinat* S

$2(-2x+19)=x+3$

$x=7 \quad y=10$

$S(7,10)$

$Area=\frac{1}{2}\begin{vmatrix}-3 & 7 & \frac{9}{2} & -3\\ 0 & 10 & 10 & 0\end{vmatrix}$

$=17.5 unit^2$

6

$(a) 19+h+k=40$

$42=39.5+\left(\frac{20-(3+h)}{12}\right)10$

$h=14$

$k=7$

$(b)\sigma^2=\frac{1(14.5^2)+2(24.5^2)+14(34.5^2)+12(44.5^2)+4(54.5^2)+7(64.5^2)}{40}-\left(\frac{1(14.5)+2(24.5)+14(34.5)+12(44.5)+4(54.5)+7(64.5)}{40}\right)^2$

$\sigma^2=156.94$

7

$\sqrt{x}$	1	2	3	4	5	6
$\log_{10} y$	0.2553	0.4314	0.6075	0.7839	0.9595	1.136

$log_{10}\ \boldsymbol{y}=(log_{10}\ \boldsymbol{q})\sqrt{\boldsymbol{x}}+log_{10}\ \boldsymbol{p}^2$

use $*\boldsymbol{m}=log_{10}\ \boldsymbol{q}$ $\qquad \boldsymbol{q}=1.493\pm0.01$

use $*\boldsymbol{c}=log_{10}\ \boldsymbol{p}^2$

$\boldsymbol{p}=1.109\pm0.01$

8

(a) $hx^2+x=\frac{1}{4}$

$h(-1)^2+(-1)=\frac{1}{4}$

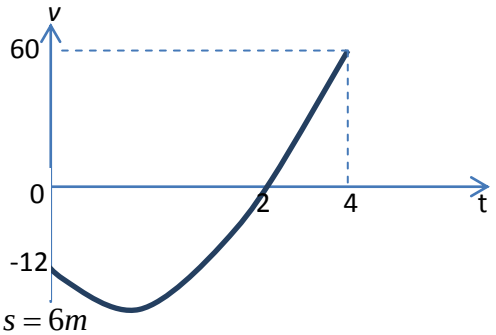
$h=\frac{5}{4}, k=9$

(b) Area$=\int_0^1\left(\boldsymbol{x}^2-6\boldsymbol{x}+9\right)\boldsymbol{dx}-\int_0^1\left(2\boldsymbol{x}+2\right)\boldsymbol{dx}$

$=\left[\frac{\boldsymbol{x}^3}{3}-\frac{8\boldsymbol{x}^2}{2}+7\boldsymbol{x}\right]_0^1$ or equivalent

$=\left(\frac{1}{3}-\frac{8}{2}+7\right)-0$

	$= 3\frac{1}{3}\,\boldsymbol{unit}^2$ (c) Volume = $\boldsymbol{\pi}\int_0^1 (\boldsymbol{x}-3)^4\,\boldsymbol{dx}$ - $\boldsymbol{\pi}\int_0^1 (2\boldsymbol{x}+2)^2\,\boldsymbol{dx}$ Volume = $\boldsymbol{\pi}\left[\frac{(\boldsymbol{x}-3)^5}{5}\right]_0^1 - \boldsymbol{\pi}\left[\frac{(2\boldsymbol{x}+2)^5}{6}\right]_0^1$ Volume = $\frac{493}{15}\pi$ *or* $32\frac{13}{15}\pi$
9	$(a)(i)\ \overrightarrow{OR} = m(10\underline{q}) + 5\underline{p}$ $= 10m\underline{q} + 5\underline{p}$ $(a)(ii)\overrightarrow{OS} = 5\underline{p} + \frac{2}{5}(-5\underline{p} + 10\underline{q})$ $= 3\underline{p} + 4\underline{q}$ $\overrightarrow{OR} = 3n\underline{p} + 4n\underline{q}$ $(b) 3n = 5\ ,\ 4n = 10m$ $n = \frac{5}{3}, m = \frac{2}{5}$ $(c) 154 = \frac{1}{2}(20)(30)\sin\angle POQ$ $\angle POQ = 149.1^0$
10	(a)(i) $p\left[Z > \frac{185-250}{70}\right]$ =0.82345 (ii) $P\left(Z > \frac{m-250}{70}\right) = \frac{358}{400}$ $\frac{m-250}{70} = -1.253$ m = 162.29 (c) (i) $P(X=2) = {}^{10}C_2(0.3)^2(0.7)^8$ =0.2335 (ii) $P(X<3) = P(X=0) + P(X=1) + P(X=2)$ $= {}^{10}C_0(0.3)^0(0.7)^{10} + {}^{10}C_1(0.3)^1(0.7)^9 + {}^{10}C_2(0.3)^2(0.7)^8$ =0.3828

11	$(a)\sin 0.3rad = \frac{y}{10}$ or $y = 2.955$ $\sin\frac{\theta}{2} = \frac{2.955}{5}$ $\theta = 72.46^{o} = 1.265$ rad (b) $5(1.265) = 6.323$ (c) Area of shaded region = $\frac{1}{2}(5)^2[1.265 - \sin 1.265rad] = 3.892$
12	(a) 6 (b) $v = 6t^2 - 6t - 12$ $(t+1)(t-2) < 0$ $0 \le t < 2$ (c)  $t = 0,\ s = 6m$ (d) *Maximum displacement*, $t = 2,\ s = -14m$ $t = 4,\ s = 38m$ *Total distance* $= 72m$
13	(a) $\cos\angle BAC = \frac{12}{13}$ $BC^2 = 114^2 + 96^2 - 2(114)(96)\cos\angle BAC$ $BC = 44.81$ (b) $\frac{44.81}{\sin 22.62} = \frac{114}{\sin\angle ACB}$ $\angle ACB = 78.09^0$ (c) $Area = \frac{1}{2}(96)(26)\sin 22.62^0 = 480\text{cm}^2$ (d) $CD = 68.95$
14	i) x = 125 ii) y = 7 iii) z = 3.20

	(b) 60 + 120 + 110 + 70 or 360 $\frac{125(60)+140(120)+150(110)+125(70)}{360}$ = 137.64 (c) $137.64 = \frac{20000}{Q_0} \times 100$ $Q_0 = 14530.66$ (d) 137.64×0.9 = 123.88
15	(a) $15x + 35y \geq 105$ or $3x + 7y \geq 21$ $40x + 40y \leq 320$ or $x + y \leq 8$ $y \leq 3x$ (c)(i) $1 \leq x \leq 5$ (ii) Maximum point is (2, 6) Maximum profit = RM3(2) + RM5(6) = RM36

Penyelesaian Perfect Score set 2 Kertas 2
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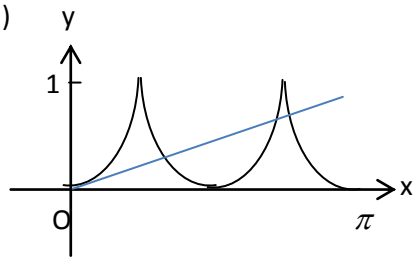
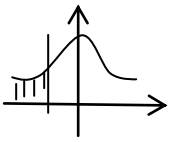
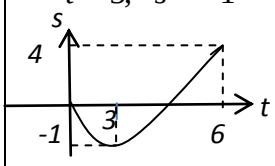
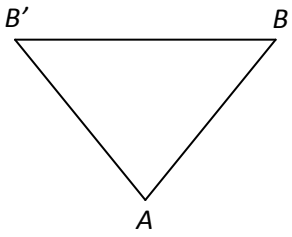
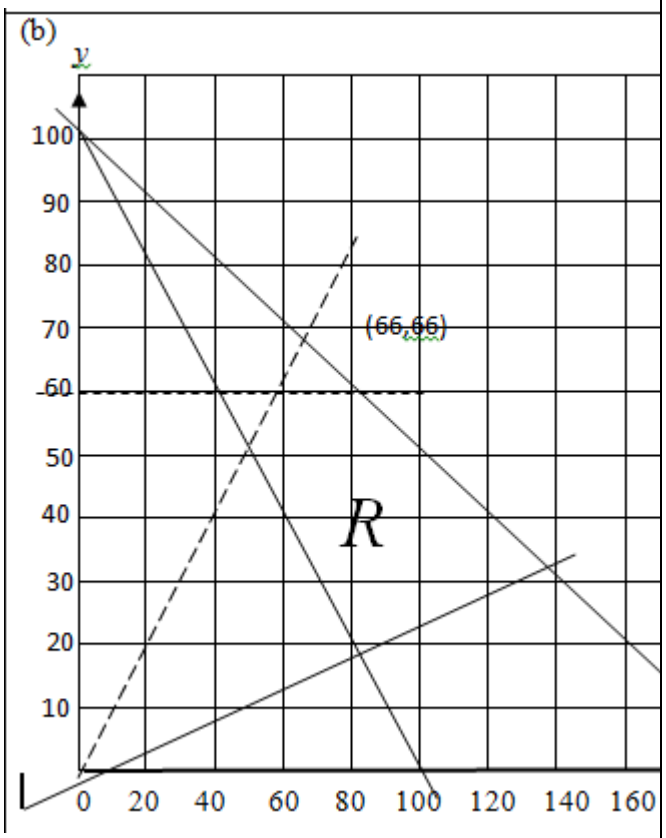
Solution	Marks	Solution	Marks
1 $y = 3 - 2x$ or $x = \dfrac{3-y}{2}$ $3x-(3-2x)^2 = 3$ **or** $3\left(\dfrac{3-y}{2}\right) - y^2 = 3$ $-4x^2 + 27x - 12 = 0$ $x = \dfrac{-27 \pm \sqrt{27^2 - 4(-4)(-12)}}{2(-4)}$ **or** x =0.478, 6.272 y = 2.044, -9.544	P1 K1 K1 N1 N1 **5**	$(a)\ 9^x = 583.2$ $x = \dfrac{\lg 583}{\lg 9}$ $= 2.898$ $(b)\ \log_a(x-y) = \log_a(xy)^{\frac{1}{2}}(3)$ $(x-y) = 3\sqrt{xy}$ $(x-y)^2 = 9xy$ $x^2 + y^2 = 11xy$	K1 K1 N1 K1 K1 N1 **6**
$3a)\quad a = 99, r = \dfrac{2}{3}$ $T_6 = 13\dfrac{1}{27}$ $b)\ \dfrac{99}{1-\frac{2}{3}} = 297$ $c)\quad T_1 = \dfrac{1}{2}(33)^2 \sin 60^0$ $T_2 = \dfrac{1}{2}(22)^2 \sin 60^0$ $T_3 = \dfrac{1}{2}\left(\dfrac{44}{3}\right)^2 \sin 60^0$ $a = 471.55,\ r = \dfrac{4}{9}$	P1 N1 K1 N1 K1 N1	$4(a)\ (i)\ \sqrt{\dfrac{23448}{N} - 8^2} = 62$ $N = 6$ $(ii)\ \dfrac{\sum x_i}{6} = 8$ $\sum x_i = 48$ (b) mean = 3(8)-2 = 22 Variance = 9 x62x62 = 34 596	K1 N1 K1 N1 N1 K1 N1 **7**

Solution	Marks	Solution	Marks
d) $S_5 = \dfrac{471.55\left(1-\left(\frac{4}{9}\right)^5\right)}{\frac{5}{9}}$ = 834.07	K1 N1 8		
5 a) P (0, 4) , Q (2 ,0) $\dfrac{2(2)+0}{5}$ *or* $\dfrac{0+12}{5}$ $T=\left(\frac{4}{5},\frac{12}{5}\right)$ $b)\ m=\dfrac{1}{2}$ $y-\dfrac{12}{5}=\dfrac{1}{2}\left(x-\dfrac{4}{5}\right)$ $2y=x+4$ $c)\ U=(0,2)$ $A=\dfrac{1}{2}\begin{vmatrix}0 & 2 & \frac{4}{5} & 0 & 0\\ 0 & 0 & \frac{12}{5} & 2 & 0\end{vmatrix}$ $=\dfrac{1}{2}\left\|\left(\dfrac{24}{5}+\dfrac{8}{5}\right)-0\right\|$ $=\dfrac{16}{5}$	P1 K1 N1 K1 N1 K1 N1 **7**	**6** a)  Shape of graph (cos θ), 1 cycle Modulus, reflection, Translation,max =1 b) y = $\dfrac{x}{\pi}$ Number of solution = 4	P1 P1 P1 N1 K1(line) N1 **6**

Solution	Marks	Solution	Marks
7		$8(a)(i)$ $\frac{dx}{dy} = 2y = 2(1) = 2, \quad \frac{dy}{dx} =$	K1
x^3 0.125 1 3.38 8 12.17 15.63 $x+y$ 1.56 2 3.19 5.5 7.58 9.31	N1	$y-1 = \frac{1}{2}(x-5)$	K1
	N1	$2y = x-3$	N1
Paksi betul, skala seragam & plot 1 titik	K1	(ii) *Area Under the Curve*:	
Plot semua titiknya dengan betul	N1	$A_1 = \int_0^1 y^2 + 4\,dy = \left[\frac{y^3}{3} + 4y\right.$	
Garis lurus penyuaian terbaik	N1	$= \frac{13}{3}$	K1
(b) $x+y = \frac{k}{p}x^3 + k$	P1	Area of trapezium:	
	K1	$A_2 = \int_0^1 2y + 3dy = \frac{1}{2}(1)(3+5) = 4$	K1
Guna $\frac{k}{p}$ =m	K1	Area of the shaded region :	
Guna k = c	K1 N1	$A_1 - A_2 = \frac{1}{3}$	K1 N1
$p = 3, k = 1.5$		*b*) $Volume = \pi\int_4^6 x-4\ dx$	K1K1
10		$= \pi\left[\frac{x^2}{2} - 4x\right]_4^6 = 2\pi$	N1
			10

