

Name : .....

Form : .....



KEMENTERIAN  
PENDIDIKAN  
MALAYSIA

BAHAGIAN PENGURUSAN SEKOLAH BERASRAMA PENUH  
DAN SEKOLAH KECEMERLANGAN

**PENTAKSIRAN DIAGNOSTIK AKADEMIK SBP 2014**  
**PERCUBAAN SIJIL PELAJARAN MALAYSIA**

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**ADDITIONAL MATHEMATICS**

**Kertas 1**

**2 jam**

**JANGAN BUKA KERTAS SOALAN INI  
SEHINGGA DIBERITAHU**

1. *Tulis nama dan tingkatan anda pada ruang yang disediakan.*
2. *Kertas soalan ini adalah dalam dwibahasa.*
3. *Soalan dalam bahasa Inggeris mendahului soalan yang sepadan dalam bahasa Melayu.*
4. *Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam bahasa Inggeris atau bahasa Melayu.*
5. *Calon dikehendaki membaca maklumat di halaman belakang kertas soalan ini.*

<i>Untuk Kegunaan Pemeriksa</i>		
Soalan	Markah Penuh	Markah Diperolehi
1	2	
2	3	
3	3	
4	3	
5	3	
6	3	
7	3	
8	4	
9	3	
10	3	
11	4	
12	3	
13	3	
14	4	
15	2	
16	4	
17	4	
18	3	
19	3	
20	3	
21	3	
22	3	
23	3	
24	4	
25	4	
<b>TOTAL</b>	<b>80</b>	

Kertas soalan ini mengandungi **26** halaman bercetak.

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***HALAMAN KOSONG***

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

### ALGEBRA

$$1 \quad x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$2 \quad a^m \times a^n = a^{m+n}$$

$$3 \quad a^m \div a^n = a^{m-n}$$

$$4 \quad (a^m)^n = a^{mn}$$

$$5 \quad \log_a mn = \log_a m + \log_a n$$

$$6 \quad \log_a \frac{m}{n} = \log_a m - \log_a n$$

$$7 \quad \log_a m^n = n \log_a m$$

$$8 \quad \log_a b = \frac{\log b}{\log a}$$

$$9 \quad T_n = a + (n-1)d$$

$$10 \quad S_n = \frac{n}{2}[2a + (n-1)d]$$

$$11 \quad T_n = ar^{n-1}$$

$$12 \quad S_n = \frac{a(r^n - 1)}{r - 1} = \frac{a(1 - r^n)}{1 - r}, \quad (r \neq 1)$$

$$13 \quad S_\infty = \frac{a}{1 - r}, \quad |r| < 1$$

### CALCULUS

$$1 \quad y = uv, \quad \frac{dy}{dx} = u \frac{dv}{dx} + v \frac{du}{dx}$$

$$2 \quad y = \frac{u}{v}, \quad \frac{dy}{dx} = \frac{v \frac{du}{dx} - u \frac{dv}{dx}}{v^2}$$

$$3 \quad \frac{dy}{dx} = \frac{dy}{du} \times \frac{du}{dx}$$

4 Area under a curve

$$= \int_a^b y \, dx \quad \text{or}$$

$$= \int_a^b x \, dy$$

5 Volume generated

$$= \int_a^b \pi y^2 \, dx \quad \text{or}$$

$$= \int_a^b \pi x^2 \, dy$$

### GEOMETRY

$$1 \quad \text{Distance} = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

2 Midpoint

$$(x, y) = \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

$$3 \quad |r| = \sqrt{x^2 + y^2}$$

$$4 \quad \hat{r} = \frac{xi + yj}{\sqrt{x^2 + y^2}}$$

5 A point dividing a segment of a line

$$(x, y) = \left( \frac{nx_1 + mx_2}{m+n}, \frac{ny_1 + my_2}{m+n} \right)$$

6 Area of triangle =

$$\frac{1}{2} |(x_1 y_2 + x_2 y_3 + x_3 y_1) - (x_2 y_1 + x_3 y_2 + x_1 y_3)|$$

[Lihat halaman sebelah

## STATISTIC

$$1 \quad \bar{x} = \frac{\sum x}{N}$$

$$2 \quad \bar{x} = \frac{\sum fx}{\sum f}$$

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

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

$$5 \quad m = L + \left[ \frac{\frac{1}{2}N - F}{f_m} \right] C$$

$$6 \quad I = \frac{Q_1}{Q_0} \times 100$$

$$7 \quad \bar{I} = \frac{\sum w_i I_i}{\sum w_i}$$

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

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

$$10 \quad P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

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

$$12 \quad \text{Mean } \mu = np$$

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

$$14 \quad z = \frac{x - \mu}{\sigma}$$

## TRIGONOMETRY

$$1 \quad \text{Arc length, } s = r\theta$$

$$2 \quad \text{Area of sector, } L = \frac{1}{2} r^2 \theta$$

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

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

$$5 \quad \operatorname{cosec}^2 A = 1 + \cot^2 A$$

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

$$7 \quad \begin{aligned} \cos 2A &= \cos^2 A - \sin^2 A \\ &= 2 \cos^2 A - 1 \\ &= 1 - 2 \sin^2 A \end{aligned}$$

$$8 \quad \tan 2A = \frac{2 \tan A}{1 - \tan^2 A}$$

$$9 \quad \sin(A \pm B) = \sin A \cos B \pm \cos A \sin B$$

$$10 \quad \cos(A \pm B) = \cos A \cos B \mp \sin A \sin B$$

$$11 \quad \tan(A \pm B) = \frac{\tan A \pm \tan B}{1 \mp \tan A \tan B}$$

$$12 \quad \frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

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

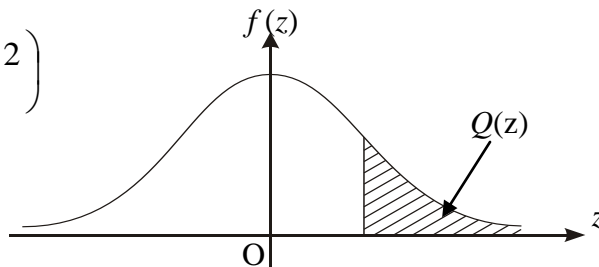
$$14 \quad \text{Area of triangle} = \frac{1}{2} ab \sin C$$

**THE UPPER TAIL PROBABILITY Q(z) FOR THE NORMAL DISTRIBUTION N(0,1)**  
**KEBARANGKALIAN HUJUNG ATAS Q(z) BAGI TABURAN NORMAL N(0, 1)**

z	0	1	2	3	4	5	6	7	8	9	Minus / Tolak								
											1	2	3	4	5	6	7	8	9
0.0	0.5000	0.4960	0.4920	0.4880	0.4840	0.4801	0.4761	0.4721	0.4681	0.4641	4	8	12	16	20	24	28	32	36
0.1	0.4602	0.4562	0.4522	0.4483	0.4443	0.4404	0.4364	0.4325	0.4286	0.4247	4	8	12	16	20	24	28	32	36
0.2	0.4207	0.4168	0.4129	0.4090	0.4052	0.4013	0.3974	0.3936	0.3897	0.3859	4	8	12	15	19	23	27	31	35
0.3	0.3821	0.3783	0.3745	0.3707	0.3669	0.3632	0.3594	0.3557	0.3520	0.3483	4	7	11	15	19	22	26	30	34
0.4	0.3446	0.3409	0.3372	0.3336	0.3300	0.3264	0.3228	0.3192	0.3156	0.3121	4	7	11	15	18	22	25	29	32
0.5	0.3085	0.3050	0.3015	0.2981	0.2946	0.2912	0.2877	0.2843	0.2810	0.2776	3	7	10	14	17	20	24	27	31
0.6	0.2743	0.2709	0.2676	0.2643	0.2611	0.2578	0.2546	0.2514	0.2483	0.2451	3	7	10	13	16	19	23	26	29
0.7	0.2420	0.2389	0.2358	0.2327	0.2296	0.2266	0.2236	0.2206	0.2177	0.2148	3	6	9	12	15	18	21	24	27
0.8	0.2119	0.2090	0.2061	0.2033	0.2005	0.1977	0.1949	0.1922	0.1894	0.1867	3	5	8	11	14	16	19	22	25
0.9	0.1841	0.1814	0.1788	0.1762	0.1736	0.1711	0.1685	0.1660	0.1635	0.1611	3	5	8	10	13	15	18	20	23
1.0	0.1587	0.1562	0.1539	0.1515	0.1492	0.1469	0.1446	0.1423	0.1401	0.1379	2	5	7	9	12	14	16	19	21
1.1	0.1357	0.1335	0.1314	0.1292	0.1271	0.1251	0.1230	0.1210	0.1190	0.1170	2	4	6	8	10	12	14	16	18
1.2	0.1151	0.1131	0.1112	0.1093	0.1075	0.1056	0.1038	0.1020	0.1003	0.0985	2	4	6	7	9	11	13	15	17
1.3	0.0968	0.0951	0.0934	0.0918	0.0901	0.0885	0.0869	0.0853	0.0838	0.0823	2	3	5	6	8	10	11	13	14
1.4	0.0808	0.0793	0.0778	0.0764	0.0749	0.0735	0.0721	0.0708	0.0694	0.0681	1	3	4	6	7	8	10	11	13
1.5	0.0668	0.0655	0.0643	0.0630	0.0618	0.0606	0.0594	0.0582	0.0571	0.0559	1	2	4	5	6	7	8	10	11
1.6	0.0548	0.0537	0.0526	0.0516	0.0505	0.0495	0.0485	0.0475	0.0465	0.0455	1	2	3	4	5	6	7	8	9
1.7	0.0446	0.0436	0.0427	0.0418	0.0409	0.0401	0.0392	0.0384	0.0375	0.0367	1	2	3	4	4	5	6	7	8
1.8	0.0359	0.0351	0.0344	0.0336	0.0329	0.0322	0.0314	0.0307	0.0301	0.0294	1	1	2	3	4	4	5	6	6
1.9	0.0287	0.0281	0.0274	0.0268	0.0262	0.0256	0.0250	0.0244	0.0239	0.0233	1	1	2	2	3	4	4	5	5
2.0	0.0228	0.0222	0.0217	0.0212	0.0207	0.0202	0.0197	0.0192	0.0188	0.0183	0	1	1	2	2	3	3	4	4
2.1	0.0179	0.0174	0.0170	0.0166	0.0162	0.0158	0.0154	0.0150	0.0146	0.0143	0	1	1	2	2	2	3	3	4
2.2	0.0139	0.0136	0.0132	0.0129	0.0125	0.0122	0.0119	0.0116	0.0113	0.0110	0	1	1	1	2	2	2	3	3
2.3	0.0107	0.0104	0.0102								0	1	1	1	1	2	2	2	2
			0.00990		0.00964	0.00939	0.00914				3	5	8	10	13	15	18	20	23
								0.00889	0.00866	0.00842	2	5	7	9	12	14	16	16	21
2.4	0.00820	0.00798	0.00776	0.00755	0.00734						2	4	6	8	11	13	15	17	19
						0.00714	0.00695	0.00676	0.00657	0.00639	2	4	6	7	9	11	13	15	17
2.5	0.00621	0.00604	0.00587	0.00570	0.00554	0.00539	0.00523	0.00508	0.00494	0.00480	2	3	5	6	8	9	11	12	14
2.6	0.00466	0.00453	0.00440	0.00427	0.00415	0.00402	0.00391	0.00379	0.00368	0.00357	1	2	3	5	6	7	9	9	10
2.7	0.00347	0.00336	0.00326	0.00317	0.00307	0.00298	0.00289	0.00280	0.00272	0.00264	1	2	3	4	5	6	7	8	9
2.8	0.00256	0.00248	0.00240	0.00233	0.00226	0.00219	0.00212	0.00205	0.00199	0.00193	1	1	2	3	4	4	5	6	6
2.9	0.00187	0.00181	0.00175	0.00169	0.00164	0.00159	0.00154	0.00149	0.00144	0.00139	0	1	1	2	2	3	3	4	4
3.0	0.00135	0.00131	0.00126	0.00122	0.00118	0.00114	0.00111	0.00107	0.00104	0.00100	0	1	1	2	2	2	3	3	4

