NAMA : _____

KELAS : _____

JABATAN PELAJARAN NEGERI JOHOR

PEPERIKSAAN PERCUBAAN SPM 2011 3472/1

ADDITIONAL MATHEMATICS
Kertas 1
September
2 Jam **Dua jam**

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. Tulis **nama** dan **kelas** anda pada petak 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 .

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

Kertas soalan ini mengandungi **19** halaman bercetak

For examiner's use only

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

1 In Diagram 1, set Q shows the images of certain elements of set P.

Dalam Rajah 1, set Q menunjukkan imej bagi unsur-unsur tertentu dari set P.

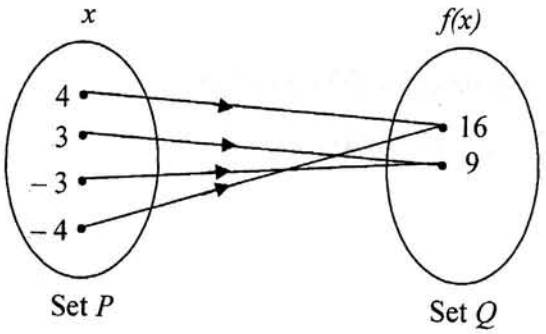


Diagram 1
Rajah 1

(a) State the type of relation between set P and set Q.

Nyatakan jenis hubungan antara set P dengan set Q.

(b) Using the function notation, write a relation between set P and set Q.

Dengan menggunakan tatatanda fungsi, tulis satu hubungan antara set P dengan set Q.

[2 marks]

[2 *markah*]

Answer/ *Jawapan :*

(a)

(b)

1 2

2 Given the function $f(x)=|4x-1|$, find the values of x such that $f(x)=5$.

Diberi fungsi $f(x)=|4x-1|$, *cari nilai-nilai x dengan keadaan* $f(x)=5$. [2 marks]

[2 *markah*]

Answer/ *Jawapan :*

2 2

For examiner's use only

3 Given the functions $f(x)=\frac{x-2}{3}$ and $g(x)=px+\frac{1}{3}$, find

Diberi fungsi $f(x)=\frac{x-2}{3}$ *dan* $g(x)=px+\frac{1}{3}$, cari

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

(b) the value of p if the function $f(3-x)=g(x)$.

nilai p jika fungsi $f(3-x)=g(x)$. [4 marks]

[4 *markah*]

Answer / *Jawapan :*

(a)

(b)

3

4

4 A quadratic equation $4x^2 + p = 3(2x - 1)$ has no real roots. Find the range of values of p.

Suatu persamaan kuadratik $4x^2 + p = 3(2x - 1)$ *tidak mempunyai punca-punca nyata.*

Cari julat bagi nilai p. [3 marks]

[3 *markah*]

Answer / *Jawapan :*

4

3

For examiner's use only

5 Diagram 5 shows the graph of a quadratic function $f(x) = -(x-b)^2 + c$ with the maximum point at $B(3,5)$. The straight line AC is parallel to the x-axis.

Rajah 5 menunjukkan graf bagi suatu fungsi kuadratik $f(x) = -(x-b)^2 + c$ *dengan titik maksimum* $B(3, 5)$. *Garis lurus AC selari dengan paksi-x.*

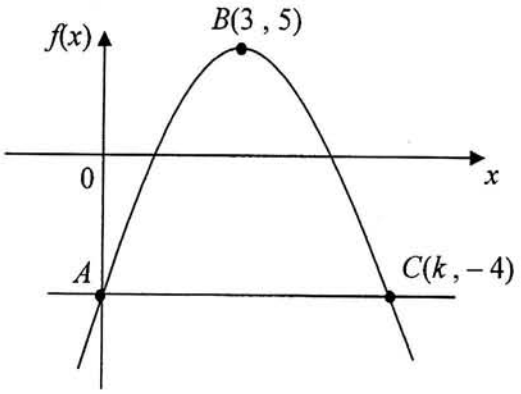


Diagram 5
Rajah 5

a) Find the value of k.
Cari nilai bagi k.

b) Find the equation of the curve in the form $y = -(x-b)^2 + c$.
Cari persamaan bagi lengkung dalam bentuk $y = -(x-b)^2 + c$. [3 marks]
[3 *markah*]

Answer/ *Jawapan* :

a)

b)

5
3

6 Find the range of values of x for $x(x-6) \leq 27$.
Cari julat bagi nilai-nilai x untuk $x(x-6) \leq 27$. [3 marks]
[3 *markah*]

Answer/ Jawapan :

6
3

For examiner's use only

7 Solve the equation

Selesaikan persamaan

$$8^x = \frac{2}{16^{1-x}}$$

[3 marks]

[3 *markah*]

Answer / *Jawapan :*

7

3

8 Given that $\log_2 m = p$, express $\log_{16m} 8m^2$ in terms of p.

Diberi bahawa $\log_2 m = p$, *ungkapkan* $\log_{16m} 8m^2$ *dalam sebutan p.* [4 marks]

[4 *markah*]

Answer/ *Jawapan :*

8

4

For examiner's use only

9 The first term of a geometric progression is p and the sixth term is $32p^6$.
Find the common ratio in terms of p.

Sebutan pertama satu janjang geometri ialah p dan sebutan keenamnya ialah $32p^6$.
Carikan nisbah sepunyanya dalam sebutan p.

[2 marks]
[2 *markah*]

Answer/ Jawapan:

9
2

10 Given the second term and fifth term of an arithmetic progression is $2q + 3$ and $12q - 1$ respectively and the common difference is 2. Find the value of q.

Diberi sebutan kedua dan sebutan kelima bagi janjang aritmetik adalah $2q + 3$ dan $12q - 1$ masing-masing dan nilai sepunya adalah 2. Carikan nilai bagi q. [3 marks]
[3 *markah*]

Answer/ Jawapan:

10
3

For examiner's use only

11 Diagram 11(a) shows the curve $y = 4x^2 - 2$.

Diagram 11(b) shows the straight line graph obtained when $y = 4x^2 - 2$ is expressed in the linear form $Y = -2X + 4$.

Rajah 11(a) menunjukkan suatu graf lengkungan $y = 4x^2 - 2$.

Rajah 11(b) menunjukkan graf garis lurus yang diperoleh apabila $y = 4x^2 - 2$ *diungkapkan dalam bentuk linear* $Y = -2X + 4$.

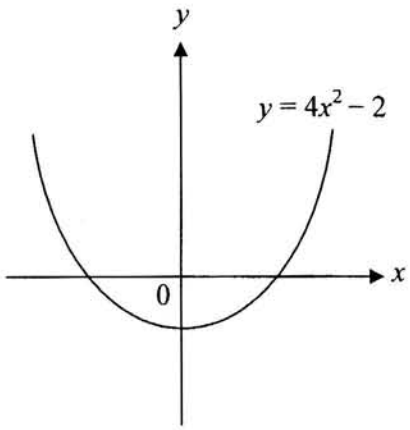


Diagram 11(a)
Rajah 11(a)

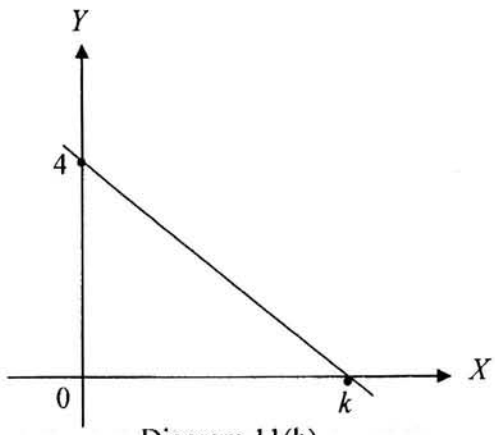


Diagram 11(b)
Rajah 11(b)

(a) Express X and Y in terms of x and y.

Ungkapkan nilai X dan Y dalam sebutan x dan y.

(b) Find the value of k.

Cari nilai bagi k.

[4 marks]
[4 *markah*]

Answer/ *Jawapan:*

(a)

(b)

11

4

For examiner's use only

12 Diagram 12 shows a straight line PQ which is perpendicular to the straight line QR at point Q. The equation of the straight line QR is $2y = x - 4$.

Rajah 12 menunjukkan garis lurus PQ yang berserenjang dengan garis lurus QR pada titik Q. Persamaan garis lurus QR ialah $2y = x - 4$.

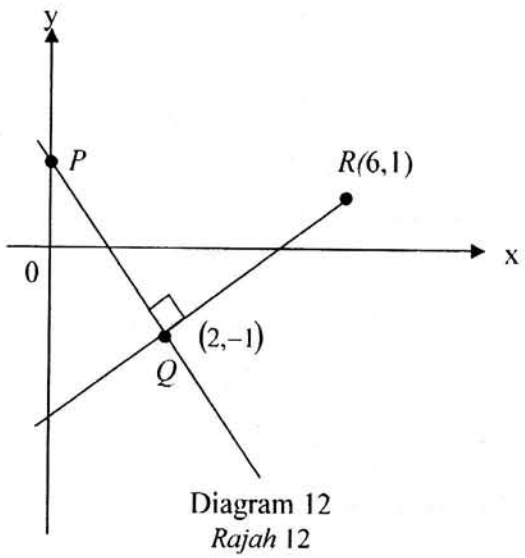


Diagram 12
Rajah 12

Find the coordinates of P.