Solution	Marks	Solution	Marks
9(*a*) $\angle BOC = \frac{2}{3}\pi\, rad \;//\; 0.095 rad$	P1	10*a*(*i*) $\overrightarrow{QC} = \overrightarrow{OA} + \overrightarrow{AC}$	K1
		$= \underline{x} + \frac{1}{2}\overrightarrow{AB}$	
(*b*) *Arc* $CB = s_1 = 4\left(\frac{2}{3}\pi\right) = 8.379$	K1	$= \frac{1}{2}\underline{x} + \frac{1}{2}\underline{y}$	N1
		(*ii*) $\overrightarrow{AD} = \overrightarrow{AO} + \overrightarrow{OD}$	
Radius of the semicircle $= 4\sin\frac{\pi}{3} rad = 3.464$		$= -\underline{x} + \frac{1}{3}\underline{y}$	N1
Perimeter of semicircle $= s_2 = 3.464\ \pi = 10.88$	Ki		
Perimeter of the shaded region $= s_1 + s_2$	K1K1		
$= 19.26$	Ni		
		(*b*) $\overrightarrow{BE} = \overrightarrow{BO} + \overrightarrow{OE} = \overrightarrow{BO} + k\overrightarrow{OC}$	
		$= -\underline{y} + k\left(\frac{1}{2}\underline{x} + \frac{1}{2}\underline{y}\right)$	
(*c*) Area of semicircle :		$\overrightarrow{BE} = \frac{k}{2}\underline{x} + \left(\frac{k-2}{2}\right)\underline{y}$	K1
$A_1 = \frac{1}{2}(3.464)^2(3.142) = 18.85$			
Area of sector :		(*c*) $\overrightarrow{BE} = \lambda\left(-\underline{x} + \frac{1}{3}\underline{y}\right)$	K1
$A_2 = \frac{1}{2}(4)^2\left(\frac{2}{3}\right)(3.142) = 16.76$			N1
Area of triangle :		$\frac{k}{2} = -\lambda \quad , \quad \frac{k-2}{2} = \frac{1}{3}\lambda$	K1
$A_3 = \frac{1}{2}(4)^2\sin\left(\frac{2}{3}\right)(3.142) = 6.928$		Solve simultaneously	
Area of the shaded region $= A_1 - (A_2 - A_3)$		$k = \frac{3}{2}$	K1
$= 9.018$			K1
			N1
11*a* (*i*) $p = 0.3,\ q = 0.7$		12(*a*) $t = 3, v = 0 \Rightarrow 27k - 6h = 0$	K1
Use $P(X \geq 2) = 1 - P(X = 1) - P(X = 0)$	K1	$s = \int 3kt^2 - 2ht\, dt$	
$P(X = 1) = {}^8C_1\,(0.3)(0.7)^7 = 0.1977$	K1	$= kt^3 - ht^2 + c$	
or $P(X = 0) = {}^8C_0\,(0.3)^0(0.7)^8 = 0.05765$	N1	$t = 0, s = 0, c = 0 \Rightarrow s = kt^3 - ht^2$	K1
$P(X \geq 2) = 0.7447$		$t = 3, s = -1 \quad \Rightarrow -1 = 27k - 9h$	K1
		Solve simultaneously	
(*ii*) *Variance* $= 8 \times \frac{7}{20} \times \frac{13}{20}$	K1	$27k - 6h = 0, \quad 27k - 9h = -1$	
$= \frac{728}{400} = 1.82$	N1	$k = \frac{2}{27}, h = \frac{1}{3}$	N1

Solution	Marks	Solution	Marks
$(b)(i)\ P(X \geq 3.1) = P\left(Z \geq \frac{3.1-2.2}{0.9}\right)$	K1	$(b)\ v = \frac{2}{9}t^2 - \frac{2}{3}t$	K1
$= P(Z \geq 1)$	N1	$a = \frac{dv}{dt} = \frac{4}{9}t - \frac{2}{3} = 0$	K1
$= 0.1587$		$t = \frac{3}{2}s$	N1
$(ii)\ P(X < m) = 0.19$ 			P1: Shape
$P\left(X < \frac{m-.2}{0.9}\right) = 0.19$	K1	$(c)\ s = \frac{2}{27}t^3 - \frac{1}{3}t^2$	K1: Points: (6,4), (3,-1), (0,0)
$\frac{m-2.2}{0.9} = -0.878$	Ki	$t = 6,\ s = 4$	
$m = 1.4098 // 1.41$	N1	$t = 0\ and\ t = 4.5, s = 0$	
		$t = 3,\ \ s = -1$	
		 S= 1+1+4= 6m	N1
13 $(a)\ x = \frac{20}{8} \times 100 = 250$	K1 N1	14 $(a)(i)\ \frac{\sin \angle CED}{9} = \frac{\sin 34.05^o}{6.5}$	K1
		$Seen:\ \ 50.83^o$	N1
		$\angle CED = 129.17^o$	N1
$(b)\ \frac{110(y) + 80(2y) + *250(3) + 150(2)}{y + 2y + 3 + 2} = 120$	K1K1	(ii)	
$y = 5$	N1	$AB^2 = 5^2 + 7^2 - 2(5)(7)\cos 34.05^o$	K1
		$AB\ =\ 4cm$	N1
$(c)\ Seen\ :\ A:\ \frac{110}{100} \times 110 = 121$	K1	(b)	
		$\angle ACD = 180^o - 34.05^o = 145.95^o$	N1
$or\quad B:\ \frac{80}{100} \times 110 = 88$	K1	$\angle CDE = 180^o - 34.05^0 - 129.17^o$	N1
$\bar{I}\ =\ \frac{121*(5) + 88*(10) + 250(3) + 150(2)}{*5 + *10 + 3 + 2}$	K1K1	$= 16.78^o$	
		$Use\ A = \frac{1}{2}ab\sin C\ \ for$	K1
$= 126.75$	N1	$\Delta ACD\ or\ \Delta CED$	
		$A_1 = \frac{1}{2}(7)(9)\sin 145.95^0 = 17.64\ or$	
		$A_2 = \frac{1}{2}(6.5)(9)\sin 16.78^0 = 8.444$	
		$Area\ of\ \Delta AED = A_1 + A_2 = 26.08$	K1 N1
		OR Other Valid Method	

Solution	Marks	Solution	Marks
		(c) 	
15 (a) $x + y \geq 100$ $x - 4y \leq 10$ $60x + 120y \leq 12000$ (b) 	1 m 1 m 1 m Any line correct 1 m All 3 lines correct 1 m Correct region 1 m	15(c)(i) $40 \leq y \leq 80$ (ii) (66,66) 60(*66) + 120 (*66) RM 11880	1 m N1 K1 N1

ANSWER

SET 3 PAPER 2

PERFECT SCORE

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1	$2x + 3y + 1 = 0$ …… $3y = -1 - 2x$ $x^2 + 6xy + 8 = 0$. $x^2 + 2x(-1 - 2x) + 8 = 0$ $-3x^2 - 2x + 8 = 0$ $x = \frac{-(-2) \pm \sqrt{-2^2 - 4(-3)8}}{2(-3)}$ $x = 1\frac{1}{3}, -2$ $y = \frac{-11}{3}, \frac{1}{3}$
2	(a) $4\log_9(5x^2 - 8) - 2\log_3 x$ $= \frac{4\log_3(5x^2 - 8)}{\log_3 9} - 2\log_3 x$ $= \log_3\left(\frac{5x^2 - 8}{x}\right)^2$ (b) $\log_3\left(\frac{5x^2 - 8}{x}\right)^2 = 2$ $\left(\frac{x}{5x - 7}\right)^2 = 3^2$ $\frac{5x^2 - 8}{x} = 3$ $5x^2 - 3x - 8 = 0$ $x = \frac{8}{5}$

3	$(a)\quad a-ar=0.375\ \ldots\ldots\ldots\ldots\ldots\ldots\ (1-r)=\dfrac{0.375}{a}$ $\dfrac{a}{1-r}=\dfrac{40}{3}$ $\dfrac{a}{\frac{0.375}{a}}=\dfrac{40}{3}$ $a^2=5$ $a=2.236\ ,\ r=0.8323$ $(b)\quad s_{7-}s_3=\dfrac{a(1-r^7)}{1-r}-\dfrac{a(1-r^3)}{1-r}$ $=\dfrac{a[(1-r^7)-(1-r^3)]}{1-r}$ $=\dfrac{40}{3}\left(0.8323^3-0.8323^7\right)$ $=3.998$
4	$(a)\ \dfrac{k+7}{2}$ $(b)\ (i)\ \ 6<k<9$ $(ii)\ \dfrac{77+9k}{20}=\dfrac{7+k}{2}$ $k=7$ $(c)\ \sigma^2=\dfrac{1150}{20}-7^2$ $=8.5$
5	(a) $\dfrac{9-5}{-2-0}=\dfrac{-3-5}{r-0}$ $r=4$ $(b)\quad m_{PQ}=-2,\ m=\dfrac{1}{2}$ $-3=\dfrac{1}{2}(4)+c$ $c=-5$ $y=\dfrac{1}{2}x-5$

$$\frac{9n-3m}{m+n}=5$$

$$9n-3m=5m+5n$$

$$4n=8m$$

$$m:n=1:2$$

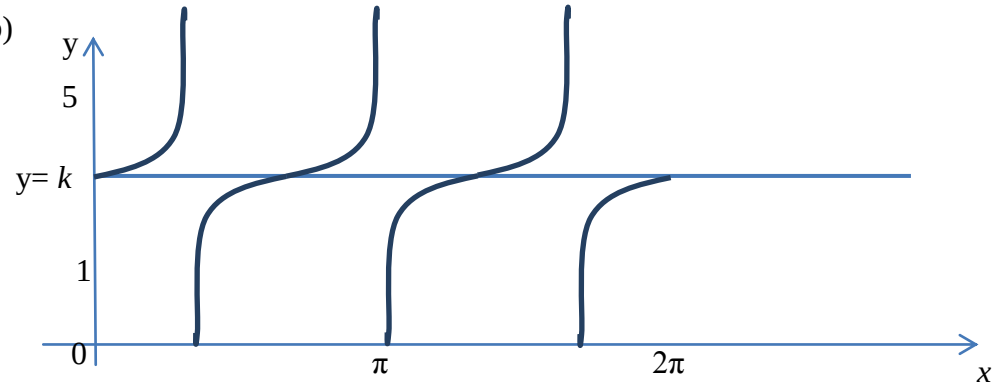
6 (a) $RHS=\tan 2x$

$$=\tan(x+x)$$

$$=\frac{\tan x+\tan x}{1-\tan x\tan x}$$

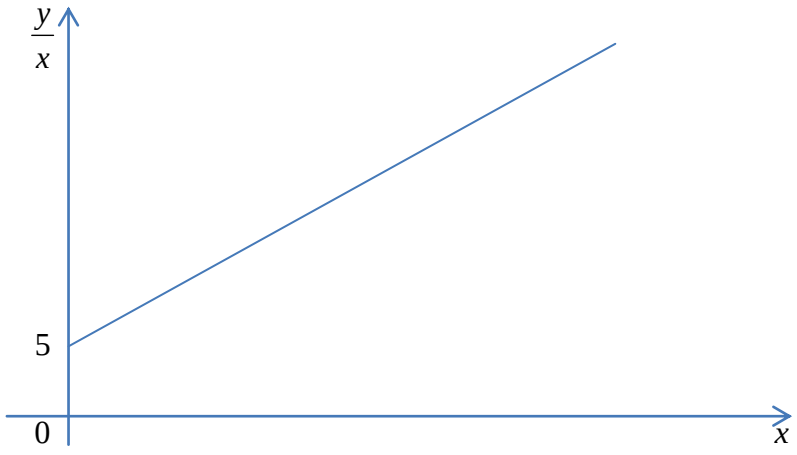
$$=\frac{2\tan x}{1-\tan^2 x}$$

(b)



