

Name :

Form :



SMKA NAIM LILBANAT 15150 KOTA BHARU KELANTAN.
“SEKOLAH BERPRESTASI TINGGI”

PEPERIKSAAN PERCUBAAN SPM 2014

3472/1

ADDITIONAL MATHEMATICS

Kertas 1

2 Jam

2 Jam

Arahan:

1. Kertas soalan ini mengandungi 25 Soalan.
2. Jawab semua soalan.
3. Tulis jawapan anda dalam ruang yang disediakan dalam kertas soalan.
4. Tunjukkan langkah-langkah penting dalam kerja mengira anda. Ini boleh membantu anda untuk mendapatkan markah.
5. Anda dibenarkan menggunakan kalkulator saintifik.

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

3472/1

Kertas soalan ini mengandungi 12 halaman bercetak.

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(Answer **all** questions)Jawab **semua** soalan

1. Diagram 1 shows the graph of function $f(x) = x - 1$.

Rajah 1 menunjukkan graf bagi fungsi $f(x) = x - 1$,

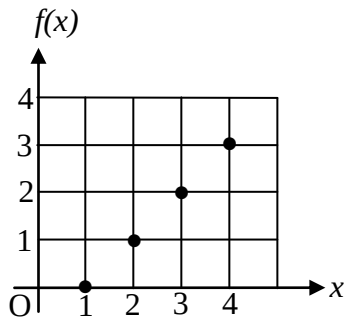


Diagram 1 / Rajah 1

State/ Nyatakan

- (a) $f(2)$
 (b) $f^{-1}(3)$

[2 Markah]

Answer / Jawapan :

(a)

(b)

2. Given the function $g(x) = \frac{17}{2x-5}$, $x \neq p$

Diberi fungsi $g(x) = \frac{17}{2x-5}$, $x \neq p$,

Find / Cari

- (a) the value of p
 nilai p .
 (b) the value of k such that $g^{-1}\left(\frac{1}{k}\right) = k$
 nilai k dengan keadaan $g^{-1}\left(\frac{1}{k}\right) = k$

Answer / Jawapan:

(a)

(b)

[3 markah]

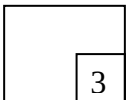
3. Given that the function $f : x \rightarrow 4k - 5x$, where k is a constant. Find the value of k such that $f^{-1}(2k) = 3$

Diberi bahawa fungsi $f : x \rightarrow 4k - 5x$, dengan keadaan k ialah pemalar. Cari nilai k dengan keadaan $f^{-1}(2k) = 3$

[3 markah]

Answer / Jawapan :

3



4. The quadratic equation $2x^2 - px + m + 3 = 0$ has a sum of roots of 3.

Persamaan kuadratik $2x^2 - px + m + 3 = 0$ mempunyai hasil tambah punca 3.

- (a) Find the value of p .

Cari nilai p .

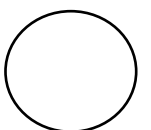
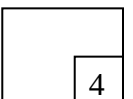
- (b) Hence, find the range of value of m if the quadratic equation has no root.

Seterusnya, cari julat nilai m jika persamaan kuadratik itu tidak mempunyai punca.

[4 markah]

Answer / Jawapan :

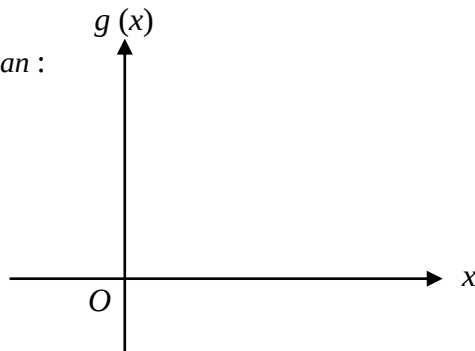
4



5. Sketch the graph of the function $g(x) = -(x - 2)^2 + 7$ on the given axes.

Lakar pada paksi-paksi yang diberi, graf fungsi kuadratik $g(x) = -(x - 2)^2 + 7$,

Answer / Jawapan :



[3 markah]

6. Given that $h(x) = 2x^2 + 5x - 4$. Find the range of values of x if $h(x) \geq 8$.

Diberi $h(x) = 2x^2 + 5x - 4$. Cari julat nilai x apabila $h(x) \geq 8$.

[3 markah]

Answer / Jawapan :

7. Solve the equation :

Selesaikan persamaan: $2^{x+3} - 10(2^{x-1}) = \frac{3}{4}$

[4 markah]

Answer / Jawapan :

8. Solve the equation $\log_3 3x + 2 = \log_3 (7x + 5)$

Selesaikan persamaan $\log_3 3x + 2 = \log_3 (7x + 5)$

Answer / Jawapan

[3 markah]

8



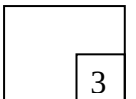
9. Given that $\log_2 x = m$ and $\log_2 y = n$, express $\log_8 \left(\frac{4y^3}{x} \right)$ in terms of m and n .

Diberi $\log_2 x = m$ dan $\log_2 y = n$, ungkapkan $\log_8 \left(\frac{4y^3}{x} \right)$ dalam sebutan m dan n .

Answer / Jawapan :

[3 markah]

9



10. The first three terms of a geometric progression are 18, 6 and $p - 1$.

Tiga sebutan pertama bagi suatu jangjang geometri ialah, 18, 6 dan $p - 1$.

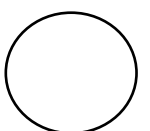
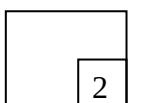
Find the value of p .

Cari nilai p

[2 markah]

Answer / Jawapan :

10



11. The fifth term of an arithmetic progression is 17. The sum of the first four terms is 38. Find the seventh term of the arithmetic progression.

Sebutan kelima suatu jangjang aritmetik ialah 17. Hasil tambah empat sebutan pertama ialah 38. Cari sebutan ketujuh bagi jangjang aritmetik itu.

[4 markah]

Answer / Jawapan :

11



12. The first term of geometric progression is 8 and the common ratio is $\frac{1}{2}$.

Find the sum from the forth term to the nine term of the progression.

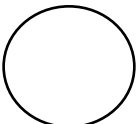
Sebutan pertama bagi jangjang geometri ialah 8 dan nisbah sepunya ialah $\frac{1}{2}$.

Cari hasil tambah dari sebutan keempat hingga sebutan kesembilan jangjang itu.

[3 markah]

Answer / Jawapan :

12



13. Given that $m, -4, -1$ are the first three terms of an arithmetic progression.
Express the eighth term of the progression in terms of m .

Diberi $m, -4, -1$ ialah tiga sebutan pertama suatu jangjang aritmetik. Ungkapkan sebutan kelapan jangjang itu dalam sebutan m .

