

3472/1
 Matematik Tambahan
 Kertas 1
 Ogos
 2010
 2 jam



BAHAGIAN PENGURUSAN
 SEKOLAH BERASRAMA PENUH DAN SEKOLAH KLUSTER
 KEMENTERIAN PELAJARAN MALAYSIA

NAMA : TINGKATAN :

PEPERIKSAAN PERCUBAAN
 SIJIL PELAJARAN MALAYSIA 2010

MATEMATIK TAMBAHAN TINGKATAN 5 TAHUN 2010 Kertas 1 Dua Jam			
	Soalan	Markah Penuh	Markah Diperoleh
	1	2	
	2	4	
	3	3	
	4	3	
	5	2	
	6	3	
	7	3	
	8	3	
	9	3	
	10	3	
	11	4	
	12	4	
	13	4	
	14	4	
	15	4	
	16	3	
	17	4	
	18	2	
	19	2	
	20	3	
	21	4	
	22	3	
	23	3	
	24	4	
	25	3	
	Jumlah		

**JANGAN BUKA KERTAS SOALAN
 INI SEHINGGA DIBERITAHU**

1. *Tuliskan nama dan tingkatan pada ruangan 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 arahan di halaman belakang kertas soalan ini.*

Kertas soalan ini mengandungi **21** halaman bercetak

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

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

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

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

4 Area under a curve
Luas di bawah lengkung

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

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

5 Volume generated / *Isipadu janaan*

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

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

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

4 Area of triangle / Luas segitiga
$$= \frac{1}{2} |(x_1 y_2 + x_2 y_3 + x_3 y_1) - (x_2 y_1 + x_3 y_2 + x_1 y_3)|$$

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

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

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

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

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

TRIGONOMETRY / TRIGONOMETRI

- | | |
|---|--|
| <p>1 Arc length, $s = r \theta$
<i>Panjang lengkok, $s = j \theta$</i></p> | <p>8 $\sin (A \pm B) = \sin A \cos B \pm \cos A \sin B$
$\sin (A \pm B) = \sin A \cos B \pm \cos A \sin B$</p> |
| <p>2 Area of sector, $A = \frac{1}{2} r^2 \theta$
<i>Luas sektor, $L = \frac{1}{2} j^2 \theta$</i></p> | <p>9 $\cos (A \pm B) = \cos A \cos B \mp \sin A \sin B$
$\cos (A \pm B) = \cos A \cos B \mp \sin A \sin B$</p> |
| <p>3 $\sin^2 A + \cos^2 A = 1$
$\sin^2 A + \cos^2 A = 1$</p> | <p>10 $\tan (A \pm B) = \frac{\tan A \pm \tan B}{1 \mp \tan A \tan B}$</p> |
| <p>4 $\sec^2 A = 1 + \tan^2 A$
$\sec^2 A = 1 + \tan^2 A$</p> | <p>11 $\tan 2A = \frac{2 \tan A}{1 - \tan^2 A}$</p> |
| <p>5 $\operatorname{cosec}^2 A = 1 + \cot^2 A$
$\operatorname{kosek}^2 A = 1 + \cot^2 A$</p> | <p>12 $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$</p> |
| <p>6 $\sin 2A = 2 \sin A \cos A$
$\sin 2A = 2 \sin A \cos A$</p> | <p>13 $a^2 = b^2 + c^2 - 2bc \cos A$
$a^2 = b^2 + c^2 - 2bc \cos A$</p> |
| <p>7 $\cos 2A = \cos^2 A - \sin^2 A$
$= 2 \cos^2 A - 1$
$= 1 - 2 \sin^2 A$</p> <p>$\cos 2A = \cos^2 A - \sin^2 A$
$= 2 \cos^2 A - 1$
$= 1 - 2 \sin^2 A$</p> | <p>14 Area of triangle / <i>Luas segitiga</i>
$= \frac{1}{2} ab \sin C$</p> |

Answer **all** questions.