$k=3$

7



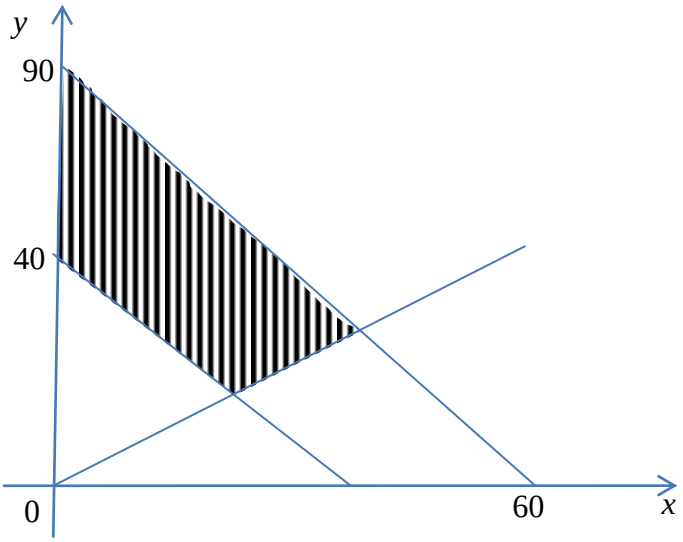
$\frac{y}{x}$	6.8	8.6	10.6	12	14	15.6

(c) (i) $p = 5$

(ii) $k = 3.6$

	(iii) 34.56
8	(*a*) $y=\int -2x$ $=-x^2+c$ $8=-(1)^2+c$ $y=-x^2+9$ $-x^2+9=0$ $x=3$ (*b*) $Area=\int_1^3 -x^2+9$ $=\left(-\frac{x^3}{3}+9x\right)_1^3$ $=\frac{28}{3}$ $-x^2+9=0$ $x=3$ (*b*) $Volume=\int_1^9 (9-y)dy$ $=\left(9y-\frac{y^2}{2}\right)_k^9$ $k=4$
9	(*a*) $CB=\sqrt{18.75}$ $\sin\theta=\frac{\sqrt{18.75}}{\sqrt{39}}$ $\theta=0.7661$ (*b*) $Perimeter=\left(7-\sqrt{39}\right)+(5\times\frac{\pi}{3})+(7\times0.7761)$ $=11.33$ (*c*) $Area=\left(7^2\times0.7761\right)-\left(5^2\times\frac{\pi}{3}\right)-\frac{1}{2}(2)(5)\sin120$ $=1.352$
10	(*a*) $\overrightarrow{AB}=\overrightarrow{AO}+\overrightarrow{OB}$ $=-\underline{x}+\underline{y}$

	(*b*) (*i*) $\overrightarrow{OE} = \overrightarrow{OA} + \overrightarrow{AE}$ $= x + m(-x + y)$ $= (1-m)x + my$ $\overrightarrow{OX} = \frac{2}{5}(1-m)x + \frac{2}{5}my$ (*ii*) $\overrightarrow{DB} = \overrightarrow{DO} + \overrightarrow{OB}$ $= -kx + y$ $\overrightarrow{DX} = -\frac{1}{5}x + \frac{1}{5}y$ (*c*) $\overrightarrow{OX} = \overrightarrow{OD} + \overrightarrow{DX}$ $= \left(k - \frac{1}{5}\right)x + \frac{1}{5}y$ $m = \frac{1}{2} \quad k = \frac{1}{5}$
11	(*a*)(*i*) ${}^{n}c_{1}(0.25)(0.75)^{n-1} = 8(0.75)^{n}$ $n = 24$ (*ii*) 0.0308 (*b*)(*i*) $P\left(z < \frac{110-\mu}{\sigma}\right) = 0.12 \quad P\left(z > \frac{1125-\mu}{\sigma}\right) = 0.35$ $\frac{110-\mu}{\sigma} = 1.175 \qquad \frac{1125-\mu}{\sigma} = 0.85$ $\sigma = 9.615$ $\mu = 117.77$ (ii) 0.0103
12	(*a*) $\frac{Sin\ P\hat{S}T}{7} = \frac{\sin 110}{12}$ $P\hat{S}T = 33.24$ (*ii*) $\frac{Sin\ 36.76}{ST} = \frac{\sin 110}{12}$ = 7.642 (*iii*) $Area = \frac{1}{2}(5)(7.642)\sin 33.24$ $= 10.47$ (b) $RU^2 = 5^2 + 5^2 - 2(5)(5)\cos 103.24$ RU = 7.839
13	(a) x =130, y =RM8.55, z = RM20 (b) (i) 116.45

	(ii) 1159.30 (c) 133.92
14	(a) 5 (b) $v = 5t - 2t^2 + 25$ $t = \frac{5}{4}$ $v = 28\frac{1}{8}$ (c) $k = 5$ (d) $Distance = \int_5^{10} (5t - 2t^2 + 25)dt$ $= 270.84$
15	$x + y \geq 40$ $120x + 80y \leq 7200$ $x \leq 2y$  (d) 30, 75 RM3200

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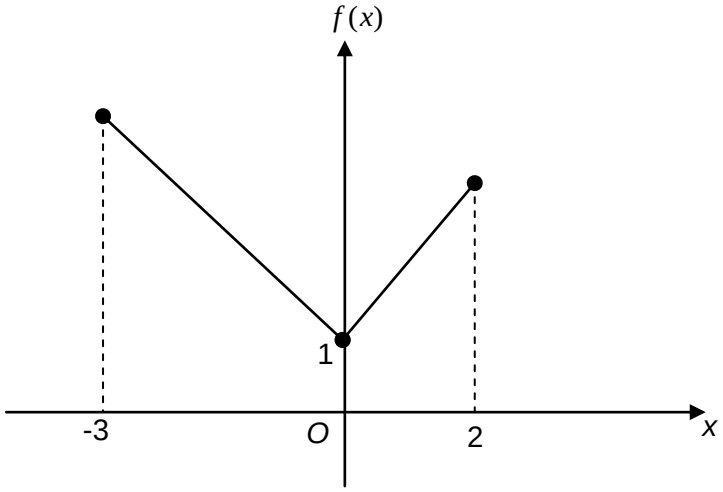
FULL SOLUTION

PAPER 1, SET 1

1 Diagram 1 shows part of a graph of a function $f : x \to |2x| + p$, where p is constant for the domain $-3 \le x \le 2$.

Rajah 1 menunjukkan sebahagian dari graf untuk fungsi $f : x \to |2x| + p$, *dengan keadaan p ialah pemalar untuk domain* $-3 \le x \le 2$.



Diagram/*Rajah* 1

State
Nyatakan

(a) the value of p,
nilai p,

(b) the range.
julat.

Answer/*Jawapan* :

(a) 1

(b) $1 \le f(x) \le 7$

2 A function f is defined as $h: x \to \frac{p+x}{3+2x}, x \neq k$ and p is a constant.

Satu fungsi ditakrifkan sebagai $h: x \to \frac{p+x}{3+2x}, x \neq k$ *dan p ialah pemalar.*

(a) Determine the value of k,
Nyatakan nilai k,

(b) Given value 2 is mapped to itself by the function f, find the value p and another value of x which is mapped to itself.
Diberi 2 memetakan kepada dirinya sendiri dibawah fungsi f, *cari nilai p dan nilai x yang satu lagi yang memetakan kepada dirinya sendiri.*

Answer/*Jawapan* :

$(a) \quad -\frac{3}{2}$

$(b) \quad \frac{p+2}{3+2(2)} = 2$

$p = 12$

$\frac{12+x}{3+2x} = x$

$2x^2 + 3x = 12 + x$

$2x^2 + 2x - 12 = 0$

$(x-2)(x-3) = 0$

$x = 2 \,.\; x = -3$

$\therefore x = -3$

---

3 Given functions $f: x \to 2x+5$ and $fg: x \to 13-2x$.
Diberi fungsi $f: x \to 2x+5$ *dan* $fg: x \to 13-2x$.

Find
Cari

(a) gf,

(b) the values of x if $gf(x^2+1) = 5x-6$.
nilai-nilai x *jika* $gf(x^2+1) = 5x-6$.

Answer/*Jawapan* :

$(a) \quad f^{-1}(x) = \frac{x-5}{2}$

$g(x) = \frac{13-2x-5}{2}$

$= 4 - x$

$gf(x) = 4 - (2x+5)$

$= -1 - 2x$

$(b) \quad -1 - 2(x^2+1) = 5x - 6$

$2x^2 + 5x - 3 = 0$

$(x+3)(2x-1) = 0$

$x = -3 \,,\; x = \frac{1}{2}$

4 The function $y = x^2 - 4px + 5p^2 + 1$ has a minimum value $2q + q^2$, where p and q are constant.
Express p in term of q.

Satu fungsi $y = x^2 - 4px + 5p^2 + 1$ *mempunyai nilai minimum* $2q + q^2$*, dengan keadaan p dan q adalah pemalar.*
Ungkapkan p dalam sebutan q.

Answer/*Jawapan* :

$(x - 2p)^2 - 4p^2 + 5p^2 + 1$

$p^2 + 1 = 2p + q^2$

$q^2 = p^2 - 2p + 1$

$q^2 = (p - 1)^2$

$q = p - 1$

$p = q + 1$

---

5 Given α and β are the roots of the equation $x^2 - 2x + k = 0$, whereas 2α and 2β are the roots of the equation $x^2 + mx + 9 = 0$.
Calculate the possible values for k and m.

Diberi α *dan* β *ialah punca-punca bagi persamaan* $x^2 - 2x + k = 0$*, manakala* 2α *dan* 2β *ialah punca-punca bagi persamaan* $x^2 + mx + 9 = 0$*.*
Kira nilai-nilai yang mungkin bagi k dan m

Answer/*Jawapan* :

$x^2 - 2x + k = 0$ $\quad$ $x^2 + mx + 9 = 0$

$SOR = 2$ $\quad$ $POR = k$ $\quad$ $SOR = -m$ $\quad$ $POR = 9$

$\alpha + \beta = 2$ $\quad$ $\alpha\beta = k$ $\quad$ $2\alpha + 2\beta = -m$ $\quad$ $2\alpha(2\beta) = 9$

$2(2) = -m$ $\quad$ $4\alpha\beta = k$

$m = -4$ $\quad$ $4(k) = 9$, $k = \frac{9}{4}$

---

6 Find the range of values of x if $x \le \frac{-3}{1-2x}$.

Cari julat nilai-nilai x *jika* $x \le \frac{-3}{1-2x}$.

Answer/*Jawapan* :

$x \le \frac{-3}{1-2x}$

$x - 2x^2 \le -3$

$2x^2 - x - 3 \ge 0$

$x \le -1$, $x \ge \frac{3}{2}$

7 Solve the equation $3^{n+2} - 3^n + 27(3^{n-1}) = 34$.

Selesaikan persamaan $3^{n+2} - 3^n + 27(3^{n-1}) = 34.$

Answer/*Jawapan* :

$3^{n+2} - 3^n + 27(3^{n-1}) = 34$

$3^n \times 3^2 - 3^n + 3^3 \times 3^n \times \frac{1}{3} = 34$

$3^n\left(3^2 - 1 + 3^2\right) = 34$

$3^n(17) = 34$

$3^n = 2$

$n = 0.6309$

---

8 Given $\log_9 y = P$ and $\log_{27} 3y = Q$,express P in term of Q.

Diberi $\log_9 y = P$ *dan* $\log_{27} 3y = Q$ *, ungkapkan* P *dalam* Q .

Answer/*Jawapan* :

$\log_9 y = P$

$\log_3 y = 2P$

$\log_{27} 3y = Q$

$\log_{27} 3 + \log_{27} y = Q$

$\frac{\log_3 3 + \log_3 y}{\log_3 27} = Q$

$\frac{1 + 2P}{3} = Q$

$P = \frac{3Q - 1}{2}$

---

9 The sum of 14 terms in an arithmetic progression is 224 and the sum of the odd terms is 105. Find the first term and the common different of the progression.

Jumlah 14 sebutan satu janjang aritmetik ialah 224. Hasil tambah bagi sebutan-sebutan ganjilnya ialah 105.
Cari sebutan pertama dan beza sepunya janjang.

Answer/*Jawapan* :

$S_{14} = 224$

$2a + 13d = 32$

$7a + 42d = 105$

$a + 6d = 15$

$d = 2$, $a = 3$

10 Given the first term of a geometric progression is $\frac{1}{2}p^2$ and the fourth term is $\frac{27}{128}p^2$.

Find the sum to infinity of this progression.

Diberi sebutan pertama satu janjang geometri ialah $\frac{1}{2}p^2$ *dan sebutan keempatnya ialah* $\frac{27}{128}p^2$.

Cari hasil tambah hingga ketakterhinggan janjang ini.

Answer/*Jawapan* :

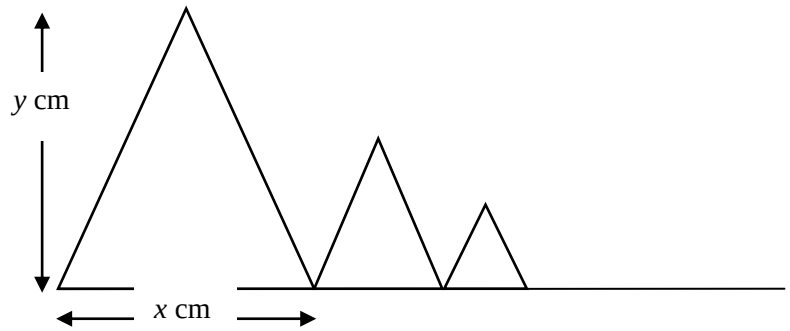
$\frac{ar^3}{a} = \frac{27p^2}{128} \times \frac{2}{p^2}$ $\quad r^3 = \frac{54}{128}$, $r = \frac{3}{4}$

$S_\infty = \frac{0.5p^2}{1-\frac{3}{4}} = 2p^2$

---

11 Diagram 11 shows the arrangement of the first three triangles for an infinite series of similar triangles.

Rajah 11 menunjukkan susunan tiga segitiga-segitiga serupa sehingga ketakterhinggaan



Diagram/*Rajah* 11

The first triangle has a base of measurement *x* cm and height *y* cm. The measurements for the base and height of the following triangle is half of the measurements of the base and the height of the previous triangle.
It is given that $x = 80$ *cm* and $y = 120$ *cm*, find, in cm^2, the sum of five triangles after the third triangle.