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

$$Q(z) = \int_k^{\infty} f(z) dz$$



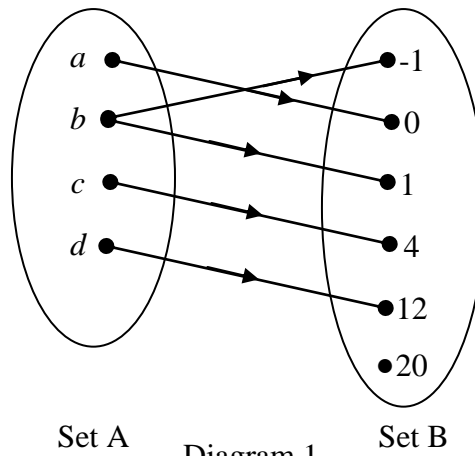
Example / Contoh:

If  $X \sim N(0, 1)$ , then  $P(X > k) = Q(k)$   
 Jika  $X \sim N(0, 1)$ , maka  $P(X > k) = Q(k)$

For  
Examiner's  
Use

Answer **all** questions.  
Jawab **semua** soalan.  
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1. Diagram 1 shows the relation between set A and set B.  
*Rajah 1 menunjukkan hubungan antara set A dan set B.*



- (a) State the range of the relation.  
*Nyatakan julat bagi hubungan itu.*
- (b) The relation is not a function. Give your reason.  
*Hubungan itu bukan suatu fungsi. Beri sebab anda.*

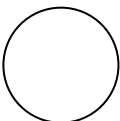
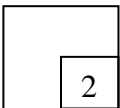
[ 2 marks ]  
[2 markah]

Answer/Jawapan :

(a)

(b)

1



2. The function  $h$  is defined as  $h^{-1}(x) = \frac{7x}{x-3}, x \neq m$ .

*Fungsi  $h$  ditakrifkan oleh  $h^{-1}(x) = \frac{7x}{x-3}, x \neq m$ .*

Find

*Cari*

- (a) the value of  $m$   
*nilai bagi  $m$*

- (b)  $h(6)$

[ 3 marks ]  
[3 markah]

Answer/Jawapan :

- (a)

- (b)

2

3
---

- 3 The following information refers to the functions  $g$  and  $fg$ .  
*Maklumat berikut adalah berkaitan dengan fungsi  $g$  dan  $fg$ .*

$$g(x) = 3x - 1$$

$$fg(x) = 6x + 8$$

Find  $f(x)$ .

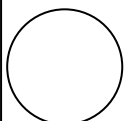
*Cari  $f(x)$ .*

[ 3 marks ]  
[3 markah]

Answer/Jawapan :

3

3
---



For  
Examiner's  
Use

4. Given that  $m$  and  $n$  are the roots of quadratic equations  $x^2 + 6x + 7 = 0$ , form the quadratic equation which has the roots  $4m$  and  $4n$ .

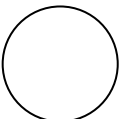
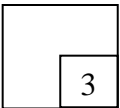
*Diberi bahawa  $m$  dan  $n$  adalah punca-punca bagi persamaan kuadratik  $x^2 + 6x + 7 = 0$ , bentukkan persamaan kuadratik yang mempunyai punca-punca  $4m$  dan  $4n$ .*

[ 3 marks ]

[3 markah]

Answer/Jawapan :

4





5. Diagram 5 shows the graph of quadratic function  $f(x) = -\frac{1}{3}[(x+p)^2 + q]$

The straight line  $y = 3$  is a tangent to the curve.

Rajah 5 menunjukkan suatu graf fungsi kuadratik  $f(x) = -\frac{1}{3}[(x+p)^2 + q]$

Garislurus  $y = 3$  ialah tangen kepada lengkung tersebut.

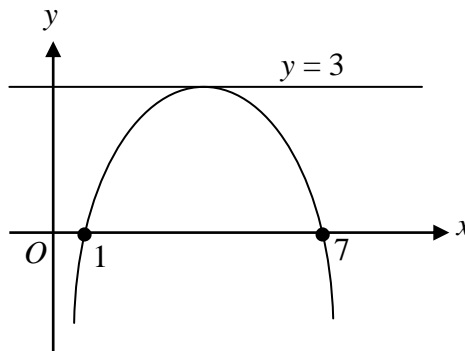


Diagram 5  
Rajah 5

Calculate the value of  $p$  and of  $q$ .

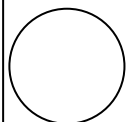
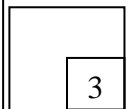
Hitung nilai bagi  $p$  dan bagi  $q$ .

[3 marks]

[3 markah]

Answer/Jawapan :

5



For  
Examiner's  
Use

- 6 Given that  $h(x) = 10 - x - 2x^2$ .  
Find the range of values of  $x$  for  $h(x) \geq 4$ .

*Diberi bahawa  $h(x) = 10 - x - 2x^2$ .  
Cari julat nilai-nilai  $x$  untuk  $h(x) \geq 4$ .*

[3 marks]  
[3 markah]

Answer/Jawapan :

6

3

7. Given that  $4(2^{p+1}) = \left(\frac{1}{8}\right)^{2p+6}$ , find the value of  $p$ .

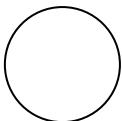
*Diberi  $4(2^{p+1}) = \left(\frac{1}{8}\right)^{2p+6}$ , cari nilai  $p$ .*

[ 3 marks ]  
[3 markah]

Answer/Jawapan :

7

3



8. Solve the equation  
*Selesaikan persamaan*

$$\log_3(2x-5) = \log_{27}(x+1)^3$$

[ 4 marks ]

[4 markah]

Answer/Jawapan :

8

4

9. If the  $n^{\text{th}}$  term of an arithmetic progression is  $4n + 3$ , find the sum of the first 20 terms.  
*Jika sebutan ke- $n$  bagi suatu jangjang aritmetik adalah  $4n + 3$ , cari hasil tambah 20 sebutan pertama.*

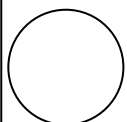
[ 3 marks ]

[3 markah]

Answer/Jawapan :

9

3



- 10 In the year 2013 the price of a hand phone decrease 5% each month. Diagram 10 shows the price of a hand phone in January 2013.  
*Pada tahun 2013 harga sebuah telefon bimbit menyusut 5% setiap bulan. Rajah 10 menunjukkan harga sebuah telefon bimbit pada bulan Januari tahun 2013.*



Diagram 10  
Rajah 10

David bought a new hand phone a day before Christmas for his mother.  
*David telah membeli sebuah telefon bimbit baru sehari sebelum Hari Natal untuk dihadiahkan kepada ibunya.*

How much David pay for the new handphone?

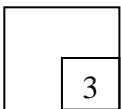
*Berapakah harga yang telah dibayar oleh David untuk membeli telefon baru tersebut?*

[ 3 marks ]

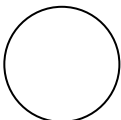
[3 markah]

Answer/Jawapan :

10



3



- 11 The sum of the first 8 terms of an arithmetic progression is 192 and the sum of the next 8 terms is 448.

*Hasiltambah 8 sebutan pertama bagi suatu jantang aritmetik adalah 192 dan hasiltambah 8 sebutan yang berikutnya adalah 448.*

Calculate the values of the first term and the common different.

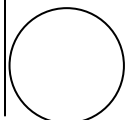
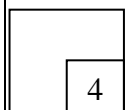
*Hitung sebutan pertama dan beza sepunya.*

[ 4 marks ]

[4 markah]

Answer/Jawapan :

11



For  
Examiner's  
Use

- 12 Diagram 12 shows a straight line graph of  $\frac{1}{y}$  against  $\frac{1}{x}$ .

Express  $y$  in terms of  $x$ .

Rajah 12 menunjukkan graf garislurus  $\frac{1}{y}$  melawan  $\frac{1}{x}$ .

Ungkapkan  $y$  dalam sebutan  $x$ .

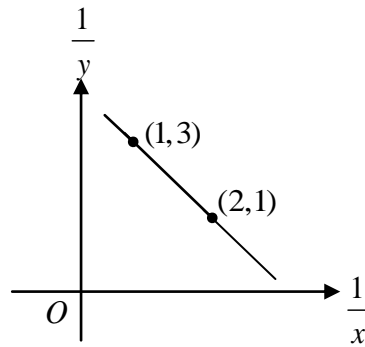
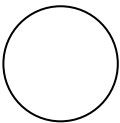


Diagram 12  
Rajah 12

Answer/Jawapan :

[ 3 marks ]  
[ 3 markah ]

12



13.

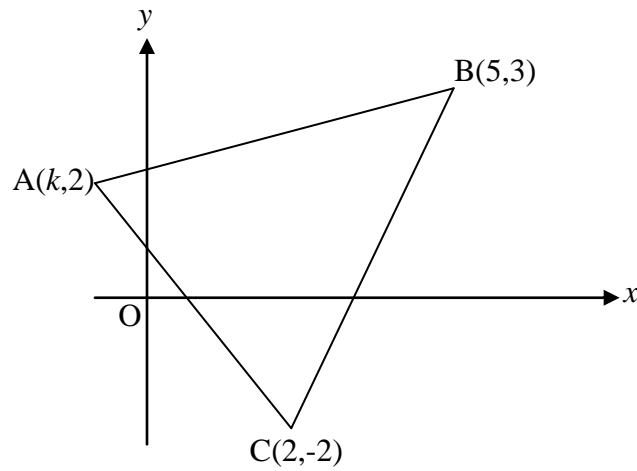


Diagram 13

Rajah 13

Diagram 13 shows the triangle  $ABC$ . Given that the area of the triangle is  $13.5 \text{ unit}^2$ , find the value of  $k$ .

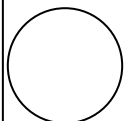
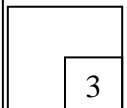
*Rajah 13 menunjukkan segitiga ABC. Diberi luas segitiga itu ialah  $13.5 \text{ unit}^2$ , cari nilai bagi  $k$ .*

[3 marks]

[3 markah]

Answer/Jawapan:

13



For  
Examiner's  
Use

14. Given that  $M(6,4)$  is the midpoint of the line segment that joins the point  $P(4,8)$  and point  $R$ . Find the equation of the straight line that passes through the point  $R$  and is perpendicular to the straight line  $PR$ .

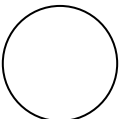
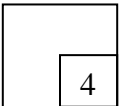
*Diberi bahawa  $M(6,4)$  adalah titik tengah tembereng garis yang menghubungkan titik  $P(4,8)$  dan titik  $R$ . Cari persamaan garislurus yang melalui titik  $R$  dan berserenjang dengan garislurus  $PR$ .*

[4 marks]

[4 markah]

Answer/Jawapan :

14





15. Diagram 15 shows the vector  $\overrightarrow{OP}$ ,  $\overrightarrow{OR}$  and  $\overrightarrow{OQ}$  drawn on a grid of equal squares with sides of 1 unit.

*Rajah 15 menunjukkan vector  $\overrightarrow{OP}$ ,  $\overrightarrow{OR}$  dan  $\overrightarrow{OQ}$  dilukis pada grid segiempat sama yang sama besar bersisi 1 unit.*

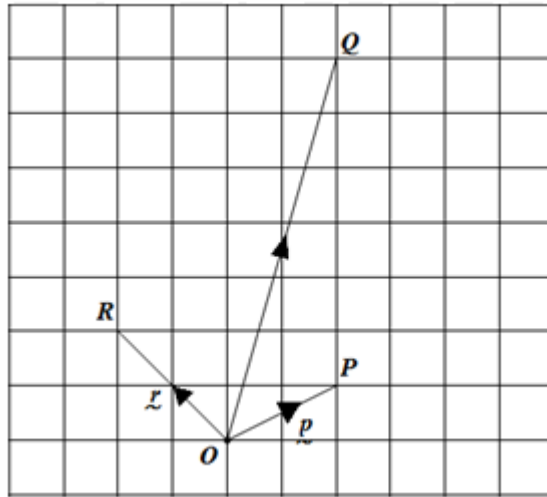


Diagram 15  
Rajah 15

Determine  
*Tentukan*

- (a)  $\overrightarrow{OQ}$  in terms of  $\underline{p}$  and  $\underline{r}$ .  
(b)  $|\overrightarrow{OQ}|$

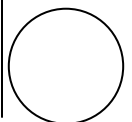
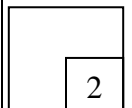
[2 marks]  
[2 markah]

Answer/Jawapan :

(a)

(b)

15



For  
Examiner's  
Use

16. It is given that  $\underline{a} = \begin{pmatrix} 1 \\ 3 \end{pmatrix}$  and  $\underline{b} = \begin{pmatrix} 2 \\ h+1 \end{pmatrix}$ . If  $\underline{a}$  is parallel to  $\underline{b}$ , find

Diberi bahawa  $\underline{a} = \begin{pmatrix} 1 \\ 3 \end{pmatrix}$  dan  $\underline{b} = \begin{pmatrix} 2 \\ h+1 \end{pmatrix}$ . Jika  $\underline{a}$  selari dengan  $\underline{b}$ , cari

- (a) the value of  $h$   
nilai bagi  $h$
- (b) the unit vector in the direction of  $\underline{b}$ .  
vector unit dalam arah  $\underline{b}$ .