Cari koordinat P.

[3 marks]

[3 *markah*]

Answer/ *Jawapan*:

12

3

For examiner's use only

13 Diagram 13 shows two vectors, $\overrightarrow{OA}$ and $\overrightarrow{AB}$. Given that $\left|\overrightarrow{OA}\right| = \left|\overrightarrow{OB}\right|$.

Rajah 13 *menunjukkan dua vektor*, $\overrightarrow{OA}$ *dan* $\overrightarrow{AB}$. *Diberi bahawa* $\left|\overrightarrow{OA}\right| = \left|\overrightarrow{OB}\right|$.

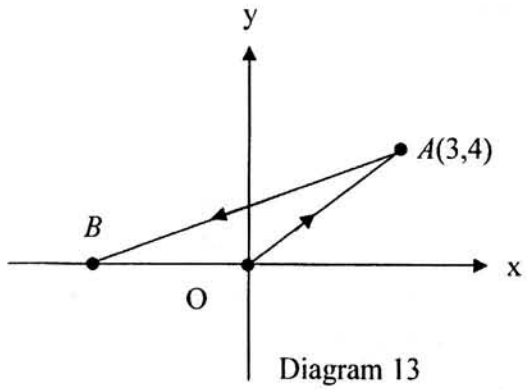


Diagram 13

Rajah 13

Express $\overrightarrow{AB}$ in the form $x\boldsymbol{i} + y\boldsymbol{j}$.

Ungkapkan $\overrightarrow{AB}$ *dalam bentuk* $x\boldsymbol{i} + y\boldsymbol{j}$. [2 marks]

[2 *markah*]

Answer / *Jawapan :*

13 2

---

14 Given $\overrightarrow{OA} = 3\boldsymbol{i} + 4\boldsymbol{j}$, $\overrightarrow{OC} = 4\boldsymbol{i} + 5\boldsymbol{j}$ and $\overrightarrow{BD} = (2k - 3)\boldsymbol{i} + 3\boldsymbol{j}$.

Diberi $\overrightarrow{OA} = 3\boldsymbol{i} + 4\boldsymbol{j}$, $\overrightarrow{OC} = 4\boldsymbol{i} + 5\boldsymbol{j}$ dan $\overrightarrow{BD} = (2k - 3)\boldsymbol{i} + 3\boldsymbol{j}$.

Find

Cari

(a) $\overrightarrow{AC}$

(b) the value of k if $\overrightarrow{AC}$ and $\overrightarrow{BD}$ are parallel. [4 marks]

nilai bagi k *jika* $\overrightarrow{AC}$ *dan* $\overrightarrow{BD}$ *adalah selari.* [4 *markah*]

Answer/ *Jawapan:*

(a)

(b)

14 4

For examiner's use only

15 Solve the equation $2\sin^2 x = \tan 45^\circ - \frac{1}{2}$ for $0^\circ \le x \le 360^\circ$.

Selesaikan persamaan $2\sin^2 x = \tan 45^\circ - \frac{1}{2}$ *for* $0^\circ \le x \le 360^\circ$. [4 marks]

[4 *markah*]

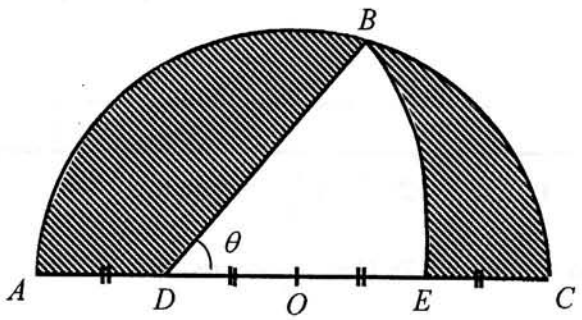
Answer / *Jawapan:*

15

4

16 Diagram 16 shows a semicircle ABC with centre O and sector DBE with centre D.

Rajah 16 menunjukkan semibulatan ABC berpusat O dan sektor DBE berpusat D.



Rajah 16

Rajah 16

Given $OD = 4$ cm and the length of arc $BE = 5.2$ cm, $AD = DO = OE = EC$.

Diberi $OD = 4$ *cm dan panjang lengkok* $BE = 5.2$ *cm*, $AD = DO = OE = EC$.

Calculate

Hitung

(a) the value of θ, in radian.

nilai θ, *dalam radian.*

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

luas, dalam cm^2, *kawasan berlorek.* [4 marks]

[use / *guna* $\pi = 3.142$] [4 *markah*]

15

4

Answer/ *Jawapan:*

(a)

(b)

For examiner's use only

17 The gradient to the curve $y = 2x^2 + x - 1$ at point A is perpendicular to the straight line $5y = -x$.

Kecerunan lengkung $y = 2x^2 + x - 1$ *pada titik A adalah berserenjang dengan garis* $5y = -x$.

Find/ *Cari*

a) the coordinate of A
koordinat A

b) the equation of the tangent to the curve at point A
persamaan tangent kepada lengkung pada titik A.

[4 marks]
[4 *markah*]

Answer/ *Jawapan:*

(a)

(b)

17

4

---

18 Given that $y = (4r + 1)^2$ and $x = 2r$. Find $\frac{dy}{dx}$ in term of x.

Diberi bahawa $y=(4r+1)^2$ *dan* $x = 2r$. *Cari* $\frac{dy}{dx}$ *in term of x.*

[3 marks]
[3 *markah*]

Answer / *Jawapan :*

18

3

For examiner's use only

19 Given $y = \frac{8}{x+1}$, express the approximate change in y in terms of m, when x changes from 3 to $(3 - m)$, where m is a small value.

Diberi $y = \frac{8}{x+1}$, *ungkapkan perubahan kecil bagi y dalam sebutan m apabila x berubah daripada* 3 *to* $(3 - m)$, *dengan keadaan m ialah satu nilai yang kecil.*

[3 marks]
[3 *markah*]

Answer/ *Jawapan :*

19 [3]

20 Diagram 20 shows the curve $y = f(x)$.

Rajah 20 *menunjukkan garis lengkung* $y = f(x)$.

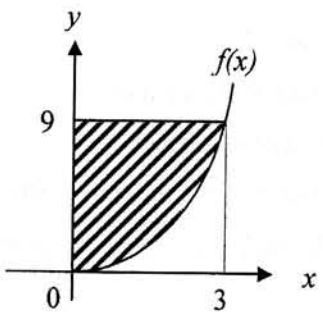


Diagram 20
Rajah 20

If $\int_0^3 y\,dx = 9$, find the area of the shaded region.

Jika $\int_0^3 y\,dx = 9$, *cari luas kawasan berlorek.*

[2 marks]
[2 *markah*]

Answer/ *Jawapan*:

20 [2]

For examiner's use only

21 Given $\int_1^3 f(x)\,dx = 3$ and $\int_3^4 f(x)\,dx = 2$. Find the value of k where k is a constant if $\int_1^4 (f(x) + 2kx)\,dx = 7$, where k is a constant.

Diberi $\int_1^3 f(x)\,dx = 3$ *and* $\int_3^4 f(x)\,dx = 2$. *Hitungkan nilai k di mana k adalah pemalar jika* $\int_1^4 (f(x) + 2kx)\,dx = 7$, jika k ialah pemalar. [3 marks]

[3 *markah*]

Answer / *Jawapan :*

21

3

22 A set of positive integers consists of 6, 7, m, 1, 8, 3, 3.

Suatu set nombor positif terdiri daripada 6, 7, m, 1, 8, 3,3.

(a) Find the value of m if the mean of the data is 5.

Cari nilai bagi m jika min bagi data itu ialah 5.

(b) State the range of the values of m if the median of the data is m.

Nyatakan julat bagi nilai m jika median bagi data itu ialah m. [3 marks]

[3 *markah*]

Answer/ *Jawapan:*

(a)

(b)

22

3

For examiner's use only

23 A Kenari car can accommodate 1 driver and 3 adults. Find the number of different ways the selections can be made from 3 men and 4 women if,

Sebuah kereta Kenari boleh menempatkan seorang pemandu dan 3 orang dewasa. Cari bilangan cara berlainan pemilihan boleh dilakukan daripada 3 orang lelaki dan 4 orang wanita jika,

(a) there is no restriction for the seating

tiada syarat dikenakan bagi tempat duduk itu

(b) the driver must be a man.

pemandu adalah seorang lelaki

[Assume that all of them can drive]

[*Andaikan kesemua mereka boleh memandu*]

[4 marks]

[4 *markah*]

Answer/ *Jawapan:*

23

4

(a)

(b)

24 The probability Bahari being chosen as a monitor is $\frac{3}{8}$ while the probability Dewi being chosen is $\frac{4}{5}$. Find the probability that

Kebarangkalian bahawa Bahari dipilih sebagai ketua ialah $\frac{3}{8}$ *manakala kebarangkalian Dewi dipilih ialah* $\frac{4}{5}$ *.Cari kebarangkalian bahawa*

(a) neither of them is chosen as a monitor,

tidak seorang daripada mereka akan diplilih sebagai ketua,

(b) only one of them is chosen as a monitor.

hanya seorang daripada mereka dipilih sebagai ketua.