Segitiga yang pertama berukuran tapak x cm dan tinggi y cm. Ukuran-ukuran tapak dan tinggi makin berkurangan separuh daripada ukuran-ukuran segitiga-segitiga yang sebelumnya. Diberikan $x = 80$ *cm dan* $y = 120$ *cm, cari , dalam cm^2 , jumlah lima segitiga selepas segitiga yang ketiga.*

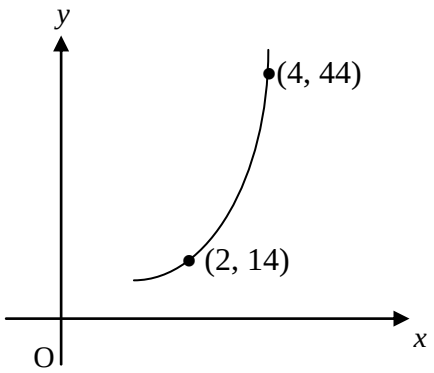
Answer/*Jawapan* :

$a = 4800$ $\quad r = 0.25$

$T_4 = 75$

$S_5 = \frac{75(1-0.25^5)}{1-0.25} = 99\frac{231}{256}$

12 Diagram 12 shows part of the curve *y* against *x*.
Rajah 12 menunjukkan sebahagian dari lengkung y melawan x.



Diagram/*Rajah* 12

It is known that *x* and *y* are related by the linear equation $\frac{y}{x} = kx + h$, where *h* and *k* are constants.

Diketahui x dan y dihubungkan oleh persamaan linear $\frac{y}{x} = kx + h$ *,dengan keadaan h dan k adalah pemalar.*

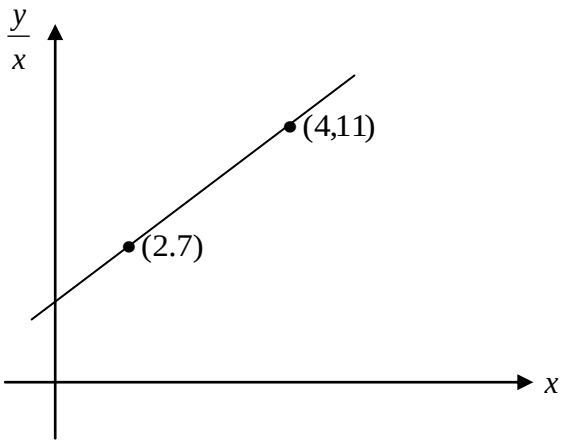
(a) Sketch the straight line graph for the equation $\frac{y}{x} = kx + h$.

Lakar garis lurus untuk persamaan $\frac{y}{x} = kx + h$

(b) Find the value of *h* and of *k.*
Cari nilai h dan dan k.

Answer/*Jawapan* :

(a)

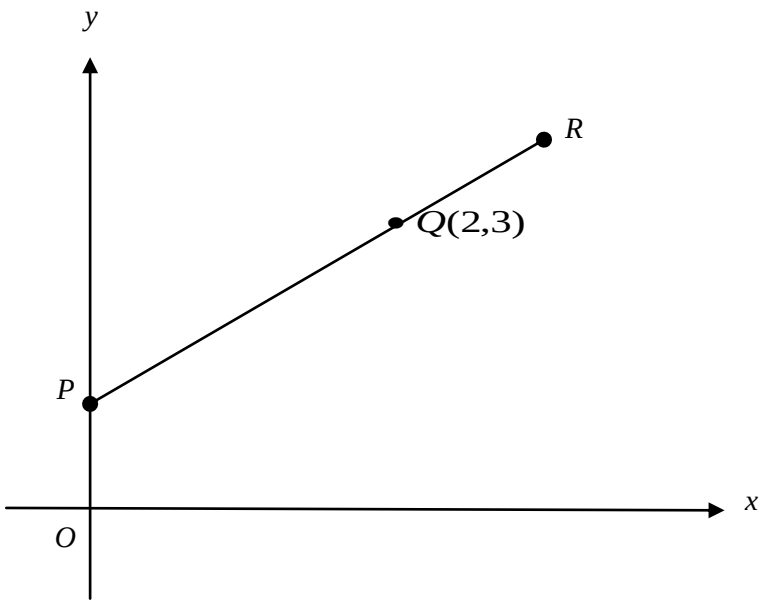


(*b*) $k = \frac{11-7}{4-2} = 2$, $\frac{7-h}{2-0} = 2$

$h = 3$

13 Diagram 13 shows *P, Q,* and *R* are three points on the straight line $2y = x + 4$ such that $PQ : PR = 4 : 5$.

Rajah 12 menunjukkan P, Q dan R adalah tiga titik di atas garis lurus $2y = x + 4$ *dengan keadaan* $PQ : PR = 4 : 5$



Diagram/*Rajah* 12

Find the equation of the straight line which passes through the point R and perpendicular to *PQR.*

Cari persamaan garis lurus yang melalui titik R dan berserenjang dengan garis lurus PQR

Answer/*Jawapan* :

$2y = x + 4$ $\qquad R\left(\frac{5}{2}, \frac{13}{4}\right)$

$x = 0 \;\; , \;\; y = 2$

$P(0,2)$ $\qquad \frac{13}{4} = -2\left(\frac{5}{2}\right) + c \quad , \quad c = \frac{33}{4}$

$y = -2x + \frac{33}{4}$

14 $ABCD$ is a parallelogram. T is the midpoint of BC. Given $\overrightarrow{AB}$ = 2**i** + 3**j** and $\overrightarrow{AT} = \frac{3}{2}$**i** + **j**, where **i** and **j** are unit vector unit parallel to x-axis and y-axis.

$ABCD$ *ialah sisiempat selari. T ialah titik tengah BC. Diberi* $\overrightarrow{AB}$ = 2***i*** + 3***j*** *dan* $\overrightarrow{AT} = \frac{3}{2}$***i*** + ***j***, *dengan keadaan* ***i*** *dan* ***j*** *ialah vektor unit yang selari dengan paksi-x dan paksi- y*

Find
Cari

(a) $\overrightarrow{AD}$, in terms of **i** and/or **j**.
$\overrightarrow{AD}$, *dalam sebutan* ***i*** *dan/atau* **j.**

(b) the length of DT.
panjang DT.

Answer/*Jawapan* :

(a) $AD = BC$, $BC = 2BT$

$$= 2(BA + AT)$$

$$= 2\left[\begin{pmatrix}-2\\-3\end{pmatrix} + \begin{pmatrix}3/2\\1\end{pmatrix}\right]$$

$$= -\underset{\sim}{i} - 4\underset{\sim}{j}$$

(b) $|DT| = \sqrt{(5/2)^2 + (5)^2}$

$= 5.590$

15 *Solution to this question by scale drawing will not be accepted.*
Jawapan secara berskala tidak diterima untuk soalan ini.

Given **a** = 2**i** – **j**, **b** = **i** + 3**j**, $P(1, -2)$ and $Q(5, 3)$. If $\overrightarrow{PQ} = m\mathbf{a} + n\mathbf{b}$ where m and n are constants, find

Diberi $\mathbf{a} = 2\mathbf{i} - \mathbf{j}$, $\mathbf{b} = \mathbf{i} + 3\mathbf{j}$, *P(1, –2) dan Q(5, 3). Jika* $\overrightarrow{PQ} = m\mathbf{a} + n\mathbf{b}$ *dengan keadaan m dan n ialah pemalar, cari*

(a) the value of m and of n,
nilai m dan n,

(b) the unit vector in the direction of $\overrightarrow{PQ}$.

vektor unit dalam arah $\overrightarrow{PQ}$.

Answer/*Jawapan* :

(*a*) $\begin{pmatrix} -1 \\ 2 \end{pmatrix} + \begin{pmatrix} 5 \\ 3 \end{pmatrix} = m\begin{pmatrix} 2 \\ -1 \end{pmatrix} + n\begin{pmatrix} 1 \\ 3 \end{pmatrix}$

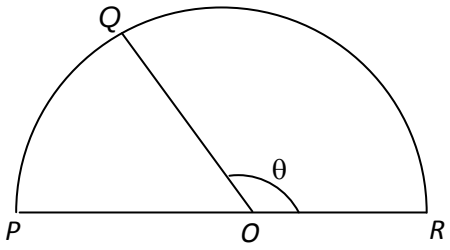
$4 = 2m + n$

$5 = -m + 3n$

$m = 1 \quad , \quad n = 2$

(*b*) $\dfrac{4\underset{\sim}{i} + 5\underset{\sim}{j}}{\sqrt{41}}$

16 Diagram 16 shows a semicircle PQR with center O.
Rajah 16 menunjukkan sebuah semibulatan PQR berpusat O.



Diagram/ *Rajah 16*

It is given that the radius of the semicircle is 10 cm and the area of the sector QOR is 85.6 cm^2.
Diberi bahawa jejari semibulatan ialah 10 cm dan luas sektor QOR ialah 85.6 cm^2.
[Use / *Guna* □ = 3.142]

Find
Cari

(a) the value of θ in radian ,

nilai θ *dalam radian*,

(b) perimeter, in cm , of sector *POQ*.
perimeter , dalam cm , sektor POQ.

Answer/*Jawapan* :

(a) $\frac{1}{2}(10)^2\theta = 85.6$

$\theta = 1.712 \quad rad$

(b) $Perimeter = 10 + 10 + 10(3.142\text{-}1.712)$

$= 34.30$

17 Given $\cos 15^o = a$ and $\sin 35^o = b$, express $\cos 50^o$ in terms of a and/ or b.
Diberi $kos 15^o = a$ *and* $\sin 35^o = b$, *ungkapkan* $kos\ 50^o$ *dalam sebutan* a *dan/atau* b.

Answer/*Jawapan* :

$\cos\ 50^o = \cos(15^o + 35^o)$

$= \cos 15^o \cos 35^o - \sin 15^o \sin 35^o$ $\quad \sin 15^o = \sqrt{1-a^2}$, $\cos 35^o = \sqrt{1-b^2}$

$= a\sqrt{1-b^2} - b\sqrt{1-a^2}$

---

18 Solve the equation $\frac{1}{\tan^2\theta} + \cos ec^2\ \theta - 3 = 0$ for $0^0 \le \theta \le 360^0$.
Selesaikan persamaan $\frac{1}{\tan^2\theta} + \cos ec^2\ \theta - 3 = 0$ *untuk* $0° \le \theta \le 360°$.

Answer/*Jawapan* :

$\frac{1}{\tan^2\theta} + \cos ec^2\ \theta - 3 = 0$

$\cot^2\theta + \cos ec^2\theta - 3 = 0$

$\cot^2\theta + 1 + \cot^2\theta - 3 = 0$

$2\cot^2\theta = 2$

$\cot\theta = \pm 1$

$\theta = 45^o, 135^o, 225^o, 315^o$

---

19 Given $\frac{d^2y}{dx^2} = 4x^3 + 1$, if $x = -1$, $y = \frac{1}{2}$ and $\frac{dy}{dx} = 3$, find the value of y when $x = 5$.
Diberi $\frac{d^2y}{dx^2} = 4x^3 + 1$, *jika* $x = -1$, $y = \frac{1}{2}$ *dan* $\frac{dy}{dx} = 3$, *cari nilai* y *apabila* $x = 5$.

Answer/*Jawapan* :

$\frac{d^2y}{dx^2} = 4x^3 + 1$, $\frac{dy}{dx} = x^4 + x + c$, $3 = (-1)^2 + -1 + c$, $c = 3$

$\frac{dy}{dx} = x^4 + x + 3$, $y = \frac{x^5}{5} + \frac{x^2}{2} + 3x + d$, $\frac{1}{2} = \frac{(-1)^5}{5} + \frac{(-1)^2}{2} + 3(-1) + d$, $d = \frac{16}{5}$

$y = \frac{x^5}{5} + \frac{x^2}{2} + 3x + \frac{16}{5}$, $y = 655.7$

20 Given the function of the graph $f(x) = px^3 + \frac{q}{x^2}$, which has a gradient function of $f'(x) = 3x^2 - \frac{96}{x^3}$, where p and q are constant.

Diberi fungsi suatu graf $f(x) = px^3 + \frac{q}{x^2}$, *dengan keadaan fungsi kecerunannya ialah* $f'(x) = 3x^2 - \frac{96}{x^3}$, *dengan keadaan* p *dan* q *adalah pemalar.*

Find
Cari

(a) the value of p and the value of q,
nilai p *dan nilai* q
(b) the coordinate point of the turning point of the graph.
koordinat titik penukaran graf tersebut.

Answer/*Jawapan* :

(a) $f(x) = px^3 + \frac{q}{x^2}$, $f'(x) = 3px^2 - \frac{2q}{x^3}$

$3p = 3$ $\quad 2q = 96$

$p = 1$ $\quad q = 48$

(b) $3x^2 - \frac{96}{x^3} = 0$, $x^5 = 32$

$x = 2$ $\quad f(x) = 1(2)^3 + \frac{48}{2^2} = 20$

(2,20)

---

21 The total surface area of a solid, $L\ cm^2$, is given by the equation $L = 3\pi\left(x^2 + \frac{16}{x}\right)$.

Calculate the minimum value of the surface area of the solid.

Luas permukaan satu pepejal , $L\ cm^2$, *diberi oleh persamaan* $L = 3\pi\left(x^2 + \frac{16}{x}\right)$.

Kira nilai minimum luas permukaan pepejal tersebut.