[2 markah]

13

2

14. Diagram 14, shows the straight line $\frac{x}{12} + \frac{y}{8} = 1$ intersects the x-axis at P and y-axis at Q.

The straight line ST is perpendicular to the straight line PQ.

Rajah 14 menunjukkan garis lurus menyilang paksi-x di P dan paksi-y di Q. Garis lurus ST berserenjang dengan garis lurus PQ.

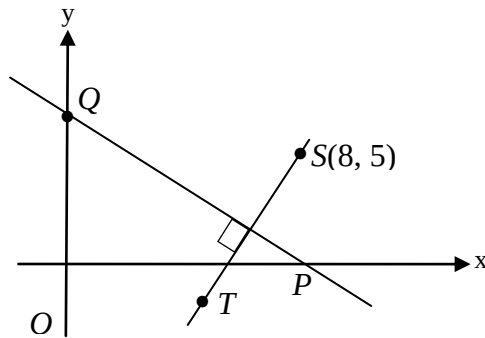


Diagram 14/ Rajah 14

- (a) Find the gradient of the straight line PQ.
Cari kecerunan bagi garis lurus PQ.
- (b) Hence, find the equation of the straight line ST.
Seterusnya cari persamaan garis lurus ST.

Answer / Jawapan

[3 markah]

14

3

15. Given $\vec{a} = \begin{pmatrix} 15 \\ 8 \end{pmatrix}$ and $\vec{b} = \begin{pmatrix} 5 \\ m+1 \end{pmatrix}$, find.

Diberi $\vec{a} = \begin{pmatrix} 15 \\ 8 \end{pmatrix}$ dan $\vec{b} = \begin{pmatrix} 5 \\ m+1 \end{pmatrix}$, cari

- (a) the unit vector in the direction of $\vec{a}$

vector unit dalam arah $\vec{a}$

- (b) the value of m such that $\vec{a}$ and $\vec{b}$ are parallel.

nilai m dengan keadaan $\vec{a}$ dan $\vec{b}$ adalah selari.

[4 markah]

Answer / Jawapan :

15

4

16. Diagram 16 shows two vectors $\vec{OP}$ and $\vec{OQ}$ on a Cartesian plane.

Rajah 16 menunjukkan dua vektor $\vec{OP}$ dan $\vec{OQ}$ pada satah Cartesian.

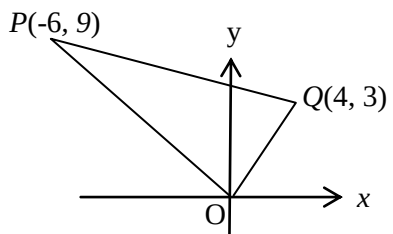


Diagram 16/ Rajah 16

- (a) State $\vec{OP}$ in the form $x\vec{i} + y\vec{j}$

Nyatakan $\vec{OP}$ dalam sebutan $x\vec{i} + y\vec{j}$

- (b) Express $\vec{PQ}$ in the form $\begin{pmatrix} x \\ y \end{pmatrix}$

Ungkapkan $\vec{PQ}$ dalam bentuk $\begin{pmatrix} x \\ y \end{pmatrix}$

[3 markah]

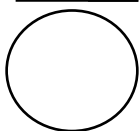
Answer / Jawapan :

(a)

(b)

16

3



3472/1

17. Given $\tan \theta = p$, θ is an acute angle.

Diberi $\tan \theta = p$, θ ialah sudut tirus.

Find/ Cari,

(a) $\cos \theta$

$\cos \theta$

(b) $\operatorname{cosec} 2\theta$

$\operatorname{kosek} 2\theta$

[3 markah]

Answer / Jawapan

(a)

(b)

17

3

18. Diagram 18 shows a sector KOL with centre O, and has a radius of 8 cm.

Given that $HL = GK = 2$ cm.

Rajah 18 menunjukkan sebuah sektor bulatan KOL berpusat O dengan jejari 8 cm.

Diberi $HL = GK = 2$ cm.

Calculate the area, in cm^2 , of the shaded region.

Hitung luas, dalam cm^2 , bagi kawasan berlorek.

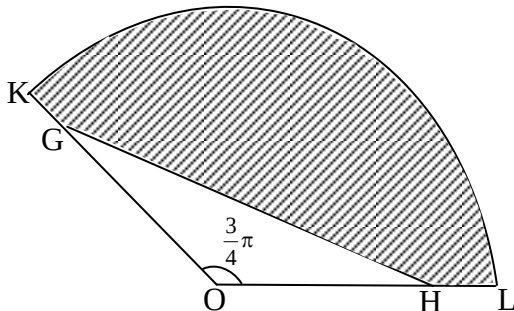


Diagram 18 / Rajah 18

[3 markah]

Answer / Jawapan :

18

3

19. The point P (2, -4) lies on the curve $y = 2x^2 - 5x$.

Titik P (2, -4) terletak pada lengkung $y = 2x^2 - 5x$.

Find / cari,

- (a) the gradient of the tangent to the curve at point P.
kecerunan tangen kepada lengkung di titik P.
- (b) the equation of the normal to the curve at point P.
persamaan normal kepada lengkung di titik P.

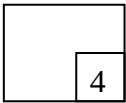
[4 markah]

Answer / Jawapan :

(a)

(b)

19



20. Diagram 20 shows the curve $y = 3x^2 + 1$ and a straight line $x = k$. If the area of the shaded region is $5k$ unit², find the value of k .

Rajah 20 menunjukkan lengkung $y = 3x^2 + 1$ dan garis lurus $x = k$. Jika luas rantau berlorek ialah $5k$ unit², cari nilai k .

[3 markah]

Answer / Jawapan :

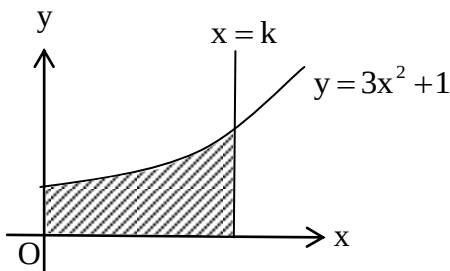
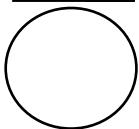
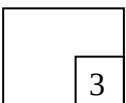


Diagram 20/ Rajah 20

20



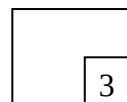
21. Given $\int_k^4 f(x)dx = 5$ and $\int_k^4 [f(x) + 3]dx = 11$, find the value of k.

Diberi $\int_k^4 f(x)dx = 5$ dan $\int_k^4 [f(x) + 3]dx = 11$, cari nilai k.

[3 markah]

Answer / Jawapan :

21



22. The mean of a set numbers, $x+4$, $2x+5$, $2x-1$, $x+7$ and $x-3$ is 8.
 Min bagi set nombor, $x+4$, $2x+5$, $2x-1$, $x+7$ dan $x-3$ ialah 8.