[4 marks]

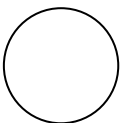
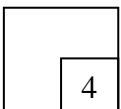
[4 markah]

Answer/Jawapan :

(a)

(b)

16



17.

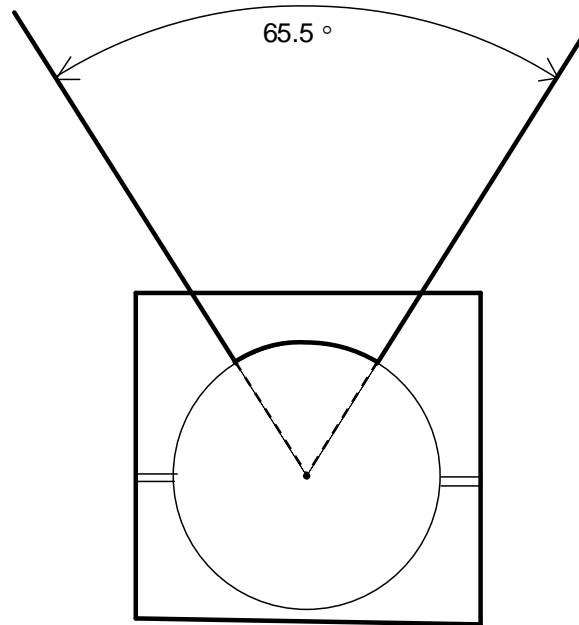


Diagram 17  
Rajah 17

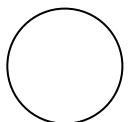
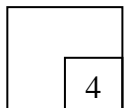
Diagram 17 shows shot pull field dimension for high school. For category A, student must throw 5 m far from centre to get 1 point and 7 m far from centre for 3 points. Find the area, in  $\text{m}^2$  for 1 point.

Rajah 17 menunjukkan dimensi ukuran padang lontar peluru bagi sekolah menengah. Bagi kategori A, pelajar mesti mendapat jarak 5 m dari pusat balingan untuk 1 mata dan 7 m dari pusat balingan untuk 3 mata. Cari luas kawasan, dalam  $\text{m}^2$ , untuk 1 mata.

[4 marks]  
[4 markah]

Answer/Jawapan :

17



For  
Examiner's  
Use

18. Given  $\sin \theta = \sqrt{1-h^2}$  and  $\theta$  is obtuse angle.  
Diberi  $\sin \theta = \sqrt{1-h^2}$  dan  $\theta$  ialah sudut cakrah.

Find

Cari

(a)  $\cot \theta$

(b)  $\sin 2\theta$

[ 3 marks ]

[3 markah]

Answer/Jawapan :

(a)

(b)

18

3

19. Given  $y = \frac{3x^2 - 4}{x}$  and  $\frac{dy}{dx} = 3h(x)$ , find  $\int_{-2}^1 h(x)dx$

Diberi  $y = \frac{3x^2 - 4}{x}$  dan  $\frac{dy}{dx} = 3h(x)$ , cari  $\int_{-2}^1 h(x)dx$

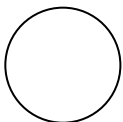
[ 3 marks ]

[3 markah]

Answer/Jawapan :

19

3



20. Given  $y = 3x^2 - 4x + 5$ , find  
*Diberi  $y = 3x^2 - 4x + 5$ , cari*

- (a) the value of  $x$  when  $y$  is minimum.  
*nilai  $x$  apabila nilai  $y$  adalah minimum*
- (b) the minimum value of  $y$ .  
*nilai minimum bagi  $y$ .*

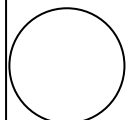
[ 3 marks ]  
[3 markah]

Answer/Jawapan :

(a)

(b)

20



For  
Examiner's  
Use

21. Given that  $\int_1^3 h(x) dx = 5$ , find the value of  $k$ , if  $\int_1^3 kx dx - \int_3^1 2h(x) dx = 18$

Diberi bahawa  $\int_1^3 h(x) dx = 5$ , cari nilai  $k$ , jika  $\int_1^3 kx dx - \int_3^1 2h(x) dx = 18$

[ 3 marks ]

[3 markah]

Answer/Jawapan :

21

3

22. The mean and standard deviation of five numbers are 6 and 3 respectively.

*Min dan sisihan piawai bagi lima nombor adalah 6 dan 3 masing-masing.*

Find

*Cari*

(a) the sum of squares of the numbers.

*hasil tambah kuasadua bagi nombor-nombor tersebut.*

(b) the new value of variance if every number is multiplied by 2 and then 3 is added to it.

*nilai varian yang baru jika setiap nombor didarab dengan 2 dan kemudian 3 ditambah kepadanya.*

[ 3 marks ]

[3 markah]

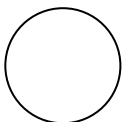
Answer/Jawapan :

(a)

22

3

(b)



23. En. Lee has a pets shop. He want to display five cages with different pets as shown in Diagram 23.

*En. Lee mempunyai sebuah kedai binatang peliharaan. Di hadapan kedainya dipamerkan lima sangkar yang diisi dengan haiwan yang berbeza seperti pada Rajah 23.*

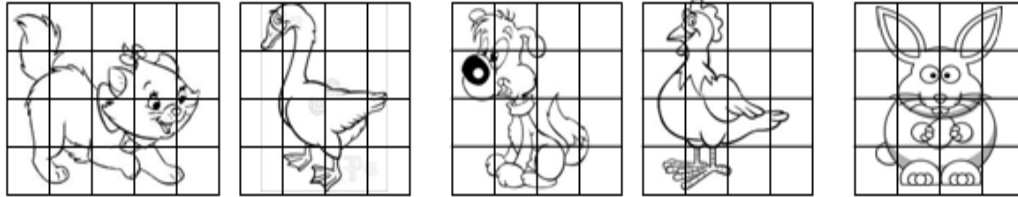


Diagram 23  
Rajah 23

Cat and dog cage's cannot be side by side.

*Sangkar anjing dan sangkar kucing tidak boleh bersebelahan.*

How many ways to arrange the cages?

*Berapakah bilangan cara untuk menyusun sangkar-sangkar tersebut?*

[ 3 marks ]  
[3 markah]

Answer/Jawapan :

For  
Examiner's  
Use

24. Table 24 shows the number of Mathematics and Science books in two racks,  $P$  and  $Q$ .

*Jadual 24 menunjukkan bilangan buku Matematik dan buku Sains di atas dua rak iaitu  $P$  dan  $Q$ .*

Rack <i>Rak</i>	Mathematics book <i>Buku Matematik</i>	Sciences book <i>Buku Sains</i>
$P$	3	$h$
$Q$	5	8

Table 24  
*Jadual 24*

- (a) A book is chosen at random from rack  $P$ . The probability of choosing Science book is  $\frac{4}{5}$ .

Find the value of  $h$ .

[2 marks]

*Sebuah buku dipilih secara rawak daripada rak  $P$ . Kebarangkalian untuk memilih buku Sains ialah  $\frac{4}{5}$ .*

*Cari nilai  $h$ .*

[2 markah]

- (b) Two books are chosen at random among Mathematics book. Find the probability that both books are from the same rack.

[2 marks]

*Dua buah buku dipilih secara rawak di kalangan buku Matematik.*

*Cari kebarangkalian bahawa kedua-dua buah buku adalah daripada rak yang sama.*

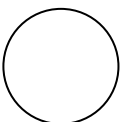
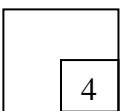
[2 markah]

Answer/Jawapan :

(a)

(b)

24





25. Diagram 25 shows a standard normal distribution graph.  
Rajah 25 menunjukkan graf taburan normal piawai.

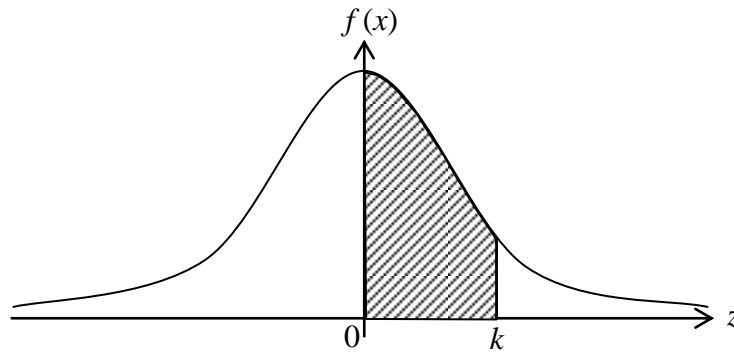


Diagram 25  
Rajah 25

It is given that the area of shaded region is 0.3494.

- (a) Find the value of  $P(z > k)$ .

*Cari nilai  $P(z > k)$ .*

[ 1 marks ]

[1 markah]

- (b)  $X$  is a continuous random variable which is normally distributed with a mean of  $\mu$  and a standard deviation of 3.5.

If the value of  $X$  is 56 and the  $z$ -score is  $k$ , find the value of  $\mu$ .

*$X$  ialah pembolehubah rawak yang bertabur secara normal dengan min,  $\mu$  dan sisihan piawai 3.5.*

*Jika nilai  $X$  ialah 56 dan skor- $z$  ialah  $k$ , cari nilai  $\mu$ .*

[ 3 marks ]

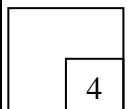
[3 markah]

Answer/Jawapan :

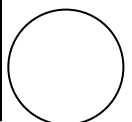
(a)

(b)

25



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END OF QUESTION PAPER  
KERTAS SOALAN TAMAT



**INFORMATION FOR CANDIDATES**  
**MAKLUMAT UNTUK CALON**

1. This question paper consists of **25** questions  
*Kertas soalan ini mengandungi 25 soalan*
2. Answer **all** questions.  
*Jawab semua soalan*
3. Write your answers in the spaces provided in the question paper.  
*Tulis jawapan anda dalam ruang yang disediakan dalam kertas soalan.*
4. Show your working. It may help you to get marks.  
*Tunjukkan langkah-langkah penting dalam kerja mengira anda. Ini boleh membantu anda untuk mendapatkan markah.*
5. If you wish to change your answer, cross out the answer that you have done. Then write down the new answer.  
*Sekiranya anda hendak menukar jawapan, batalkan jawapan yang telah dibuat. Kemudian tulis jawapan yang baru.*
6. The diagrams in the questions provided are not drawn to scale unless stated.  
*Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.*
7. The marks allocated for each question are shown in brackets.  
*Markah yang diperuntukkan bagi setiap soalan ditunjukkan dalam kurungan.*
8. A list of formulae is provided on pages 3 to 5.  
*Satu senarai rumus disediakan di halaman 3 hingga 5.*
9. You may use a non-programmable scientific calculator.  
*Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram.*
10. Hand in this question paper to the invigilator at the end of the examination.  
*Serahkan kertas soalan ini kepada pengawas peperiksaan di akhir peperiksaan.*



**KEMENTERIAN  
PENDIDIKAN  
MALAYSIA**  
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**BAHAGIAN PENGURUSAN SEKOLAH BERASRAMA PENUH  
DAN SEKOLAH KECEMERLANGAN**

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**PENTAKSIRAN DIAGNOSTIK AKADEMIK SBP 2014  
PERCUBAAN SIJIL PELAJARAN MALAYSIA**

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**ADDITIONAL MATHEMATICS**

**Kertas 2**

**2 jam 30 minit**

---

**JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU**

1. *This question paper consists of three sections: Section A, Section B and Section C.*
2. *Answer **all** questions in Section A, **four** questions from Section B and **two** questions from Section C.*
3. *Give only **one** answer / solution to each question.*
4. *Show your working. It may help you to get marks.*
5. *The diagrams in the questions provided are not drawn to scale unless stated.*
6. *The marks allocated for each question and sub-part of a question is shown in brackets.*
7. *A list of formulae and normal distribution table is provided on pages 2 to 4.*
8. *You may use a non-programmable scientific calculator.*

---

Kertas soalan ini mengandungi **21** halaman bercetak.