Answer/*Jawapan* :

$L = 3\pi\left(x^2 + \frac{16}{x}\right)$, $L = 3\pi x^2 + 48\pi x^{-1}$, $\frac{dL}{dx} = 6\pi x - 48\pi x^{-1}$

$6\pi x - 48\pi x^{-1} = 0$, $x = \sqrt{8}$, $L_{\text{maximum}} = 3\pi(\sqrt{8})^2 + \frac{48\pi}{\sqrt{8}}$

$= 40.97\pi$

22 A mean of the set of numbers $6,\ 2,6,\ 2,2,\ 10,\ x,\ y$ is 5. Given the standard deviation of the set of the numbers is $\frac{1}{2}\sqrt{37}$, find the values of x.

Purata satu set nombor-nombor $6,\ 2,6,\ 2,2,\ 10,\ x,\ y$ *ialah 5. Diberi sisihan piawai nombor-nombor itu ialah* $\frac{1}{2}\sqrt{37}$ *, cari nilai-nilai of* x.

Answer/*Jawapan* :

$\bar{x} = 5$

$x + y = 12$

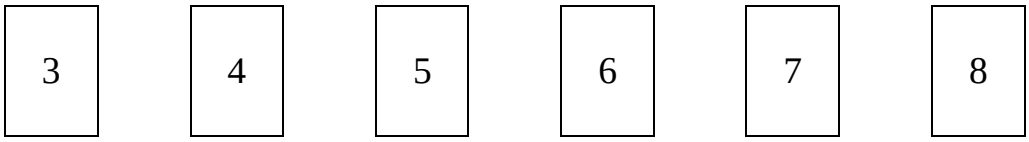
$$\frac{6^2 + 2^2 + 6^2 + 2^2 + 2^2 + 10^2 + x^2 + (12 - x)^2}{8} = \frac{1}{2}\sqrt{37}$$

$x^2 - 12x + 27 = 0 \quad , \quad (x-3)(x-9) = 0$

$x = 3 \ , \ x = 9$

---

23 23 Diagram 23 shows six numbered cards.
Rajah 23 menunjukkan enam keeping kad nombor.



Diagram/*Rajah* 23

A four-digit number is to be formed by using four these cards.
Satu nombor empat digit hendak dibentuk dengan menggunakan empat daripada kad-kad ini.

How many
Berapa banyak

(a) different numbers can be formed ?
nombor yang berlainan yang dapat dibentuk?

(b) different number greater than 6500 can be formed?
nombor yang berlainan yang lebih lebih besar dari 6500 yang dapat dibentuk ?

Answer/*Jawapan* :

$(a)\ \ 6 \times 5 \times 4 \times 3 = 360$

$(b)\ \ 1 \times 1 \times 4 \times 3 + \ 2 \times 5 \times 4 \times 3 = 132$

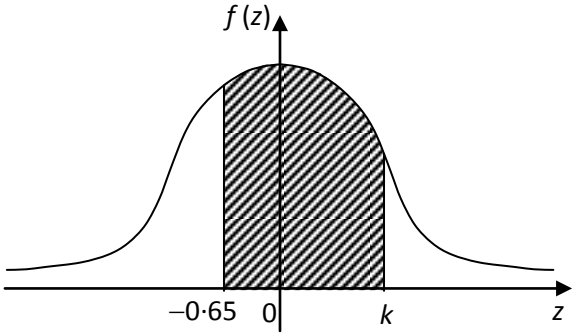
24 A box contains *n* red marbles and 6 blue marbles. Two balls are picked simultaneously at random. Find the value of *n* if the probability of getting two blue marbles is $\frac{1}{3}$.

Satu kotak mengandungi n biji guli dan 6 biji guli biru. Dua biji guli dikeluarkan secara serentak secara rawak. Cari nilai n jika kebarangkalian mendapat dua biji guli biru ialah $\frac{1}{3}$.

Answer/*Jawapan* :

$$\frac{6}{n+6}\times\frac{5}{n+5}=\frac{1}{3}$$
$$(n+6)(n+5)=90$$
$$n^2+11n-60=0$$
$$(n+15)(n-4)=0$$
$$n=4$$

25 Diagram 25 shows a standard normal distribution graph. The probability represented by the area of the shaded region is 0·7038.
Rajah 25 menunjukkan graf taburan normal. Kebarangkalian yang ditunjukkan dengan kawasan berlorek ialah 0·7038.



Diagram/*Rajah* 25

(a) Find $P(z \geq k)$
Cari $P(z \geq k)$

(b) X is a continuous random variable which normally distributed , $N(82,5)$, find the value of nilai X when the $z-$score is *k*.
X ialah pemboleh ubah rawak selanjar bertaburan normal , $N(82,5)$, cari nilai X apabila skor-z ialah *k*.

Answer/*Jawapan* :

(a) $1-0.2578-0.7038=0.0384$

(b) $\frac{X-82}{\sqrt{5}}=1.77$
$X=83.72$

PAPER 1, SET 2

1 Diagram 1 shows an arrow diagram of the given function
Rajah 1 menunjukkan gambarajah anak panah untuk fungsi yang diberi

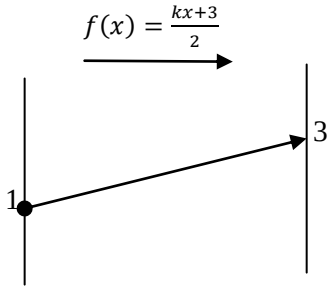


DIAGRAM 1/Rajah 1

(a) Find the value of k,
Carikan nilai k

(b) From the value of k in (a) , find f(5)
Dari nilai k dalam (a), carikan f(5)

Answer:
Jawapan: (a) $\frac{k(1)+3}{2} = 3$

k = 3

(b) f(5) = $\frac{3(5)+3}{2} = 9$

---

2 The function *f* is defined by $f: x \to rx^2 + s$ and the function g^{-1} is defined by $g^{-1}: x \to \frac{x-1}{2}$. Given the composite function *fg* is $fg: x \to x^2 + x + 6$, find the values of *r* and s.
Fungsi-fungsi f dan g^{-1} ditakrifkan sebagai $f: x \to rx^2 + s$ *dan* $g^{-1}: x \to \frac{x-1}{2}$.
Diberi fungsi gubahan $fg: x \to x^2 + x + 6$, cari nilai –nilai of r and *s*

Answer:
Jawapan:

g(x) = 2x + 1
$fg(x) = r(2x + 1)^2 + s$

$= 4rx^2 + 4rx + r + s$

4r = 1 ¼ + s = 6

r = ¼ s = 23/4

3. Given the function $h(x) = 6x + 1$ and $h^{-1}g(x) = \frac{1-x}{3}$. Find

Diberi fungsi $h(x) = 6x + 1$ *dan* $h^{-1}g(x) = \frac{1-x}{3}$. *Cari*

(a) $h^{-1}(5)$

(b) $gh^{-1}(x)$

Answer:
Jawapan:

a) $6x + 1 = 5$

$x = 2/3$

b) $\frac{g(x)-1}{6} = \frac{1-x}{3}$

$g(x) = 3 - 2x$

$gh^{-1}(x) = 3 - 2(\frac{x-1}{6})$

$= \frac{10-x}{3}$

---

4 Find the range of the values of x such that $2x(x - 1) \geq 3x+3$.
Cari julat nilai x bagi $2x(x - 1) \geq 3x+3$.
Answer:
Jawapan:

$2x^2 - 5x - 3 \geq 0$
$(2x + 1)(x-3) \geq 0$

$x \leq -\frac{1}{2}$ $\quad x \geq 3$

---

5 Given the quadratic equation $(p+1)x^2 + 2q\,x + 1 - 2q^2 = 0$, where p and q are constants, has equal roots, express p in terms of q.
Diberi persamaan kuadratik $(p+1)x^2 + 2qx + 1 - 2q^2 = 0$, *dengan keadaan p dan q ialah pemalar mempunyai punca-punca sama, ungkapkan p dalam sebutan q.*

Answer:
Jawapan:

$(2q)^2 - 4(p+1)(1-2q^2) = 0$

$(p+1) = \frac{q^2}{1-2q^2}$

$P = \frac{q^2}{1-2q^2} - 1$

$P = \frac{3q^2-1}{1-2q^2}$

6 The quadratic function $f(x) = mx^2 - 6mx - 4m^2 - 1$, has a maximum point (n, 1), where *m and n* are constant Find the values of *m* and the value of *n*
Fungsi kuadratik $f(x) = mx^2 - 6mx - 4m^2 - 1$, mempunyai titik maksimum (n,1) di mana m dan n adalah pemalar.Carikan nilai-nilai m dan nilai n

Answer:
Jawapan:

$$-\frac{(-6m)}{2m} = n$$

$$n = 3$$

$$1 = m(3)^2 - 6m(3) - 4m^2 - 1$$

$$4m^2 + 9m + 2 = 0$$

$$(4m + 1)(m+2) = 0$$

$$m = -1/4 \ , \ m = -2$$

---

7 Given the equation $7^{2m-p} = \frac{1}{\sqrt[3]{49^{p-3}}}$, express m in terms of p.
Diberi persamaan $7^{2m-p} = \frac{1}{\sqrt[3]{49^{p-3}}}$, ungkapkan m dalam sebutan p
Answer:
Jawapan:

$$7^{2m-p} = 7^{\frac{-2(p-3)}{3}}$$

$$6m - 3p = -2p + 6$$

$$m = \frac{p+6}{6}$$

---

8 Given $\log_x 625 = \log_5 x$, find the values of *x*.
Diberi $\log_x 625 = \log_5 x$, cari nilai-nilai bagi x.
Answer:
Jawapan:

$$\frac{\log_5 625}{\log_5 x} = \log_5 x$$

$$4 = (\log_5 x)^2$$

$$\log_5 x = 2 \quad \text{or} \quad \log_5 x = -2$$

$$x = 25 \qquad x = \frac{1}{25}$$

9 The *n* terms of an arithmetic progression is given by $T_n = 6n - 29$
Sebutan ke n bagi suatu janjang aritmetik diberi oleh Tn = 6n - 29.
Find
Carikan
(a) the 9th terms.
sebutan ke 9.
(b) the sum of the first 8 terms.
hasil tambah 8 sebutan pertama.
Answer:
Jawapan:

$a)\ T_9 = 6(9) - 29$

$= 25$

b) $T_1 = 6(1) - 29 = -23, \quad d = 6(2) - 29 - (-23) = 6$

$S_8 = \frac{8}{2}[2(-23) + 7(6)]$

$= -16$

---

10 In a geometric progression, the first term is 423. Given that the sum to infinity of this progression is $634\frac{1}{2}$, find the common ratio of the geometric progression.
Dalam suatu janjang geometri, sebutan pertama ialah 423. Diberi hasil tambah hingga ketakterhinggaan bagi janjang ini ialah $634\frac{1}{2}$ *, cari nisbah sepunya janjang geometri ini.*
Answer:
Jawapan:

$$634\frac{1}{2} = \frac{423}{1-r}$$

$$r = \frac{1}{3}$$

---

11 The first three terms of a arithmetic progression are 5h, h -2, 6 - h^2.
Find the values of h.
Tiga sebutan pertama suatu janjang aritmetik ialah 5h, h -2, 6 - h^2.
Cari nilai- nilai bagi h.

Answer:
Jawapan:

$$h - 2 - 5h = 6 - h^2 - (h - 2)$$

$$h^2 - 3h - 10 = 0$$

$$(h - 5)(h + 2) = 0$$

$$h = 5, \quad h = -2$$

12 The variables *x* and *y* are related by the equation $py^2 = qx^3 + pq$.

y^2

Diagram 2 shows the straight line graph obtained by plotting y^2 against x^3.
Pemboleh ubah x dan y dihubungkan oleh persamaan $py^2 = qx^3 + pq$.
Rajah 2 menunjukkan graf garis lurus yang diperoleh dengan memplot y^2 melawan x^3.

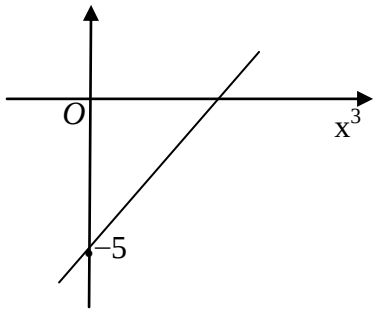


Diagram 2
Rajah 2

Given the gradient of the straight line is 4, find the value of p and q.
Diberi kecerunan garis luus itu ialah 4, cari nilai p dan q.