[4 marks]

[4 *markah*]

Answer/ *Jawapan:*

24

4

(a)

(b)

For examiner's use only

25 X is the mass of the nails produced in a factory and it is a continuous random variable of a normal distribution with a mean of 52 g and standard deviation of 10 g.

X merupakan jisim bagi paku yang dihasilkan di sebuah kilang dan jisim merupakan pembolehubah rawak selanjar bagi tabutan normal dengan min 52 g dan sisihan piawai 10 g.

(a) Find the range of z – score if the mass of each nail must be between 53.25g and 54.25g.

Cari julat skor – z jika jisim bagi setiap paku mesti antara 53.25g dan 54.25g.

(b) Diagram 25 shows standard normal distribution graph of the mass of the nails. The probability of $k < z < 0$ is 0.3485.

Rajah 25 menunjukkan graf taburan normal bagi jisim paku. Kebarangkalian bagi $k < z < 0$ *ialah* 0.3485.

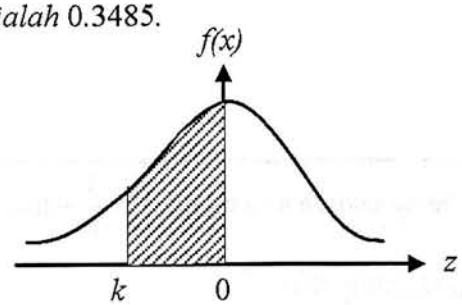


Diagram 12
Rajah 12

Find the mass of a nail which has $P(z < k)$.

Cari jisim bagi sebatang paku yang mempunyai $P(z < k)$

[4 marks]
[4 *markah*]

Answer/ *Jawapan:*

(a)

(b)

25

4

END OF QUESTION PAPER

THE UPPER TAIL PROBABILITY Q(z) FOR THE NORMAL DISTRIBUTION N(0, 1)

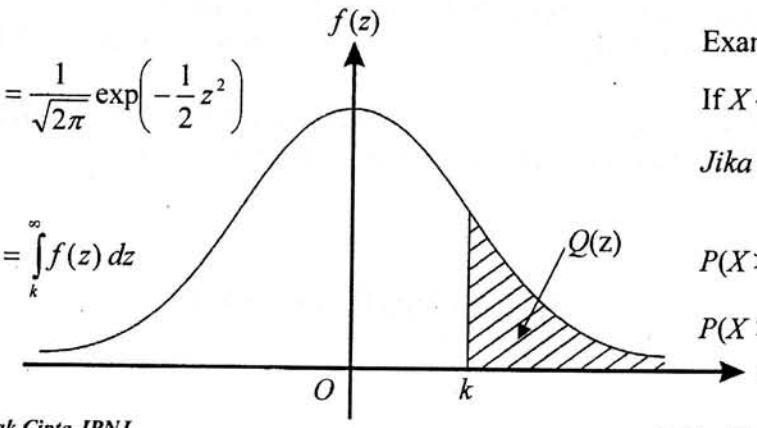
***KEBARANGKALIAN HUJUNG ATAS Q(z) BAGI TABURAN NORMAL* N(0, 1)**

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

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

maka

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



Example / *Contoh*:

If $X \sim N(0, 1)$, then

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

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

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

$= 0.0179$

JABATAN PELAJARAN NEGERI JOHOR

PEPERIKSAAN PERCUBAAN SPM 2011 3472/2

ADDITIONAL MATHEMATICS
PAPER 2
Sept. 2011

$2\frac{1}{2}$ **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.*
4. *Calon dikehendaki menceraikan halaman* 21 *dan ikat sebagai muka hadapan bersama-sama dengan jawapan anda.*

Kertas soalan ini mengandungi 21 halaman bercetak dan 1 halaman tidak bercetak

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

ALGEBRA

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

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

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

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

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

6 $\log_a \dfrac{m}{n} = \log_a m - \log_a n$

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

8 $\log_a b = \dfrac{\log_c b}{\log_c a}$

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

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

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

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

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

CALCULUS

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

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

3 $\dfrac{dy}{dx} = \dfrac{dy}{du} \times \dfrac{du}{dx}$

5 Volume generated

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

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

GEOMETRY

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

2 Midpoint

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

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

4 $\hat{r} = \dfrac{x\underline{i} + y\underline{j}}{\sqrt{x^2 + y^2}}$

5 A point dividing a segment of a line

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

6 Area of triangle =

$\dfrac{1}{2}\left|(x_1y_2 + x_2y_3 + x_3y_1) - (x_2y_1 + x_3y_2 + x_1y_3)\right|$

STATISTICS

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

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

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

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

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

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

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

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

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

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

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

12 Mean, $\mu = np$

13 $\sigma = \sqrt{npq}$

14 $z = \dfrac{x-\mu}{\sigma}$

TRIGONOMETRY

1 Arc length, $s = r\theta$

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

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

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

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

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

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

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

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

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

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

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

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

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

[Lihat halaman sebelah
SULIT

Section A
Bahagian A

[40 *marks*]

[40 *markah*]

Answer **all** questions in this section .

Jawab **semua** *soalan.*

1 Solve the following simultaneous equations :

Selesaikan persamaan serentak berikut:

$$y - x = 3$$
$$y^2 + x - 2xy = 7$$

[5 marks]

[5 *markah*]

2 Given the quadratic function $y = 3 - 8x - 2x^2 = -2(x+b)^2 + c$.

Diberi fungsi kuadratik $y = 3 - 8x - 2x^2 = -2(x+b)^2 + c$.

a) Find the values of b and c. [3 marks]

Tentukan nilai bagi b dan c. [3 *markah*]

b) Sketch the graph of the quadratic function $y = 3 - 8x - 2x^2$. [3 marks]

Lakarkan graf fungsi kuadratik $y = 3 - 8x - 2x^2$. [3 *markah*]

c) Write the function of the graph if the graph in b) is reflected on the x-axis. [1 mark]

Tulis persamaan bagi graf jika graf dalam b) dipantulkan pada paksi-x. [1 *markah*]

3 Diagram 3 shows four the semicircles *AH, BG, CF* and *DE* with center *O*

Rajah 3 *menunjukkan empat semibulatan AE, BF, CG and DH dengan pusat O.*

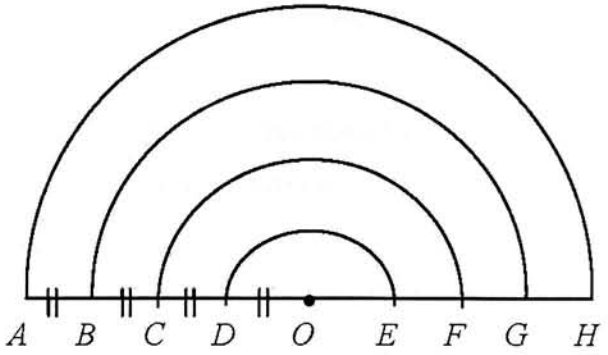


Diagram 3
Rajah 3

(a) Given $OE = 3$ cm. Show that the length of the circumference of the semicircles form a arithmetic progression. Hence state the common difference in term of π

[3 marks]

Diberi $OE = 3$ *cm. Tunjukkan bahawa panjang lilitan bagi semibulatan membentuk janjang aritmetik. Seterusnya nyatakan beza sepunyanya dalam sebutan* π.

[3 *markah*]

(b) (i) Find the sum of the length of the circumference of the semicircles [2 marks]
Carikan jumlah semua panjang lilitan semibulatan tersebut [2 *markah*]

(ii) Calculate in which term that the circumference of the semicircle is 21π
Kira pada semibulatan yang ke berapakah panjang lilitannya ialah 21π

[2 marks]
[2 *markah*]

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

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

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

Seterusnya dengan menggunakan paksi-paksi yang sama, lukiskan garis lurus yang sesuai untuk mencari bilangan penyelesaian bagi persamaan $\cos 2x = \frac{x}{\pi} - 1$ *bagi nilai* $0 \le x \le \pi$.

State the number of solutions. [3 marks]

Nyatakan bilangan penyelesaian itu. [3 *markah*]

5. Table 5 shows the frequency distribution of the marks of group of pupils in an Additional Mathematics test.

Jadual 5 menunjukkan taburan kekerapan markah bagi sekumpulan murid dalam satu ujian Matematik Tambahan.