Jawab **semua** soalan.

$$A = \{ -3, -2, -1, 0, 1, 2 \}$$
$$B = \{ -1, 0, 1, 2, 3 \}$$

1. Based on the above information, the relation between A and B is defined by the set of ordered pairs

$$\{ (-2, -1), (-1, 0), (0, 1), (1, 2), (2, 3) \}.$$

Berdasarkan maklumat atas, hubungan antara A dan B adalah di takrifkan oleh set pasangan bertertib

$$\{ (-2,-1), (-1, 0), (0, 1), (1, 2), (2, 3) \}.$$

State

Nyatakan

(a) the image of 2.

imej bagi 2.

(b) the object of 0.

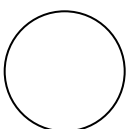
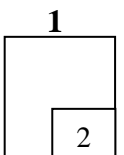
objek bagi 0.

[2 marks]

[2 markah]

Answer : (a).....

(b).....



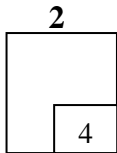
2. Given that $f^{-1} : x \rightarrow x - 1$ and $gf : x \rightarrow 3x^2 - 2$, find

Diberi fungsi $f^{-1} : x \rightarrow x - 1$ dan $gf : x \rightarrow 3x^2 - 2$, cari

- (a) the function $g(x)$,
fungsi $g(x)$,
- (b) the values of x if $g(x) + 3 = x$
nilai-nilai x jika $g(x) + 3 = x$.

[4 marks]

[4 markah]



Answer : (a).....

(b).....

3. Given the function $h : x \rightarrow 2x^2 + 5x$, find

Diberi fungsi $h : x \rightarrow 2x^2 + 5x$, cari

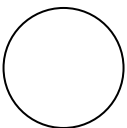
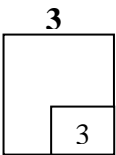
- (a) $h(3)$,
- (b) the values of x which maps onto itself by $h(x)$.
nilai-nilai x yang memetakan kepada sendiri oleh $h(x)$.

[3 marks]

[3 markah]

Answer : (a).....

(b).....



4. The quadratic equation $x(x + y) + 8 = 0$ does not intersects the straight line $x + 2y = p$, where p is a constant. Find the range of values of p .

Persamaan $x(x + y) + 8 = 0$ tidak menyilang garis lurus $x + 2y = p$, dengan keadaan p adalah pemalar. Cari julat nilai p .

[3 marks]
[3 markah]

4
3

Answer :

5. Diagram 5 shows the graph of the function $y = -(x - p)^2 + \frac{25}{4}$ where p is a constant.

Rajah 5 menunjukkan fungsi $y = -(x - p)^2 + \frac{25}{4}$, dengan keadaan p ialah pemalar.

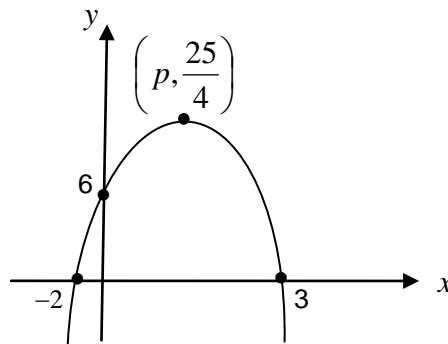


Diagram 5
Rajah 5

Find
Cari

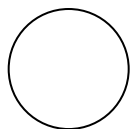
- (a) the value of p ,
nilai p ,
- (b) the equation of the axis of symmetry.
persamaan paksi simetri.

[2 marks]
[2 markah]

5
2

Answer : (a).....

(b).....



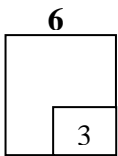
6. Given a quadratic function $f(x) = 8x + 2x^2 = 2(x + hk)^2 + k$, where h and k are constants.

Diberi fungsi kuadratik $f(x) = 8x + 2x^2 = 2(x + hk)^2 + k$, dengan keadaan h dan k adalah pemalar.