Answer:
Jawapan:

$$y^2 = \frac{q}{p}x^3 + q$$

$$q = -5, \quad \frac{-5}{p} = 4$$

$$p = -\frac{5}{4}$$

---

13 Given the area of a triangle with vertices $K(-2, 5)$, $L(-3, -2)$ and $M(p, -1)$ is 17 unit^2. Find the possible values of p.
Diberi luas segi tiga dengan bucu-bucu $K(-2, 5)$, $L(-3, -2)$ dan $M(p, -1)$ ialah 17 unit^2. Carikan nilai yang mungkin bagi p.
Answer:
Jawapan:

$$\frac{1}{2}\begin{vmatrix} -2 & -3 & p & -2 \\ 5 & -2 & -1 & 5 \end{vmatrix} = 17$$

$$4 + 3 + 5p + 15 + 2p - 2 = 34$$

$$7p + 20 = 34 \quad \text{or} \quad 7p + 20 = -34$$

$$p = 2 \qquad p = \frac{-54}{7}$$

14 Find the equation of the locus of moving point Q such that its distances from $P(2, 7)$ and $R(-2, 3)$ are in

the ratio 2 : 3.
Carikan persamaan lokus bagi titik bergerak Q di mana jaraknya dari P(2, 7) *dan R*(-2, 3) *adalah dalam nisbah 2 : 3.*
Answer:
Jawapan:

$$3QP = 2QR$$
$$3\sqrt{(x-2)^2+(y-7)^2} = 2\sqrt{(x+2)^2+(y-3)^2}$$
$$9[x^2-4x+4+y^2-14y+49] = 4[x^2+4x-4+y^2-6y+9]$$
$$5x^2+5y^2-52x-102y+425=0$$

---

15 Given that $\underset{\sim}{x} = 2\underset{\sim}{i} - 3\underset{\sim}{j}$, $\underset{\sim}{y} = 3\underset{\sim}{i} - 5\underset{\sim}{j}$, and $\left| h\underset{\sim}{x} - \underset{\sim}{y} \right| = 5$. Find the values of h

Diberi $\underset{\sim}{x} = 2\underset{\sim}{i} - 3\underset{\sim}{j}$, $\underset{\sim}{y} = 3\underset{\sim}{i} - 5\underset{\sim}{j}$, dan $\left| h\underset{\sim}{x} - \underset{\sim}{y} \right| = 5$. Cari nilai-nilai bagi h

Answer:
Jawapan:

$$\left|h(2i-3j)-(3i-5j)\right| = 5$$
$$\left|(2h-3)i+(5-3h)j\right| = 5$$
$$\sqrt{(2h-3)^2+(5-3h)^2} = 5$$
$$4h^2-12h+9+25-30h+9h^2 = 25$$
$$13h^2-42h+9=0$$
$$(13h-3)(h-3)=0$$
$$h = \frac{3}{13} \quad , \quad h = 3$$

---

16 Diagram 3 shows a triangle *PQR*.
Rajah 3 menunjukkan sebuah segi tiga PQR.

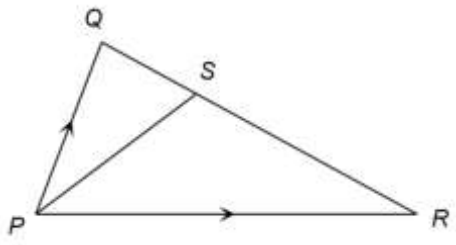


Diagram 3
Rajah 3

It is given that $\overrightarrow{PR} = 6\underset{\sim}{i}$, $\overrightarrow{PQ} = 9\underset{\sim}{j}$ and the point *S* lies on *QR* such that *QS* : *SR* = 1 : 2.
Diberi bahawa $\overrightarrow{PR} = 6\underset{\sim}{i}$, $\overrightarrow{PQ} = 9\underset{\sim}{j}$ *dan titik S terletak di atas QR dengan keadaan QS : SR = 1 : 2.*

Express in terms of $\underset{\sim}{i}$ and $\underset{\sim}{j}$
Ungkapkan dalam sebutan $\underset{\sim}{i}$ *dan* $\underset{\sim}{j}$

(a) $\overrightarrow{SR}$

(b) unit vector in direction $\overrightarrow{RS}$

Answer

Jawapan

$a)\ \vec{SR} = \frac{2}{3}(-9j + 6i)$

$= 4\text{i} - 6\text{j}$

$\text{b)}\ \vec{\text{RS}} = 6j - 4i$

$\left|\vec{\text{RS}}\right| = \sqrt{6^2 + (-4)^2} = \sqrt{52}$

$\hat{\text{RS}} = \frac{1}{\sqrt{13}}(3j - 2i)$

17 Diagram 4 shows sector *OPQ* with centre *O* , sector YOZ with centre O and sector *PXY* with centre *P* .
Rajah 4 menunjukkan sektor *OPQ* dengan pusat *O, sector YOZ dengan pusat O* and sektor *PXY* dengan pusat *P.*

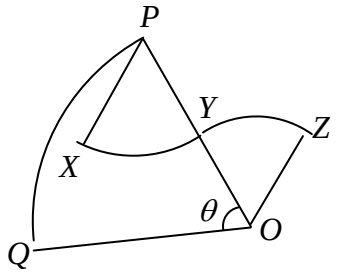


DIAGRAM 4

Given that *OQ* = 15 cm , *PY* = 9 cm , $\angle XPY = \angle YOZ$ = 1.15 radians and the length of arc *PQ* = 10.5 cm , Calculate
Diberi bahawa *OQ* = 15 cm , *PY* = 9 cm , $\angle XPY = \angle YOZ$ = 1.15 radian dan panjang lengkok *PQ* = 10.5 cm, Kirakan

(a) the value of θ, in radian ,
nilai θ, dalam radian

(b) the perimeter, in cm, of the whole diagram .
Perimeter dalam cm, keseluruhan gambarajah

Answer:
Jawapan:

$a)10.5 = 15\theta$

$\theta = 0.7 \text{ rad}$

$\text{b)Perimeter} = 10.5 + 9 + 15 + 6 + (1.15)(6)$

$= 47.4$

---

18 Given that cos θ = *p*, where *p* is a constant and 180 ° ≤ θ ≤ 360°.
Diberi cos θ = p, dengan keadaan p ialah pemalar dan 180° ≤ θ ≤ 360°.

Find in terms of *p*
Cari dalam sebutan p

(a) sec θ
sek θ

(b) tan 2θ

Answer:
Jawapan

$a)\ \sec\theta = \dfrac{1}{p}$

$$b)\ \tan 2\theta = \frac{2\left(\dfrac{-\sqrt{1-p^2}}{p}\right)}{1-\left(\dfrac{-\sqrt{1-p^2}}{p}\right)^2}$$

$$= \frac{-2p\sqrt{1-p^2}}{2p^2-1}$$

19 Given $\frac{d}{dx}\left(\frac{5x}{7-x}\right) = 5g(x)$, find $\int_1^3 g(x)dx$

Diberi $\frac{d}{dx}\left(\frac{5x}{7-x}\right) = 5g(x)$,*cari* $\int_1^3 g(x)dx$

Answer:
Jawapan:

$$\int_1^3 g(x)dx = \frac{1}{5}\int_1^3 5g(x)dx$$

$$= \frac{1}{5}\left[\frac{5x}{7-x}\right]_1^3$$

$$= \frac{7}{12}$$

---

20 The normal to the curve $y = x^2 - 7x + 10$ at a point *P* is parallel to the straight line $y = \frac{1}{3}x + 6$. Find the equation of the normal to the curve at point P.

Garis normal kepada lengkung $y = x^2 - 7x + 10$ *pada titik P adalah selari dengan garis lurus* $y = \frac{1}{3}x + 6$. *Cari persamaan garis normal kepada lengkung itu pada titik P.*

.
Answer:

$$\frac{dy}{dx} = 2x - 7$$

$$\frac{-1}{2x-7} = \frac{1}{3}$$

$$x = 2$$

Jawapan: $y = 2^2 - 7(2) + 10 = 0$

$$0 = \frac{1}{3}(2) + c, \quad c = -\frac{2}{3}$$

$$y = \frac{1}{3}x - \frac{2}{3}$$

21 Given $y = 16x^3 - 1$. If y decrease at a constant rate of 24 units per second when y = 1, find the rate of change of x.
Diberi $y = 16x^3 - 1$ *. Jika y berkurang dengan kadar 24 unit sesaat apabila y = 1, carikan kadar perubahan untuk x.*

Answer:
Jawapan:

$$\frac{dy}{dx} = 48x^2, \quad y = 1$$

$$16x^3 - 1 = 1$$

$$x = \frac{1}{2}$$

$$-24 = 48\left(\frac{1}{2}\right)^2 \times \frac{dx}{dt}$$

$$\frac{dx}{dt} = -2$$

22 The Interquartile range of the set of numbers 4, 3*n* - 2, 3*n*, 10, 13, 4n + 3, 18 which are arranged in ascending order is 8. Find the mean for the set of numbers .
Julat antara kuartil set 4, 3n - 2, 3n, 10, 13, 4n + 3, 18 yang telah disusun mengikut susunan menaik ialah 8 . Carikan min bagi set nombor tersebut .

Answer:
Jawapan:

$$4n + 3 - (3n - 2) = 8$$

$$n = 3$$

$$\bar{x} = \frac{4 + 7 + 9 + 10 + 13 + 15 + 18}{7}$$

$$= 10.86$$

---

23 (a) How many 4-digit even numbers can be formed from the digits , 4, 5, 6, 7 and 8
Berapakah nombor 4-digit nombor genap boleh dibentuk daripada digit-digit 4, 5, 6, 7 dan 8
(b) Hence, find the probability that the 4- digit number formed are odd numbers
seterusnya, cari kebarangkalian bahawa nombor 4 digit yang dibentuk adalah nombor ganjil

Answer:
Jawapan:

$$a)\ 3\times {}^4P_3 = 72$$

$$b) {}^5p_4 - 72 = 48$$

$$P(ODD) = \frac{48}{120} = 0.4$$

24. Table 1 shows the number of marbles in a box.
Jadual 1 menunjukkan bilangan guli dalam sebuah kotak.

Colour/*War*	Number of marbles/*Bilangan guli*
Red/*Merah*	2
Green/*Hijau*	5
Blue/*Biru*	3

Table 1 / *Jadual 1*

Three marbles are drawn at random from the box. Find the probability that
Tiga biji guli dikeluarkan secara rawak daripada kotak itu. Cari kebarangkalian bahawa

(a) all are same colour,
kesemuanya sama warna

(b) all are different colour.
Kesemuanya berbeza warna.

Answer:
Jawapan:

$$a)\ \frac{5}{10}\times\frac{4}{9}\times\frac{3}{8}+\frac{3}{10}\times\frac{2}{9}\times\frac{1}{8}=\frac{11}{120}$$

$$b)\left(\frac{2}{10}\times\frac{5}{9}\times\frac{3}{8}\right)\times 6=\frac{1}{4}$$

25 In a Additional Mathematics test, 55% of the students score A. If a sample of 5 students is randomly selected, find
Dalam suatu ujian Matematik Tambahan, 55% murid skor A. Jiaka satu sampel 5 orang murid dipilih secara rawak, cari

(a) the probability that 3 students from a sample do not score A,
kebarangkalian bahawa 3 orang murid daripada sampel itu tidak skor A,

(b) the standard deviation of the students score A if the total number of students taken the test are 100.
Sisihan piawai murid yang skor A jika murid yang mengambil ujian itu ialah 100 orang.

Answer:
Jawapan:

$$a)\ p=0.45,\ \mathrm{q}=0.55,\ \mathrm{n}=5,\ \mathrm{r}=3$$

$${}^{5}C_{3}(0.45)^{3}(0.55)^{2}=0.2757$$

$$b)\ \sigma=\sqrt{100(0.55)(0.45)}=4.9749$$

END OF QUESTION PAPER
KERTAS SOALAN TAMMAT

PAPER 1, SET 3

http://cikguadura.wordpress.com/

No.	Answer
1(a)	15 and 21
(b)	{(8.2),(15,3),(15,5),(21,3),(21,7)}
2	$f^{-1}fg(x) = g(x)$ $f^{-1}\left[\frac{3}{x}\right] = \frac{4-3x}{x}$ $f^{-1}(y) = \frac{4-3\left(\frac{3}{y}\right)}{\frac{3}{y}}$ $f^{-1}(3) = 1$ $gf^{-1}(3) = g(1) = 1$
3	$(a)\frac{3}{4y-1} - 2 = x$ $f(x) = \frac{x+5}{4x+8}, x \neq -2$ $(b)\frac{x+5}{4x+8} = x$ $0.5447, -2.2947$
4	$f(x) = (1+m^2)x^2 + x(6m-2) + 5$ $b^2 - 4ac < 0$ $-\frac{1}{2} < m < 2$
5(a) (b)	$(a)\ k = \frac{3}{2}$ $-2 = a\left(x - \frac{3}{2}\right)^2 - 3$ $a = \frac{4}{9}$ $(b)\ \left(\frac{3}{2}, -3\right)$

6	$2x^2 - 7x - 15 \le 0$ $-\frac{3}{2} \le x \le 5$
7	$3^{x+2} = \frac{3^{3x}}{3^{2(x+1)(\frac{1}{2})}}$ $x = 3$
8	$\frac{\log_3 \frac{x}{27y^3\sqrt{x}}}{\log_3 9}$ $\frac{\log_3 x - 3\log_3 3 - 3\log_3 y - \frac{1}{2}\log_3 x}{2}$ $\frac{1}{4}p - \frac{3}{2}q - \frac{3}{2}$
9	$d = l$ $a + 6d = 74$ $k + 6l = 74.....1$ $\frac{5}{2}[2a + 4d] = 290$ $k + l = 58.....2$ $l = 4$ $k = 50$
10(a) (b)	$a = S_1 = \frac{21}{8}$ $S_2 = 6$ $T_2 = 6 - \frac{21}{8}$ $d = \frac{3}{4}$ $S_{20} - S_5$ $\frac{1395}{8} / 174.375$

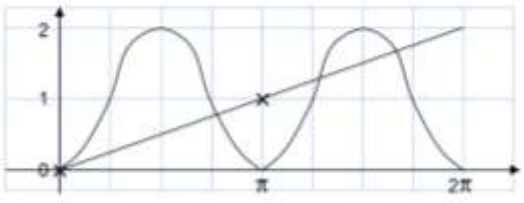
11(a) (b)	$ar^2 + ar^3 = 20$ $ar^2(1+r) = 20.....1$ $ar^3 + ar^4 = -10$ $ar^3(1+r) = -10.....2$ $r = -\frac{1}{2}$ $a = 160$ $S_\infty = \frac{160}{1-(-\frac{1}{2})}$ $S_\infty = \frac{320}{3}$
12	$\log(y-1) = \log\left[10^{\frac{2}{m}} x^{2(x-1)}\right]$ $\log(y-1) = (k-1)\log x^2 + \frac{2}{m}$ $\frac{8-5}{2-8} = -\frac{3}{6}$ $k-1 = -\frac{1}{2}$ $\frac{8-c}{2-0} = \frac{1}{2}$ $c = 7$ $\frac{2}{m} = 7$ $m = \frac{7}{2}$