- (a) Find the value of x
 Cari nilai x.
- (b) Find the variance of the set of numbers.
 Cari varians bagi set nombor itu.

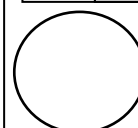
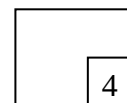
[4 markah]

Answer / Jawapan

(a)

(b)

22



23. A group of students which consists of 3 boys and 5 girls to be arrange in a row.
Calculate the number of possible ways if,

Sekumpulan murid yang terdiri daripada 3 orang murid lelaki dan 5 orang murid perempuan hendak disusun dalam satu baris. Hitungkan bilangan cara susunan berlainan yang mungkin jika,

- (a) no condition is imposed
tiada syarat dikenakan
- (b) all the girls sit next to each other.
semua murid perempuan duduk bersebelahan antara satu sama lain

[4 markah]

Answer / Jawapan :

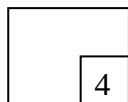
(a)

.

(b)

.

23



24. The probability that a bomb dropped by a warplane will hit the target is 0.6.
Kebarangkalian bahawa sebiji bom yang dijatuhkan oleh sebuah kapal terbang pejuang akan mengenai sasaran ialah 0.6.

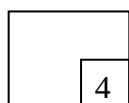
- (a) If five bombs are dropped by the plane, calculate the probability that exactly two of them will hit the target.
Jika lima biji bom dijatuhkan oleh kapal terbang itu, hitung kebarangkalian bahawa tepat dua daripadanya mengenai sasaran.
- (b) Find the minimum number of bombs that must be dropped so that the probability of hitting the target at least once is larger than 0.99.
Cari bilangan minimum bom yang mesti dijatuhkan supaya kebarangkalian bom itu mengenai sasaran sekurang-kurangnya sekali adalah lebih besar daripada 0.99.

[4 markah]

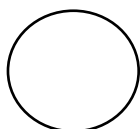
Answer/ Jawapan:

(a)

24



(b)



3472/1

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

Given the probability of the shaded region is 0.3023.
Diberi kebarangkalian kawasan berlorek ialah 0.3023.

Find / Cari

(a) $P(Z < t)$.

(b) X is a random variable of a normal distribution with a mean of 36 and a variance of 25. Find the value of X when z -score = t .

X ialah pembolehubah rawak bagi suatu taburan normal dengan min 36 dan varians 25. Cari nilai X apabila skor- z ialah t .

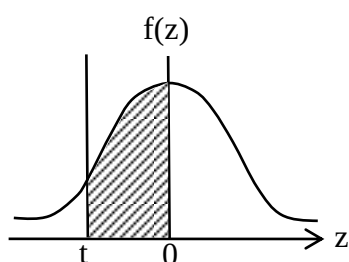


Diagram 25/ Rajah 25

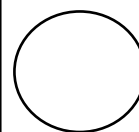
Answer / Jawapan :

[3 markah]

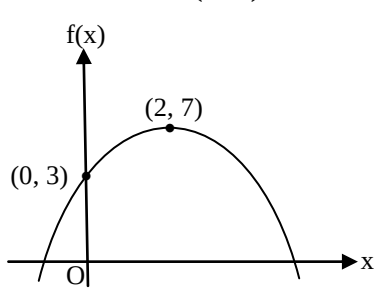
(a)

(b)

END OF QUESTIONS PAPER.
KERTAS SOALAN TAMAT



SEK. MEN. KEB. AGAMA NAIM LILBANAT
PEPERIKSAAN PERCUBAAN SPM 2014
SKEMA PERMARKAHAN MATEMATIK TAMBAHAN KERTAS 1

No		Solution and Mark Scheme	Sub Marks	Total Marks
1	(a)	1	1	2
	(b)	4	1	
2	(a)	$\frac{5}{2}$	1	3
	(b)	$-\frac{1}{3}$ B1 : $g(k) = k$ or $g^{-1}(x) = \frac{5x+17}{2x}$	2	
3		$\frac{15}{2}$ B2 : $4k - 5(3) = 2k$ or $\frac{2k-4k}{-5} = 3$ B1 : $f(3) = 2k$ or $f^{-1}(x) = \frac{x-4k}{-5}$	3	3
4	(a)	6	1	4
	(b)	$m > \frac{3}{2}$ B2 : $-8m < -12$ B1 : $(-6)^2 - 4(2)(m+3) < 0$	3	
5		B1 : bentuk maksimum. B1 : melalui titik (2, 7) B1 : melalui titik (0, 3) 		3

6		$x \leq -4, \quad x \geq \frac{3}{2}$ $\text{B2 : } (2x - 3)(x + 4) \geq 0$ $\text{B1 : } 2x^2 + 5x - 12 \geq$	3	3
7		-2 $\text{B3 : } 2^x = \frac{1}{4}$ $\text{B2 : } 2^x(8 - 5) = \frac{3}{4}$ $\text{B1 : } 2^x(2^3) - 10(2^x(\frac{1}{2})) = \frac{3}{4}$	4	4
8		$\frac{1}{4}$ $\text{B2 : } \left(\frac{3x}{7x+5}\right) = 3^{-2}$ $\text{B1 : } \log_3\left(\frac{3x}{7x+5}\right) = -2$	3	3
9		$\frac{2+3n-m}{3}$ $\text{B2 : } \frac{2+3\log_2 y - \log_2 x}{3}$ $\text{B1 : } \frac{\log_2\left(\frac{4y^3}{x}\right)}{\log_2 8}$	3	3
10		3 $\text{B1 : } \frac{p-1}{6} = \frac{6}{18}$	2	2

11		$T_7=23$ B3 : $a=5$ B2 : $d=3$ B1 : $a+4d=17$ or $\frac{4}{2}(2a+3d)=38$	4	4
12		$\frac{63}{32}$ or 1.96875 // 1.97 B2 : $S_9 - S_3$ B1 : $S_3 = \frac{8(1-(\frac{1}{2})^3)}{1-\frac{1}{2}}$ or $S_9 = \frac{8(1-(\frac{1}{2})^9)}{1-\frac{1}{2}}$	3	3
13		14 or $m+21$ or $-6m-28$ B1 : $m=-7$ or $d=3$	2	2
14	(a)	$m_{PQ} = -\frac{2}{3}$	1	3
	(b)	$y = \frac{3}{2}x - 7$ B1 : $y = \frac{3}{2}x + c$ or $y - 5 = \frac{3}{2}(x - 8)$	2	
15	(a)	$\frac{15}{17}i + \frac{8}{17}j$ B1 : $\sqrt{15^2 + 8^2}$	2	4
	(b)	$m = \frac{5}{3}$ B1 : $15 = \lambda 5$ or $\frac{m+1}{5} = \frac{8}{15}$	2	