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***HALAMAN KOSONG***

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

## ALGEBRA

$$1 \quad x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$2 \quad a^m \times a^n = a^{m+n}$$

$$3 \quad a^m \div a^n = a^{m-n}$$

$$4 \quad (a^m)^n = a^{nm}$$

$$5 \quad \log_a mn = \log_a m + \log_a n$$

$$6 \quad \log_a \frac{m}{n} = \log_a m - \log_a n$$

$$7 \quad \log_a m^n = n \log_a m$$

$$8 \quad \log_a b = \frac{\log_c b}{\log_c a}$$

$$9 \quad T_n = a + (n-1)d$$

$$10 \quad S_n = \frac{n}{2}[2a + (n-1)d]$$

$$11 \quad T_n = ar^{n-1}$$

$$12 \quad S_n = \frac{a(r^n - 1)}{r - 1} = \frac{a(1 - r^n)}{1 - r}, \quad (r \neq 1)$$

$$13 \quad S_\infty = \frac{a}{1 - r}, \quad |r| < 1$$

## CALCULUS

$$1 \quad y = uv, \quad \frac{dy}{dx} = u \frac{dv}{dx} + v \frac{du}{dx}$$

$$2 \quad y = \frac{u}{v}, \quad \frac{dy}{dx} = \frac{v \frac{du}{dx} - u \frac{dv}{dx}}{v^2}$$

$$3 \quad \frac{dy}{dx} = \frac{dy}{du} \times \frac{du}{dx}$$

$$4 \quad \text{Area under a curve} = \int_a^b y \, dx \quad \text{or} \\ = \int_a^b x \, dy$$

5 Volume generated

$$= \int_a^b \pi y^2 \, dx \quad \text{or} \\ = \int_a^b \pi x^2 \, dy$$

## GEOMETRY

$$1. \quad \text{Distance} = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$$

2. Midpoint

$$(x, y) = \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

$$3. \quad |r| = \sqrt{x^2 + y^2}$$

$$4. \quad \hat{r} = \frac{xi + yj}{\sqrt{x^2 + y^2}}$$

5. A point dividing a segment of a line

$$(x, y) = \left( \frac{nx_1 + mx_2}{m + n}, \frac{ny_1 + my_2}{m + n} \right)$$

6. Area of triangle =

$$\frac{1}{2} |(x_1 y_2 + x_2 y_3 + x_3 y_1) - (x_2 y_1 + x_3 y_2 + x_1 y_3)|$$

## STATISTIC

$$1 \quad \bar{x} = \frac{\sum x}{N}$$

$$2 \quad \bar{x} = \frac{\sum fx}{\sum f}$$

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

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

$$5 \quad M = L + \left[ \frac{\frac{1}{2}N - F}{f_m} \right] C$$

$$6 \quad I = \frac{P_1}{P_0} \times 100$$

$$7 \quad \bar{I} = \frac{\sum w_i I_i}{\sum w_i}$$

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

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

$$10 \quad P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

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

$$12 \quad \text{Mean, } \mu = np$$

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

$$14 \quad z = \frac{x - \mu}{\sigma}$$

## TRIGONOMETRY

$$1 \quad \text{Arc length, } s = r\theta$$

$$2 \quad \text{Area of sector, } A = \frac{1}{2} r^2 \theta$$

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

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

$$5 \quad \text{cosec}^2 A = 1 + \cot^2 A$$

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

$$7 \quad \begin{aligned} \cos 2A &= \cos^2 A - \sin^2 A \\ &= 2 \cos^2 A - 1 \\ &= 1 - 2 \sin^2 A \end{aligned}$$

$$8 \quad \tan 2A = \frac{2 \tan A}{1 - \tan^2 A}$$

$$9 \quad \sin(A \pm B) = \sin A \cos B \pm \cos A \sin B$$

$$10 \quad \cos(A \pm B) = \cos A \cos B \mp \sin A \sin B$$

$$11 \quad \tan(A \pm B) = \frac{\tan A \pm \tan B}{1 \mp \tan A \tan B}$$

$$12 \quad \frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

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

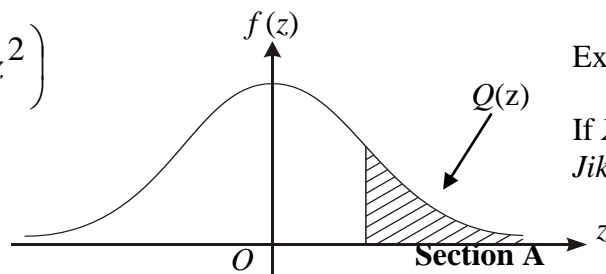
$$14 \quad \text{Area of triangle} = \frac{1}{2} ab \sin C$$

**THE UPPER TAIL PROBABILITY Q(z) FOR THE NORMAL DISTRIBUTION N(0,1)  
KEBARANGKALIAN HUJUNG ATAS Q(z) BAGI TABURAN NORMAL N(0, 1)**

z										Minus / Tolak									
	0	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
0.0	0.5000	0.4960	0.4920	0.4880	0.4840	0.4801	0.4761	0.4721	0.4681	0.4641	4	8	12	16	20	24	28	32	36
0.1	0.4602	0.4562	0.4522	0.4483	0.4443	0.4404	0.4364	0.4325	0.4286	0.4247	4	8	12	16	20	24	28	32	36
0.2	0.4207	0.4168	0.4129	0.4090	0.4052	0.4013	0.3974	0.3936	0.3897	0.3859	4	8	12	15	19	23	27	31	35
0.3	0.3821	0.3783	0.3745	0.3707	0.3669	0.3632	0.3594	0.3557	0.3520	0.3483	4	7	11	15	19	22	26	30	34
0.4	0.3446	0.3409	0.3372	0.3336	0.3300	0.3264	0.3228	0.3192	0.3156	0.3121	4	7	11	15	18	22	25	29	32
0.5	0.3085	0.3050	0.3015	0.2981	0.2946	0.2912	0.2877	0.2843	0.2810	0.2776	3	7	10	14	17	20	24	27	31
0.6	0.2743	0.2709	0.2676	0.2643	0.2611	0.2578	0.2546	0.2514	0.2483	0.2451	3	7	10	13	16	19	23	26	29
0.7	0.2420	0.2389	0.2358	0.2327	0.2296	0.2266	0.2236	0.2206	0.2177	0.2148	3	6	9	12	15	18	21	24	27
0.8	0.2119	0.2090	0.2061	0.2033	0.2005	0.1977	0.1949	0.1922	0.1894	0.1867	3	5	8	11	14	16	19	22	25
0.9	0.1841	0.1814	0.1788	0.1762	0.1736	0.1711	0.1685	0.1660	0.1635	0.1611	3	5	8	10	13	15	18	20	23
1.0	0.1587	0.1562	0.1539	0.1515	0.1492	0.1469	0.1446	0.1423	0.1401	0.1379	2	5	7	9	12	14	16	19	21
1.1	0.1357	0.1335	0.1314	0.1292	0.1271	0.1251	0.1230	0.1210	0.1190	0.1170	2	4	6	8	10	12	14	16	18
1.2	0.1151	0.1131	0.1112	0.1093	0.1075	0.1056	0.1038	0.1020	0.1003	0.0985	2	4	6	7	9	11	13	15	17
1.3	0.0968	0.0951	0.0934	0.0918	0.0901	0.0885	0.0869	0.0853	0.0838	0.0823	2	3	5	6	8	10	11	13	14
1.4	0.0808	0.0793	0.0778	0.0764	0.0749	0.0735	0.0721	0.0708	0.0694	0.0681	1	3	4	6	7	8	10	11	13
1.5	0.0668	0.0655	0.0643	0.0630	0.0618	0.0606	0.0594	0.0582	0.0571	0.0559	1	2	4	5	6	7	8	10	11
1.6	0.0548	0.0537	0.0526	0.0516	0.0505	0.0495	0.0485	0.0475	0.0465	0.0455	1	2	3	4	5	6	7	8	9
1.7	0.0446	0.0436	0.0427	0.0418	0.0409	0.0401	0.0392	0.0384	0.0375	0.0367	1	2	3	4	4	5	6	7	8
1.8	0.0359	0.0351	0.0344	0.0336	0.0329	0.0322	0.0314	0.0307	0.0301	0.0294	1	1	2	3	4	4	5	6	6
1.9	0.0287	0.0281	0.0274	0.0268	0.0262	0.0256	0.0250	0.0244	0.0239	0.0233	1	1	2	2	3	4	4	5	5
2.0	0.0228	0.0222	0.0217	0.0212	0.0207	0.0202	0.0197	0.0192	0.0188	0.0183	0	1	1	2	2	3	3	4	4
2.1	0.0179	0.0174	0.0170	0.0166	0.0162	0.0158	0.0154	0.0150	0.0146	0.0143	0	1	1	2	2	2	3	3	4
2.2	0.0139	0.0136	0.0132	0.0129	0.0125	0.0122	0.0119	0.0116	0.0113	0.0110	0	1	1	1	2	2	2	3	3
2.3	0.0107	0.0104	0.0102								0	1	1	1	1	2	2	2	2
				0.00990	0.00964	0.00939	0.00914				3	5	8	10	13	15	18	20	23
								0.00889	0.00866	0.00842	2	5	7	9	12	14	16	16	21
2.4	0.00820	0.00798	0.00776	0.00755	0.00734						2	4	6	8	11	13	15	17	19
						0.00714	0.00695	0.00676	0.00657	0.00639	2	4	6	7	9	11	13	15	17
2.5	0.00621	0.00604	0.00587	0.00570	0.00554	0.00539	0.00523	0.00508	0.00494	0.00480	2	3	5	6	8	9	11	12	14
2.6	0.00466	0.00453	0.00440	0.00427	0.00415	0.00402	0.00391	0.00379	0.00368	0.00357	1	2	3	5	6	7	9	9	10
2.7	0.00347	0.00336	0.00326	0.00317	0.00307	0.00298	0.00289	0.00280	0.00272	0.00264	1	2	3	4	5	6	7	8	9
2.8	0.00256	0.00248	0.00240	0.00233	0.00226	0.00219	0.00212	0.00205	0.00199	0.00193	1	1	2	3	4	4	5	6	6
2.9	0.00187	0.00181	0.00175	0.00169	0.00164	0.00159	0.00154	0.00149	0.00144	0.00139	0	1	1	2	2	3	3	4	4
3.0	0.00135	0.00131	0.00126	0.00122	0.00118	0.00114	0.00111	0.00107	0.00104	0.00100	0	1	1	2	2	2	3	3	4

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

$$Q(z) = \int_k^{\infty} f(z) dz$$



Example / Contoh:

If  $X \sim N(0, 1)$ , then  $P(X > k) = Q(k)$   
 Jika  $X \sim N(0, 1)$ , maka  $P(X > k) = Q(k)$

[40 marks]

[40 markah]

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Answer **all** questions.Jawab **semua** soalan.

- 1 Solve the following simultaneous equations:

*Selesaikan persamaan serentak berikut:*

$$5y - 4x = 5xy$$

$$3x + 2y = 6$$

Give your answer correct to two decimal places.

*Beri jawapan anda betul kepada dua tempat perpuluhan.*

[5 marks]

[5 markah]

- 2 The quadratic function  $h(x) = -2x^2 + 4x - m$  can be express in the form of  $h(x) = 7 - 6k - (x - 2k)^2$  where  $k$  and  $m$  are constants.

*Fungsi kuadratik  $h(x) = -2x^2 + 4x - m$  boleh diungkapkan dalam bentuk*

*$h(x) = 7 - 6k - 2(x - 2k)^2$  dengan keadaan  $k$  dan  $m$  adalah pemalar*

- (a) Express  $m$  in terms of  $k$  [3 marks]

*Ungkapkan  $m$  dalam sebutan  $k$ .* [3 markah]

- (b) Find the values of  $k$  and  $m$  [2 marks]

*Cari nilai  $k$  dan nilai  $m$ .* [2 markah]

- (c) Hence, using the answer from 2(b), find the values of  $n$  if the straight line  $y = nx + 10$  is a tangent to the quadratic function  $h(x) = -2x^2 + 4x - m$ . [3 marks]

*Seterusnya, dengan menggunakan jawapan dari 2(b), cari nilai-nilai bagi  $n$  jika garis lurus*

*$y = nx + 10$  adalah tangen kepada fungsi kuadratik  $h(x) = -2x^2 + 4x - m$*  [3 markah]



- 3 Razilah is a plastic ware entrepreneur. Diagram 3 shows a set of 7 different size of plastic food ware.