Marks ***Markah***	**Number of pupils** ***Bilangan murid***
40 – 49	9
50 – 59	24
60 – 69	*m*
70 – 79	9
80 – 89	5
90 – 99	2

Table 5
Jadual 5

(a) It is given that the median mark of the distribution is 58.25.
Calculate the value of *m*. [3 marks]

Diberi bahawa markah median bagi taburan itu ialah 58.25.
Hitung nilai bagi m [3 *markah*]

(b) Calculate the variance of the marks [3 marks]

Hitung varian bagi markah itu [3 *markah*]

6 In Diagram 6, *ABC* is a triangle.

Dalam Rajah 6, *ABC ialah sebuah segitiga.*

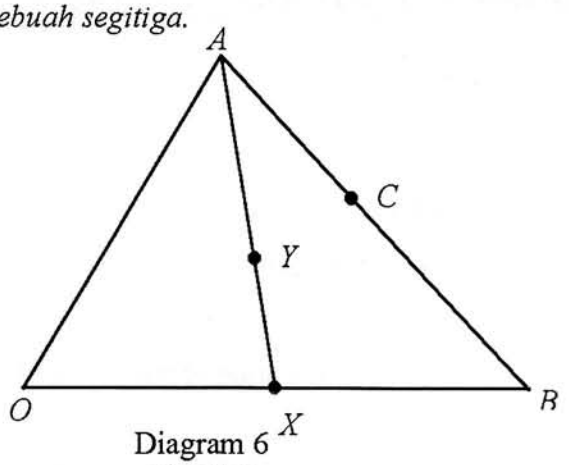


Diagram 6
Rajah 6

It is given that $\overrightarrow{OA} = \boldsymbol{a}$, $\overrightarrow{OB} = \boldsymbol{b}$, $\overrightarrow{OX} = \frac{1}{2}\overrightarrow{OB}$ and $\overrightarrow{AC} = \frac{2}{3}\overrightarrow{AB}$.

Diberi bahawa $\overrightarrow{OA} = \boldsymbol{a}$, $\overrightarrow{OB} = \boldsymbol{b}$, $\overrightarrow{OX} = \frac{1}{2}\overrightarrow{OB}$ and $\overrightarrow{AC} = \frac{2}{3}\overrightarrow{AB}$

a) Express in term of $\boldsymbol{a}$ and $\boldsymbol{b}$

(i) $\overrightarrow{OC}$

(ii) $\overrightarrow{XC}$ [3 marks]

[3 *markah*]

b) (i) Given that $\overrightarrow{AY} = k\overrightarrow{AX}$. Express $\overrightarrow{OY}$ in term of *k*, $\boldsymbol{a}$ and $\boldsymbol{b}$ [2 marks]

Diberi bahawa $\overrightarrow{AY} = k\overrightarrow{AX}$. *Nyatakan* $\overrightarrow{OY}$ *dalam sebutan k,* $\boldsymbol{a}$ *dan* $\boldsymbol{b}$. [2 *markah*]

(ii) If *O, Y and C* are collinear, find the value of *k*. [3 marks]

Jika O, Y dan C adalah segaris, tentukan nilai bagi k. [3 *markah*]

[Lihat sebelah

Section B
Bahagian B

[40 *marks*]
[40 *markah*]

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

7 Used the graph paper to answer this question.

Gunakan kertas graf untuk menjawab soalan ini.

Table 7 shows the value of two variables, x and y, obtained from an experiment. Variables x and y are related by the equation $2y - a = \frac{b}{x}$, where a and b are constants.

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

x	1	2	3	4	5	6
y	5	3.5	3.1	2.7	2.6	2.5

Table 7
Jadual 7

(a) Plot xy against x, using a scale of 2 cm to 1 unit on the x-axis and 2 cm to 2 units on the xy-axis. Hence draw the line of best fit. [5 marks]

Plot xy melawan x, dengan menggunakan skala 2 cm kepada 1 unit di paksi-x dan 2 cm kepada 2 unit di paksi-xy. Seterusnya lukis garis lurus penyuaian terbaik.

[5 *markah*]

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

Gunakan graf daripada 7(a) bagi menghitung nilai

(i) a

(ii) b

(iii) y when $x = 4.5$

y *apabila* $x = 4.5$

[5 marks]

[5 *markah*]

8 Diagram 8 shows the point B which is the point of intersection between curve $y = -x^2 + 8$ and straight line AB. Given AB is a tangent to the curve. The gradient of the normal to the curve at point B is $\frac{1}{4}$.

Rajah 8 menunjukkan titik B yang merupakan titik persilangan antara $y = -x^2 + 8$ *dengan garis lurus AB. Diberi AB adalah tangen kepada lengkung. Kecerunan normal lengkung pada titik B adalah* $\frac{1}{4}$

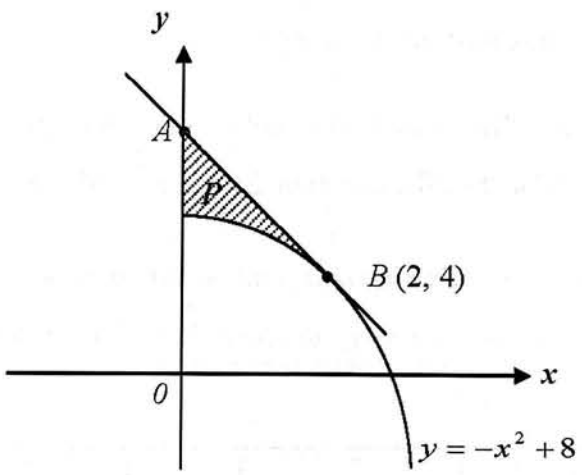


Diagram 8
Rajah 8

Find
Cari

a) the equation of AB [3 marks]
persamaan AB [3 *markah*]

b) the area of shaded region P [4 marks]
luas kawasan rantau berlorek P [4 *markah*]

c) the volume generated when the region which are bounded by the curve, y-axis and $y = 4$ is revolved 360° about the y-axis. [3 marks]

isipadu yang terjana apabila kawasan yang dilengkungi oleh lengkung,paksi y dan garis $y = 4$ *diputarkan* 360° *di paksi-y.* [3 *markah*]

9 Solution by scale drawing is not accepted.

Penyelesaian secara lukisan berskala tidak diterima.

Diagram 9 shows a triangle ABC where O is the origin. Point D lies on the straight line AB.

Rajah 9 menunjukkan segitiga ABC di mana O ialah asalan . Titik D terletak pada garis lurus AB.

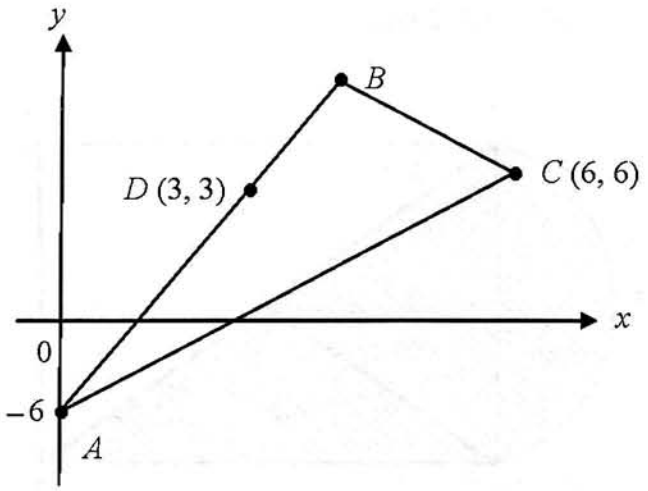


Diagram 9
Rajah 9

a) Given that $AD : DB = 3 : 2$, find coordinate of B. [2 marks]
Diberi bahawa AD : DB = 3 : 2, cari koordinat bagi B. [2 *markah*]

b) Calculate the area , in unit^2, of triangle ABC. [2 marks]
Hitung luas, dalam unit^2, segi tiga ABC. [2 *markah*]

c) Given $AP : PC = 1 : 2$.
Diberi AP : PC = 1 : 2.

i) Find the equation of the locus of P.
Cari persamaan bagi lokus P.

ii) Determine whether locus P intercepts the x-axis. [6 marks]
Tentukan sama ada lokus P memintas paksi-x atau tidak. [6 *markah*]

10 Diagram 10 shows a rectangle *ABCD*.
OAED is a sector of a circle with centre *O* and radius 4 cm. It is given that *O* is the midpoint of *AC* and $\angle AOD = 1.222$ radian.