16	(a)	$\vec{OP} = -6i + 9j$	1	3
	(b)	$\vec{PQ} = \begin{pmatrix} 10 \\ -6 \end{pmatrix}$ $\mathbf{B1} : \vec{PQ} = \begin{pmatrix} 4 \\ 3 \end{pmatrix} - \begin{pmatrix} -6 \\ 9 \end{pmatrix}$	2	
17	(a)	$\frac{1}{\sqrt{1+p^2}}$	1	
	(b)	$\frac{1+p^2}{2p}$ $\mathbf{B1} : \operatorname{Cosec} 2\theta = \frac{1}{\sin 2\theta} \text{ or } \sin \theta = \frac{p}{\sqrt{1+p^2}}$	2	
18		62.68 cm^2 $\mathbf{B2} : 75.408 - 12.7279$ $\mathbf{B1} : \frac{1}{2}(8^2)(\frac{3}{4}\pi) \text{ or } \frac{1}{2}(6)(6)\sin 135^\circ$	3	3
19	(a)	3	1	4
	(b)	$y = -\frac{1}{3}x - \frac{10}{3} \text{ or } 3y + x = -10$ $\mathbf{B2} : y = -\frac{1}{3}x + c \text{ or } y + 4 = -\frac{1}{3}(x - 2)$ $\mathbf{B1} : m_2 = -\frac{1}{3}$	3	
20		$k = 2$ $\mathbf{B2} : k^3 + k = 5k \text{ or } [x^3 + x]_0^k = 5k$ $\mathbf{B1} : \int_0^k (3x^2 + 1)dx = 5k$	3	3

21		$k = 2$ B2 : $12 - 3k = 6$ B1 : $5 + 3x$	3	3
22	(a)	x = 4 $\frac{7x + 12}{5}$ B1 :	2	4
	(b)	16.8 B1 : 8, 13, 7, 11, 1 or $8^2 + 13^2 + 7^2 + 11^2 + 1^2$ or 404	2	
23	(a)	40 320 B1 : $8!$ or $8P_8$	2	4
	(b)	2880 B1 : $5! \times 4!$	2	
24	(a)	0.2304	1	4
	(b)	$n = 6$ B2 : $1 - P(0) > 0.99$ or $0.4^n < 0.01$ B1 : $P(x \geq 1) > 0.99$	3	
25	(a)	0.1977	1	3
	(b)	31.75 B1 : $-0.85 = \frac{x - 36}{5}$	2	

Name :

Form :



SMKA NAIM LILBANAT 15150 KOTA BHARU KELANTAN.
“SEKOLAH BERPRESTASI TINGGI”

PEPERIKSAAN PERCUBAAN SPM 2014
ADDITIONAL MATHEMATICS

3472/2

Kertas 2
2 ½ Jam

2 ½ Jam

Arahan:

1. This question paper consists of three sections:
Section **A**, Section **B** and Section **C**.
2. Answer **all** questions in Section A, any **four** questions from Section B and any **two** questions from Section C.
3. Write your answers on the paper sheets provided.

Untuk Kegunaan Pemeriksa			
	Soalan	Markah Penuh	Markah Diperoleh
A	1	5	
	2	7	
	3	6	
	4	7	
	5	8	
	6	7	
B	7	10	
	8	10	
	9	10	
	10	10	
	11	10	
C	12	10	
	13	10	
	14	10	
	15	10	
	JUMLAH	100	

Kertas soalan ini mengandungi 8 halaman bercetak.

Section A

[40 marks]

(Answer all questions)

1. Solve the following simultaneous equations :

Selesaikan persamaan serentak berikut:

$$3x - y = 1 \text{ and } 5x^2 - xy - 2y = -1$$

[5 marks]

2. (a) Sketch the graph of $y = 4\sin 2x$ for $0 \leq x \leq \frac{3}{2}\pi$

Lakarkan graf bagi $y = 4\sin 2x$ untuk $0 \leq x \leq \frac{3}{2}\pi$

[3 marks]

- (b) Hence, by using the same axes, sketch a suitable straight line to find the number of the solutions of the equation $\sin 2x + \frac{x}{\pi} = \frac{1}{2}$ for $0 \leq x \leq \frac{3}{2}\pi$.

Seterusnya, dengan menggunakan paksi yang sama, lakar satu garis lurus yang sesuai untuk mencari

bilangan penyelesaian bagi persamaan $\sin 2x + \frac{x}{\pi} = \frac{1}{2}$ untuk $0 \leq x \leq \frac{3}{2}\pi$.

[4 marks]

3. The gradient function of a curve which passes through the point $(1, -\frac{3}{2})$ is $kx^2 - x$, where k is a constant. The equation of the tangent to the curve at that point is $y - 2x + 5 = 0$.

Fungsi kecerunan bagi satu lengkung yang melalui titik $(1, -\frac{3}{2})$ ialah $kx^2 - x$, dengan keadaan k ialah pemalar.

Persamaan tangen kepada lengkung pada titik itu ialah $y - 2x + 5 = 0$.

- (a) Find the value of k .

Cari nilai k .

[3 marks]

- (b) Find the equation of the curve.

Cari persamaan bagi lengkung itu.

[3 marks]

4. A circle is divided into n sectors such that the angles of the sectors form an arithmetic progression.

Sebuah bulatan dibahagikan kepada n sektor dengan keadaan sudut-sudut sektor itu membentuk suatu jangjang aritmetik.

- (a) If the smallest angle and the largest angle are 3° and 27° respectively, find the value of n .
Jika sudut yang terkecil dan sudut yang terbesar masing-masing ialah 3° dan 27° . cari nilai n .

[3 marks]

- (b) Using the value of n obtained in 4(a), find
Dengan menggunakan nilai n yang diperoleh di 4(a), cari

- (i) the common difference of the progression.
beza sepunya jangjang itu.

- (ii) the value of the tenth angle.
nilai bagi sudut yang kesepuluh.

[4 marks]

5. Diagram 5 shows a triangle PQR where A is a point on PQ, B is a point on PR and C is a point on AR.

Rajah 8 menunjukkan sebuah segi tiga PQR di mana A ialah satu titik pada PQ, B ialah satu titik pada PR dan C ialah satu titik pada AR.

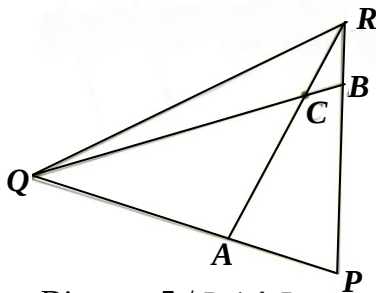


Diagram 5 / Rajah 5

It is given that:

Diberi bahawa: $2QA = 3AP$, $AC = 3CR$, $PB = 5BR$, $\vec{RB} = \vec{a}$, $\vec{PA} = 2\vec{b}$

- (a) Express in terms of $\vec{a}$ and $\vec{b}$

Ungkapkan dalam sebutan $\vec{a}$ dan $\vec{b}$

(i) $\vec{RA}$

(ii) $\vec{BC}$

(iii) $\vec{CQ}$

[5 marks]

- (b) Hence, show that B, C and Q lie on a straight line.