*Razilah merupakan seorang usahawan bekas makanan plastik. Satu set bekas makanan mempunyai 7 biji berlainan saiz seperti dalam Rajah 3.*



Diagram 3  
Rajah 3

Razilah wants to upgrade the plastic food ware sets by patching the ribbons around the food ware. She used a piece of ribbons that has length  $216\pi$  cm cutting to paste on the 7 pieces of plastic food ware. The diameters of each food ware increasing by 1 cm consecutively.

*Razilah ingin meningkatkan nilai tambah bekas makanan dengan menampal riben di sekeliling bekas makanan itu. Dia menggunakan reben yang berukuran panjang  $216\pi$  cm yang dipotong untuk ditampal pada 7 biji bekas makanan tersebut. Diameter bagi setiap biji bekas makanan plastik tersebut meningkat secara berturutan sebanyak 1 cm.*

Calculate  
*Hitung*

- (a) the length, in term of  $\pi$ , of the ribbon to paste on the smallest plastic food ware.  
*panjang riben, dalam sebutan  $\pi$ , untuk ditampal pada bekas makanan yang paling kecil.*  
[3 marks]  
[3 markah]
- (b) For Raya promotion Razilah add extra number of food ware in each set. If she fixed  $48\pi$  cm ribbon to paste on the largest food ware, how many food ware are in the promotion set?  
*Razilah membuat promosi Raya dengan menambah bilangan bekas makanan dalam setiap set. Jika dia menetapkan  $48\pi$  cm riben untuk menampal bekas makanan yang paling besar, berapakah bilangan bekas makanan dalam set promosi tersebut?*  
[3 marks]  
[3 markah]

4

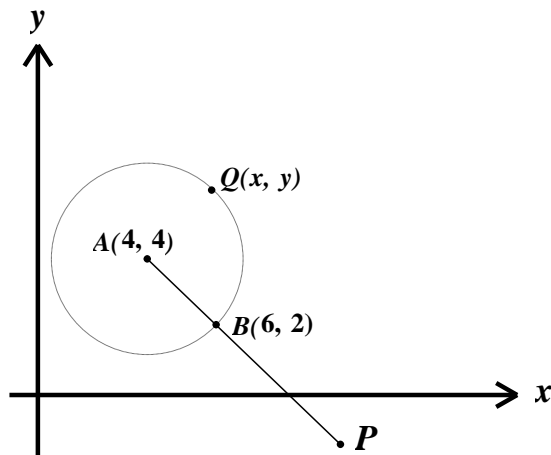


Diagram 4 shows a straight line  $AP$  and a circle with centre  $A$  forms from a moving point  $Q$ . Point  $B$  lies on  $AP$  such that  $AB : AP = 2 : 7$ .

Rajah 4 menunjukkan garis lurus  $AP$  dan satu bulatan yang berpusat di  $A$  terbentuk oleh titik  $Q$  yang bergerak. Titik  $B$  terletak di atas garis lurus  $AP$  dengan keadaan  $AB : AP = 2 : 7$ .

Find

Cari

- (a) the equation of straight line  $AP$  [2 marks]  
 persamaan garis lurus  $AP$ . [2 markah]
- (b) the coordinates of  $P$ . [2 marks]  
 koordinat  $P$  [2 markah]
- (c) the equation of the locus of point  $Q$ . [3 marks]  
 persamaan lokus  $Q$ . [3 markah]

5 (a) Sketch the graph of  $y = 3 \cos\left(\frac{3}{2}x\right)$  for  $0 \leq x \leq 2\pi$ . [3 marks]

*Lakar graf bagi of  $y = 3 \cos\left(\frac{3}{2}x\right)$  untuk  $0 \leq x \leq 2\pi$ . [3 markah]*

(b) Hence, using the same axes, sketch a suitable graph to find the number of solutions to the equation  $\frac{x}{3\pi} + \cos\left(\frac{3}{2}x\right) = \frac{2}{3}$  for  $0 \leq x \leq 2\pi$ .

State the number of solutions. [3 marks]

*Seterusnya dengan menggunakan paksi yang sama, lakar satu graf yang sesuai untuk mencari bilangan penyelesaian bagi persamaan  $\frac{x}{3\pi} + \cos\left(\frac{3}{2}x\right) = \frac{2}{3}$  untuk  $0 \leq x \leq 2\pi$ .*

*Nyatakan bilangan penyelesaian itu. [3 markah]*

- 6 Cikgu Nik wants to analyze the data of Additional Mathematics marks for 5 Bakti in mid year 2014 examination. Table 6 shows the distribution of the marks.  
*Cikgu Nik ingin menganalisis data markah Matematik Tambahan bagi Kelas 5 Bakti dalam peperiksaan pertengahan tahun 2014. Jadual 6 menunjukkan data markah yang telah dikumpulkan .*

Marks <i>Markah</i>	Number of students <i>Bilangan pelajar</i>
11-20	2
21-30	5
31-40	12
41-50	6
51-60	7

Table 6  
*Jadual 6*

Calculate  
*Hitung*

- (a) the mean mark of the students, [2 marks]  
*min markah bagi pelajar itu* [2 markah]
- (b) the variance of the mark of the students [3 marks]  
*varian markah pelajar itu* [3 markah]
- (c) the mark obtained by 75% of the students in the class. [3 marks]  
*markah yang diperolehi oleh 75% pelajar dalam kelas tersebut* [3 markah]

**Section B**  
**Bahagian B**

[40 marks]

[40 markah]

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Answer any **four** questions from this section.

*Jawab mana-mana empat soalan daripada bahagian ini.*

- 7 Use graph paper to answer this questions.  
*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  $y = qx^p$ , where  $p$  and  $q$  are constants.

*Jadual 7 menunjukkan nilai-nilai bagi dua pembolehubah,  $x$  dan  $y$ , yang diperolehi daripada satu eksperimen. Pembolehubah  $x$  dan  $y$  dihubungkan oleh persamaan  $y = qx^p$ , dengan keadaan  $p$  and  $q$  adalah pemalar.*

$x$	1.2	1.58	2.82	3.98	6.03	7.94
$y$	0.57	1	3.16	6.30	14.45	25.12

Table 7

*Jadual 7*

- (a) Plot  $\log_{10} y$  against  $\log_{10} x$ , using a scale of 2 cm to 0.1 units on  $\log_{10} x$ -axis and 2 cm to 0.2 units on  $\log_{10} y$ -axis.  
Hence, draw the line of best fit. [5 marks]

*Plot  $\log_{10} y$  melawan  $\log_{10} x$  dengan menggunakan skala 2 cm kepada 0.1 unit pada paksi- $\log_{10} x$  dan 2 cm kepada 0.2 unit pada paksi- $\log_{10} y$ .*

*Seterusnya, lukis garis lurus penyuaian terbaik.* [5 markah]

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

- (i)  $p$ ,  
(ii)  $q$ ,  
(iii)  $x$  when  $y = 3$ .  
 *$x$  apabila  $y = 3$ .*

[5 marks]

[5 markah]

- 8 Diagram 8 shows the part of the curve  $y = 2x^2 + 3$  and the straight line  $y = x + 4$  intersect at point  $P$ .

*Rajah 8 menunjukkan sebahagian daripada lengkung  $y = 2x^2 + 3$  dan garis lurus  $y = x + 4$  bersilang pada titik  $P$*

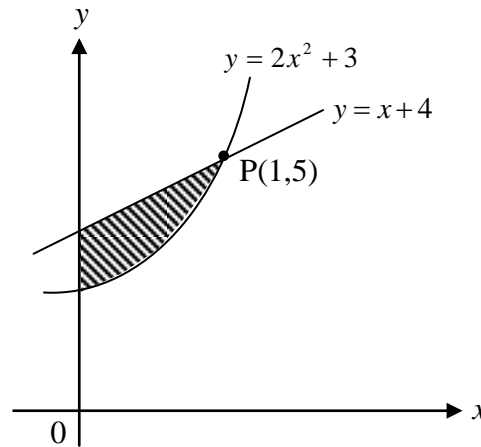


Diagram 8  
Rajah 8

Calculate

*Hitung*

- (a) the equation of the normal to the curve at point  $P$  [3 marks]  
*persamaan normal pada lengkung di titik  $P$*  [3 markah]
- (b) the area of the shaded region. [4 marks]  
*luas kawasan rantau yang berlorek.* [4 markah]
- (c) the volume of revolution, in terms of  $\pi$ , when the area bounded by the curve, the  $y$ -axis and the line  $y = 5$  is rotated through  $360^\circ$  about the  $y$ -axis.

*isipadu kisanan, dalam sebutan  $\pi$ , apabila rantau yang dibatasi oleh lengkung, paksi- $y$  dan garis lurus  $y = 5$  diputarakan melalui  $360^\circ$  pada paksi- $y$ .*

[3 marks]  
[3 markah]

9

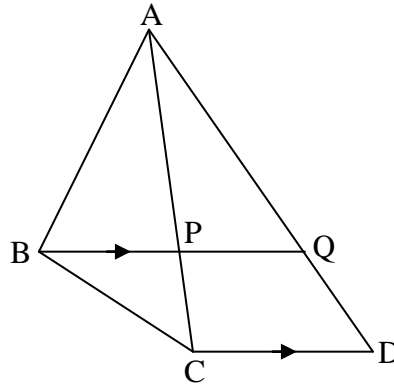


Diagram 9  
Rajah 9

In diagram 9,  $ABCD$  is a quadrilateral. The point  $Q$  lies on  $AD$  and straight line  $AC$  intersects the straight line  $BQ$  at the point  $P$ .

Dalam rajah 9,  $ABCD$  ialah sebuah sisiempat. Titik  $Q$  terletak pada  $AD$  dengan garislurus  $AC$  bersilang dengan garislurus  $BQ$  di titik  $P$ .

It is given that  $\overline{AB} = 3\underset{\sim}{x}$ ,  $\overline{AD} = 8\underset{\sim}{y}$ ,  $\overline{CD} = \frac{1}{2}\overline{BQ}$  and  $\overline{AQ} = 3\overline{QD}$ .

Diberi bahawa  $\overline{AB} = 3\underset{\sim}{x}$ ,  $\overline{AD} = 8\underset{\sim}{y}$ ,  $\overline{CD} = \frac{1}{2}\overline{BQ}$  dan  $\overline{AQ} = 3\overline{QD}$ .

(a) Express in terms of  $\underset{\sim}{x}$  and/or  $\underset{\sim}{y}$ :

Ungkapkan dalam sebutan  $\underset{\sim}{x}$  dan/atau  $\underset{\sim}{y}$ :

(i)  $\overline{BQ}$

(ii)  $\overline{AC}$

[3 marks]

[3 markah]

(b) Using  $\overline{AP} = m\overline{AC}$  and  $\overline{AP} = \overline{AB} + n\overline{BQ}$ , where  $m$  and  $n$  are constants, find the value of  $m$  and of  $n$ .

[5 marks]

Dengan menggunakan  $\overline{AP} = m\overline{AC}$  dan  $\overline{AP} = \overline{AB} + n\overline{BQ}$ , dengan keadaan  $m$  dan  $n$  adalah pemalar, cari nilai  $m$  dan nilai  $n$ .

[5 markah]

(c) Hence, using the value of  $m$  or value of  $n$  from (b), find  $\overline{PD}$

[2 marks]

Seterusnya, dengan menggunakan nilai  $m$  atau nilai  $n$  daripada (b), cari  $\overline{PD}$

[2 markah]

- 10 (a) In a survey carried out in certain month it is found that 75% of the students who used the school library are female students.

*Dalam satu kajian yang dijalankan pada bulan tertentu, didapati 75% daripada pelajar yang menggunakan perpustakaan sekolah adalah terdiri daripada pelajar perempuan.*

If 10 students are randomly chosen,

*Jika 10 orang pelajar dipilih secara rawak,*

- (i) calculate the mean and variance of choosing female students.

[2 marks]

*hitung min dan varian bagi memilih pelajar perempuan.*

[2 markah]

- (ii) find the probability at least 9 of them are female students.