Rajah 10 *menunjukkan sebuah segi empat tepat ABCD.*
OAED ialah sektor bagi sebuah bulatan berpusat O dan jejari 4 *cm. Diberi bahawa O ialah titik tengah AC dan* $\angle AOD = 1.222$ *radian.*

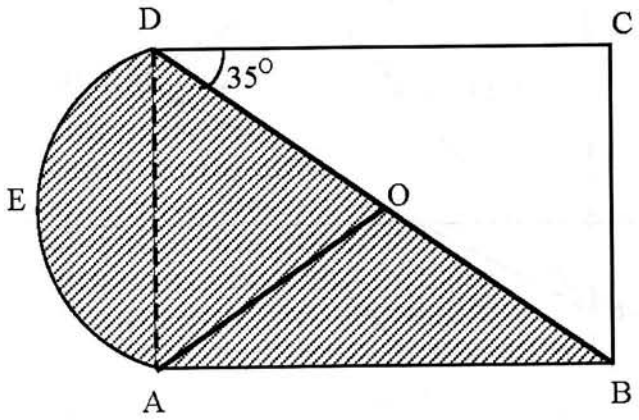


Diagram 10
Rajah 10

Calculate
Hitung

a) the area of sector *AODE* [2 marks]
luas sector AODE [2 *markah*]

b) the perimeter of the shaded region [4 marks]
perimeter kawasan berlorek [4 *markah*]

c) the area of the shaded region [4 marks]
luas kawasan berlorek [4 *markah*]

11 a) 10% of starfruits from an orchard are rotten. 8 starfruits are chosen randomly. Find the probability,

10% daripada buah belimbing dari sebuah kebun adalah busuk. 8 biji buah belimbing dipilih secara rawak. Tentukan kebarangkalian,

(i) none of rotten starfruits is chosen. [2 marks]
tiada buah belimbing busuk dipilih. [2 *markah*]

(ii) at least two rotten starfruits are chosen. [3 marks]
sekurang-kurangnya 2 biji buah belimbing busuk dipilih. [3 *markah*]

b) A school with 1000 students take part in a cross-country event. The Cross-country event started at 0800. Time taken for the students to finish the event is normally distributed with a mean of 45 minutes and a variance of 100 minutes^2.

Sebuah sekolah yang mempunyai 1000 orang pelajar mengambil bahagian dalam Acara merentas desa. Acara merentas desa bermula pada 0800. Tempoh masa untuk menamatkan acara adalah tertabur secara normal dengan min 45 minit dan varians 100 minit^2.

(i) Find the probability of students who finished the event after 1 hour.

[2 marks]

Cari kebarangkalian pelajar yang menamatkan acara merentas desa selepas 1 jam. [2 *markah*]

(ii) If 242 students finished the event in less than t minutes, find the value of t.

[3 marks]

Jika 242 orang pelajar tamat acara kurang dari t minutes, cari nilai t.

[3 *markah*]

Section C
Bahagian C

[20 *marks*]
[20 *markah*]

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

12 Table 12 shows the price of four ingredients, *A*, *B*, *C* and *D* used in making a kind of biscuit.

Jadual 12 *menunjukkan harga bagi empat bahan, A, B,C dan D yang digunakan untuk membuat sejenis biskut.*

Ingredient *Bahan*	**Price per kg (RM)** *Harga sekilogram (RM)*	
	Year 1998 *Tahun* **1998**	**Year 1999** *Tahun* **1999**
A	3.00	3.45
B	x	y
C	1.80	2.16
D	6.00	z

Table 12
Jadual 12

(a) The index number of ingredient *D* in the year 1999 based on the year 1998 is 90. Calculate the value of *z*. [2 marks]

Nombor indeks bagi bahan D dalam tahun 1999 *berasaskan tahun* 1998 *ialah* 90. *Hitungkan nilai bagi z* [2 *markah*]

(b) The index number of ingredient *B* in the year 1999 based on the year 1998 is 130. The price per kg of ingredient *B* in the year 1999 is RM 3 more than its corresponding price in the year 1998. Calculate the values of *x* and *y*. [3 marks]

Nomber indeks bagi bahan B dalam tahun 1999 *berasaskan tahun* 1998 *ialah* 130. *Harga sekilogram bahan B dalam tahun* 1999 *adalah RM* 3 *lebih mahal daripada harganya yang sepadan dalam tahun* 1998. *Hitungkan nilai bagi x dan y.*

[3 *markah*]

(c) The composite index for the cost of making the biscuit in the year 1999 based on the year 1998 is 114.2. Calculate,

Indeks gubahan kos membuat biskut itu dalam tahun 1999 *berasaskan tahun* 1998 *ialah* 114.2. *Hitungkan,*

i) the price of the biscuit in the year 1998 if its corresponding price in the year 1999 is RM1.75.

harga sebungkus biskut itu pada tahun 1998 *jika harganya yang sepadan dalam tahun* 1999 *ialah RM*1.75.

ii) the value of p if the amount of ingredient *A, B, C* and *D* used are in the ratio of 3 : 5 : *p* : 6.

nilai p jika kuantiti bahan A, B, C and D yang digunakan adalah mengikut nisbah 3 : 5 : p : 6.

[5 marks]

[5 *markah*]

13 Diagram 13 shows quadrilateral *ABCD*.

Rajah 13 *menunjukkan sebuah sisi empat ABCD.*

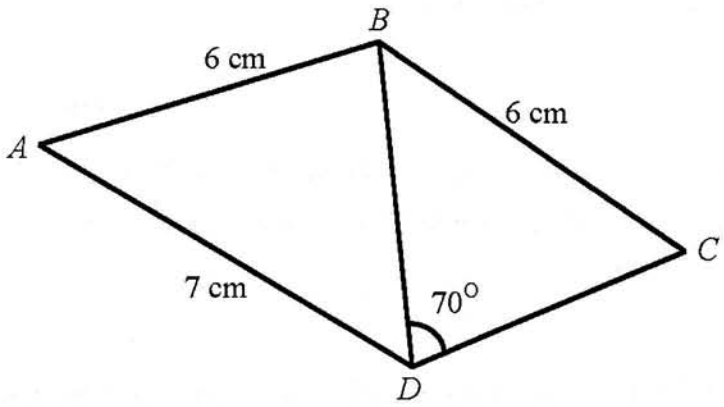


Diagram 13

Rajah 13

The area of triangle *ABD* is 16 cm^2 and $\angle BAD$ is acute.

Luas segi tiga ABD ialah 16 *cm*^{2} dan $\angle BAD$ *ialah tirus.*

Calculate

Hitung

(a) $\angle BAD$ [2 *marks*]
[2 *markah*]

(b) the length, in cm, of *BD*. [2 *marks*]
panjang, dalam cm, bagi BD. [2 *markah*]

(c) $\angle CBD$ [3 *marks*]
[3 *markah*]

(d) the area, in cm^2, of quadrilateral *ABCD*. [3 *marks*]
luas, dalam cm^2*, sisi empat ABCD.* [3 *markah*]

[Lihat sebelah
SULIT

14 A particle moves in a straight line passes through a fixed point ***O***. It velocity, v ms^{-1}, is given by $v = t^2 - 7t + 12$, where t is the time, in second, after passing through ***O***.

*Satu zarah bergerak di sepanjang suaru garis lurus dan melalui satu titik tetap **O**. Halajunya, v ms^{-1}, diberi oleh $v = t^2 - 7t + 12$, dengan keadaan t ialah masa, dalam saat, selepas melalui **O**.*

[Assume motion to the right is positive]

[*Anggapkan gerakan ke arah kanan sebagai positif*]

(a) (i) Find the time when the particle is momentarily at rest.

Cari masa apabila zarah berehat seketika.

(ii) The time interval during which the acceleration of the particle is negative

Julat masa apabila pecutan zarah itu adalah negatif.

[4 marks]

[*4 markah*]

(b) Sketch the velocity–time graph of motion of the particle for $0 \leq t \leq 4$

Lakar graf halaju melawan masa bagi pergerakkan zarah itu untuk $0 \leq t \leq 4$.

[2 marks]

[2 *markah*]

(c) Calculate the total distance travelled during the first **4 seconds** after leaving ***0***.

Hitung jumlah jarak yang dilalui dalam **4 *saat*** *yang pertama selepas melalui* ***0***.

[4 marks]

[*4 markah*]

15 A factory produce two types of circuit boards, P and Q. The production of each type of circuit board involves two process, assembling and welding. Table 15 shows the time taken to assemble and weld both types of circuit boards.

Sebuah kilang mengeluarkan dua jenis papan litar, P dan Q. Pengeluaran setiap jenis papan litar melibatkan dua proses iaitu pemasangan dan kimpalan. Jadual 15 *menunjukkan masa yang diambil untuk memasang dan mengimpal kedua-dua jenis papan litar tersebut.*

Circuit Board *Papan Litar*	**Time Taken (minutes)** *Masa yang diambil*	
	Assembling *Pemasangan*	**Welding** *Pengimpalan*
P	50	40
Q	30	60

Table 15
Jadual 15

The factory produces x circuit boards of type P and y circuit boards of type Q per day is based on the following constrains.

Kilang itu menghasilkan x papan litar jenis P dan y papan litar jenis Q setiap hari berdasarkan kekangan-kekangan berikut:

I) The maximum total time taken for assembling both types of circuit board is 600 minutes.

Jumlah maksimum masa yang diambil untuk menggabung kedua-dua jenis papan litar tersebut ialah 600 *minit.*

II) The total time taken for welding both types of circuit boards is at least 300 minutes.

Jumlah masa yang diambil untuk mengimpal kedua-dua jenis papan litar adalah sekurang-kurangnya 300 *minit.*

III) The ratio of the number of circuit boards of type P to the number of circuit boards of type Q is at most 9: 10.