Seterusnya, tunjukkan bahawa B, C dan Q berada pada satu garis lurus.

[3 marks]

6. Table 6 shows the distribution of the scores of 60 students in a test.

Jadual 6 menunjukkan taburan skor bagi 60 orang murid dalam satu ujian.

Score / Skor	Frequency/ Kekerapan
1 – 10	10
11 – 20	16
21 – 30	11
31 – 40	12
41 – 50	11

Table 6/ Jadual 6

- (a) Find the mean of the scores.

Cari min bagi skor tersebut.

[2 marks]

- (b) Without drawing an ogive, find the interquartile for scores.

Tanpa melukis ogif, cari julat antara kuartil bagi skor tersebut.

[5 marks]

Section B

[40 marks]

(Answer any **four** questions from this section)

7. Use graph paper to answer this question.

Table 7 shows the values of two variables, x and y , obtained from an experiment. The variables x and y are related by the equation $y = px^{q-1}$, where p and q are constants.

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

Pembolehubah x dan y di hubungkan oleh persamaan $y = px^{q-1}$

x	1.5	2	2.5	3	3.5	5
y	30.20	16.98	10.96	7.244	5.012	2.512

Table 7/ Jadual 7

- (a) Construct a table for the values of $\log_{10} x$ and $\log_{10} y$

Bina sebuah jadual bagi nilai-nilai $\log_{10} x$ dan $\log_{10} y$

[2 marks]

- (b) Plot $\log_{10} y$ against $\log_{10} x$ by using a scale of 2 cm to 0.1 units on $\log_{10} x$ -axis and 2 cm to 0.2 unit on the $\log_{10} y$ - axis.

Hence, draw the line of best fit.

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

Seterusnya, lukis garis penyesuaian terbaik.

[3 marks]

- (c) From your graph in 7(b), find the value of

Dari graf anda di 7(b), cari nilai bagi,

(i) p and q .

(ii) y when $x = 2.7$.

nilai y apabila $x = 2.7$

[5 marks]

8. Diagram 8 shows a straight line $y = k$ touching the maximum point A of the curve $y = 6x - x^2$.
 Rajah 8 menunjukkan garis lurus $y = k$ menyentuh titik maksimum A bagi lengkung $y = 6x - x^2$.

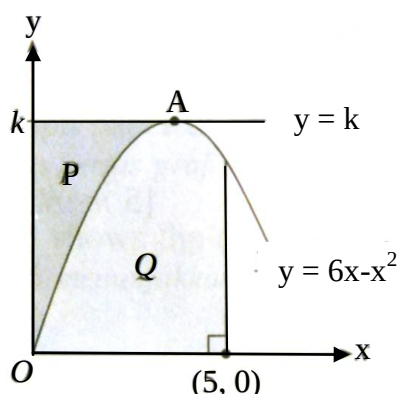


Diagram 8/ Rajah 8

- (a) Find the value of k .
 Cari nilai k . [3 marks]
- (b) Find the area, in unit^2 , of region Q.
 Cari luas, dalam unit^2 , bagi rantau Q. [3 marks]
- (c) Calculate the volume generated, in terms of π , when the region P is revolved 360° about the x-axis.
 Hitung isi padu janaan, dalam sebutan π , apabila rantau P dikisarkan melalui 360° pada paksi-x. [4 marks]

9. Solution by scale drawing is **not** accepted.
 Penyelesaian secara lukisan berskala **tidak** diterima.

Diagram 9 shows a triangle ABC.
 Rajah 9 menunjukkan segi tiga ABC.

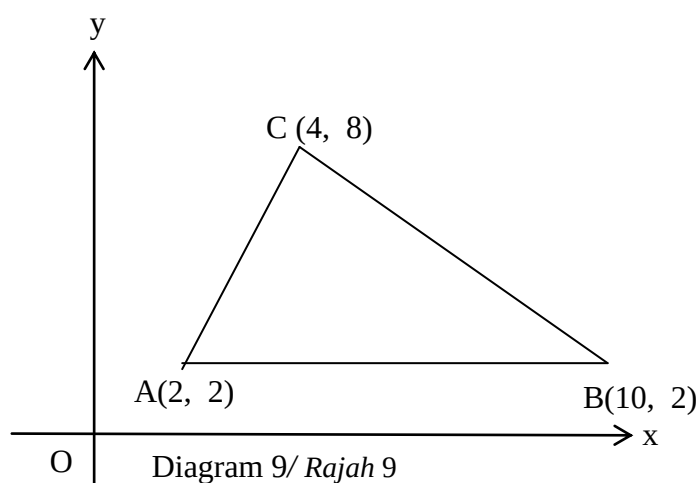


Diagram 9/ Rajah 9

- (a) Calculate the area, in unit^2 , of the triangle ABC.
 Hitung luas, dalam unit^2 , segi tiga ABC. [2 marks]
- (b) Find the equation of the perpendicular bisector of BC.
 Cari persamaan pembahagi dua serenjang BC. [4 marks]
- (c) The perpendicular bisector of BC intersects line AB at a point D. Find the coordinates of point D.
 Pembahagi dua sama serenjang BC bersilang dengan garis AB di titik D. Cari koordinati bagi titik D. [2 marks]
- (d) A point P(x, y) moves such that $PC = 5$ units. Find the equation of the locus of point P.
 Satu titik P(x, y) bergerak dengan keadaan $PC = 5$ unit. Cari persamaan lokus bagi titik P. [2 marks]

10. Diagram 10 shows a sector AOB of a circle with centre O and a radius of 14 cm. Point C lies on OB such that $AC = 2 OC$ and $OC = 5$ cm.

Rajah 10 menunjukkan sektor AOB bagi satu bulatan berpusat O dan berjejari 14 cm. Titik C terletak pada OB dengan keadaan $AC = 2 OC$ dan $OC = 5$ cm.

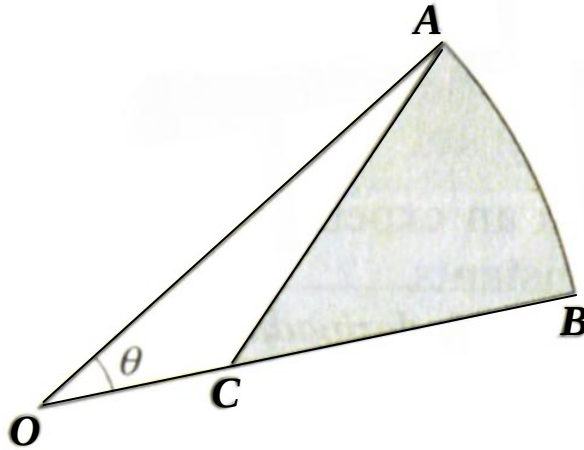


Diagram 10/ Rajah 10

Calculate/ Hitung,

- the value of θ , in radian.
nilai θ , dalam radian. [3 marks]
- the perimeter, in cm, of the shaded region.
perimeter, dalam cm, kawasan berlorek. [3 marks]
- the area, in cm^2 , of the shaded region.
luas, dalam cm^2 , kawasan berlorek. [4 marks]

11. (a) In a survey carried out in a particular district, it is found that three out of five families have less than four children. If 9 families are chosen at random from that district, calculate the probability that at least seven families have less than four children.