State the value of h and value of k ,
Nyatakan nilai h dan nilai k ,

[3 marks]
[3 markah]

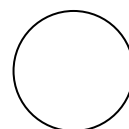
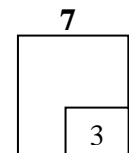
Answer:



7. Solve the equation $4^{2x-1} + 4^{2x} = 4$.

Selesaikan persamaan $4^{2x-1} + 4^{2x} = 4$

[3 marks]
[3 markah]



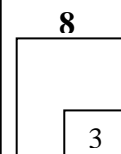
Answer:

8. Given $\log_m 3 = p$ and $\log_m 5 = r$, express $\log_{\sqrt{m}}\left(\frac{125m}{81}\right)$ in terms of p and r .

Diberi $\log_m 3 = p$ dan $\log_m 5 = r$, ungkapkan $\log_{\sqrt{m}}\left(\frac{125m}{81}\right)$ dalam sebutan p dan r .

[3marks]
[3 markah]

Answer



9. Given the first three terms of an arithmetic progression are $2h - 6$, $h + 1$ and $h - 4$, find

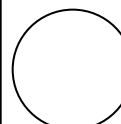
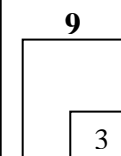
Diberi tiga sebutan pertama suatu jantang aritmetik ialah $2h - 6$, $h + 1$ dan $h - 4$, cari

- (a) the value of h ,
nilai h ,
- (b) the common difference of the progression.
nisbah sepunya jantang itu..

[3 marks]
[3 markah]

Answer: (a).....

(b).....

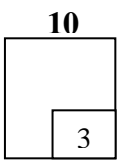


10. The first term of the geometric progression is 0.6 and the fourth term of the progression is 9.375 , find the sum of the first three terms.

Sebutan pertama suatu jangjang geometri ialah 0.6 dan sebutan keempat jangjang aritmetik ialah 9.375 , cari jumlah tiga sebutan pertama.

[3 marks]

[3 markah]



Answer :

11. The n^{th} term of a geometric progression , T_n , is given by $T_n = \left(\frac{3}{4}\right)^{n+1}$, find

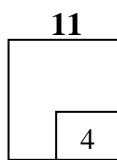
Sebutan ke- n bagi suatu jangjang geometri , T_n , diberi oleh $T_n = \left(\frac{3}{4}\right)^{n+1}$,

cari

- (a) the common ratio,
nisbah sepunya,
- (b) the sum to infinity of the progression.
jumlah sehingga ke tak terhinggaan.

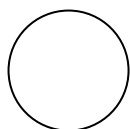
[4 marks]

[4 markah]



Answer : (a).....

(b).....



12. Diagram 12 shows a sector AOB of a circle with center O and radius r cm.

Rajah 12 menunjukkan sektor AOB bagi sebuah bulatan berpusat O dan berjajari x cm.

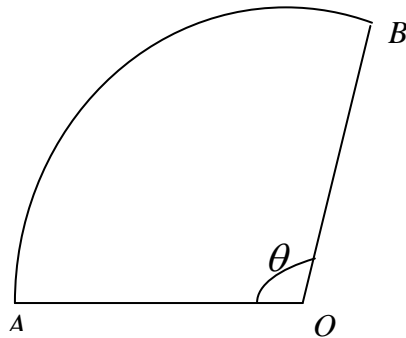


Diagram 12
Rajah 12

Given the length of the arc $AB = 30.5$ cm and the perimeter of the sector AOB is 55.5 cm.

Diberi panjang bagi lengkok $AB = 30.5$ cm dan perimeter sektor AOB adalah 55.5 cm.

Find

Cari

[Use/Guna $\pi = 3.142$]

- (a) θ , in radians,
 θ , dalam radian,
- (b) the area, in cm^2 , of the sector AOB .
luas, dalam cm^2 , sektor AOB .