13	$(a)\ r = 4,$ $=\left(\frac{9+0}{5}, \frac{0-8}{5}\right)$ $R(\frac{9}{5}, -\frac{8}{5})$ $(b)\ m = -\frac{3}{4}$ $y + \frac{8}{5} = -\frac{3}{4}\left(x - \frac{9}{5}\right)$ $y = -\frac{3}{4}x - \frac{1}{4}$
14	$f(x) = 4\left\|\sin\frac{3}{2}x\right\|$
15	$(a)\ \cot^2 A = \frac{1}{\tan^2 A}$ $= \frac{1}{\left(\frac{-5}{12}\right)^2}$ $= \frac{144}{25}$ $(b) = \left(\frac{-15}{13}\right)\left(\frac{8}{17}\right) + \left(\frac{12}{13}\right)\left(\frac{-15}{17}\right)$ $= -\frac{300}{221}$
16	$\overrightarrow{OP} = \overrightarrow{OA} + \overrightarrow{AP}$ $= \frac{1}{3}\underset{\sim}{a} + 2\underset{\sim}{b}$ $4k\underset{\sim}{a} + 3\underset{\sim}{b} = 3\left(\frac{1}{3}\underset{\sim}{a} + 2\underset{\sim}{b}\right)$ $k = \frac{1}{8}, h = \frac{1}{2}$

17(a) (b)	$(a)\begin{pmatrix} p \\ 2 \end{pmatrix} = \lambda \begin{pmatrix} -3 \\ 4 \end{pmatrix}$ $\lambda = \frac{1}{2}$ $p = \frac{-3}{2}$ $(b)\ \underline{U} + 2\underline{V} = \begin{pmatrix} p \\ 2 \end{pmatrix} + 2\begin{pmatrix} -3 \\ 4 \end{pmatrix} = \begin{pmatrix} p-6 \\ 10 \end{pmatrix}$ $\sqrt{(p-6)^2 + 10^2} = 10$ $p = 6$
18(a) (b)	2.095 $L = \frac{1}{2}(7)^2(2.095 - \sin 120) = 30.11$
19	$\int_0^1 3k\,dx - \int_0^1 f(x)\,dx = 7k$ $\left[3kx\right]_0^1 - \frac{3}{2}\left[\frac{x}{2x-3}\right]_0^1 = 7k$ $3k + \frac{3}{2} = 7k$ $k = \frac{3}{8}$
20	$\partial r = -0.02$ $\partial A = \frac{dA}{dr} \times \partial r = 8\pi r \times (-0.02)$ $= 8\pi(2) \times (-0.02)$ $= -0.32\pi$

21	$\left[\frac{x}{m}\right]_1^m - \left[-\frac{2}{x}\right]_1^m = 5$ $1-\frac{1}{m}+\frac{2}{m}-2=5$ $m=\frac{1}{6}$
22	$(a)\quad \frac{22+4k}{2}=15$ $k=2$ $(b)\quad \sigma^2=\frac{1692}{6}-\left(\frac{47}{3}\right)^2=36.56$
23	$5!=120$ ${}^5P_4=120$ $4\times4\times3=48$ $1\times1\times3=3$ $\therefore 120+120+48+3=291$
24	$(a)\quad \frac{1}{2}\times\frac{20}{30}=\frac{1}{3}$ $(b)\quad \frac{1}{2}\times\frac{10}{30}+\frac{1}{2}\times\frac{13}{30}=\frac{23}{60}$
25	$P(X=1)=5P(X=0)$ ${}^nC_1\left(\frac{5}{7}\right)^1\left(\frac{2}{7}\right)^{n-1}=5\,{}^nC_0\left(\frac{5}{7}\right)^0\left(\frac{2}{7}\right)^n$ $\frac{n\left(\frac{5}{7}\right)\left(\frac{2}{7}\right)^n}{\frac{2}{7}}=5\left(\frac{2}{7}\right)^n$ $n=2$

PAPER 2, SET 1

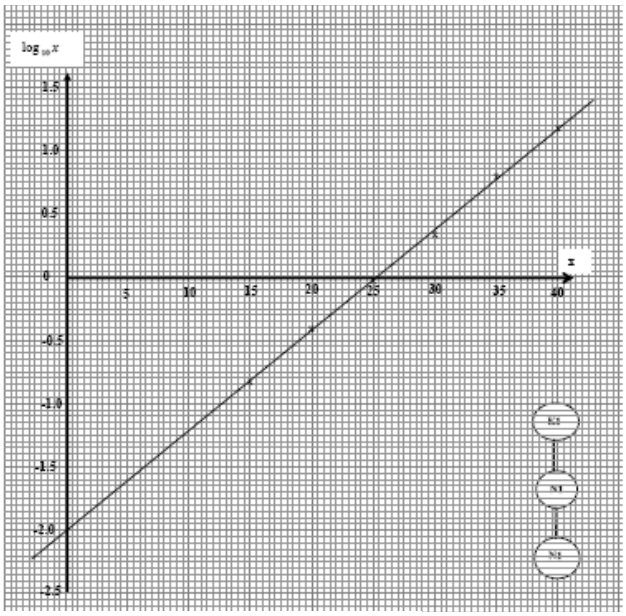
No	Working	Marks
Q1	$y = 3 - 2x$ $x^2 - x(3 - 2x) + (3 - 2x)^2 - 10 = 0$ $3x^2 - 9x - 1 = 0$ $x = \frac{-(-9) \pm \sqrt{(-9)^2 - 4(3)(-1)}}{2(3)}$ $x = 3.107, -0.107$ $y = 3.214, -3.214$	5
Q2a b/c	$\frac{2\sin x \cos x}{1 - (1 - 2\sin^2 x)} = \frac{\cos x}{\sin x}$  $x(\sin 2x \tan x) = x$ $x(1 - \cos 2x) = x$ $1 - \cos 2x = \frac{x}{\pi}$ No of solution = 4	8
Q3a	$ar = a + 8d \Rightarrow a(r - 1) = 8d$ $ar^2 = a + 10d \Rightarrow a(r^2 - 1) = 10d$ $\frac{a(r^2 - 1)}{a(r - 1)} = \frac{10d}{8d}$ $r = \frac{1}{4}$	7
b	$\frac{a}{1 - r} = 8$ $a = 8(1 - \frac{1}{4}) = 6$	
c	$8d = 6(\frac{1}{4}) - 6$ $d = -\frac{9}{16}$	

Q4a	$\frac{dy}{dx} = 4x = 4(1) = 4$	
b	$\frac{y-9}{x-1} = 4$ $y = 4x + 5$	7
c	$x = 1,\ \partial x = 0.947 - 1 = -0.053$ $\partial y \approx 4 \times -0.053$ $y_Q = 9 + (4 \times -0.053)$ $= 8.788$	
Q5a	$m_{JK} = \frac{1}{2},\ m_l = -2$ $\frac{y--1}{x-8} = -2$ $y = -2x + 15$	
b	$\frac{1}{2}\begin{vmatrix} 0 & 0 & 8 & 0 \\ 0 & -5 & -1 & 0 \end{vmatrix} = 20$ $JK = \sqrt{(0-8)^2 + (-5--1)^2}$ $\frac{1}{2} \times JK \times h = 20$ $h = \frac{20 \times 2}{\sqrt{80}} = 4.4721$	7
6a	$\frac{\sum x_A}{20} = 12 \Rightarrow \sum x_A = 240$ $\bar{X}_C = \frac{240 + 5 + 8 + 10 + 11 + 14}{25}$ $= 11.52$	
b	$\sqrt{\frac{\sum x_A{}^2}{20} - 12^2} = 3 \Rightarrow \sum x_A{}^2 = 3060$ $\sigma_C = \sqrt{\frac{3060 + 5^2 + 8^2 + 10^2 + 11^2 + 14^2}{25} - 11.52^2}$ $= 3.151$	6

7a

x	15	20	25	30	35	40
lg y	-0.82	-0.42	-0.022	0.37	0.77	1.17

b



$\log_{10} y = -A\log_{10} 10 + x\log_{10} b$

y-intercept, c = $-A\log_{10} 10$

$-2.05 = -A\log_{10} 10$

ci $A = 2.05$

$m = \log_{10} b = 0.08$

cii $b = 1.2$

ciii 37.5

10

8a

$\int_2^0 f(x)dx - \int_2^0 8dx = 4$

$\int_2^0 f(x)dx = 4 + [8x]_2^0$

$= -12$

b

$\int_2^5 (x-5)^2 dx = \left[\frac{(x-5)^3}{3}\right]_2^5$

$= 0 - (-9) = 9$

$Area = 12 + 9 = 21$

c. $V_{cyc} = \frac{1}{3}\pi \times 9^2 \times 2 = 54\pi$

$V = \pi\int_2^5 (x-5)^4 dx$

$= \pi\left[\frac{(x-5)^5}{5}\right]_2^5$

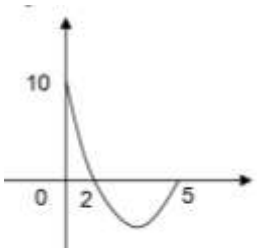
$= \pi\left[0 - (\frac{-3^5}{5})\right] = 48.6\pi$

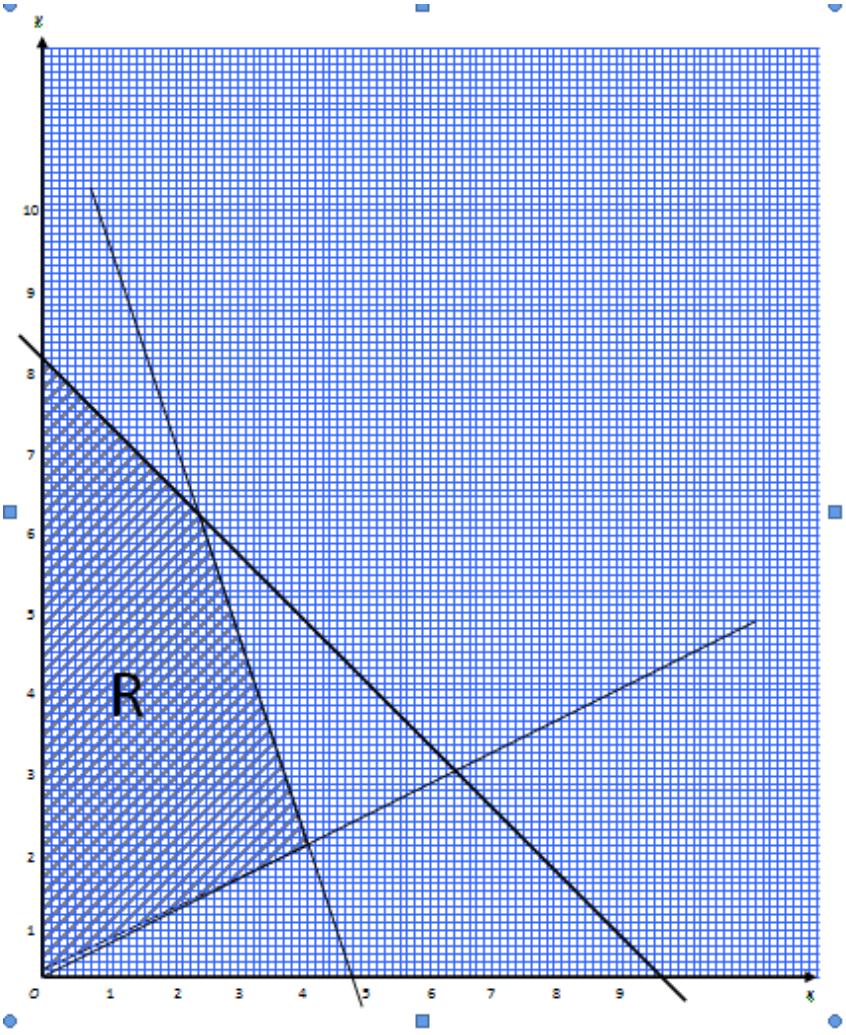
$V_{ALL} = 54\pi + 48.6\pi$

$= 102.6\pi$

10

9ai	$\overrightarrow{AB} = \overrightarrow{AO} + \overrightarrow{OB}$ $= -6\underline{x} + 3\underline{y}$	
aii	$\overrightarrow{OD} = \frac{1}{2}\underline{x} + \frac{9}{4}\underline{y}$	
b	$\overrightarrow{OC} = m\left(\frac{1}{2}\underline{x} + \frac{9}{4}\underline{y}\right)$ $\overrightarrow{BC} = n(6\underline{x} - 3\underline{y})$ $3\underline{y} = \frac{1}{2}m\underline{x} + \frac{9}{4}m\underline{y} - 6n\underline{x} + 3n\underline{y}$ $n = \frac{1}{10} \quad m = \frac{6}{5}$	10
c	$\frac{1}{2} \times 8 \times h = 20$ $h = 5$	
10a	$\frac{r}{42 - r} = \sin 30^\circ$ $r = 14$	
b	$A : 14 \times \frac{2}{3}\pi$ $B : \sqrt{28^2 - 14^2}$ $Perimeter = A + 2B$ $= 77.823$	
c	$C : \frac{1}{2} \times 14^2 \times \frac{\pi}{3}$ $D : \frac{1}{2} \times 14 \times B$ $Area = 2(D - C)$ $= 134.209$	10
11ai	$P(X = 0) = {}^5C_0(0.02)^0(0.98)^5$ $= 0.9039$	
aii	$\mu = 1500(0.02) = 30$ $\sigma = \sqrt{30 \times 0.98} = 5.422$	
bi	$\sigma = 50, \ P(X < 400) = 0.0314$ $-1.86 = \frac{400 - \mu}{50}$ $\mu = 493$	10
bii	$P(480 < X < 550) = P(-0.26 < Z < 1.14)$ $Q(-0.26) + Q(1.14) = 0.47543$	