Dalam suatu tinjauan di sebuah daerah tertentu, didapati tiga daripada lima keluarga mempunyai kurang daripada empat orang anak. Jika 9 keluarga dipilih secara rawak dari daerah itu, hitung kebarangkalian bahawa sekurang-kurangnya tujuh keluarga mempunyai kurang daripada empat orang anak.

[4 marks]

- (b) 500 students from a school sat for a test. The marks obtained are normally distributed with a mean of 55 and a standard deviation of 10.

Seramai 500 orang murid dari sebuah sekolah menduduki satu ujian. Markah yang diperolehi bertaburan secara normal dengan min 55 dan sisihan piawai 10.

- (i) Find the number of students who pass the test if the passing mark is 45.

Cari bilangan murid yang lulus ujian itu jika markah lulus ialah 45.

- (ii) If 15.87% of the students obtained distinction, find the minimum mark needed to obtain a distinction.

Jika 15.87% daripada murid-murid itu mendapat kepujian, cari markah minimum yang diperlukan untuk mendapat kepujian.

[6 marks]

SECTION C

[20 marks]

(Answer any **two** questions from this section)

12. Diagram 12 shows a quadrilateral ABCD. Given the area of triangle ABD is 19.7 cm^2 .

Rajah 12 menunjukkan sisi empat ABCD. Diberi luas segi tiga ABD ialah 19.7 cm^2 .

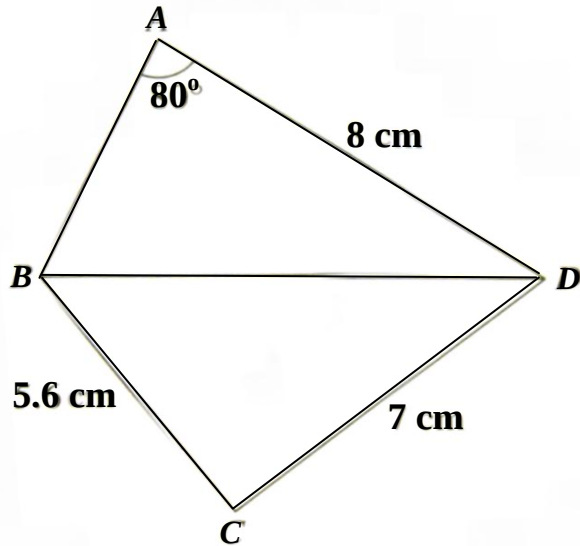


Diagram 12/ Rajah 12

Calculate/ Hitung,

- (a) the length of AB, in cm.

panjang AB, dalam cm

[2 marks].

- (b) the length of BD, in cm

panjang BD, dalam cm.

[2 marks]

- (c) $\angle BCD$,

[3 marks]

- (d) $\angle CBD$

[3 marks]

13. Table 13 shows the prices, the price indices and the weightage of four materials, A, B, C and D, used in the production of a model car.

Jadual 13 menunjukkan harga, indeks harga dan peratusan bagi empat bahan A, B, C dan D, yang digunakan dalam menghasilkan model sejenis kereta.

Material Bahan	Price (RM) for the year Harga (RM) bagi tahun		Price index for the year 2006 based 2004 Indeks harga bagi tahun 2006 berasaskan tahun 2004	Weightage Peratusan (%)
	2004	2006		
A	100	120	120	60
B	240	x	200	20
C	800	1200	150	10
D	160	240	y	10

Table 13/ Jadual 13

- (a) Calculate the values of x and y.

Hitung nilai x dan nilai y.

[3 marks]

- (b) Calculate the composite index for the year 2006 based on the year 2004

Hitungkan indeks gubahan bagi tahun 2006 berasaskan tahun 2004.

[3 marks]

- (c) The price of material C is expected to decrease by 30% in the year 2008 compared to the year 2006. Find the price index of C for the year 2008 based on the year 2004.

Harga bahan C dijangka akan menurun sebanyak 30% pada tahun 2008 berbanding dengan tahun 2006. Cari indeks harga C bagi tahun 2008 berasaskan tahun 2004.

[4 marks]

14. Use graph paper to answer this question.

Guna kertas graf untuk menjawab soalan ini

A company wishes to purchase two types of computers, A and B, for its staff. It plans to buy x computers of type A which cost RM2 000 each and y computers of type B which cost RM3 000 each. The purchase of the computers is subject to the following constraints:

Sebuah syarikat ingin membeli dua jenis komputer, A dan B, untuk pekerjaanya. Syarikat itu bercadang membeli x unit komputer A yang setiapnya berharga RM2000 dan y unit komputer B yang setiapnya berharga RM 3000. Pembelian komputer itu adalah berdasarkan kekangan yang berikut:

- I : The company allocated RM1500 000 for the purchase of the computers.

Syarikat itu memperuntukkan RM1500 000 untuk membeli komputer itu.

- II : The total number of computers purchased cannot exceed 600.

Jumlah bilangan komputer yang dibeli tidak boleh melebihi 600 unit.

- III: The ratio of the number of computers of type B purchased to the number of computers of type A purchased must be at least 1 : 2.

Nisbah bilangan komputer B yang dibeli kepada bilangan komputer A yang dibeli mestilah sekurang-kurangnya 1 : 2.

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

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

[3 marks]

- (b) Using a scale of 2 cm to 100 computers on both axes, construct and shade the region R which satisfies all the above constraints.

Dengan menggunakan skala 2 cm kepada 100 unit komputer pada kedua-dua paksi, bina dan lorek rantau R yang memenuhi semua kekangan di atas.

[3 marks]

- (c) (i) If 250 computers of type A are purchased, find the range of the number of computers of type B purchased.

Jika 250 unit komputer A telah dibeli, cari julat bagi bilangan komputer B yang dibeli.

- (ii) If the cost of maintenance is RM500 for a computer of type A and RM200 for a computer of type B, find the maximum total cost of maintenance that has to be borne by the company.

Jika kos penyelenggaraan ialah RM500 untuk seunit komputer A dan RM200 untuk seunit komputer B, cari jumlah kos penyelenggaraan maksimum yang akan ditanggung oleh syarikat itu.