Nisbah bilangan papan litar jenis P kepada papan litar jenis Q adalah selebih-lebihnya 9 : 10.

(a) Write three inequalities, other than $x \geq 0$ and $y \geq 0$, which satisfy the constraints above. [3 marks]

Tuliskan tiga ketaksamaan selain daripada $x \geq 0$ *dan* $y \geq 0$ *yang memuaskan kekangan-kekangan di atas.* [3 *markah*]

(b) Using a scale of 2 cm to 2 circuit boards on the both axes, construct and shade the region R in which every point stratifies all the constrains above. [3 marks]

Menggunakan skala 2 *cm kepada* 2 *papan litar di paksi-x dan* 2 *cm kepada* 5 *papan litar di paksi-y, bina dan lorekkan rantau R yang dapat memuaskan kekangan-kekangan yang diberi.* [3 *markah*]

(c) Using your graph from (b), find

Menggunakan graf yang diberi, cari

i. the maximum number of the circuit board of type Q produced per day if 3 circuit boards of type P are produced per day.

Bilangan maksimum papan litar dari jenis Q yang dapat dihasilkan setiap hari jika 3 *papan litar jenis P dihasilkan setiap hari.*

ii. The maximum total profit obtained per day if the profit from one circuit board of type P is RM 40 and one circuit board of type Q is RM20.

Jumlah keuntungan maksimum setiap hari jika keuntungan satu papan litar jenis P ialah RM 40 *dan satu papan litar jenis Q ialah RM* 20.

[4 marks]

[4 *markah*]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

END OF QUESTION PAPER

THE UPPER TAIL PROBABILITY Q(z) FOR THE NORMAL DISTRIBUTION N(0, 1)

***KEBARANGKALIAN HUJUNG ATAS Q(z) BAGI TABURAN NORMAL* N(0, 1)**

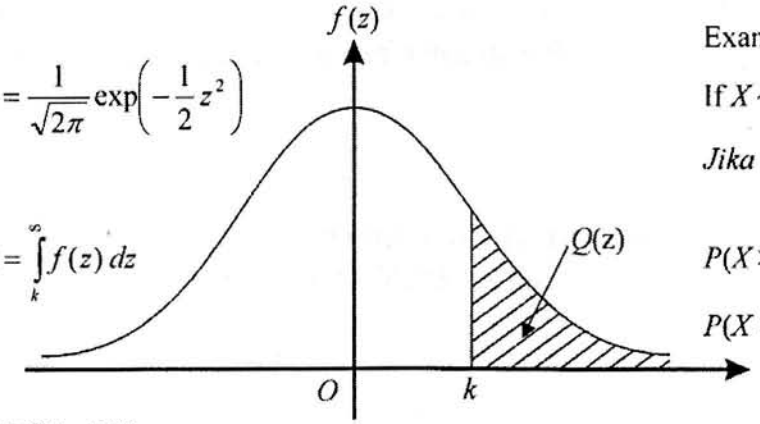
z	0	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
											Minus / Tolak								
0.0	0.5000	0.4960	0.4920	0.4880	0.4840	0.4801	0.4761	0.4721	0.4681	0.4641	4	8	12	16	20	24	28	32	36
0.1	0.4602	0.4562	0.4522	0.4483	0.4443	0.4404	0.4364	0.4325	0.4286	0.4247	4	8	12	16	20	24	28	32	36
0.2	0.4207	0.4168	0.4129	0.4090	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

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

maka

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

= 0.0179



Example / *Contoh*:

If $X \sim N(0, 1)$, then

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

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

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

[Lihat halaman sebelah

SULIT

3472/1
Additional
Mathematics
Kertas 1
September 2011
2 Jam

JABATAN PELAJARAN NEGERI JOHOR
PEPERIKSAAN PERCUBAAN SPM 2011

ADDITIONAL MATHEMATICS
Kertas 1

MARKING SCHEME

Kertas soalan ini mengandungi ~~5~~ 6 halaman bercetak

ADDITIONAL MATHEMATICS
MARKING SCHEME – PAPER 1

NO		SOLUTION	SUB MARKS	FULL MARKS
1	(a)	many to one	B1	2
	(b)	$f: x \to x^2$	B1	
2		$x = \frac{3}{2}$ and $x = -1$	2	2
		$x = \frac{3}{2}$ or $x = -1$	B1	
3	(a)	17	2	4
		$\frac{x-2}{3} = 5$	B1	
	(b)	$-\frac{1}{3}$	2	
		$\frac{(3-x)-2}{3}$	B1	
4		$p > -\frac{3}{4}$	3	3
		$(-6)^2 - 4(4)(p+3) < 0$	B2	
		$4x^2 - 6x + p + 3 = 0$	B1	
5	(a)	6	2	3
		$\frac{0+k}{2} = 3$	B1	
	(b)	$f(x) = -(x-3)^2 + 5$	1	
6		$-3 \le x \le 9$	2	3
			B2	
		$(x+3)(x-9)$	B1	

7		3 $2^{3x} = 2^{-3+4x}$ or equivalent 2^{3x} or $2^{4(1-x)}$	3 B2 B1	**3**
8		$\frac{3+2p}{4+p}$ $\frac{\log_2 8 + 2\log_2 m}{\log_2 16 + \log_2 m}$ use two laws of logarithm use one law of logarithm $\frac{\log_2 8m^2}{\log_2 16m}$ change to any base	4 B3 B2 B1	**4**
9		$r = 2p$ $pr^5 = 32p^6$	2 B1	**2**
10		1 $10q - 4 = 6$ $3d = 10q - 4$	3 B2 B1	**3**
11	(a)	$Y = \frac{y}{x^2}$ $X = \frac{1}{x^2}$	1 1	**4**
	(b)	2 $\frac{4-0}{0-k} = -2$	2 B1	
12		$P(0, 3)$ $\frac{y+1}{x-2} = -2$ $m = -2$	3 B2 B1	**3**

13		$-8\mathbf{i}-4\mathbf{j}$ $-5\mathbf{i}$	2 B1	2
14	(a)	$\begin{pmatrix}1\\1\end{pmatrix}$ or $\mathbf{i}+\mathbf{j}$ $\mathbf{AC}=\mathbf{AO}+\mathbf{OC}$	2 B1	4
	(b)	3 $\lambda\begin{pmatrix}1\\1\end{pmatrix}=\begin{pmatrix}2k-3\\3\end{pmatrix}$ or $\frac{1}{1}=\frac{2k-3}{3}$	2 B1	
15		$30°, 150°, 210°, 330°$ $30°, 150°$ or $210°, 330°$ $\sin x=\pm\frac{1}{2}$ or $30°$ is seen $\sin^2 x=\frac{1}{4}$	4 B3 B2 B1	4
16	(a)	0.65 $8\theta=5.2$	2 B1	
	(b)	79.74 $\frac{1}{2}(8^2)(3.142)-\frac{1}{2}(8^2)(0.65)$	2 B1	4
17	(a)	A(1, 2) $\frac{dy}{dx}=4x+1$ or 5 is seen	2 B1	
	(b)	$y=5x-3$ $\frac{y-2}{x-1}=5$	2 B1	4

23	(a)	35 $^{7}C_{4}$	2 B1	4
	(b)	60 $^{3}C_{1} \times {}^{6}C_{3}$	2 B1	
24	(a)	$\frac{1}{8}$ $\frac{5}{8} \times \frac{1}{5}$	2 B1	4
	(b)	$\frac{23}{40}$ $\frac{3}{8} \times \frac{1}{5} + \frac{5}{8} \times \frac{4}{5}$	2 B1	
25	(a)	$0.125 < Z < 0.225$ $\frac{53.25 - 52}{10}$ or $\frac{54.25 - 52}{10}$	2 B1	4
	(b)	41.7 g $k = -1.03$	2 B1	

18		$4(2x+1)$ $2(2x+1)(2)$ or $8(4r+1)(\frac{1}{2})$ $(2x+1)^2$ or 2	3 B2 B1	**3**
19		$\frac{m}{2}$ $\frac{-8}{(3+1)^2}(-m)$ $\frac{dy}{dx}=-8(x+1)^{-2}$ *or* $\delta x=-m$	3 B2 B1	**3**
20		18 27 is seen	2 B1	**2**
21		$\frac{2}{15}$ $5+2k\left[\frac{x^2}{2}\right]_1^4=7$ $2+3$ or $5+2k\int_1^4 x\,dx=7$	3 B2 B1	**3**
22	(a) (b)	7 $\frac{28+x}{7}=5$ or $\frac{6+7+x+1+8+3+3}{7}=5$ $3\le m\le 6$	2 B1 1	**3**