[3 marks]

*cari kebarangkalian bahawa sekurang-kurangnya 9 daripada mereka adalah pelajar perempuan.*

[3 markah]

- (b) The mass of durians in a lorry is normally distributed with a mean of 1.5 kg and a variance of  $0.64 \text{ kg}^2$ . Given that 160 durians have mass between 1.3 kg and 2.5 kg.

*Berat buah durian yang dibawa oleh sebuah lori tertabur secara normal dengan min 1.5 kg dan varian  $0.64 \text{ kg}^2$ . Didapati 160 biji durian mempunyai berat di antara 1.3 kg dan 2.5 kg.*

- (i) Find the probability for the durians which have mass between 1.3 kg and 2.5 kg.

*Cari kebarangkalian bagi durian yang mempunyai berat di antara 1.3 kg dan 2.5 kg.*

[3 marks]

[3 markah]

- (ii) Hence, find the total number of durians carried by the lorry.

*Seterusnya, cari jumlah durian yang dibawa oleh lori tersebut.*

[2 marks]

[2 markah]



11

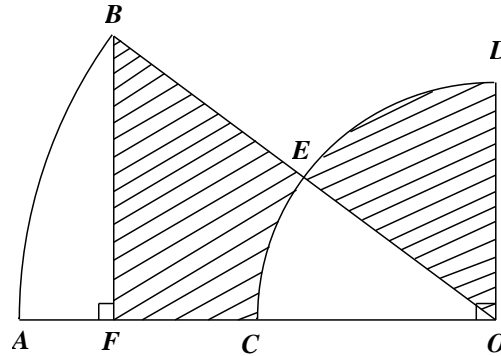


Diagram 11  
Rajah 11

Diagram 11 shows a sector  $AOB$  with centre  $O$ .  $COD$  is a quadrant of a circle with centre  $O$  and radius 4 cm.  $C$  is the midpoint of  $AO$  and  $BF = 5$  cm.

*Rajah 11 menunjukkan sektor  $AOB$  berpusat  $O$ .  $COD$  ialah sukuan sebuah bualatan berpusat  $O$  dan berjajari 4 cm.  $C$  ialah titik tengah  $AO$  dan  $BF = 5$  cm.*

[Use/ Guna  $\pi = 3.142$ ]

Calculate  
*Hitung*

- (a)  $\angle AOB$ , in radian. [2 marks]  
 *$\angle AOB$ , dalam radian [2 markah]*
- (b) the perimeter, in cm, of the shaded region. [4 marks]  
*perimeter, dalam cm, rantau berlorek. [4 markah]*
- (c) the area, in  $\text{cm}^2$ , of the shaded region. [4 marks]  
*luas, dalam  $\text{cm}^2$ , rantau berlorek. [4 markah]*

Section C

**Bahagian C**

[20 marks]

[20 markah]

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Answer any **two** questions from this section.*Jawab mana-mana **dua** soalan daripada bahagian ini.*

- 12 A particle moves along a straight line and passes through a fixed point  $O$  with a velocity of  $14 \text{ ms}^{-2}$ . Its acceleration is given by  $a = 5 - 2t$ , where  $t$  is the time, in seconds.

*Satu zarah bergerak sepanjang satu garislurus dan melalui satu titik tetap  $O$  dengan halajunya  $14 \text{ ms}^{-2}$ . Pecutannya diberi oleh  $a = 5 - 2t$  dengan keadaan  $t$  ialah masa, dalam saat.*

Find

Cari

- (a) the maximum velocity in  $\text{ms}^{-1}$  of the particle [3 marks]

*halaju maksimum, dalam  $\text{ms}^{-1}$  zarah itu.* [3 markah]

- (b) the time, in seconds when the particle stops instantaneously. [3 marks]

*masa, dalam saat, apabila zarah berhenti seketika .*

[3 markah]

- (c) the total distance, in m, travelled by the particle in the first 9 seconds. [4 marks]

*jumlah jarak, dalam m, yang dilalui oleh zarah itu dalam 9 saat pertama.*

[4 markah]

- 13 Diagram 13 shows trapezium  $ABCD$ .  $AB$  is parallel to  $DC$  and  $\angle ADC$  is obtuse .  
*Rajah 13 menunjukkan trapezium  $ABCD$ .  $AB$  adalah selari dengan  $DC$  dan  $\angle ADC$  ialah sudut cakah.*

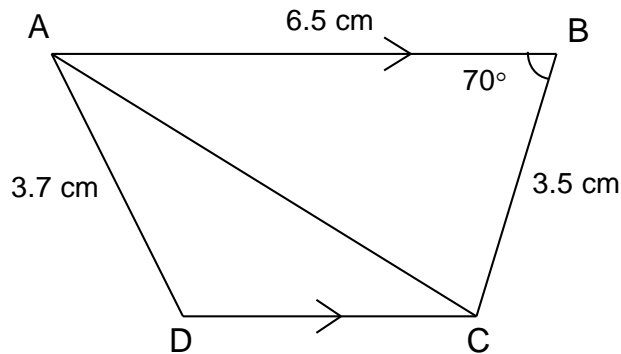


Diagram 13  
*Rajah 13*

Find  
*Cari*

- (a) the length, in cm, of  $AC$   
*panjang dalam cm,  $AC$*  [2 marks]  
 [2 markah]
- (b)  $\angle ADC$ , [4 marks]  
 [4 markah]
- (c) The straight line  $CD$  is extended to  $D'$  such that  $AD = AD'$   
*Garis lurus  $CD$  dipanjangkan di mana  $AD = AD'$*
- (i) Sketch the triangle  $ACD'$   
*Lakarkan segi tiga  $ACD'$*  [1 mark]  
 [1 markah]
- (ii) Calculate the area, in  $\text{cm}^2$ , of  $\triangle ADD'$   
*Hitung luas, dalam  $\text{cm}^2$ , bagi  $\triangle ADD'$*  [3 marks]  
 [3 markah]

- 14 Norsiah runs an online business. She sells shawls and scarves .In a week, she sells  $x$  pieces of shawls and  $y$  pieces of scarves. The selling price of a shawl is RM 12 and a scarf is RM 5. The selling is based on the following constraints:

*Norsiah menjalankan perniagaan atas talian. Dia menjual selindang dan tudung. Dalam seminggu, dia menjual  $x$  helai selindang dan  $y$  helai tudung. Harga jualan untuk sehelai selindang ialah RM 12 dan sehelai tudung ialah RM 5. Penjualannya adalah berdasarkan kekangan berikut:*

I: The maximum total number of shawls and scarves must be 90.

*Jumlah maksimum selindang dan tudung ialah 90.*

II: The number of shawls must not exceed two times the number of scarves.

*Bilangan selindang mesti tidak melebihi dua kali bilangan tudung.*

III: The minimum total sales of both shawls and scarves is RM 600.

*Jumlah minimum hasil jualan selindang dan tudung ialah RM 600.*

- (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 10 shawls on  $x$ -axis and 2 cm to 10 scarves on the  $y$ -axis, construct and shade the region  $R$  which satisfies all the above constraints.

[ 3 marks ]

*Menggunakan skala 2 cm kepada 10 selindang pada paksi- $x$  dan 2 cm kepada 10 tudung , 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 minimum number of scarves sold, if 50 shawls sold.  
*bilangan minimum tudung yang dijual, jika 50 selendang dijual.*
- (ii) the maximum sales of both shawls and scarves.  
*harga jualan maksimum selindang dan tudung tersebut.*

[4 marks]

[ 4 markah]

- 15 Table 15 shows the price indices of four items,  $P$ ,  $Q$ ,  $R$  and  $S$ , needed in the production of a type of shoes.

*Jadual 15 menunjukkan indeks harga bagi empat bahan  $P$ ,  $Q$ ,  $R$  dan  $S$  yang diperlukan dalam pengeluaran sejenis kasut.*

Item <i>Bahan</i>	Price index in the year 2012 based on the year 2010 <i>Indeks harga dalam tahun 2012 berasaskan tahun 2010</i>
$P$	110
$Q$	136
$R$	120
$S$	125

Table 15  
*Jadual 15*

- (a) Calculate the price of item  $S$  in the year 2010 if its price in the year 2012 is RM12.00. [2 marks]  
*Hitungkan harga bahan  $S$  pada tahun 2010 jika harganya pada tahun 2012 ialah RM12.00. [2 markah]*
- (b) If the price of item  $P$  increase by 20% from the year 2012 to the year 2014, calculate the price index of item  $P$  in the year 2014 based on the year 2010. [3 marks]  
*Jika harga bahan  $P$  meningkat sebanyak 20% dari tahun 2012 ke tahun 2014, hitung indeks harga bahan  $P$  pada tahun 2014 berasaskan tahun 2010. [3 markah]*
- (c) The composite index for the production cost of the shoes in the year 2012 based on the year 2010 is 121.  
*Indeks gubahan bagi kos pengeluaran kasut itu pada tahun 2012 berasaskan tahun 2010 ialah 121.*  
Calculate  
*Hitungkan*
- (i) the price of a pair of shoes in the year 2012 if its price in the year 2010 is RM 90.00 . [2 marks]  
*harga sepasang kasut itu pada tahun 2012 jika harganya pada tahun 2010 ialah RM 90.00. [2 markah]*
- (ii) the value of  $m$  if the cost of the items  $P$ ,  $Q$ ,  $R$  and  $S$  used are in the ratio 8 : 5 :  $m$  : 4. [3 marks]  
*nilai bagi  $m$  jika kos bahan-bahan  $P$ ,  $Q$ ,  $R$  dan  $S$  yang digunakan adalah mengikut nisbah 8 : 5 :  $m$  : 4. [3 markah]*

**END OF QUESTION PAPER**  
**KERTAS SOALAN TAMAT**

**INFORMATION FOR CANDIDATES**  
**MAKLUMAT UNTUK CALON**

- 1 This question paper consists of three sections: **Section A**, **Section B** and **Section C**.  
*Kertas soalan ini mengandungi tiga bahagian Bahagian A, Bahagian B dan Bahagian C*
- 2 Answer **all** questions in **Section A**, **four** questions from **Section B** and **two** questions from **Section C**.  
*Jawab semua soalan dalam Bahagian A, mana-mana empat soalan daripada Bahagian B dan mana-mana dua soalan daripada Bahagian C.*
- 3 Write your answer on the ‘buku jawapan’ provided. If the buku jawapan is insufficient, you may ask for ‘helaian tambahan’ from the invigilator.  
*Jawapan anda hendaklah ditulis di dalam buku jawapan yang disediakan. Sekiranya buku jawapan tidak mencukupi, sila dapatkan helaian tambahan daripada pengawas peperiksaan.*
- 4 Show your working. It may help you to get marks.  
*Tunjukkan langkah-langkah penting dalam kerja mengira anda. Ini boleh membantu anda untuk mendapatkan markah.*
- 5 The diagrams in the questions provided are not drawn to scale unless stated.  
*Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.*
- 6 The marks allocated for each question and sub-part of a question are shown in brackets.  
*Markah yang diperuntukan bagi setiap soalan dan ceraihan soalan are shown in brackets.*
- 7 A list of formulae is provided on pages 2 to 4.  
*Satu senarai rumus disediakan di halaman 2 hingga 4.*
- 8 Graph paper is provided.  
*Kertas graf disediakan.*
9. You may use a non-programmable scientific calculator.  
*Anda dibenarkan menggunakan kalkulator scientific calculator yang tidak boleh diprogramkan.*
9. Tie the ‘helaian tambahan’ and the graph papers together with the ‘buku jawapan’ and hand in to the invigilator at the end of the examination.  
*Ikat helaian tambahan dan kertas graf bersama-sama dengan buku jawapan dan serahkan kepada pengawas peperiksaan pada akhir peperiksaan.*

NO.KAD PENGENALAN

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ANGKA GILIRAN

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Arahan Kepada Calon

- 1 Tulis nombor kad pengenalan dan angka giliran anda pada petak yang disediakan.
- 2 Tandakan ( / ) untuk soalan yang dijawab.
- 3 Ceraikan helaian ini dan ikat sebagai muka hadapan bersama-sama dengan buku jawapan.