[4 marks]

15. A particle moves along a straight line and passes through a fixed point O at a velocity 36 m s^{-1} . Its acceleration, $a \text{ m s}^{-2}$, $t \text{ s}$ after passing through O is given by $a = 6(t - 4)$.

Satu zarah bergerak di sepanjang suatu garis lurus dan melalui titik tetap O dengan halaju 36 m s^{-1} . Pecutannya, $a \text{ m s}^{-2}$, selepas melalui O diberi oleh $a = 6(t - 4)$.

[Assume motion to the right is positive.]

[Anggapkan gerakan ke arah kanan sebagai positif.]

- (a) Find its velocity, $v \text{ m s}^{-1}$, in term of t .

Cari halajunya, $v \text{ m s}^{-1}$, dalam sebutan t

[2 marks]

- (b) Find the values of t when the particle reverses its direction of motion.

Cari nilai-nilai t ketika zarah itu bertukar arah gerakannya.

[3 marks]

- (c) Find the minimum velocity, in m s^{-1} , of the particle.

Cari halaju minimum, dalam m s^{-1} zarah itu.

[2 marks]

- (d) Calculate the distance, in m , travelled during the third second.

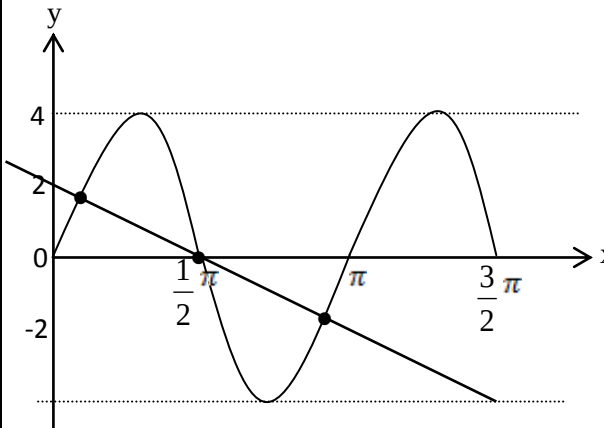
Hitung jarak, dalam m , yang dilalui dalam saat yang ketiga.

[3 marks]

END OF QUESTIONS PAPER.

KERTAS SOALAN TAMA

SEK. MEN. KEB. AGAMA NAIM LILBANAT
PEPERIKSAAN PERCUBAAN SPM 2014
SKEMA PERMARKAHAN MATEMATIK TAMBAHAN KERTAS 2

NO	SOLUTIONS	MARKS	TOTAL
1.	$y = 3x - 1$ or $x = \frac{1+y}{3}$ $5x^2 - x(3x - 1)^2 - 2(3x - 1) - 2(3x - 1) = -1$ or $\left(\frac{y-3}{2}\right)^2 - 2y^2 - \left(\frac{y-3}{2}\right)y + 27 = 0$ $2x^2 - 5x + 3 = 0$ $(2x - 3)(x - 1) = 0$ or $x = \frac{3}{2}, x = 1$ $y = \frac{7}{2}, y = 2$	P1 K1 K1 N1 N1	5
2(a)	 shape of $\sin$ curve P1 $1\frac{1}{2}$ cycle for $0 \leq x \leq \frac{3}{2}\pi$ P1 maximum = 2 and minimum = -2 P1		7
(b)	straight line $y = 2 - \frac{4}{\pi}x$ No. of solutions = 3	N1 K1 N1 N1	

3(a) $\frac{dy}{dx} = kx^2 - x$ $(1, -\frac{3}{2}) : k - 1 = 2$ $k = 3$ (b) $y = \int (3x^2 - x) dx$ $= \frac{3x^3}{3} - \frac{x^2}{2} + c$ gradient $(1, -\frac{3}{2}) :$ $y = x^3 - \frac{x^2}{2} - 2$	P1 K1 N1 K1 K1 N1	6
4(a) $a = 3$ $l = 27$ (b) (i) $T_{24} = 3 + 23d = 27$ $d = \frac{24}{23}$ (ii) $T_{10} = 3 + 9(\frac{24}{23})$ $= 12\frac{9}{23} \text{ or } 12.39$	P1 K1 N1 K1 N1 K1 N1	7
5(a) (i) $\vec{RA} = \vec{RP} + \vec{PA}$ $= 6\vec{a} + 2\vec{b}$ (ii) $\vec{BC} = \vec{BR} + \vec{RC}$ $= -\vec{a} + \frac{1}{4}(6\vec{a} + 2\vec{b})$ $= \frac{1}{2}\vec{a} + \frac{1}{2}\vec{b}$ (iii) $\vec{CQ} = \vec{CA} + \vec{AQ}$ $= \frac{3}{4}(6\vec{a} + 2\vec{b}) + 2\vec{b}$ $= \frac{9}{2}\vec{a} + \frac{9}{2}\vec{b}$	N1 K1 N1 K1 N1	

5.(b)	$(i) \frac{\vec{BC}}{\vec{CQ}} = \frac{\frac{1}{2}\tilde{a} + \frac{1}{2}\tilde{b}}{\frac{9}{2}\tilde{a} + \frac{9}{2}\tilde{b}}$ $= \frac{\frac{1}{2}\tilde{a} + \frac{1}{2}\tilde{b}}{9[\frac{1}{2}\tilde{a} + \frac{1}{2}\tilde{b}]}$ $\vec{BC} = \frac{1}{9}\vec{CQ}$	K1 K1 N1	8
6.		K1	
(a)	$\bar{x} = \frac{\sum fx}{N}$ $= \frac{1510}{60}$ $= 25.17$	N1	
(b)	$Q_1 = 10.5 + \frac{\left[\frac{1}{4}(60) - 10 \right]}{16} 10$ $= 13.625$ $Q_3 = 30.5 + \frac{\left[\frac{3}{4}(60) - 37 \right]}{12} 10$ $= 37.167$ Julat antara quartile = $37.167 - 13.625 = 23.542$	K1 N1 K1 N1 N1	7