3472/2
Additional
Mathematics
Kertas 2
September 2011
2 ½ Jam

JABATAN PELAJARAN NEGERI JOHOR
PEPERIKSAAN PERCUBAAN SPM 2011

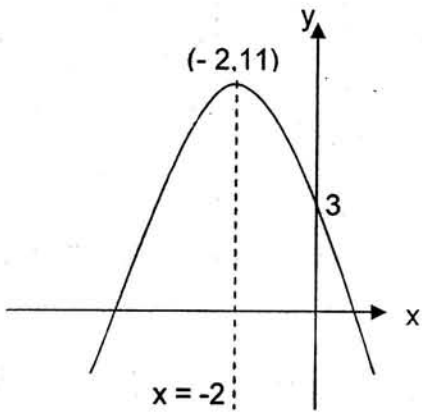
ADDITIONAL MATHEMATICS
Kertas 2

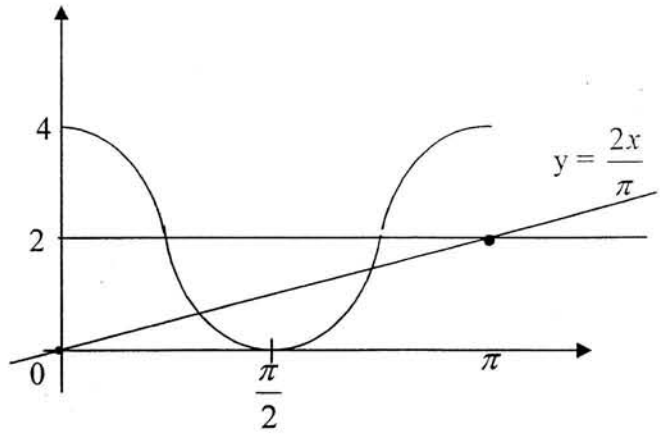
MARKING SCHEME

Kertas soalan ini mengandungi 17 halaman bercetak

BAHAGIAN A

No	Solution	Sub marks	Total marks
1	$y = 3 + x$ Or $x = y - 3$ P1 Eliminate x or y $*(3 + x)^2 + x - 2x*(3 + x) = 7$ K1 Or $y^2 + y - 3 - 2*(y - 3)y = 7$ Or or equivalent $x^2 - x - 2 = 0$ $y^2 - 7y + 10 = 0$ K1 Solve the quadratic equation by using the factorization. $(x + 1)(x - 2) = 0$ $(y - 2)(y - 5) = 0$ $x = -1$, $x = 2$, N1 or $y = 2$, $y = 5$ $y = 2$, $y = 5$ or $x = -1$, $x = 2$ N1 **Note :** **OW-1** if the working of solving quadratic equation is not shown.	5	5

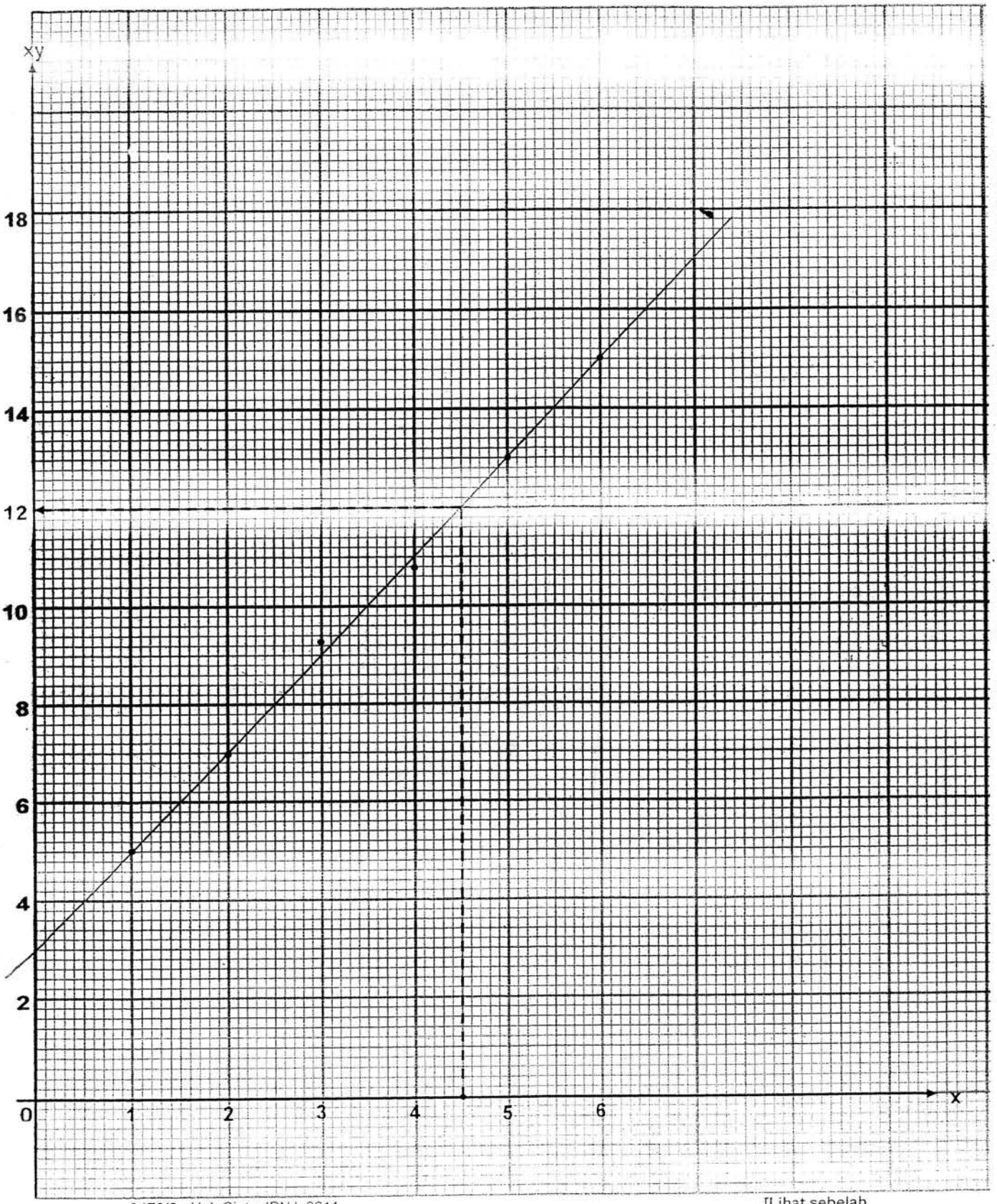
No	Solution	Sub marks	Total marks
2a)	$y = -2[(x+2)^2 - \frac{3}{2} - 2^2]$ K1 $-2(x+2)^2 + 11$ OR equivalent method b = 2, N1 N1 c = 11	3	
b)	 Shape : P1 Max. point : (-2, 11) P1 y- intercept = 3 P1	3	7
c)	$y = 2(x+2)^2 - 11$ N1	1	
3a)	3π or 6π or 9π Mana-mana satu tiga sebutan berturut-turut yang betul. P1 Dapatkan sekurang-kurangnya dua beza sepunya bagi sebutan berturutan $d_1 = 6\pi - 3\pi$ $d_2 = 9\pi - 6\pi$ K1 $d = 3\pi$ N1	1	
b)i)	Use $S_n = \frac{n}{2}[2a + (n-1)d]3$ K1 $S_4 = \frac{4}{2}[2(*3\pi) + (3)(*3\pi)]$ *OR* $3\pi+6\pi+9\pi+12\pi$ 30π N1	2	
ii)	Use $T_n = a + (n-1)d$ $21\pi = 3\pi + (n-1)3\pi$ K1 7 N1 OR other valid method.	2	7
	Note : If listing method is used all terms must be correctly listed, accept for correct answer.		

No	Solution	Sub marks	Total marks
4 a)	 Graph Cos 1 period in $0 \le x \le \pi$ P1 Shape graph cos P1 Amplitude = 2 P1 Graph shifted up by 2 unit P1	4	
b)	Drawing of the straight line from the equation involving x and y, either gradient OR y intercept of straight Line must be correct. K1 $y = \frac{2x}{\pi}$ N1 Straight line drawn correctly and Number of solutions = 2 N1 All must be correct	3	7

No	Solution	Sub marks	Total marks
6a) i) ii)	Use the triangle law For $\frac{2}{3}\overline{AB} = \overline{AO} + \overline{OC}$ K1 or $\overline{XC} = \overline{XO} + \overline{OC}$ $\overline{OC} = \frac{1}{3}a - \frac{2}{3}b$ N1 $\overline{XC} = \frac{1}{3}a + \frac{1}{6}b$ N1	3	
b)	$\overline{AY} = k\overline{AX}$ $= k(\overline{AO} + \overline{OX})$ P1 $= k(-a + \frac{1}{2}b)$ K1 Use the triangle law For $\overline{OY} = \overline{OA} + \overline{AY}$ $= a + k(-a + \frac{1}{2}b)$ $= (1-k)a + \frac{1}{2}kb$ $\overline{OY} = \lambda\overline{OC}$ K1 $(1-k)a + \frac{1}{2}kb = \lambda(\frac{1}{3}a - \frac{2}{3}b)$ Compare the coefficient of a and b. K1 $1-k = \frac{\lambda}{3}$ $\frac{1}{2}k = \frac{2}{3}\lambda$ $k = \frac{4}{5}$ N1	5	8