12ai	$p = 10$	10
aii	$(t-2)(t-5) < 0$ $2 < t < 5$	
aiii	$a = 2t - 7$ $2t - 7 > 0$ $t > \frac{7}{2}$	
bi		
bii	$\int_0^2 t^2 - 7t + 10dt + \left\lvert \int_2^4 t^2 - 7t + 10dt \right\rvert$ $= 12$	
13a	$NM^2 = 10^2 + 30^2 - 2(10)(30)\cos 50^\circ$ $NM = 24.79$	10
b	$NP = \sqrt{30^2 - 8^2} = \sqrt{836}$ $PM = \sqrt{10^2 - 8^2} = 6$ $24.79^2 = 6^2 + \sqrt{836^2} - 2(6)(\sqrt{836})\cos \angle NPM$ $\angle NPM = 42.1^\circ$	
c	$2 \times \frac{1}{2} \times 10 \times 30 \times \sin 50^\circ$ $+$ $\frac{1}{2} \times 16 \times \sqrt{836}$ 461.1	
d	$\sin 42.1 = \frac{h}{\sqrt{836}}$ $h = 19.38$	
14a	$x + y \leq 8$ $y \geq \frac{1}{2}x$ $y \leq 12 - 3x$	10
ci	3 *vans*	
cii	220 *members*	



15a	$x = \frac{158}{130} \times 100 = 121.54$	10
b	$\frac{x}{150} = \frac{100}{140}$ $I_P = 107.14, I_Q = 90.03,$ $I_R = 109.09, I_S = 102.5$	
c	$\bar{I}_{13/10} = \frac{107.14(3) + 90.03(5) + 109.09(2) + 102.5(2)}{12}$ $= 99.56$	
d	$\frac{x}{130} = \frac{99.56}{100}$ $x = 129.43$	

PAPER 2, SET 2

1

$y = 3-3x$

$2(3-3x) +3x = 6x(3-3x)$

$18x^2- 21x + 6 = 0$

$(3x-2)(2x-1) = 0$

$x= 2/3 \ , ½$

$y = 1 \ , 3/2$

2

a) $\frac{dy}{dx} = \frac{x^3-1}{x^2}$

$\frac{dy}{dx} = 0$

$\frac{x^3-1}{x^2} = 0$

$x = 1$

$\therefore p = 1$

b) $\frac{x^3-1}{x^2} = x - x^{-2}$

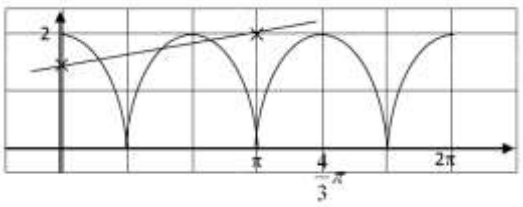
$\frac{d^2y}{dx^2} = 1 - 2x^{-3}$

$\frac{d^2y}{dx^2} > 0 \ point \ (1,2)$ minimum point

c) $y = \frac{x^2}{2} + \frac{1}{x} + c$ sub. point (1,2)

$y = \frac{x^2}{2} + \frac{1}{x} + \frac{1}{2}$

3



$3 + \frac{x}{\pi} = 4\left|\cos\frac{3}{2}x\right|$

$\frac{3}{2} + \frac{x}{2\pi} = 2\left|\cos\frac{3}{2}x\right|$

$y = \frac{3}{2} + \frac{x}{2\pi}$

Number of solutions = 3

9

a) $½(10)^2\theta = 45$

$\theta = 0.9$ rad

b) $BD^2 = 10^2+10^2- 2(10)(10)\cos 51.56$

$BD = 8.698$ cm

c) Luas segitiga BDC= $1/2(8.698)^2 \sin 25.78$

$= 16.452 \ cm^2$

Luas segitiga ABD = $½(10)^2 \sin 51.56$

$= 39.1630 \ cm^2$

Luas kaw berlorek = 16.452 –(45-39.1630)

$= 10.615 \ cm^2$

10

a) $y = \frac{2a}{x-2} = 2a(x-2)^{-1}$

$\frac{dy}{dx} = (-1)(2a)(x-2)^{-2}(1)$

$\frac{dy}{dx} = -6$ at P (a,6)

$-\frac{2a}{(x-2)^2} = -6$

$3a^2 – 13a + 12 = 0$

$(3a – 4)(a – 3) = 0$

Since $a > 2$, we have $a = 3$

(5,b) lies on the curve:

$y = \frac{6}{x-2}$

$b = \frac{6}{5-2} = 2$

b) area of region R

$\int_3^5 \frac{6}{x-2} \ dx$

Area of region R < area of trapezium PQAB

$\int_3^5 \frac{6}{x-2} \ dx < \frac{1}{2}(6+2)(5-3)$

$\int_3^5 \frac{6}{x-2} \ dx < 8$

c) Volume of revolution

$\int_3^5 \pi y^2 \ dy$

$\int_3^5 \pi(\frac{6}{x-2})^2 \ dx$

$= 36\pi \int_3^5 (x-2)^{-2} \ dx$

$= 36\pi [-\frac{1}{x-2}]_3^5$

$= 24\pi$

11

a) $P(Z \geq \frac{a-56.8}{9.6}) = 0.18$

$\therefore \frac{a-56.8}{9.6} = 0.915$

$a = 65.584$

$P(\frac{c-56.8}{9.6} \leq Z < \frac{57-56.8}{9.6}) = 0.15$

$P(\frac{c-56.8}{9.6} \leq Z < 0.0208) = 0.15$

$P(z \leq \frac{c-56.8}{9.6}) = 0.15 – 0.0083$

$= 0.1417$

$\frac{c-56.8}{9.6} = -1.072$

$C = 46.51$

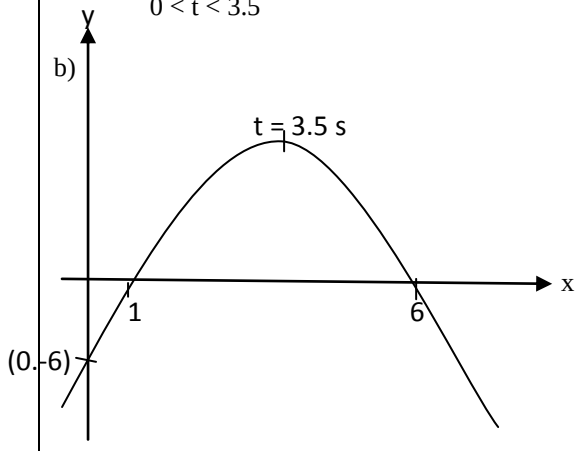
b) (i) P (grade B)

$= P(\frac{57-56.8}{9.6} \leq Z \leq \frac{65.58-56.8}{9.6})$

$= P(0.0208 \leq Z \leq 0.9146)$

$= 0.3115$

500 x 0.3115 = 156

			(ii) P (Z ≫ $\frac{55.0-56.8}{9.6}$) = 0.5574 500 x 0.5744 = 287
4	a) 31 Dec 2004 : T_1 = RM 300 000 31 Dec 2005 : T_2 = RM 300 000 x 1.06 31 Dec 2006 : T_3 = (RM 300 000 x 1.06) x 1.06 a =RM 300 000 , r = 1.06 31 Dec 2008: T_5 = RM 300 000 x $(1.06)^4$ = RM 378 743 b) T_n > RM 500 000 300 000 x $(1.06)^{n-1}$ > 500 000 $(1.06)^{n-1} > \frac{5}{3}$ log $(1.06)^{n-1}$ > log $\frac{5}{3}$ n > 9.77 n = 10 c) Total profit $S_6 = \frac{300\,000(1.06^6-1)}{1.06-1}$ = 2092 596	12	a) $\frac{p}{2.00} x\ 100 = 114$ p = 2.28 b) y = x + 1.5 $\frac{y}{x} x\ 100 = 120$ $\frac{x+1.50}{x} = 1.2$ x = 7.5 and y = 9 c) (i) $\bar{I} = \frac{1913}{16}$ = 119.56 (ii) $\frac{119.56x}{100} = 145$ x =121.28 $\frac{50}{x}$ x 100 = 121.28 x = 41.23
5	a) Length SR = length SP 8 – 10 = -2 , Coordinate P = (0,-2) b) Coordinat Q , (3.-1) = $(\frac{3x}{4}, \frac{3y+8}{4})$ = (4,-4) c) gradient PQ = $-\frac{1}{2}$ y = $-\frac{1}{2}$ x – 2	13	a) (i) v = 7t -6-t^2, t = 0 v = -6 (ii) v > 0 7t -6-t^2 > 0 (t - 1)(t – 6) < 0 1 < t < 6 (iii) a = dv/dt = 7 – 2t dv/dt > 0 7 – 2t > 0 t > 3.5 0 < t < 3.5 b)  c. (i) t = 3.5 v = 7(3.5) – 6 – $(3.5)^2$ = 6.25 (ii) s = $\int v\ dt$ = $\frac{7}{2}t^2 - 6t - \frac{1}{3}t^3 + c$ t= 0, s = 0 dan c = 0 s = $\frac{7}{2}t^2 - 6t - \frac{1}{3}t^3$ t = 1, s = $\frac{7}{2}(1)^2 - 6(1) - \frac{1}{3}(1)^3 = -17/6$ t = 6, s= $\frac{7}{2}(6)^2 - 6(6) - \frac{1}{3}(6)^3 = 18$ Jarak = 2(17/6) + 18 = 71/3

6 a)

Marks	0 – 19	20 - 39	40 - 59	60 - 79	80 - 99
No of students	5	6	10	12	7

b)

$Q_3 = 59.5 + (\frac{30-21}{12})(20) = 74.5$

$Q_1 = 19.5 + (\frac{10-5}{6})(20) = 36.17$

∴ interquartile range = 74.5 – 36.17 = 38.33

7

log (y + 10) = log A + xlog k

log A = 0.3

A = 1.995

log k = 0.2

k = 1.585

y = 0

log (0+10) = 1

∴ x = 3.4

8 a) $\overrightarrow{PR} = \overrightarrow{PQ} + \overrightarrow{QR}$

= (3x +3y) + (x + 3y)

= 4x + 6y

$\overrightarrow{SV} = \frac{1}{2}\overrightarrow{SQ}$

$= \frac{1}{2}[\overrightarrow{PQ} - \overrightarrow{PS}]$

$= \frac{1}{2}$ [(3x + 3y) – (-x + y)]

= 2x + y

b) (i) $\overrightarrow{QT} = \overrightarrow{PT} - \overrightarrow{PQ}$

= k(5x + 4y) – (3x + 3y)

= (5k – 3)x + (4k – 3)y

(ii) If T, Q and V are collinear points,

$\overrightarrow{SQ} = h\overrightarrow{QT}$

4x+2y = h[(5k -3)x + (4k-3)y]

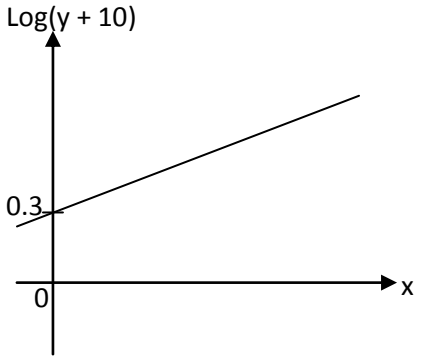
h(5k-3) = 4

h(4k-3) = 2

$\frac{h(5k-3)}{h(4k-3)} = 2$

k = 1 and h = 2

∴ SQ : QT = 2 : 1



14 a) $13^2 = 7^2 + 8^2 - 2(7)(8)\cos \angle NKL$

$\angle NKL = 120$

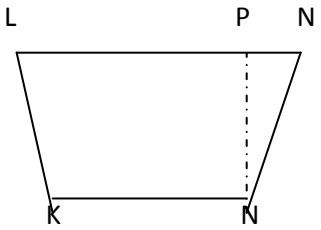
$\frac{7}{\sin \angle KNL} = \frac{13}{\sin 120}$

$\angle KNL = 27.80$

b) $\angle MLN = \angle KNL = 27.78$

$\sin 27.78 = \frac{PN}{13}$

PN = 6.0622



(i) Area of triangle LMN

= ½ (13)(6.6022) = 42.91 cm^2

(ii) Area of trapezium KLMN

= ½(13 + 8) (6.6022) = 69.32 cm^2

15 a) x + y ≤ 75

8x + 7y ≤ 560

4x + 5y ≥ 60

b) Graf

C (i) from y = 2x (25,50)

Maximum sales = 32 (25) + 28 (50)

= 2200

(ii) Given x = 5,

Minimum number of fiksyen books = 8

Maximum number of fiction books = 70