Kod Pemeriksa				
Bahagian	Soalan	Soalan Dijawab	Markah Penuh	Markah Diperoleh ( Untuk Kegunaan Pemeriksa)
A	1		5	
	2		8	
	3		6	
	4		7	
	5		6	
	6		8	
B	7		10	
	8		10	
	9		10	
	10		10	
	11		10	
C	12		10	
	13		10	
	14		10	
	15		10	
<b>JUMLAH</b>				

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**Matematik  
Tambahan  
Kertas 1**  
2 jam  
Ogos 2014



**BAHAGIAN PENGURUSAN  
SEKOLAH BERASRAMA PENUH DAN SEKOLAH KECEMERLANGAN**

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**PENTAKSIRAN DIAGNOSTIK AKADEMIK SBP 2014  
PERCUBAAN SIJIL PELAJARAN MALAYSIA**

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**ADDITIONAL MATHEMATICS**

**Paper 1**

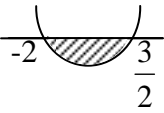
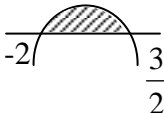
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**MARKING SCHEME**

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Skema Pemarkahan ini mengandungi **6** halaman bercetak



No.	Solution and Mark Scheme <span style="float: right;">cikguadura.wordpress.com</span>	Sub Marks	Total Marks
1(a)	$\{-1, 0, 1, 4, 12\}$	1	2
(b)	one-to-many relation or object $b$ has two images	1	
2(a)	3	1	3
(b)	-18 B1 : $\frac{7x}{x-3} = 6$ or $h(x) = \frac{3x}{x-7}$ or $h(x) = \frac{-3x}{7-x}$	2	
3	$f(x) = 2x + 10$ B2 : $f(x) = 6 \left[ \frac{x+1}{3} \right] + 8$ B1 : $g^{-1}(x) = \frac{x+1}{3}$  OR $f(x) = 2x + 10$ B2 : $f(y) = 6 \left[ \frac{y+1}{3} \right] + 8$ B1 : $x = \frac{y+1}{3}$	3	3
4	$x^2 + 24x + 112 = 0$  B2 : $S.O.R = -24$ or $P.O.R = 112$  B1 : $m+n = -6$ or $mn = 7$	3	3
5	$p = -4$ and $q = -9$  B2 : $p = -4$ or $q = -9$  B1 : $f(x) = -\frac{1}{3}(x+p)^2 - \frac{1}{3}q$	3	3
6	$-2 \leq x \leq \frac{3}{2}$  B2 : $(2x-3)(x+2) \leq 0$ OR  OR   B1 : $2x^2 + x - 6 \leq 0$ OR $-2x^2 - x + 6 \geq 0$	3	3

7	$p = -3$ B2 : $p + 3 = -6p - 18$ B1 : $2^2(2^{p+1}) = \left(\frac{1}{2^3}\right)^{2p+6}$	3	3
8	$x = 6$ B3 : $2x - 5 = x + 1$ B2 : $\log_3(2x - 5)^3 = \log_3(x + 1)^3$ or $\log_3(2x - 5) = \log_3(x + 1)$ B1 : $\frac{\log_3(x + 1)^3}{\log_3 27}$	4	4
9	$S_{20} = 900$ B2 : $S_{20} = \frac{20}{2}[2(7) + 19(4)]$ B1 : $T_1 = a = 4(1) + 3 = 7$ or $d = 4$	3	3
10	RM 284.40 B2 : $T_{12} = 500(0.95)^{11}$ B1 : $r = 0.95 / \frac{19}{20}$	3	3
11	$a = 10$ and $d = 4$ B3 : $a = 10$ or $d = 4$  B2 : $8a + 28d = 192$ and $16a + 120d = 640$  B1 : $S_8 = \frac{8}{2}[2a + 7d] = 192$ or $S_{16} - S_8 = 448$ or $S_{16} = 640$	4	4
12	$y = \frac{x}{-2 + 5x}$  B2 : $\frac{1}{y} = -2\left(\frac{1}{x}\right) + 5$  B1 : $m = -2$ or $c = 5$	3	3

13	$k = -1$ B1 : $5k - 22 = 27$ or $5k - 22 = -27$ B1 : $\frac{1}{2}  (3k - 10 + 4) - (10 + 6 - 2k)  = 13.5$	3	3
14	$y = \frac{1}{2}x - 4$ or equivalent B3 : $y - 0 = \frac{1}{2}(x - 8)$ B2 : $R(8,0)$ and $m_2 = \frac{1}{2}$ B1 : $R(8,0)$ or $m_2 = \frac{1}{2}$	4	4
15(a)	$3p + 2r$	1	2
(b)	$\sqrt{53}$	1	
16(a)	$h = 5$	2	4
(b)	$B1 : 3 = \frac{1}{2}(h + 1)$ $\frac{1}{\sqrt{10}} \begin{pmatrix} 1 \\ 3 \end{pmatrix}$ , accept $\frac{1}{\sqrt{40}} \begin{pmatrix} 2 \\ 6 \end{pmatrix}$ $B1 : \sqrt{2^2 + 6^2}$	2	
17	13.72 B3 : $\frac{1}{2}(7)^2(1.143) - \frac{1}{2}(5)^2(1.143)$ B2 : $\frac{1}{2}(7)^2(1.143)$ or $\frac{1}{2}(5)^2(1.143)$ B1 : 1.143 rad	4	4

SULIT

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18(a)	$\cot \theta = -\frac{h}{\sqrt{1-h^2}}$ $\text{B1 : } \frac{\sqrt{1-h^2}}{h}$	2	3
(b)	$-2h\sqrt{1-h^2}$	1	
19	$\text{B2 : } \frac{1}{3} \left[ \frac{3(1)^2 - 4}{1} \right] - \frac{1}{3} \left[ \frac{3(-2)^2 - 4}{-2} \right] \quad \text{OR} \quad \text{B2 : } \left[ x + \frac{4x^{-1}}{-3} \right]_{-2}^1$ $\text{B1 : } \frac{1}{3} \int_{-2}^1 3h(x) dx \quad \text{B1 : } h(x) = \frac{1}{3}(3 + 4x^{-2})$	3	3
20(a)	$\frac{2}{3}$ $\text{B1 : } 6x - 4 = 0$	2	3
(b)	$\frac{11}{3}$	1	
21	$\text{B2 : } \left[ \frac{kx^2}{2} \right]_1^3 - 2(-5) = 18$ $\text{B1 : } \frac{kx^2}{2} \text{ or } -10$	3	3
22(a)	$225$ $\text{B1 : } \frac{\sum x^2}{5} - (6)^2 = 3^2$	2	3
(b)	$36$	1	

SULIT

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23	72  B2 : $5! - 2! \times 4!$  B1 : $5!$ or $2! \times 4!$		3
24(a)	12 B1 : $\frac{h}{h+3} = \frac{4}{5}$	2	4
(b)	$\frac{13}{28}$ [accept $\frac{26}{56}$ ]  B1 : $\frac{3}{8} \times \frac{2}{7}$ or $\frac{5}{8} \times \frac{4}{7}$	2	
25(a)	0.1506	1	4
(b)	52.381 B2 : $1.034 = \frac{56 - \mu}{3.5}$ B1 : 1.034	3	

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**Matematik  
Tambahan  
Kertas 2**  
Ogos 2014

2 ½ jam



**KEMENTERIAN  
PENDIDIKAN  
MALAYSIA**

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**BAHAGIAN PENGURUSAN  
SEKOLAH BERASRAMA PENUH DAN SEKOLAH KECEMERLANGAN  
KEMENTERIAN PELAJARAN MALAYSIA**

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**PENTAKSIRAN DIAGNOSTIK AKADEMIK SBP 2014  
PERCUBAAN SIJIL PELAJARAN MALAYSIA**

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**ADDITIONAL MATHEMATICS**

**Paper 2**

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**MARKING SCHEME**

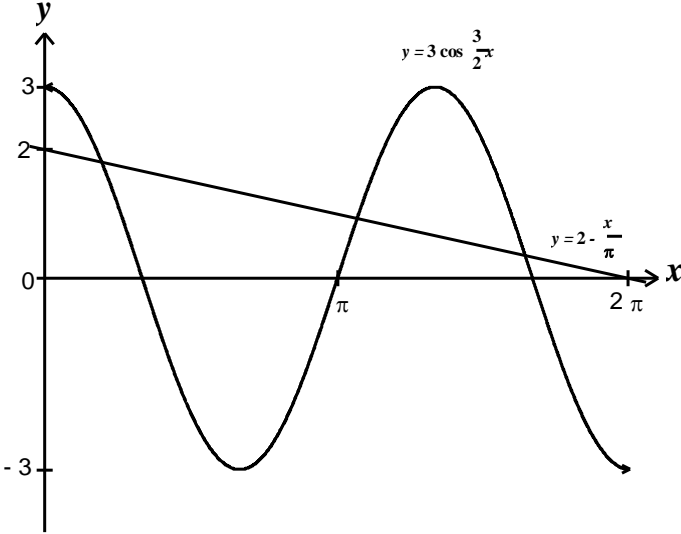
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Skema Pemarkahan ini mengandungi **10** halaman bercetak

No	Solution and Mark Scheme cikguadura.wordpress.com	Sub Marks	Total Marks
1	$x = \frac{6-2y}{3}$ $5y - 4\left(\frac{6-2y}{3}\right)5\left(\frac{6-2y}{3}\right)y$ $10y^2 - 7y - 24 = 0$ $y = \frac{-(-7) \pm \sqrt{(-7)^2 - 4(10)(-24)}}{2(10)}$ $y = 1.94, -1.24$ $x = 0.71, 2.83$ <p style="text-align: center;">OR</p> $y = \frac{6-3x}{2}$ $5\left(\frac{6-3x}{2}\right) - 4x = 5x\left(\frac{6-3x}{2}\right)$ $15x^2 - 53x + 30 = 0$ $x = \frac{-(-53) \pm \sqrt{(-53)^2 - 4(15)(30)}}{2(15)}$ $x = 0.71, 2.83$ $y = 1.94, -1.24 // -1.25$	P1 K1 K1 N1 N1	5 5
2(a)	$h(x) = -2(x-1)^2 + 2 - m$ $2 - m = 7 - 6k$ $m = 6k - 5$	K1 K1 N1	3 2 3
(b)	$k = \frac{1}{2} \quad m = -2$	N1, N1	
(c)	$-2x^2 + (4-n)x - 8 = 0$ $(4-n)^2 - 4(-2)(-8) = 0$ $n = -4, 12$	K1 K1 N1	

3(a)	$2\pi r, 2\pi(r+1), 2\pi(r+2), \dots$ K1 $\frac{7}{2}[2(2\pi r) + 6(2\pi)] = 216\pi$ K1 $r = 15$ length of ribbon = $30\pi$ N1	3	6
(b)	$30\pi, 32\pi, 34\pi, \dots$ K1 $d = 2\pi$ K1 $48\pi = 30\pi + (n-1)(2\pi)$ $n = 9$ N1	3	
4 (a)	$m = -1$ K1 $y = -x + 8$ N1	2	7
(b)	$\frac{4(5) + x(2)}{7} = 6$ or $\frac{4(5) + y(2)}{7} = 2$ K1 $P(11, -3)$ N1	2	
(c)	$AB = \sqrt{8}$ K1 $\sqrt{(x-4)^2 + (y-4)^2} = \sqrt{8}$ K1 $x^2 + y^2 - 8x - 8y + 24 = 0$ N1	3	



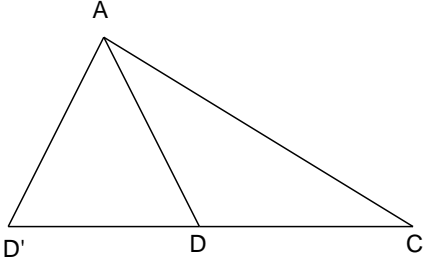
<p>5(a)</p>	 <p>Shape of Cosine <math>0 \leq x \leq 2\pi</math> P1</p> <p>Period 1.5 cycle P1</p> <p>Amplitude 3 P1</p> <p><math>y = 2 - \frac{x}{\pi}</math> K1</p> <p>(b) Draw line <math>y = 2 - \frac{x}{\pi}</math> K1</p> <p>Number of solutions = 3 N1</p>	<p>3</p> <p>3</p>	<p>6</p>
<p>6(a)</p>	<p><math>Mean = \frac{15.5 \times 2 + 25.5 \times 5 + 35.5 \times 12 + 45.5 \times 6 + 55.5 \times 7}{32}</math> K1</p> <p><math>= 38.94</math> N1</p> <p>(b) <math>Varian = \frac{15.5^2 \times 2 + 25.5^2 \times 5 + 35.5^2 \times 12 + 45.5^2 \times 6 + 55.5^2 \times 7}{32} - (38.94)^2</math> K1K1</p> <p><math>= 134.86</math> N1</p>	<p>2</p> <p>3</p>	<p>8</p>

(c)	$Q_3 = 40.5 + \left( \frac{\frac{3}{4}(32) - 19}{6} \right) \times 10$ $= 41.33$	<p>K1K1</p> <p>N1</p>	3	
7	LAMPIRAN			
8 (a)	$\frac{dy}{dx} = 4x$ $m_N = -\frac{1}{4}$ $y - 5 = -\frac{1}{4}(x - 1)$ $y = -\frac{1}{4}x + \frac{21}{4}$	<p>K1</p> <p>K1</p> <p>N1</p>	3	10
(b)	$\text{Area} = \frac{1}{2}(4+5)(1) - \int_0^1 2x^2 + 3 dx$ $= \frac{9}{2} - \left[ \frac{2x^3}{3} + 3x \right]_0^1$ $= \frac{9}{2} - \left[ \left( \frac{2}{3} + 3 \right) - 0 \right]$ $\frac{5}{6}$	<p>K1</p> <p>K1</p> <p>K1</p> <p>N1</p>	4	
(c)	$\text{Volume} = \pi \int_3^5 \left( \frac{y-3}{2} \right) dy$ $= \pi \left[ \frac{y^2}{4} + \frac{3y}{2} \right]_3^5$ $= \pi \left[ \left( \frac{5^2}{4} + \frac{3(5)}{2} \right) - \left( \frac{3^2}{4} + \frac{3(3)}{2} \right) \right]$ $7\pi$	<p>K1</p> <p>K1</p> <p>N1</p>	3	

<p>9(a)</p> <p>(i)</p> <p>(ii)</p> <p>(b)</p> <p>(c)</p>	<p><math>\overline{BQ} = \overline{BA} + \overline{AQ}</math> Or <math>\overline{AC} = \overline{AD} + \overline{DC}</math> K1</p> <p><math>\overline{BQ} = -3\tilde{x} + 6\tilde{y}</math> N1</p> <p><math>\overline{AC} = 5\tilde{y} + \frac{3}{2}\tilde{x}</math> N1</p> <p><math>\overline{AP} = 5m\tilde{y} + \frac{3}{2}m\tilde{x}</math> K1</p> <p><math>\overline{AP} = (3 - 3n)\tilde{x} + 6n\tilde{y}</math> K1</p> <p>Compare and solve</p> <p><math>\frac{3}{2}m = 3 - 3n</math> and <math>5m = 6n</math> K1</p> <p><math>m = \frac{3}{4}</math> N1</p> <p><math>n = \frac{5}{8}</math> N1</p> <p><math>\overline{PD} = \frac{3}{8}\overline{BQ} + \overline{QD}</math> or <math>\overline{PD} = \frac{1}{4}\overline{AC} + \frac{1}{2}\overline{BQ}</math> K1</p> <p><math>\overline{PD} = -\frac{9}{8}\tilde{x} + \frac{17}{4}\tilde{y}</math> N1</p>	<p>3</p> <p>5</p> <p>2</p>	<p>10</p>
<p>10(a)</p> <p>(i)</p> <p>(ii)</p>	<p><math>\mu = 10(0.75)</math> <math>= 7.5</math> N1</p> <p><math>\sigma^2 = 10(0.75)(0.25)</math> <math>= 1.875</math> N1</p> <p><math>P(X \geq 9) = P(X = 9) + P(X = 10)</math> <math>= {}^{10}C_9(0.75)^9(0.25)^1 + {}^{10}C_{10}(0.75)^{10}(0.25)^0</math> K1 K1 <math>= 0.2440</math> N1</p>	<p>2</p> <p>3</p>	<p>10</p>

(b)(i)	$P(1.3 < x < 2.5) = P\left(\frac{1.3-1.5}{0.8} < z < \frac{2.5-1.5}{0.8}\right)$ $= P(-0.25 < z < 1.25)$ $= 0.4931$	K1 K1 N1	3	
(ii)	$\text{Total} = \frac{160}{0.4931}$ $324$	K1 N1	2	
11(a)	$\angle AOB = \sin^{-1}\left(\frac{5}{8}\right)$ $\angle AOB = 0.6752 \text{ rad}$	K1 N1	2	10
(b)	$FC = \left(\sqrt{8^2 - 5^2}\right) - 4$ $\cap CD = 4(1.571)$ $\text{Perimeter} = \left(\left(\sqrt{8^2 - 5^2}\right) - 4\right) + (4(1.571)) + 5 + 4 + 8$ $= 25.53 \text{ cm}$	K1 K1 K1 N1	4	
(c)	$\Delta BFO = \frac{1}{2}(5)(6.245)$ $\frac{1}{2}(4^4)(0.6752) \text{ Or } \frac{1}{2}(4^4)(1.571 - 0.6752)$ $\text{Area} = \frac{1}{2}(5)(6.245) - \frac{1}{2}(4^2)(0.6752) + \frac{1}{2}(4^2)(1.571 - 0.6752)$ $= 17.38 \text{ cm}^2$	K1 K1 K1 N1	4	

12(a)	$5 - 2t = 0 \quad \text{K1}$ $t = \frac{5}{2}$ $v = 5t - t^2 + 14 \quad \text{K1}$ $v_{\max} = 5\left(\frac{5}{2}\right) - \left(\frac{5}{2}\right)^2 + 14$ $= 20.25 \quad \text{N1}$	3	10
(b)	$5t - t^2 + 14 = 0 \quad \text{K1}$ $t^2 - 5t - 14 = 0$ $(t + 2)(t - 7) = 0 \quad \text{K1}$ $t = 7 \quad \text{N1}$	4	
(c)	$s = \frac{5t^2}{2} - \frac{t^3}{3} + 14t \quad \text{K1}$ $s_7 = \frac{5(7)^2}{2} - \frac{(7)^3}{3} + 14(7) \quad \text{or} \quad s_9 = \frac{5(9)^2}{2} - \frac{(9)^3}{3} + 14(9) \quad \text{K1}$ $\text{Total distance} = 106\frac{1}{6} + 106\frac{1}{6} - 85\frac{1}{2} \quad \text{K1}$ $= 127\frac{1}{3} \quad \text{N1}$		

13(a)	$EC^2 = 6.5^2 + 3.5^2 - 2(6.5)(3.5)\cos 70^\circ$ <p>K1</p> <p>6.24 cm</p> <p>N1</p>	2	10
(b)	$\frac{\sin \angle BAC}{3.5} = \frac{\sin 70}{6.24}$ <p>K1</p> <p>Use <math>\angle ACD = \angle BAC = 31.81^\circ</math></p> <p>K1</p> <p><math>\angle ADC = 180^\circ - 62.74^\circ</math></p> <p>K1</p> <p>117.26°</p> <p>N1</p>	4	
(c)(i)	 <p><math>\angle AD'C</math> must acute angle</p> <p>N1</p>	1	
(ii)	<p><math>\angle D'AD = 180^\circ - 2(62.74^\circ)</math></p> <p>K1</p> $\Delta ADD' = \frac{1}{2}(3.7)(3.7)(\sin 54.52^\circ)$ <p>K1</p> <p>5.57 cm<sup>2</sup></p> <p>N1</p>	3	
14	LAMPIRAN		

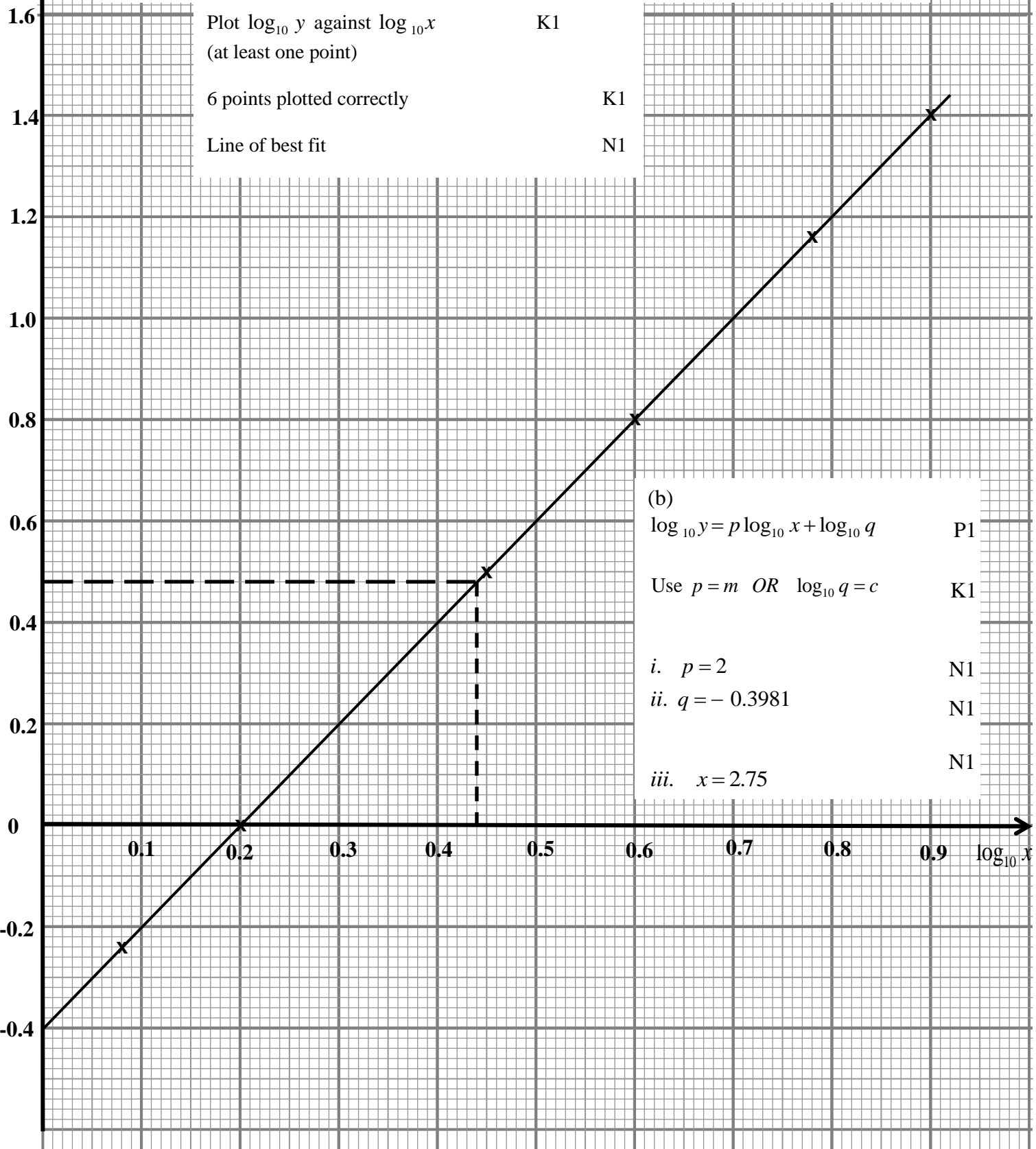
15(a)	$\frac{12}{Q_{10}} \times 100 = 125$ $Q_{10} = \text{RM } 9.60$	K1 N1	2	10
(b)	Use 120 $\frac{120}{100} \times 110$ $= 132$	P1 K1 N1	3	
(c)	$\frac{Q_{12}}{90} \times 100 = 121$ $Q_{12} = \text{RM}108.90$	K1 N1	2	
(d)	$\frac{110(8) + 136(5) + 120m + 125(4)}{8 + 5 + m + 4} = 121$ $\frac{2060 + 120m}{17 + m} = 121$ $m = 3$	K1 K1 N1	3	

END OF MARKING SCHEME

$\log_{10} y$  **No.7**

(a)

$\log_{10} x$	0.08	0.20	0.45	0.60	0.78	0.90	N1
$\log_{10} y$	-0.24	0.00	0.50	0.80	1.16	1.40	N1



(b)  
 $\log_{10} y = p \log_{10} x + \log_{10} q$  P1  
 Use  $p = m$  OR  $\log_{10} q = c$  K1  
 i.  $p = 2$  N1  
 ii.  $q = -0.3981$  N1  
 iii.  $x = 2.75$  N1