BAHAGIAN B

No	Solution	Sub marks	Total marks
7 a)	<table><tr><td>x</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr><tr><td>xy</td><td>5</td><td>7</td><td>9.3</td><td>10.8</td><td>13</td><td>15</td></tr></table> N1	1	
	Note: If table is not shown award N1 mark if all the points are plotted correctly. Plot xy against x (Correct axes and uniform scales) K1 6 *points plotted correctly N1 Line of best fit N1 $xy = \frac{a}{2}x + \frac{b}{2}$ P1 Or implied.	4	
b) i)	Use *m = $\frac{a}{2}$ K1 $\frac{13-7}{5-2}$ a = 4 N1		
ii)	From graph xy against x K1 $\frac{b}{2}$ = *c $\frac{b}{2} = 3$ N1 b = 6		
iii)	x = 4.5 xy = 12 y = 2.67 N1	5	
	Note: SS – 1 if, Part of the scale is not uniform at the x-axis and/ or the xy-axis. OR not using the given scales. OR not using graph paper.		10



No	Solution	Sub marks	Total marks
8 (a)	$\frac{dy}{dx} = -2x$ K1 Gantikan x = 2 dalam * $\frac{dy}{dx}$ To find the value of the gradient of the tangent to the curve K1 $\frac{dy}{dx} = -4$ $y - 4 = *-4(x-2)$ $y = -4x + 12$ or equivalent N1	3	
(b)	Find the area of trapezium , A_1 $\frac{1}{2}[12+4][2] = 16$ K1 or $\int_0^2 -4x+12dx = 16$ Find the area under the curve, A_2 and Use the limit 0 to 2 K1 $\int_0^2 (-x^2+8)dx$ $\left[\frac{(-x^3}{3} + 8x\right]_0^2 = \frac{40}{3}$ $*A_1 - *A_2$ K1 $16 - (\frac{40}{3})$ N1 $\frac{8}{3}$ unit ^{2}	4	
(c)	Integrate $\int \pi(8-y)dy$ $\pi\left[8y - \frac{y^2}{2}\right]$ K1 Substitute limit 4 to 8 into the integration K1 $\pi * \left[8y - \frac{y^2}{2}\right]_4^8$ N1 8π	3	**10**

No	Solution	Sub marks	Total marks
9 a)	*Use* $(\frac{0+3x}{5}, \frac{-12+3y}{5}) = (3,3)$ K1 B (5, 9) N1	2	
b)	Use $\frac{1}{2}\begin{bmatrix} 0 & 6 & 5 & 0 \\ -6 & 6 & 9 & -6 \end{bmatrix}$ K1 15 N1	2	
c) i)	2AD = PC P1 $2\sqrt{(x-0)^2+(y+6)^2} = \sqrt{(x-6)^2+(y-6)^2}$ K1 $x^2+y^2+4x+20y+24 = 0$ N1		
ii)	$y = 0$ P1 can be implied		
(c)	$x^2+4x+24 = 0$ $b^2-4ac = -80$ K1 N1 does not intercept	6	
			10

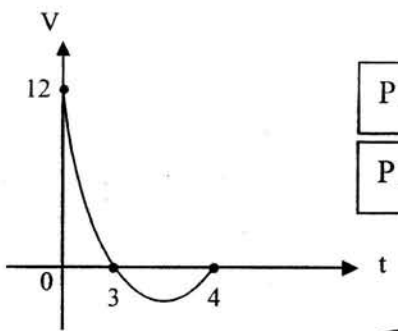
No	Solution	Sub marks	Total marks
10a)	Use ½ r^2 θ to find the area of sector AODE = ½(4)²(1.222) K1 9.776 // 9.78 N1	2	
b)	Use S = rθ to find the length of arc AED 4(1.222) K1 K1 Find length of DC 2(4)cos35° or 2(4)sin55° K1 Perimeter of the shaded region *4.888 + *6.553 + 4 + 4 N1 19.441 // 19.44	4	
c)	<COD = 3.142 – 1.222 = 1.92 rad P1 or 180°- 35°- 35° = 110° find the area of triangle DOC ½(4)²sin110° K1 Area of shaded region (9.776 + 7.5175) K1 N1 17.2935 // 17.294 // 17.29	4	
			10

No	Solution	Sub marks	Total marks
11 a)i)	$p = \frac{1}{10}$ and $q = \frac{9}{10}$ **P1** Use Binomial formula $P(x = 0) = {}^{8}C_{0}(\frac{1}{10})^{0}(\frac{9}{10})^{8}$ **K1** 0.4305 **N1**		
ii)	Use $P(x \geq 2) = 1 - P(x = 0) - P(x = 1)$ **K1** $= 1 - {}^{8}C_{0}(\frac{1}{10})^{0}(\frac{9}{10})^{8} - {}^{8}C_{1}(\frac{1}{10})^{1}(\frac{9}{10})^{7}$ 0.1869 **N1**	**5**	
b) i)	Use $Z = \frac{(x-\mu)}{\sigma}$ to find the value of z **K1** $P(Z > \frac{0900-0845}{10})$ or $P(Z > \frac{60-45}{10})$ or $P(Z > 1.5)$ 0.0668 **N1**		
ii)	$P(Z < \frac{t-45}{10}) = 0.242$ **P1** $\frac{t-45}{10} = -0.7$ **K1** **N1** t = 38	**5**	**10**

BAHAGIAN C

No	Solution	Sub marks	Total marks
12 a)	Use $I = \frac{Q_1}{Q_0} \times 100$ $\frac{z}{6.00} \times 100 = 90$ K1 $z = 5.40$ N1	2	
b)	$\frac{y}{x} \times 100 = 130$ K1 or $y - x = 3$ K1 menghapuskan x atau y (Eliminate x or y) N1 $x = 10, y = 13$	3	
	Nota : if steps to solve the quadratic equations is not shown OW - 1		
c)i)	Use $\frac{1.75}{Q_o} \times 100 = 114.20$ K1 Atau setara RM1.53 N1	2	
ii)	Use $I = \frac{Q_1}{Q_0} \times 100$ K1 Untuk bahan A or C $I_A = 115, I_C = 120$ $\frac{(115)3 + (130)5 + (120)p + (90)6}{3 + 5 + p + 6} = 114.2$ K1 $p = 11$ N1	3	10

No	Solution	Sub marks	Total marks
13 a)	Use Area of ABD = 16 to find <BAD ½ (7)(6)sinθ = 16 K1 <BAD = 49.63° // 49°38' N1	2	
b)	Use cosine rule in Δ ABD to find BD. $BD^2 = 6^2 + 7^2 - 2(6)(7)\cos 49.63°$ K1 5.531 N1	2	
c)	Use sine rule in Δ BCD to find <BCD $\frac{5.531}{Sin < BCD} = \frac{6}{Sin 70^o}$ K1 <BCD = 60.02° <CBD = 180° - 60.02° - 70° K1 49.98° N1	3	
d)	Use ½ (a)(b)sinθ to find the area of triangle BDC K1 ½ (6)(5.531)sin49.98° = 12.6659 Area of quadrilateral ABCD K1 = *(area BDC) + 16 28.71 N1	3	
			10

No	Solution	Sub marks	Total marks
14 a)i)	Used $t^2 - 7t + 12 = 0$ K1 $(t-3)(t-4) = 0$ $t = 3, t = 4$ N1		
ii)	used $\frac{dv}{dt} < 0$ to find t $\frac{dv}{dt} < 0$ K1 $2t - 7 < 0$ $t < \frac{7}{2}$ N1	4	
b)	 P1 For shape of the graph P1 y- intercept and x-intercept	2	
c)	Intergrate $\int t^2 - 7t + 12\ dt$ K1 $S = \frac{t^3}{3} - \frac{7t^2}{2} + 12t$ K1 Use limit $\int_0^3$ or $\int_3^4$ $\frac{27}{2}, \frac{1}{6},$ K1 Find the total distance $\frac{27}{2} + \frac{1}{6}$ $\frac{41}{3} m$ N1	4	10

No	Solution	Sub marks	Total marks
15 (a)	i. $50x + 30y \le 600$ *or* $5x + 3y \le 60$ N1		
	ii. $40x + 60y \ge 300$ *or* $2x + 3y \ge 15$ N1		
	iii. $\frac{x}{y} \le \frac{9}{10}$ *or* $10x \le 9y$ N1	3	
(b)	Draw correctly at least one straight line from the *inequalities which invoves x and y. K1 Draw correctly all three *straight lines. N1 **Note : Accept dotted lines.** The correct region R shaded N1	3	
c) i)	When $x = 3$, maximum number of circuit boards of type Q = 15 P1 (from x = 3 in the region)		
ii)	Maximum point at (7, 8) N1		
	Use $40x + 20y$ for point in the *region R K1 $40(7) + 20(8)$ RM440 N1	4	
	Note: SS – 1 if In (a) the symbol " = " is not used at all **or** more than three Inequalities are given. In (b) does not use the scale given **or** does not use graph paper **Or** interchange between the x-axis and the y-axis.		10