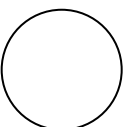
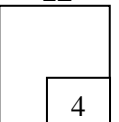
[4 marks]

[4 markah]

Answer: (a).....

(b).....

12



13. The following information refers to the vectors \vec{p} and \vec{q} .

Maklumat berikut adalah berkaitan dengan vektor-vektor \vec{p} dan \vec{q} .

$$\vec{p} = 5\vec{i} - 12\vec{j}$$
$$\vec{q} = m\vec{i} + 6\vec{j}$$

where m is a constants.
dengan keadaan m ialah pemalar.

By using the information given, find

Dengan menggunakan maklumat di atas, cari

(a) the value of m if the vector of \vec{p} and the vector of \vec{q} are parallel,

nilai m jika vektor \vec{p} dan vektor \vec{q} adalah selari,

(b) the unit vector in direction of \vec{p} .

vector unit dalam arah \vec{p} .

[4 marks]

[4 markah]

13

4

Answer: (a).....

(b).....

14. Diagram 14 shows a parallelogram $PQRS$ and STQ is a straight line.

Rajah 14 menunjukkan segiempat selari $PQRS$ dan STQ ialah garis lurus.

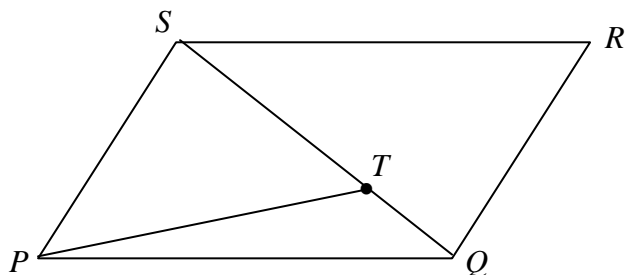


Diagram 14
Rajah 14

Given $\vec{PQ} = 12a$, $\vec{PS} = 6b$ and $ST = 2TQ$, express in terms of a and b .

Diberi $\vec{PQ} = 12a$, $\vec{PS} = 6b$ dan $ST = 2TQ$, ungkapkan dalam sebutan a dan b .

(a) \vec{SQ} ,

(b) \vec{PT} .

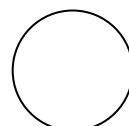
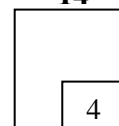
[4 marks]

[4 markah]

Answer : (a).....

(b).....

14



15. Given that x and y are related by the equation $x + \frac{m}{x} = ny$, where m and n are constants. A straight line is obtained by plotting xy against x^2 , as shown in Diagram 15.

Diberi x dan y dihubungkan oleh persamaan $x + \frac{m}{x} = ny$, dengan keadaan m dan n adalah pemalar. Suatu graf garis lurus diperolehi apabila memplotkan xy melawan x^2 , seperti dalam Rajah 15.

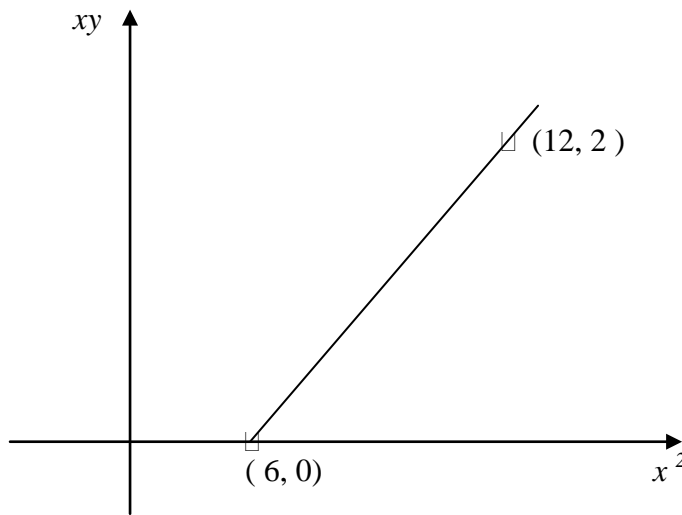


Diagram 15
Rajah 15

Calculate the value of m and of n .