7 (a)	<table><tr><td>$\log_{10} x$</td><td>0.18</td><td>0.30</td><td>0.40</td><td>0.48</td><td>0.54</td><td>0.70</td></tr><tr><td>$\log_{10} y$</td><td>1.48</td><td>1.23</td><td>1.04</td><td>0.86</td><td>0.70</td><td>0.40</td></tr></table>	$\log_{10} x$	0.18	0.30	0.40	0.48	0.54	0.70	$\log_{10} y$	1.48	1.23	1.04	0.86	0.70	0.40	N1	10
$\log_{10} x$	0.18	0.30	0.40	0.48	0.54	0.70											
$\log_{10} y$	1.48	1.23	1.04	0.86	0.70	0.40											
(b)	Both axes correct (at least plotting 1 point) Plotting all 6 points – correct line of the best fit - correct.	N1 K1 K1 N1															
(c)	(i) $\log_{10} y = (q - 1) \log_{10} x + \log_{10} p$ $\log_{10} p = Y - \text{intercept}$ $= 1.86$ $p = 10^{1.86}$ $= 72.44$	N1 K1															
	(ii) $q - 1 = \text{gradient}$ $= \frac{0.40 - 1.23}{0.70 - 0.30} = -2.075$ $q = -1.075$ When $x = 2.7$, $\log_{10} x = 0.43$ $\log_{10} y = 0.96$ $y = 9.120$	K1 N1 N1															
8 (a)	$\frac{dy}{dx} = 6 - 2x = 0$ $x = 3$ Ganti (3, k) : $k = 6(3) - 3^2$ $= 9$	P1 K1 N1															
(b)	Area of Q $= \int_0^5 6x - x^2 dx$ $= \left[3x^2 - \frac{x^3}{3} \right]_0^5$ $= (3(5)^2 - \frac{5^3}{3}) - (0)$ $= \frac{100}{3} \text{ or } 33\frac{1}{3}$	K1 K1 N1	10														

(c)	Volume of P $= \pi \int_0^3 81 dx - \pi \int_0^3 (6x - x^2)^2$ $= \pi [81x]_0^3 - \pi \left[12x^3 - 3x^4 + \frac{x^5}{5} \right]_0^3$ $= 243\pi - [324 - 243 + 48.6]\pi$ $= 113.4\pi$	P1 K1 K1 N1	
9 (a) (b) (c) (d)	Area of $\triangle ABC$ $= \frac{1}{2} \begin{vmatrix} 2 & 10 & 4 & 2 \\ 2 & 2 & 8 & 2 \end{vmatrix}$ $= \frac{1}{2} (4 + 80 + 8) - (20 + 8 + 16) $ $= 24$ Mid point BC $= \left(\frac{10+4}{2}, \frac{2+8}{2} \right)$ $= (7, 5)$ Gradient BC $= \frac{8-2}{4-10}$ $= -1$ $m_2 = 1$ $y - 5 = 1(x - 7)$ $y = x - 2$ D(x, 2) $y = x - 2$ $2 = x - 2$ $x = 4$ $D = (4, 2)$ PC = 5 $\sqrt{(x-4)^2 + (y-8)^2} = 5$ $x^2 + y^2 - 8x - 16y + 55 = 0$	K1 N1 P1 N1 K1 N1 K1 N1	10

10 (a) $\cos \theta = \frac{14^2 + 5^2 - 10^2}{2(14)(5)}$ $= 0.8643$ $\angle \theta = \frac{30.197 \times 3.142}{180} = 0.527 \text{ rad}$ (b) $\text{Perimter} = 10 + 9 + 14(0.527)$ $= 26.378 \text{ cm}$ (c) $\text{Area} = \frac{1}{2}(14)^2(0.527) - \frac{1}{2}(5)(14) \sin 30.197^\circ$ $= 51.646 - 17.604$ $= 34.052 \text{ cm}^2$		K1 N1 N1 K1 K1 N1 N1	10
11(a) $p = \frac{3}{5} \text{ or } q = \frac{2}{3} \text{ or } n = 9$ $P(X \geq 7) = 9C_7(0.6)^7(0.4)^2 + 9C_8(0.6)^8(0.4)^1 + 9C_9(0.6)^9(0.4)^0$ $= 0.2318$ (b) (i) $n = 500, \mu = 55, \sigma = 10$ $P(X > 45)$ $= P\left(Z > \frac{45 - 55}{10}\right)$ $= P(Z > -1)$ $= 0.8413$ $\text{Bilangan Murid} = 0.8413 \times 500$ $= 420 / 421$ (ii) $P(z > x) = 15.87$ $P\left(z > \frac{x - 55}{10}\right) = 0.1587$ $\frac{x - 55}{10} = 1.0$ $x = 65$		P1 K1 K1 N1 K1 N1 N1 K1 N1 N1	10

12(a) $\frac{1}{2}(AB)(8)\sin 80^\circ = 19.7$ $AB = \frac{19.7 \times 2}{8 \times \sin 80^\circ}$ $= 5$ (b) $BD = \sqrt{5^2 + 8^2 - 2(5)(8)\cos 80^\circ}$ $= \sqrt{75.1081}$ $= 8.667 \text{ cm}$ (c) $\cos \angle BCD = \frac{5.6^2 + 7^2 - 8.667^2}{2(5.6)(7)}$ $= 0.0669$ $\angle BCD = 86.16^\circ \text{ or } 86^\circ 10'$ (d) $\frac{\sin \angle CBD}{7} = \frac{\sin 86.16^\circ}{8.667}$ $\sin \angle CBD = 0.8058$ $\angle CBD = 53.69^\circ \text{ or } 53^\circ 41'$		K1 N1 K1 N1 K1 N1 N1 K1 N1 N1	10
13. (a) Use $I = \frac{Q_1}{Q_o} \times 100$ $x = 480, \quad y = 150$ (b) $I_{06/04} = \frac{120(60) + 200(20) + 150(10) + 150(10)}{60 + 20 + 10 + 10}$ $= 142$ (c) $I_{08/06} = 70$ Use $\frac{I_{08/04}}{I_{06/04}} \times 100 = I_{08/06}$ $I_{08/04} = \frac{70 \times 150}{100}$ $= 105$		K1 N1 N1 K1 N1 N1 P1 K1 K1 N1	10

14 (a) $2x + 3y \leq 1500$ $x + y \leq 600$ $y \geq \frac{1}{2}x$ (b) Draw correctly all three straight line which involves x and y. Region shaded correctly (c) (i) $x = 250, 120 \leq y \leq 330$ (ii) Use $500x + 200y$ for point in the shaded region $(400, 200) : 500(400) + 200(200)$ $= \text{RM}240,000$		N1 N1 N1 K1 N1 N1 N1 K1 N1 N1	10
15. (a) $v = \int 6t - 24 \, dt$ $= 3t^2 - 24t + c$ $c = 36, \quad v = 3t^2 - 24t + 36$ (b) $V = 0$ $3t^2 - 24t + 36 = 0$ $t^2 - 8t + 12 = 0$ $(t - 2)(t - 6) = 0$ $t = 2, t = 6$ (c) $V_{\min}, a = 0, t = 4$ $V_{\min} = 3(4^2) - 24(4) + 36$ $= -12 \text{ ms}^{-1}$ (d) $S_3 - S_2 = \int_2^3 3t^2 - 24t - 36 \, dt$ $= \left[t^3 - 12t^2 + 36t \right]_2^3$ $= (27 - 12(9) + 36(3)) - (8 - 12(4) + 36(2))$ $= 5$		K1 N1 P1 K1 N1 K1 N1 K1 K1 N1	10

Soalan 7

Tarikh:

