

NAMA	
ANGKA GILIRAN	

PEPERIKSAAN PERCUBAAN SPM TAHUN 2012
ADDITIONAL MATHEMATICS

3472/1

Kertas 1

September 2012

2 jam

Dua jam

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Kertas soalan ini adalah dalam dwibahasa.*
2. *Soalan dalam bahasa Inggeris mendahului soalan yang sepadan dalam bahasa Malaysia.*
3. *Calon dibenarkan menjawab keseluruhan atau sebahagian soalan dalam bahasa Inggeris atau bahasa Malaysia.*
4. *Calon dikehendaki membaca maklumat di halaman belakang kertas soalan ini.*

Untuk Kegunaan Pemeriksa		
Kod Pemeriksa:		
Soalan	Markah Penuh	Markah Diperoleh
1	3	
2	3	
3	2	
4	3	
5	3	
6	3	
7	4	
8	3	
9	4	
10	3	
11	3	
12	3	
13	2	
14	3	
15	3	
16	3	
17	4	
18	4	
19	4	
20	3	
21	3	
22	4	
23	4	
24	3	
25	3	
Jumlah	80	



Kertas soalan ini mengandungi 21 halaman bercetak.

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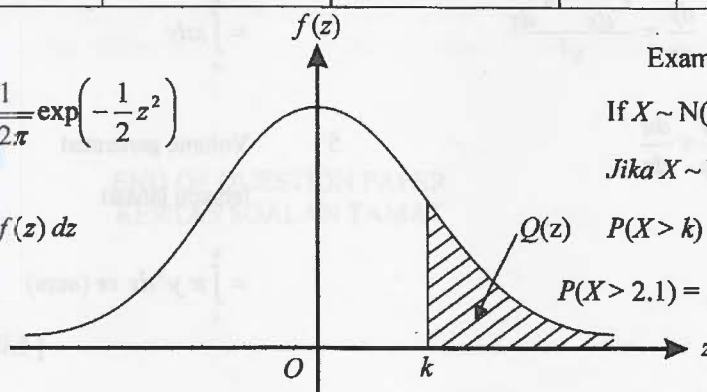
THE UPPER TAIL PROBABILITY $Q(z)$ FOR THE NORMAL DISTRIBUTION $N(0, 1)$
KEBARANGKALIAN Hujung Atas $Q(z)$ BAGI TABURAN NORMAL $N(0, 1)$

z	0	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
											Minus / Tolak								
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

Jika $X \sim N(0, 1)$, maka

$$P(X > k) = Q(k)$$

$$P(X > 2.1) = Q(2.1) = 0.0179$$

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

Rumus-rumus berikut boleh membantu anda menjawab soalan. Simbol-simbol yang diberi adalah yang biasa digunakan.

ALGEBRA

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

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

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

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

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

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

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

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

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

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

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

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

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

CALCULUS / KALKULUS

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

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

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

$$4 \quad \text{Area under a curve}$$

Luas di bawah lengkung

$$= \int_a^b y dx \text{ or (atau)}$$

$$= \int_a^b x dy$$

$$5 \quad \text{Volume generated}$$

Isipadu janaan

$$= \int_a^b \pi y^2 dx \text{ or (atau)}$$

[Lihat halaman sebelah

STATISTICS / STATISTIK

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

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

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

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

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

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

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

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

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

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

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

12 Mean / Min, $\mu = np$

13 $\sigma = \sqrt{npq}$

14 $Z = \frac{X - \mu}{\sigma}$

GEOMETRY / GEOMETRI

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

2 Midpoint / Titik tengah

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

3 A point dividing a segment of a line
Titik yang membahagi suatu tembereng garis

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

5 $|r| = \sqrt{x^2 + y^2}$

6 $\hat{r} = \frac{x\hat{i} + y\hat{j}}{\sqrt{x^2 + y^2}}$

4 Area of triangle / Luas segitiga

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



TRIGONOMETRY / TRIGONOMETRI

- | | | | |
|---|--|----|--|
| 1 | Arc length, $s = r\theta$
<i>Panjang lengkok, $s = j\theta$</i> | 8 | $\sin(A \pm B) = \sin A \cos B \pm \cos A \sin B$
$\sin(A \pm B) = \sin A \cos B \pm \cos A \sin B$ |
| 2 | Area of sector, $A = \frac{1}{2}r^2\theta$
<i>Luas sector, $L = \frac{1}{2}j^2\theta$</i> | 9 | $\cos(A \pm B) = \cos A \cos B \mp \sin A \sin B$
$\cos(A \pm B) = \cos A \cos B \mp \sin A \sin B$ |
| 3 | $\sin^2 A + \cos^2 A = 1$
$\sin^2 A + \cos^2 A = 1$ | 10 | $\tan(A \pm B) = \frac{\tan A \pm \tan B}{1 \mp \tan A \tan B}$ |
| 4 | $\sec^2 A = 1 + \tan^2 A$
$\sec^2 A = 1 + \tan^2 A$ | 11 | $\tan 2A = \frac{2 \tan A}{1 - \tan^2 A}$ |
| 5 | $\operatorname{cosec}^2 A = 1 + \cot^2 A$
$\operatorname{kosec}^2 A = 1 + \cot^2 A$ | 12 | $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$ |
| 6 | $\sin 2A = 2 \sin A \cos A$
$\sin 2A = 2 \sin A \cos A$ | 13 | $a^2 = b^2 + c^2 - 2bc \cos A$
$a^2 = b^2 + c^2 - 2bc \cos A$ |
| 7 | $\cos 2A = \cos^2 A - \sin^2 A$
$= 2 \cos^2 A - 1$
$= 1 - 2 \sin^2 A$

$\cos 2A = \cos^2 A - \sin^2 A$
$= 2 \cos^2 A - 1$
$= 1 - 2 \sin^2 A$ | 14 | Area of triangle / <i>Luas segitiga</i>
$= \frac{1}{2} ab \sin c$ |



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Answer all questions.
Jawab semua soalan.

- 1 Diagram 1 shows the relation between set P and set Q .
Rajah 1 menunjukkan hubungan antara set P dan set Q

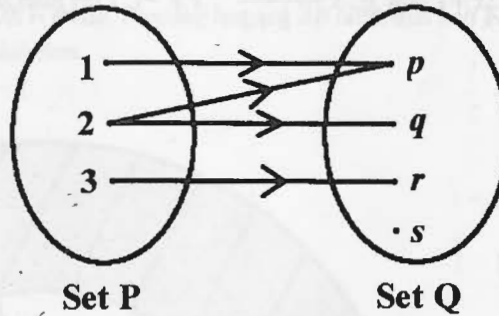


Diagram 1
Rajah 1

State
Nyatakan

- the image of 2
imej bagi 2
- the object of q
objek bagi q
- type of relation
jenis hubungan

[3 marks]
[3 markah]

Answer / Jawapan

(a)

(b)

(c)

- 2 Given the function $f : x \rightarrow 2x+1$ and $g : x \rightarrow \frac{-3x}{x+1}$, $x \neq -1$. Find the value of $fg(-2)$.

[3 marks]

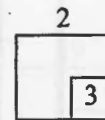
Diberi fungsi $f : x \rightarrow 2x+1$ dan $g : x \rightarrow \frac{-3x}{x+1}$, $x \neq -1$. Cari nilai bagi $fg(-2)$.

[3 markah]

Answer / Jawapan :

3472/1

For
Examiner's
Use



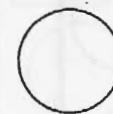
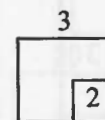
- 3 The function h is defined as $h : x \rightarrow \frac{5}{2x} - 3$, $x \neq 0$. Find $h^{-1}(x)$.

[2 marks]

Fungsi h ditakrifkan sebagai $h : x \rightarrow \frac{5}{2x} - 3$, $x \neq 0$. Cari $h^{-1}(x)$.

[2 markah]

Answer / Jawapan :



For
Examiner's
Use

8

3472/1

- 4 Given that the straight line $y = 4x + 1$ is a tangent to the curve $y = x^2 + k$.
Find the value of k . [3 marks]

Diberi garis lurus $y = 4x + 1$ ialah tangent kepada lengkung $y = x^2 + k$. Cari nilai k . [3 markah]

Answer / Jawapan :



4

	3

- 5 Find the range of values of x for $3 - 5x \geq 2x^2$. [3 marks]
Cari julat nilai x bagi $3 - 5x \geq 2x^2$. [3 markah]

Answer / Jawapan :

5

	3



- 6 Solve the equation :
Selesaikan persamaan :

[3 marks]

For
Examiner's
Use

$$\log_5(3x+14) = 1 - \log_5 x$$

[3 marks]

[3 markah]

Answer / Jawapan :

6



- 7 Solve the equation :
Selesaikan persamaan :

$$[2 \log_4(5-x)] - 3 = \log_2(x+1)$$

[3 marks]

[3 markah]

Answer / Jawapan :

7



For
Examiner's
Use

10

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- 8 Diagram 8 shows the graph of quadratic function $f(x) = a(x + p)^2 + 9$, where p is a constant.

[3 marks]

Rajah 8 menunjukkan graf bagi fungsi kuadratik $f(x) = a(x + p)^2 + 9$, dimana keadaan p ialah pemalar.

[3 markah]

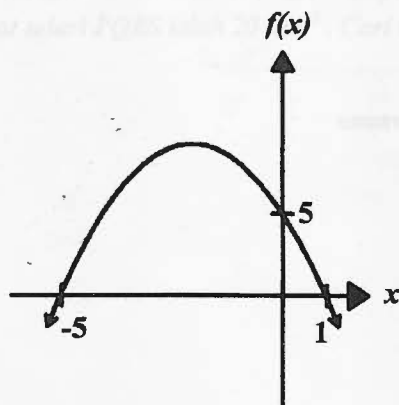


Diagram 8
Rajah 8

Find :

Cari :

- (a) the value of p
cari nilai p
- (b) the maximum value of $f(x)$
nilai maksimum bagi $f(x)$
- (c) the value of a
nilai bagi a

Answer / Jawapan :

8

(a)

(b)

(c)

- 9 The first three terms of an arithmetic progression are $-6, p-2, -14, \dots$
Tiga sebutan yang pertama bagi suatu jangjang aritmetik adalah $-6, p-2, -14, \dots$

Find :

Cari :

- (a) the value of p
 nilai bagi p
- (b) the sum of the first 7 terms.
Hasil tambah bagi 7 sebutan pertama

[4 marks]

[4 markah]

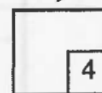
Answer / Jawapan :

(a)

(b)

For
Examiner's
Use

9



- 10 The first three terms of a geometric progression are $64, 32, 16, \dots$. Find the sum to infinity of the progression.

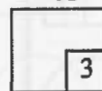
[3 marks]

Tiga sebutan pertama bagi suatu jangjang geometri ialah $64, 32, 16, \dots$. Cari hasil tambah hingga ketakterhinggaan jangjang itu

[3 markah]

Answer / Jawapan :

10



For
Examiner's
Use

- 11 The vertices of parallelogram $PQRS$ are $P(-3, 4)$, $Q(-2, 7)$, $R(5, 8)$ and $S(4, h)$. Given that the area of parallelogram $PQRS$ is 20 unit^2 . Find the possible value of h .

[3 marks]

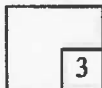
Bucu segiempat selari PQRS ialah $P(-3, 4)$, $Q(-2, 7)$, $R(5, 8)$ and $S(4, h)$.

Diberi luas segiempat selari PQRS ialah 20 unit^2 . Cari nilai-nilai yang mungkin bagi h .

[3 markah]

Answer / Jawapan :

11



- 12 Given that the point $P(-3r, 2)$ divided the line segment $A(-4, t)$ and $B(r, 8)$ in the ratio $AP : PB = 1 : 4$. Find the value of r and t .

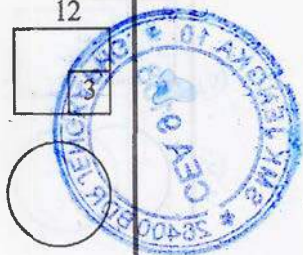
[3 marks]

Diberi titik $P(-3r, 2)$ membahagi tembereng garis $A(-4, t)$ dan $B(r, 8)$ dalam nisbah $AP : PB = 1 : 4$. Cari nilai bagi r dan t .

[3 markah]

Answer / Jawapan :

12



For
Examiner's
Use

- 13 Diagram 13 shows a triangle PQR .
Gambarajah 13 menunjukkan suatu segitiga PQR .

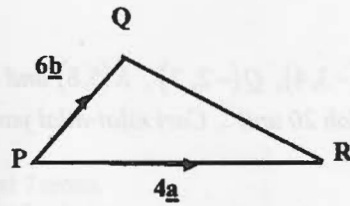


Diagram 13
Rajah 13

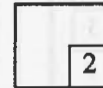
Express $\overrightarrow{QR}$ in terms of $\mathbf{a}$ and $\mathbf{b}$.

Ungkapkan $\overrightarrow{QR}$ dalam sebutan $\mathbf{a}$ dan $\mathbf{b}$.

[2 marks]
[2 markah]

Answer / Jawapan :

13



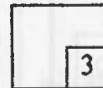
- 14 Given $\mathbf{a} = 2\mathbf{i} + 5\mathbf{j}$ and $\mathbf{c} = -3\mathbf{i} + 7\mathbf{j}$, find the vector $3\mathbf{c} - 2\mathbf{a}$ in terms of $\mathbf{i}$ and $\mathbf{j}$.

Diberi $\mathbf{a} = 2\mathbf{i} + 5\mathbf{j}$ dan $\mathbf{c} = -3\mathbf{i} + 7\mathbf{j}$, cari vektor $3\mathbf{c} - 2\mathbf{a}$ dalam sebutan $\mathbf{i}$ dan $\mathbf{j}$.

[3 marks]
[3 markah]

Answer / Jawapan :

14



For
Examiner's
Use

- 15 The diagram 15 shows the graph of $\frac{x}{y}$ against x .

Rajah 15 menunjukkan graf $\frac{x}{y}$ melawan x .

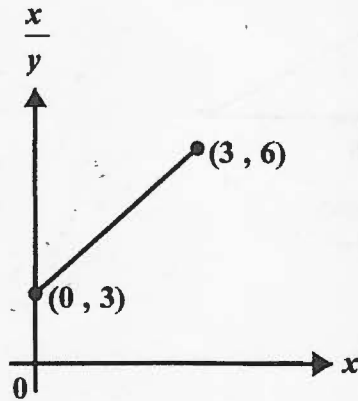


Diagram 15
Rajah 15

Express y in terms of x .
Ungkapkan y dalam sebutan x .

[3 marks]
[3 markah]

Answer / Jawapan :



- 16 Given that $\sin \theta = t$, $0^\circ < \theta < 90^\circ$, express in terms of t ,

Diberi $\sin \theta = t$, $0^\circ < \theta < 90^\circ$, ungkapkan dalam sebutan t ,

- (a) $\cot \theta$,
kot θ
- (b) $\sin(90 - \theta)$.

[3 marks]
[3 markah]

Answer / Jawapan :

(a)

(b)

16

3

- 17 (a) Given that the equation of a trigonometric function is $y = 3 \cos 2\theta$. Find the value of the amplitude.

Diberi persamaan fungsi trigonometri ialah $y = 3 \cos 2\theta$. Cari nilai amplitud

- (b) Solve the equation $3 \cos 2\theta + \cos \theta + 1 = 0$, for $0^\circ \leq \theta \leq 360^\circ$.
Selesaikan persamaan $3 \cos 2\theta + \cos \theta + 1 = 0$ bagi $0^\circ \leq \theta \leq 360^\circ$

[4 marks]
[4 markah]

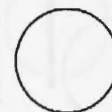
Answer / Jawapan :

(a)

(b)

17

4



For
Examiner's
Use

- 18 Diagram 18 shows the sector OAB and OCD of the circles with center O. Given that $\angle COD = \angle AOB = \theta$ rad. The length of arc AB is twice the radius OA and the radius OC is 8cm.

[4 marks]

Rajah 18 menunjukkan sektor bulatan OAB dan OCD dengan pusat bulatan di titik O. Diberi $\angle COD = \angle AOB = \theta$ rad. Panjang lengkok AB ialah dua kali ganda jejari OA dan jejari OC ialah 8cm.

[4 markah]

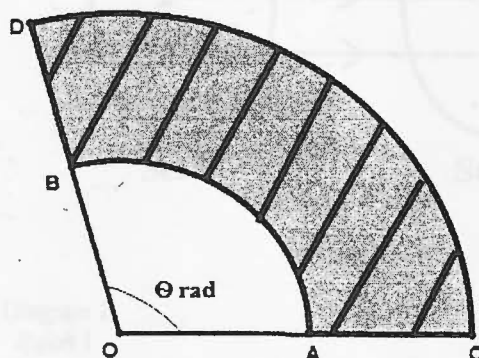


Diagram 18
Rajah 18

Find:
Cari:

- (a) the value of θ in radian.
nilai θ dalam radian.
- (b) the perimeter of shaded region ABCD.
perimeter bagi kawasan berlerek ABCD.

[4 marks]

[4 markah]

Answer / Jawapan :

(a)

(b)

18



- 19 Given the function $y = 2x^2 + hx + k$, where h and k are constants, has a minimum point of $(2, 9)$. Find the value of h and k .

[4 marks]

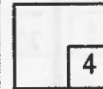
Diberi fungsi $y = 2x^2 + hx + k$, dimana h dan k adalah pemalar, mempunyai titik minimum $(2, 9)$. Cari nilai bagi h dan k .

[4 markah]

Answer / Jawapan :



19



- 20 Solve :
Selesaikan :

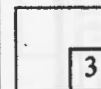
$$\int_4^5 \frac{10}{(x-3)^2} dx$$

[3 marks]

[3 markah]

Answer / Jawapan :

20



For
Examiner's
Use

- 21 A set of 8 numbers has a mean of 16.8 and a standard deviation of 2.5. If every number in the set of data is multiplied by 2 and then added by 3, find

Suatu set 8 nombor mempunyai min 16.8 dan sisihan piawai 2.5. Jika setiap nombor dalam set data didarab dengan 2 dan kemudian ditambah dengan 3, cari

- (a) the new mean
min baru
- (b) the new standard deviation of the set of data
sisihan piawai baru bagi set data itu

[3 marks]

[3 markah]

Answer / Jawapan :

(a)

(b)

21

	3

- 22 Diagram 22 shows eight cards of different letters .
Rajah 22 menunjukkan 8 keping kad yang berbeza huruf



Diagram 22

Rajah 22

- (a) Find the number of possible arrangement, in a row, of all the cards.
Cari bilangan susunan yang mungkin, dalam satu barisan, bagi semua kad.
- (b) In how many ways can all the letters in the word 'DOCUMENT' be arranged without repetition such that the two letters in the middle are vowels?
Berapa banyak cara yang boleh supaya semua huruf dalam perkataan 'DOCUMENT' disusun tanpa pengulangan, di mana kedua-dua huruf di tengah-tengah adalah huruf vokal?

[4 marks]

[4 markah]

Answer / Jawapan :

(a)

(b)

22

	4



- 23 BanYing, John and Lata will be taking a driving test. The probability that BanYing, John and Lata will pass the test is $\frac{2}{3}$, $\frac{3}{5}$ and $\frac{1}{3}$ respectively. Find the probability that

[4 marks]

BanYing, John dan Lata akan mengambil ujian memandu. Kebarangkalian bahawa BanYing, John dan Lata akan lulus ujian adalah $\frac{2}{3}$, $\frac{3}{5}$ dan $\frac{1}{3}$ masing-masing. Cari kebarangkalian bahawa

[4 markah]

- (a) only Lata will fail the test,
hanya Lata akan gagal ujian,
- (b) only two of them will pass the test.
hanya dua daripada mereka akan lulus ujian itu.

Answer / Jawapan :

(a)

(b)

23

4

- 24 In a school, the probability of a student's doing a part-time job in the evening is 0.4. Given that the variances of student doing a part time job in the evening is 196.8, calculate the number of students in the school.

[3 marks]

Di sebuah sekolah, kebarangkalian seorang pelajar melakukan kerja sambilan pada waktu petang ialah 0.4. Diberi bahawa varians bagi pelajar melakukan kerja sambilan pada waktu petang adalah 196.8, kira bilangan pelajar di sekolah.

[3 markah]

Answer / Jawapan :

24

3



For
Examiner's
Use

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

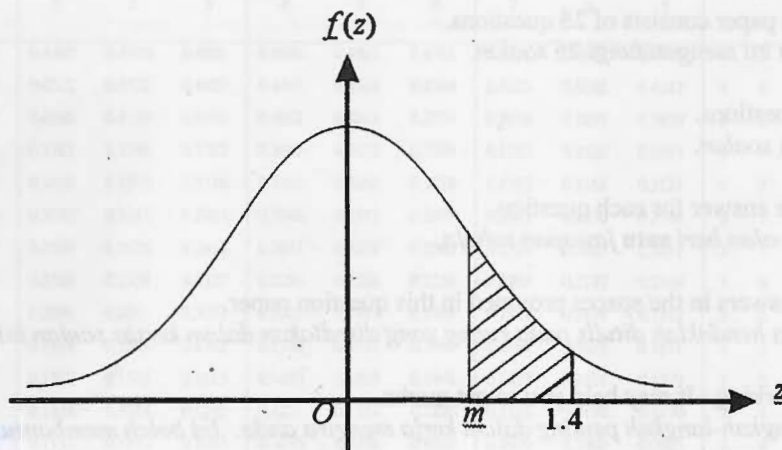


Diagram 25
Rajah 25

Given $P(m < Z < 1.4) = 0.1612$, find $P(0 < Z < m)$.

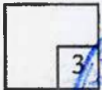
Diberikan $P(m < Z < 1.4) = 0.1612$, cari $P(0 < Z < m)$.

[3 marks]

[3 markah]

Answer / Jawapan :

25



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. Give only **one** answer for each question.
Bagi setiap soalan beri satu jawapan sahaja.
4. Write your answers in the spaces provided in this question paper.
Jawapan anda hendaklah ditulis pada ruang yang disediakan dalam kertas soalan ini.
5. 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.
6. If you wish to change your answer, cross out the answer that you have done. Then write down the new answer.
Jika anda hendak menukar jawapan, batalkan dengan kemas jawapan yang telah dibuat. Kemudian tulis jawapan yang baru.
7. The diagrams in the questions provided are not drawn to scale unless stated.
Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.
8. The marks allocated for each question are shown in brackets.
Markah yang diperuntukkan bagi setiap soalan ditunjukkan dalam kurungan.
9. A list of formulae is provided on pages 3 to 5.
Satu senarai rumus disediakan di halaman 3 hingga 5.
10. A four-figure table for the Normal Distribution $N(0, 1)$ is provided on page 2.
Satu jadual empat angka bagi Taburan Normal $N(0, 1)$ disediakan di halaman 2.
11. You may use a non-programmable scientific calculator.
Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram.
12. Hand in this question paper to the invigilator at the end of the examination.
Serahkan kertas soalan ini kepada pengawas peperiksaan pada akhir peperiksaan.



**PEPERIKSAAN PERCUBAAN SPM
2012**

TINGKATAN 5

3472/2

ADDITIONAL MATHEMATICS

Kertas 2

September

$2\frac{1}{2}$ jam

Dua jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Kertas soalan ini adalah dalam dwibahasa*
2. *Soalan dalam bahasa Inggeris mendahului soalan yang sepadan dalam bahasa Melayu.*
3. *Calon dikehendaki membaca maklumat di halaman belakang kertas soalan ini.*



Kertas soalan ini mengandungi 16 halaman bercetak.

3472/2

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

answering the questions. The symbols given

ALGEBRA

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

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

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

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

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

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

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

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

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

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

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

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

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

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 Area under a curve

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

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

5 Volume generated

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

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

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 =

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

STATISTICS

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

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

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

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

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

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

$$7 \quad \bar{I} = \frac{\sum w_1 I_1}{\sum w_1}$$

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

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

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

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

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

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

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

TRIGONOMETRY

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

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

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

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

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

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

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

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

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

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

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

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

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

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



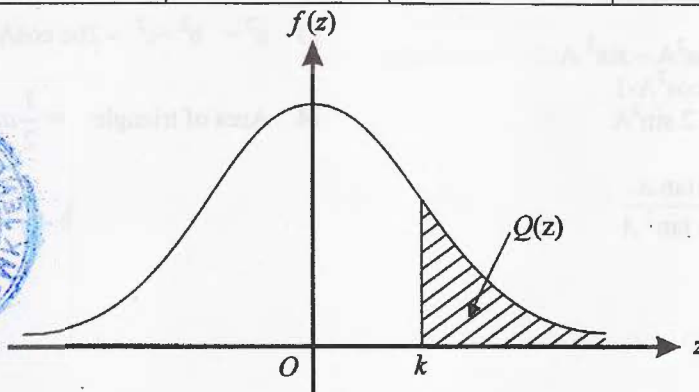
[Lihat sebelah

**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								
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



3472/2



SECTION A

[40 marks/markah]

Answer all questions in this section .

Jawab semua soalan.

- 1 Solve the following simultaneous equation.
Selesaikan persamaan serentak yang berikut.

$$4x + 3y = 5 = 2x^2 - 3y + 3xy$$

[6 marks/markah]

- 2 Diagram 2 shows the function $g: x \rightarrow \frac{x-p}{x}, x \neq 0$ and $f: y \rightarrow ky + 4$, where p and k are constant.

Rajah 2 menunjukkan fungsi $g: x \rightarrow \frac{x-p}{x}, x \neq 0$ dan $f: y \rightarrow ky + 4$, dengan p dan k ialah pemalar

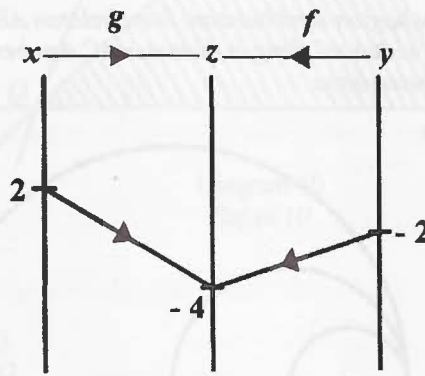


Diagram 2
Rajah 2

Find
Cari

- (a) the value of p and k
nilai bagi p dan k

[3 marks/markah]

- (b) $f^{-1}(y)$

[2 marks/markah]

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

[1 mark/markah]

- a) Sketch the graph of $y = -2 \cos \frac{3}{2}x$ for $0 \leq x \leq 2\pi$.

Lakarkan graf bagi $y = -2 \cos \frac{3}{2}x$ untuk $0 \leq x \leq 2\pi$

[4 marks/markah]

[Lihat sebelah

- b) Find the equation of a suitable straight line to solve the equation $1 - \cos \frac{3}{2}x = \frac{3}{4\pi}x$.

Hence, using the same axes, sketch the straight line and state the number of solutions to the equation $1 - \cos \frac{3}{2}x = \frac{3}{4\pi}x$ for $0 \leq x \leq 2\pi$.

Cari persamaan garis lurus yang sesuai untuk menyelesaikan

persamaan $1 - \cos \frac{3}{2}x = \frac{3}{4\pi}x$. Seterusnya, dengan menggunakan paksi yang sama, lakar

garis lurus itu dan nyatakan bilangan penyelesaian bagi persamaan $1 - \cos \frac{3}{2}x = \frac{3}{4\pi}x$ untuk $0 \leq x \leq 2\pi$.

[3 marks/markah]

- 4 Diagram 4 shows a part of semicircles. The first semicircle AB with a diameter AB and center O . The second semicircle AC with a diameter AC and center B . This pattern is continuously for the next semicircle.

Rajah 4 menunjukkan sebahagian semi bulatan. Semi bulatan AB dengan diameter AB dan berpusat O . Semi bulatan kedua AC dengan diameter AC dan berpusat B . Bentuk ini berterusan untuk semi bulatan yang seterusnya.

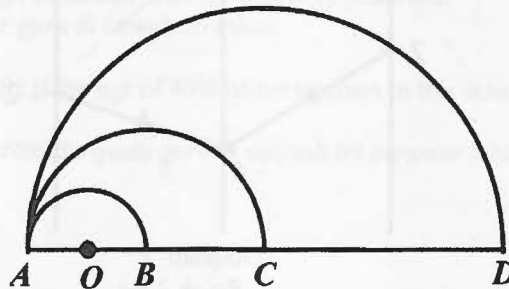


Diagram 4
Rajah 4

The length of AB is 4 cm.
Panjang AB ialah 4 cm.

Find
Cari

- (a) the length of the 8th circumference of the semicircles, in term of π cm
panjang lilitan bagi semi bulatan ke 8, dalam unit π cm.

[3 marks/markah]

- (b) If the arc of the semicircles are build using wires and the cost for the wire is RM 0.01 for 1 cm, calculate the total cost needed tofor build ten semicircles.

[Use $\pi = 3.142$]

Jika lengkung semi bulatan tersebut dibina dengan menggunakan wayar dan kos untuk wayar tersebut ialah RM 0.01 bagi setiap 1 cm, hitungkan jumlah kos untuk membina sepuluh semi bulatan.

[Guna $\pi = 3.142$]

[3 marks/markah]

- 5 Solution by scale drawing is not accepted.

Penyelesaian secara lukisan berskala tidak diterima.

Diagram 5 shows the graph of a straight line ABC and DEB . The line ABC is perpendicular to the line DEB and intercept at point B . It is given that the equation of ABC is $y = 2x - 6$ and

$$BE : ED = 2 : 1.$$

Rajah 5 menunjukkan graf garis lurus ABC dan DEB . Garis lurus ABC berserenjang dengan garis DEB dan bersilang di titik B . Diberi bahawa persamaan ABC ialah $y = 2x - 6$ dan $BE : ED = 2 : 1$

dan $BE : ED = 2 : 1$

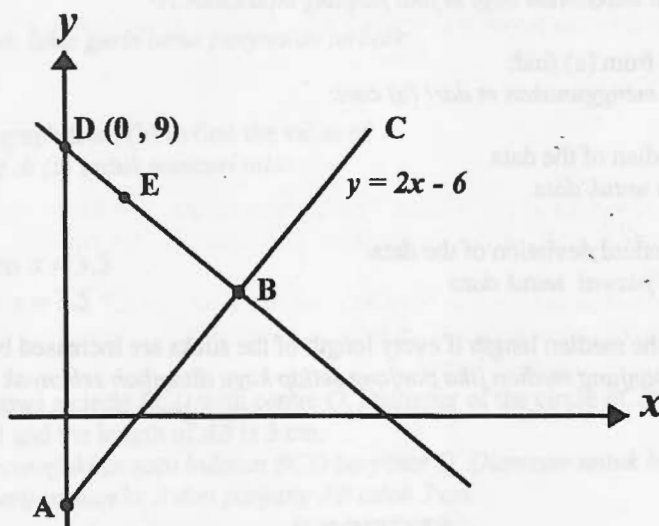


Diagram 5
Rajah 5

- (a) Find
Cari

(i) the equation of straight line DEB .
persamaan garis lurus DEB .

[2 marks/markah]

(ii) the coordinates of point B .
koordinat B .

[2 marks/markah]

(iii) the coordinates of point E .
koordinat E .

[2 marks/markah]

- (b) A point P moves such that its distance from point B is equal to its distance from point D .
Find the equation of the locus P .
*Suatu titik P bergerak dengan keadaan jarak dari titik B sama dengan jarak dari titik D .
Cari persamaan lokus P .*

[2 marks/markah]

[Lihat sebelah

- 6 Table 6 shows the data length of some sticks.
Jadual 6 menunjukkan data bagi panjang sebahagian kayu.

Length (cm) <i>Panjang(cm)</i>	9	10	11	12	13
Frequency <i>Kekerapan</i>	m	5	4	3	2

- (a) find the maximum value of m if the mode length is 10
cari nilai maksimum bagi m jika panjang mod ialah 10 [1 mark/markah]
- (b) Using m from (a) find:
Dengan menggunakan m dari (a) cari:
- (i) the median of the data
median untuk data
- (ii) the standard deviation of the data.
sisihan piawai untuk data [5 marks/markah]
- (c) What is the median length if every length of the sticks are increased by 3 cm?
Apakah panjang median jika panjang setiap kayu ditambah sebanyak 3 cm [1 marks/markah]

SECTION B

[40 marks/markah]

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

Jawab mana- mana empat soalan daripada bahagian ini.

- 7 Use the 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. It is known that x and y are related by the equation $y = hx^3 - kx^2$ where h and k are constant.

Jadual 7 menunjukkan nilai – nilai bagi dua pemboleh ubah, x dan y , yang diperolehi daripada suatu eksperimen. Diketahui bahawa pemboleh ubah x dan y dihubungkan oleh persamaan $y = hx^3 - kx^2$, di mana h dan k ialah pemalar.

x	1	2	3	4	5	6
y	114	396	765	1100	1325	1400

- a) Based on table 7, construct a table for the values of $\frac{y}{x^2}$
Berdasarkan jadual 7, bina satu jadual bagi nilai – nilai $\frac{y}{x^2}$

[1 mark/markah]

- b) Plot $\frac{y}{x^2}$ against x by using a scale of 2 cm to 1 unit on the x -axis and 2 cm to 20 units on the $\frac{y}{x^2}$ -axis.

Hence, draw the line of best fit.

Plot melawan x , dengan menggunakan skala 2 cm kepada 1 unit kepada paksi- x dan 2

cm kepada 20 unit pada paksi- $\frac{y}{x^2}$.

Seterusnya, lukis garis lurus penyuaian terbaik

[3 marks/markah]

- c) Use your graph from (b) to find the value of
Guna graf di (b) untuk mencari nilai

(i) h

(ii) k

(iii) y when $x = 3.5$

y bila $x = 3.5$

[6 marks/markah]

- 8 Diagram 8 shows a circle BCD with centre O . Diameter of the circle BCD is 8 cm. OB is extended to A and the length of AB is 3 cm.
Diagram 8 menunjukkan satu bulatan BCD berpusat O . Diameter untuk bulatan BCD ialah 8 cm. OB dipanjangkan ke A dan panjang AB ialah 3 cm.

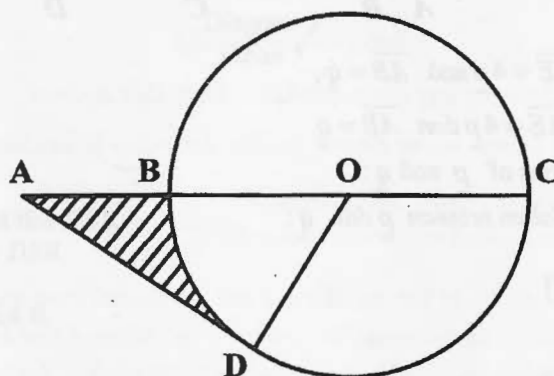


Diagram 8

Rajah 8

It is given that AD is the tangent to the circle BCD at D .

Use $\pi = 3.142$ and the answer correct to three decimal places.

Diberi bahawa AD ialah garis tangent kepada bulatan BCD di D .

Guna $\pi = 3.142$ dan beri jawapan betul kepada tiga titik perpuluhan.

Calculate

Hitung

(a) $\angle AOD$ in radian.

$\angle AOD$ dalam radian

[3 marks/markah]

[Lihat sebelah

- (b) the perimeter, in cm, of the shaded region
perimeter, dalam cm, kawasan berlorek

[4 marks/markah]

- (c) the area, in cm^2 , of the shaded region
luas, dalam, cm^2 , kawasan berlorek

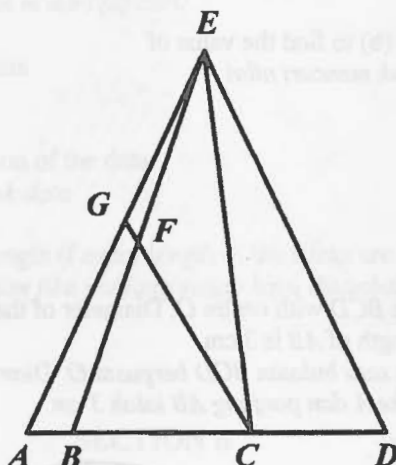
[3 marks/markah]

- 9 Diagram 9 shows a triangle ADE . Point B and C lie on AD such that

$AB : BC : CD = 1 : 4 : 3$. Point G is the midpoint of AE .

Rajah 9 menunjukkan segitiga ADE . Titik B dan C berada di atas garis AD dengan keadaan

$AB : BC : CD = 1 : 4 : 3$. Titik G ialah titik tengah AE .



It is given that $\overline{AE} = 4p$ and $\overline{AB} = q$,

Diberi bahawa $\overline{AE} = 4p$ dan $\overline{AB} = q$

- (a) Express in terms of p and q :

Ungkapkan dalam sebutan p dan q :

- (i) $\overline{DE}$
 (ii) $\overline{CG}$

[3 marks/markah]

- (b) Given that $\overline{BF} = n\overline{BE}$ and $\overline{CF} = m\overline{CG}$, where n and m are constants. Express:

Diberi bahawa $\overline{BF} = n\overline{BE}$ dan $\overline{CF} = m\overline{CG}$, dengan keadaan m dan n ialah pemalar

Ungkapkan:

- (i) $\overline{BF}$ in terms of n , p and q

$\overline{BF}$ dalam sebutan n , p dan q

- (ii) $\overline{CF}$ in terms of m , p and q

$\overline{CF}$ dalam sebutan m , p dan q

[3 marks/ markah]

- (c) Hence, find the value of m and n .

Seterusnya, cari nilai m dan n .

[4 marks/ markah]

3472/2

- 10 Diagram 10 shows the straight line $y = x + 3$ intersect the curve $y = -3x - x^2$ at points P and Q.

Rajah 10 menunjukkan garis lurus $y = x + 3$ yang menyilang lengkung $y = -3x - x^2$ pada titik P dan Q.

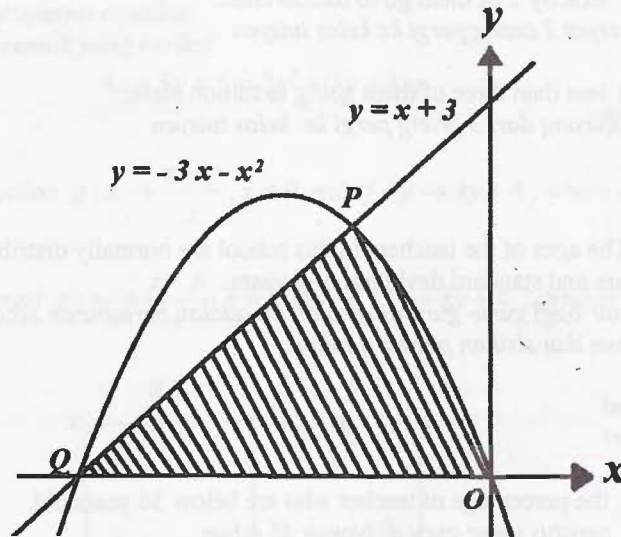


Diagram 10
Rajah 10

Find
Cari

- (a) the point P and Q
koordinat P dan Q.

[3 marks/markah]

- (b) the area of the shaded region
luas rantau berlorek

[4 marks/markah]

- (c) Volume in terms of π when the region under the curve and the x -axis is rotated 360° about x -axis.

Isi padu janaan, dalam sebutan, apabila rantau di bawah lengkung dan paksi- x dikisarkan melalui 360° pada paksi- x .

[3 marks/ markah]



[Lihat sebelah

- 11 (a) The result of a study shows that 30% of the pupils in a school go to tuition class. If 6 pupils from this school are chosen at random, calculate the probability that
Hasil dari satu kajian menunjukkan 30% daripada murid dalam sebuah sekolah mengikuti kelas tuisyen.

- (i) exactly 2 of them go to tuition class.
tepat 2 orang pergi ke kelas tuisyen
- (ii) less than three of them going to tuition class.
kurang dari 3 orang pergi ke kelas tuisyen

[5 marks/markah]

- (b) The ages of the teachers in this school are normally distributed with a mean of 38.2 years and standard deviation of 4 years.
Umur bagi guru-guru di sekolah ini adalah bertaburan secara normal dengan min 38.2 tahun dan sisihan piawai 4 tahun.

Find
Cari

- (i) the percentage of teacher who are below 36 years old.
peratus umur guru di bawah 36 tahun
- (ii) the values of k if the age of 40% of the teachers in this school is more than k years old.
nilai k jika 40% daripada guru di sekolah ini berumur lebih dari k tahun.

[5 marks/markah]



SECTION C

[20 marks/markah]

Answer any two questions from this section.

Jawab mana – mana dua soalan daripada bahagian ini.

- 12 Table 12 shows the prices and the quantities of four ingredients used in making chocolate cakes.

Jadual 12 menunjukkan harga s dan kuantiti bagi empat jenis bahan yang digunakan untuk membuat kek coklat.

Ingredient Bahan	Price in the year Harga pada tahun		Quantity (g) Kuantiti (g)
	2010	2012	
P	RM 3.00	RM 3.50	30
Q	RM 10.00	RM 12.00	50
R	RM 4.00	RM 5.00	70
S	RM 5.00	RM 6.50	20

- (a) the price index of ingredient S in the year 2012 based on the year 2010.
indeks harga bagi bahan S bagi tahun 2012 berasaskan tahun 2010. [2 marks/markah]
- (b) Calculate the composite index for the cost of making the cake in year 2012 based on the year 2010.
Hitungkan indeks gubahan untuk kos membuat kek ini pada tahun 2012 berasaskan tahun 2010. [4 marks/markah]
- (c) If the cost of making the cake is RM 40.00 in year 2010, calculate the corresponding cost in the year 2012.
Jika kos untuk membuat kek tersebut pada tahun 2010 ialah RM 40.00, hitungkan kos yang sepadan untuk tahun 2012. [2 marks/markah]
- (d) If the cost for ingredient Q increase 15 % from 2008 to 2010, find the price index in 2012 based on year 2008.
Jika kos untuk bahan Q meningkat 15% dari tahun 2008 ke 2010, cari indeks harga pada tahun 2012 berasaskan tahun 2008. [2 marks/markah]

[Lihat sebelah

- 13 Diagram 13 shows a cyclic quadrilateral PQRS.
Rajah 13 menunjukkan segi empat kitaran PQRS.

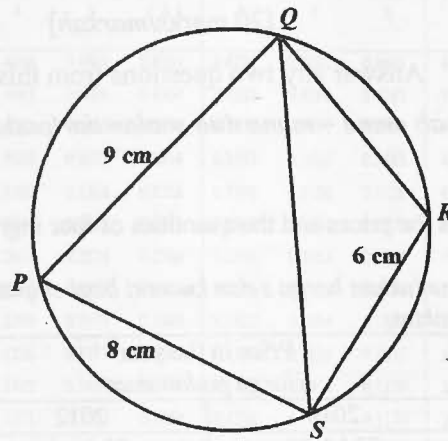


Diagram 13
Rajah 13

The area of triangle PQS is 34 cm^2 and angle $\angle SPQ$ is an acute angle. Calculate
Luas segi tiga PQS ialah 34 cm^2 dan ialah $\angle SPQ$ sudut tirus. Hitung

- (a) $\angle QPS$

[2 marks/markah]

- (b) The length of QS, in cm
Panjang QS, dalam cm

[2 marks/markah]

- (c) $\angle QSR$

[3 marks/markah]

- (d) the area, in cm^2 , of the quadrilateral PQRS.
luas, dalam cm^2 , sisi empat PQRS.

[3 marks/markah]



- 14 A factory manufactures two types of machines, RZ2001 and RZ2002. The table below shows the time (in minutes) to produce and testing the machines.
 Sebuah kilang mengeluarkan dua jenis mesin, RZ2001 dan RZ2002. Jadual menunjukkan masa (dalam minit) untuk penghasilan dan pengujian mesin tersebut.

Machine mesin	Time (Production) Masa(penghasilan)	Time (Testing) Masa(pengujian)
RZ2001	30	12
RZ2002	60	2

The factory manufactures x unit of RZ2001 and y units of RZ2002 per day. The production and testing of the machines are based on the following constraints:

Kilang tersebut mengeluarkan x unit RZ2001 dan y unit RZ2002 sehari. Penghasilan dan pengujian mesin tersebut berdasarkan kekangan berikut.

- I : The total number of machines manufactured is not more than 35.

Jumlah mesin yang dikeluarkan tidak melebihi 35.

- II : The total time needed to produce the machines is at least 20 hours.

Jumlah masa diperlukan untuk penghasilan mesin - mesin tersebut sekurang -
kurangnya 20 jam.

- III : The minimum total time for testing the machines is 2 hours.

Jumlah masa minimum untuk pengujian mesin - mesin tersebut ialah 2 jam.

- a. Write the three inequalities other than $x \geq 0$ and $y \geq 0$ that satisfies the constraints above.

Tulis tiga ketaksamaan, selain $x \geq 0$ dan $y \geq 0$ yang memenuhi semua kekangan di atas.

[3 marks/markah]

- b. Using a scale of 2 cm to 5 units on both the x -axis and y -axis, construct and shaded the region R that satisfies all the three inequalities.

Dengan menggunakan skala 2 cm kepada 5 unit untuk kedua-dua paksi, bina dan lorek rantau R yang memenuhi semua kekangan di atas.

[3 marks/markah]

- c. Use your graph in 14(b) to find

Gunakan graf anda di 14(b) untuk mencari

- (i) the minimum number of machine RZ2001 if 15 machine RZ2002 are produce.
 bilangan minimum bagi mesin RZ2001 jika 15 mesin RZ2002 dihasilkan.

- (ii) If the profit obtained from the sales of RZ2001 machine and RZ2002 machine are RM 850 and RM 1150 respectively, find the maximum profit made by the factory

Jika keuntungan yang diperolehi dari penjualan mesin RZ2001 dan mesin RZ2002 ialah RM 850 dan RM 1150, cari keuntungan maksimum yang diperolehi oleh kilang tersebut.

[4 marks/markah]

[Lihat sebelah

- 15 A particle moves along a straight line starting from a fixed point O . Its velocity, $V \text{ ms}^{-1}$, is given by $V = 3t^2 - 18t + 15$, where t is the time, in seconds, after passing through O .
Suatu zarah bergerak di sepanjang garis dan bermula dari suatu titik tetap O . Halajunya, $V \text{ ms}^{-1}$, diberi oleh $V = 3t^2 - 18t + 15$, dengan keadaan t ialah masa, dalam saat, selepas melalui O .

[Assume motion to the right is positive]

[Anggap gerakan ke arah kanan sebagai positif]

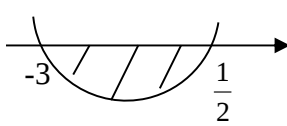
Find/
 cari:

- the initial velocity, in ms^{-1} , of the particle.
halaju awal, dalam ms^{-1} , zarah itu [1 mark/mark]
- the minimum velocity, in ms^{-1} , of the particle,
halaju minimum, dalam ms^{-1} , zarah [3 marks/markah]
- the time interval during which the velocity of the particle is negative.
julat masa apabila halaju zarah adalah negatif [2 marks/markah]
- the total distance, in m , travelled by the particle in the first 4 seconds.
jumlah jarak, dalam m , yang dilalui oleh zarah dalam 4 saat pertama. [4 marks/markah]

END OF QUESTION PAPER



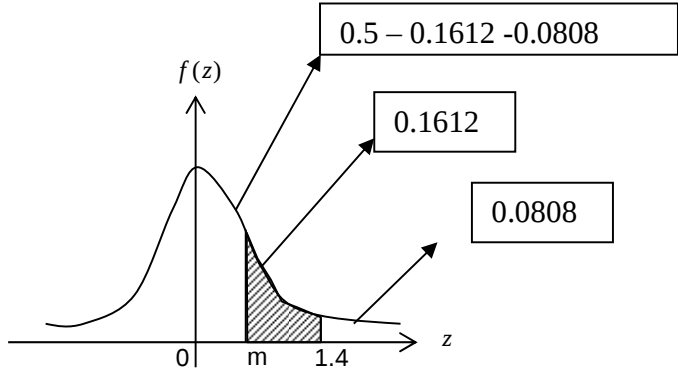
PEPERIKSAAN PERCUBAAN SPM TAHUN 2012
MARKING SCHEME FOR ADDITIONAL MATHEMATICS FORM 5 PAPER 1

NO.	MARKING SCHEME	MARKS	FULL MARKS
1	a) p, q b) 2 c) many to many	1 1 1	3
2	-11 $f(-6) = 2(-6) + 1$ @ $fg(-2) = \frac{-6(-2)}{-2+1} + 1$ $g(-2) = -6$ @ $fg(x) = 2\left[\frac{-3x}{x+1}\right] + 1$	3 B2 B1	3
3	$\frac{5}{2(x+3)}, x \neq -3$ $5 = (x+3)2y$ or $y = \frac{5}{2x+6}$	2 B1	2
4	$k = -5$ $(-4)^2 - 4(1)(k-1) = 0$ $x^2 + k = 4x + 1$	3 B2 B1	3
5	$-3 \leq x \leq \frac{1}{2}$  $(2x-1)(x+3) \leq 0$	3 B2 B1	3
6	$x = \frac{1}{3}$ and $x = -5$ $(3x+14)(x) = 5$ $\log_5(3x+14)(x) = 1$	3 B2 B1	3

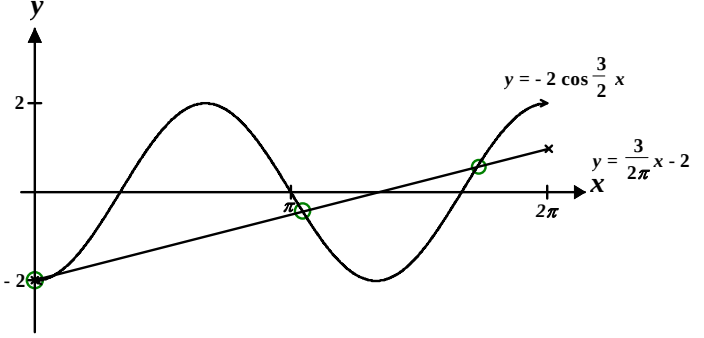
7	$x = \frac{-1}{3}$ $\frac{5-x}{x+1} = 8$ $\log_2 \left[\frac{5-x}{x+1} \right] = 3$ Change base: $\frac{2\log_2(5-x)}{2\log_2 2}$	4 B3 B2 B1	4
8	a) $p=2$ b) 9 c) $a = -1$	1 1 1	3
9	a) -8 $P - 2 - (-6) = -14 - (p - 2) \quad @ \quad \frac{-6 + (-14)}{2} = p - 2$ b) -126 $S_7 = \frac{7}{2}[2(-6) + 6(-4)]$ $d = -10 - (-6) = -4$	2 B1 2 B2 B1	4
10	128 $S_\infty = \frac{(64)}{1 - \left(\frac{1}{2}\right)}$ $r = \frac{1}{2}$	3 B2 B1	3
11	$h = 5$ and $h = 15$ $h = 5$ or $h = 15$ $ -21 - 16 + 5h + 16 + 8 - 35 - 32 + 3h = 40$	3 B2 B1	3
12	$r = 1$	1	

	$t = \frac{1}{2}$ $-3r = \frac{4(-4)+1(r)}{5} \text{ or } 2 = \frac{4(t)+1(8)}{5}$	1 B1	3
13	$4\underset{\sim}{a} - 6\underset{\sim}{b}$ $\overrightarrow{QR} = \overrightarrow{QP} + \overrightarrow{PR}$	2 B1	2
14	$\sqrt{290}$ $-13\underset{\sim}{i} + 11\underset{\sim}{j}$ $3 (-3\underset{\sim}{i} + 7\underset{\sim}{j}) - 2(2\underset{\sim}{i} + 5\underset{\sim}{j})$	3 B2 B1	3
15	$y = \frac{x}{x+3}$ $\frac{x}{y} = 1x + 3$ $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{6-3}{3-0} = \frac{3}{3} = 1 \text{ or } c = 3$	3 B2 B1	3
16	a) $\frac{\sqrt{1-t^2}}{t}$ $\text{Cot } \theta = \frac{1}{\tan \theta}$ b) $\sqrt{1-t^2}$	2 B1 1	3
17	a) 3 b) $60^\circ, 131.81^\circ, 228.19^\circ, 300^\circ$ $(3\cos\theta + 2)(2\cos\theta - 1) = 0$ $3(2\cos^2\theta - 1) + \cos\theta + 1 = 0$	1 3 B2 B1	4

18	a) $\theta = 2 \text{ rad}$ b) 32cm $r = 4 \text{ or } S_{AB} = 4(2) = 8$ $2r = (8 - r) 2$	1 3 B2 B1	4
19	$k = 17$ $h = -8$ $4x + h = 0$ $\frac{dy}{dx} = 4x + h$	4 B3 B2 B1	4
20	-5 $= \frac{-10}{(5-3)^1} - \left[\frac{-10}{(4-3)^1} \right]$ $= \left[\frac{10(x-3)^{-1}}{-1(1)} \right]_4^5$	3 B2 B1	3
21	a) 36.6 $(16.8 \times 2) + 3$ b) 5	2 B1 1	3
22	a) ${}^8P_8 = 40320$ b) 4320 $= {}^6P_6 \times {}^3P_2$ 3P_2	1 3 B2 B1	4
23	BJL' $= \left(\frac{2}{3}\right)\left(\frac{3}{5}\right)\left(\frac{2}{3}\right) = \frac{4}{15}$	1	

	$= \frac{19}{45}$ $= \frac{12}{45} + \frac{3}{45} + \frac{4}{45}$ $= \left(\frac{2}{3}\right)\left(\frac{3}{5}\right)\left(\frac{2}{3}\right) + \left(\frac{1}{3}\right)\left(\frac{3}{5}\right)\left(\frac{1}{3}\right) + \left(\frac{2}{3}\right)\left(\frac{1}{3}\right)\left(\frac{2}{5}\right)$ $BJL' + LJ B' + BL J'$	3	4
24	$n = 820$ $\sigma^2 = npq$ $196.8 = n(0.4)(0.6)$ $P=0.4$ or $q=0.6$	3 B2 B1	3
25	0.2580 $= 0.5 - 0.1612 - 0.0808$ 0.0808 	3 B2 B1	3

No. Question	PERATURAN PEMARKAHAN		TOTAL MARKS
1	$4x + 3y = 5 \text{ or } 2x^2 - 3y + 3xy = 5 \text{ or}$ $4x + 3y = 2x^2 - 3y + 3xy$ $x = \frac{5-3y}{4} \text{ OR } y = \frac{5-4x}{3}$ $2 \left[\frac{5-3y}{4} \right]^2 - 3y + 3y \left[\frac{5-3y}{4} \right] = 5 \text{ OR}$ $2x^2 - 3 \left[\frac{5-4x}{3} \right] + 3x \left[\frac{5-4x}{3} \right] = 5$ $3y^2 + 8y + 5 = 0$ $(3y+5)(y+1) = 0 \text{ or } y = \frac{-(-8) \pm \sqrt{(8)^2 - 4(3)(5)}}{2(3)}$ OR $2x^2 - 9x + 10 = 0$ $(2x-5)(x-2) = 0 \text{ or } x = \frac{-(-9) \pm \sqrt{(-9)^2 - 4(2)(10)}}{2(2)}$ $y = -\frac{5}{3}, \quad y = -1$ $x = \frac{5}{2}, \quad x = 2$	1 1 1 1 1 1	6
2	(a) $\frac{2-p}{2} = -4 \text{ or } k(-2)+4=-4$ $p=10$ $k=4$ (b) $x-4=4y$ $f^{-1}(y)=\frac{y-4}{4}$ (c) $f^{-1}g(2)=-2$	1 1 1 1 1 1	6

3	 (a) Draw cosine shape Negative cos 1.5 cycle Amplitude 2 (b) Equation : $y = \frac{3}{2\pi}x - 2$ Draw line $y = \frac{3}{2\pi}x - 2$ No of solutions : 3	1 1 1 1 1 1 1	<u>7</u>
4	(a) $a = 2\pi$ or $r = 2$ $T_8 = (2\pi)(2)^7$ 256π (b) $S_{10} = \frac{2\pi(2^{10} - 1)}{2 - 1}$ $S_{10} = 6428.532 \text{ cm}$ RM 64. 29	1 1 1 1 1 1	<u>6</u>

5	(a) $m_{DEB} = -\frac{1}{2}$ $y = -\frac{1}{2}x + 9$ (b) $-\frac{1}{2}x + 9 = 2x - 6$ $B(6, 6)$ (c) $E = \left(\frac{0(2) + 6(1)}{3}, \frac{9(2) + 6(1)}{3} \right)$ $E(2, 8)$ (d) $\sqrt{(x-6)^2 + (y-6)^2} = \sqrt{(x-0)^2 + (y-9)^2}$ $4x - 2y + 3 = 0$	1 1 1 1 1 1 1	<u>8</u>
6	(a) $m = 4$ (b) (i) $\frac{10+11}{2}$ Median = 10.5 (ii) $\sum fx^2 = 2078$ or $\bar{x} = \frac{32}{3}$ $\sigma = \sqrt{\frac{2078}{18} - \left(\frac{32}{3}\right)^2}$ $\sigma = 1.291$ (c) New median = 13.5	1 1 1 1 1 1 1	<u>7</u>

7	a) <table border="1" data-bbox="373 264 1024 349"> <tr> <td>$\frac{y}{x^2}$</td><td>114</td><td>99</td><td>85</td><td>68.75</td><td>53</td><td>38.89</td></tr> </table> b) Plot 1 point and use a correct scale Plot all points correctly Line of best fit c) $\frac{y}{x^2} = hx - k$ (i) $h = m$ $h = -5$ (ii) $-k = y - \text{int}$ $k = -128$ (iii) $y = 931$	$\frac{y}{x^2}$	114	99	85	68.75	53	38.89	1 1 1 1 1 1 1 1 1 1 1	10
$\frac{y}{x^2}$	114	99	85	68.75	53	38.89				
8	(a) $\cos \angle AOD = \frac{4}{7}$ $\angle AOD = 55.15^\circ$ $\angle AOD = 0.963 \text{ rad}$ (b) $\cap BD = 4 * (0.963)$ $AD = \sqrt{7^2 - 4^2} \text{ or } AD = 5.745$ Perimeter = $4 * (0.963) + 5.745 + 3$ 12.597 cm (c) Area $\triangle AOD = \frac{1}{2} * (5.745)(4) \text{ or}$ Area sector BOD = $\frac{1}{2}(4)^2 * (0.963)$	1 1 1 1 1 1 1 1 1								

	$\text{Area} = \frac{1}{2} * (5.745)(4) - \frac{1}{2}(4)^2 * (0.963)$ 3.786 cm^2	1 1	<u>10</u>
9	(a) (i) $\overrightarrow{DE} = \overrightarrow{DA} + \overrightarrow{AE}$ (ii) $\overrightarrow{CG} = \overrightarrow{CA} + \overrightarrow{AG}$ $\overrightarrow{DE} = -8\hat{q} + 4\hat{p}$ $\overrightarrow{CG} = -5\hat{q} + 2\hat{p}$ (b) (i) $\overrightarrow{BE} = -\hat{q} + 4\hat{p}$ $\overrightarrow{BF} = -n\hat{q} + 4n\hat{p}$ (ii) $\overrightarrow{CF} = -5m\hat{q} + 2m\hat{p}$ (c) $\overrightarrow{BF} = \overrightarrow{BC} + \overrightarrow{CF}$ $-n\hat{q} + 4n\hat{p} = 4\hat{q} + (-5m\hat{q} + 2m\hat{p})$ Sub $m = 2n$ in $-n = 4 - 5m$ $n = \frac{4}{9}$ $m = \frac{8}{9}$	1 1 1 1 1 1 1 1 1 1	<u>10</u>
10	(a) $x + 3 = -3x - x^2$ $(x + 3)(x + 1) = 0$ $P(-1, 2)$ $Q(-3, 0)$	1 1 1	

	(b) Area $\Delta = \frac{1}{2}(2)(2)$ or $\left[-\frac{3x^2}{2} - \frac{x^3}{3} \right]$ Sub limit 0 and *1 in $\left[-\frac{3x^2}{2} - \frac{x^3}{3} \right]$ Total area $= \frac{1}{2}(2)(2) + \left[-\frac{3x^2}{2} - \frac{x^3}{3} \right]$ $\frac{19}{6}$ unit² (c) $y^2 = (-3x - x^2)^2$ Volume $= \pi \int_{-3}^0 (9x^2 + 6x^3 + x^4) dx$ $\left[3x^3 + \frac{3x^4}{2} + \frac{x^5}{5} \right]$ Use limit 0 and *-3 in $\left[3x^3 + \frac{3x^4}{2} + \frac{x^5}{5} \right]_{-3}^0$ 8.1 π unit²	1 1 1 1 1 1 1 1	10
11	(a)(i) $p = 0.3$ and $q = 0.7$ $P(X = 2) = {}^6C_2 (0.3)^2 (0.7)^4$ 0.3241 (ii) $P(X < 3)$ ${}^6C_2 (0.3)^2 (0.7)^4 + {}^6C_1 (0.3)^1 (0.7)^5 + {}^6C_0 (0.3)^0 (0.7)^6$ 0.7443 (b) (i) $P(z) < -0.55$ 29.12 %	1 1 1 1 1 1 1 1	

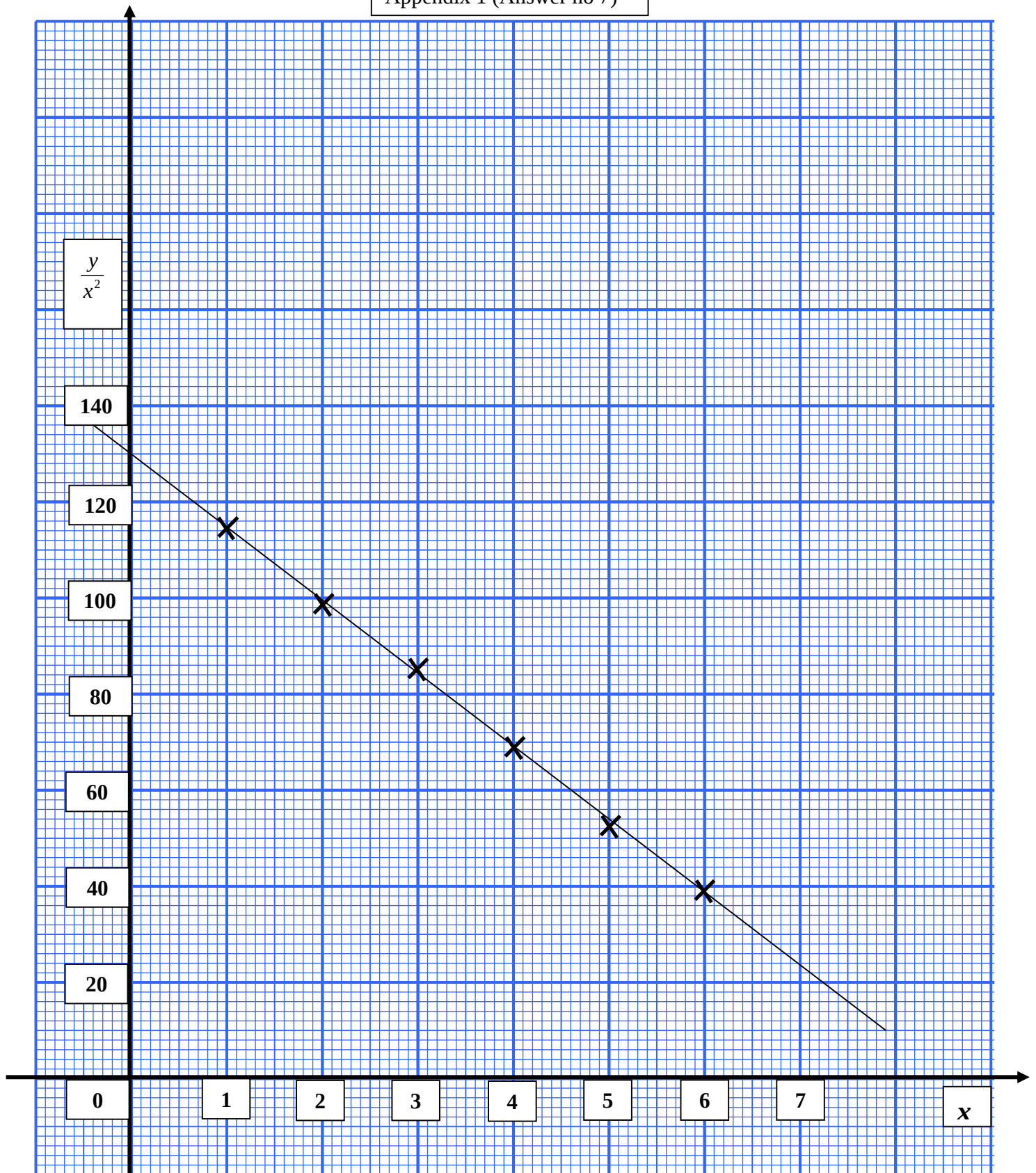
	(ii) $P(z > k) = 0.4$ $z = 0.253$ $\frac{k - 38.2}{4} = 0.253$ $k = 39.21$	1 1 1	<u>10</u>
12	(a) $I_{12/10} = \frac{6.50}{5.00} \times 100$ 130 (b) $I_p = 116.67$ or $I_Q = 120$ or $I_R = 125$ Note: all correct 2, one or two correct 1. $\bar{I} = \frac{116.67(30) + 120(50) + 125(70) + 130(20)}{30 + 50 + 70 + 20}$ 122.65 (c) $\frac{P_{12}}{40} \times 100 = 122.65$ RM 49.06 (d) $\bar{I}_{12/08} = \frac{115}{100} \times 120$ 138	1 1 2 1 1 1 1 1	<u>10</u>
13	(a) $34 = \frac{1}{2}(8)(9)\sin \angle QPS$ $\angle QPS = 70.81^\circ$ (b) $QS = \sqrt{8^2 + 9^2 - 2(8)(9)\cos(70.81^\circ)}$ $QS = 9.883$ cm	1 1 1 1	

	(c) Use $\angle QRS = 109.19^\circ$ $\frac{\sin \angle SQR}{6} = \frac{\sin 109.19^\circ}{9.883}$ $\angle QSR = 35.82^\circ$ (d) Area $\triangle QSR = \frac{1}{2}(9.883)(6)\sin 35.82^\circ$ $\text{Area PQRS} = \frac{1}{2}(9.883)(6)\sin 35.82^\circ + 34$ 51.35 cm^2	1 1 1 1 1 1	<u>10</u>
14	a) (i) $x + y \leq 35$ (ii) $30x + 60y \geq 1200$ (iii) $12x + 2y \geq 120$ b) Draw one line correctly Draw all line correctly Shaded the region R correctly c) (i) 10 (ii) Use point (5, 30) $\text{Profit} = 850(5) + 1150(30)$ $\text{RM } 38750$	1 1 1 1 1 1 1 1 1 1	<u>10</u>

15	(a) $v = 3(0)^2 - 18(0) + 15$ 15 ms^{-1} (b) $\frac{dv}{dt} = 6t - 18$ $t = 3$ $v = -12 \text{ ms}^{-1}$ (c) $3t^2 - 18t + 15 < 0$ $(t - 5)(t - 1) < 0$ $1 < t < 5$ (d) $S = t^3 - 9t^2 + 15t + c$ $S = 0, t = 0 \quad \therefore c = 0$ $S_1 = (1)^3 - 9(1)^2 + 15(1)$ or $S_4 = (4)^3 - 9(4)^2 + 15(4)$ Total distance = $2 S_1 + S_4$ 34 m	1 1 1 1 1 1 1 1 1 1	
			10

END OF MARKING SCHEME

Appendix 1 (Answer no 7)



Appendix 2 (Answer no 14)