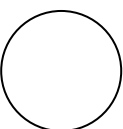
Cari nilai m dan nilai n .

[4 marks]

[4 markah]

15

4



Answer: $m = \dots\dots\dots$

$n = \dots\dots\dots$

16. A point $P(8, t)$ divides the line joining $M(4, 1)$ and $N(r, 7)$ such that $2MP = 3PN$.

Titik $P(8, t)$ membahagi garis yang menyambung $M(4,1)$ dan $N(r, 7)$ dengan keadaan $2MP = 3PN$.

Find the value of

Cari nilai bagi

(a) r

(b) t

[3 marks]

[3 markah]

16

3

Answer: (a).....

(b).....

17. Solve the equation $3 \sin 2x = 4 \cos x$ such that $0^\circ \leq x \leq 360^\circ$.

Selesaikan persamaan $3 \sin 2x = 4 \cos x$ untuk $0^\circ \leq x \leq 360^\circ$.

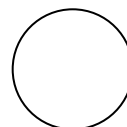
[4 marks]

[4 markah]

17

4

Answer:



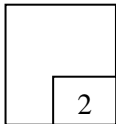
18. Find $f''(x)$ for the function $f(x) = (x^2 + 3)^3$

Cari $f''(x)$ bagi fungsi $f(x) = (x^2 + 3)^3$.

[3 marks]

[3 markah]

18



Jawapan :

19. The curve $y = 2x^2 + hx + 3$ has a gradient of -3 at the point where $x = -1$

find the value of h .

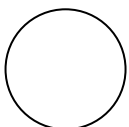
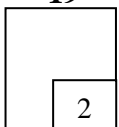
Persamaan lengkung $y = 2x^2 + hx + 3$, mempunyai kecerunan -3 pada

$x = -1$, cari nilai bagi h .

[3 marks]

[3 markah]

19



Answer :

20. Given that $\int_1^5 g(x)dx = 5$, find the value of m if $\int_1^5 [mx - 2g(x)]dx = -3m$.

Diberi $\int_1^5 g(x)dx = 5$, cari nilai bagi m jika $\int_1^5 [mx - 2g(x)]dx = -3m$.

[3 marks]

[3 markah]

20

3

Answer:

21. Table 21 shows the frequency distribution of ages of workers.

Jadual 21 menunjukkan taburan frekuensi bagi umur pekerja.

Age/Umur (years/tahun)	28-32	33-37	38-42	43-47	48-52
Number of workers/ Bilangan pekerja	16	38	26	11	9

Table 21

Jadual 21

Given the third quartile of ages of workers is $K = L + \left(\frac{75 - F}{G}\right)5$,

find the values of K , L , G and F .

Diberi kuartil ketiga bagi umur pekerja-pekerja adalah $K = L + \left(\frac{75 - F}{G}\right)5$,

cari nilai-nilai bagi K , L , G dan F .

[4 marks]

Answer: $K = \dots\dots\dots$

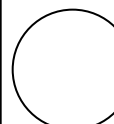
$L = \dots\dots\dots$

$G = \dots\dots\dots$

$F = \dots\dots\dots$

21

4



22. A debating team consists of 5 students. These 5 students are chosen from 4 monitors, 2 assistant monitors and 6 prefects. Calculate the number of different ways the team can be formed if

Suatu pasukan bahas terdiri dari 5 orang pelajar. Pelajar-pelajar ini akan dipilih dari 4 orang ketua kelas, 2 orang penolong ketua kelas dan 6 orang pengawas sekolah. Kira bilangan cara pasukan ini boleh dibentuk jika

(a) there is no restriction

tiada syarat dikenakan

(b) the team contains only one monitor and exactly 3 prefects

pasukan ini terdiri dari hanya seorang ketua kelas dan tepat 3 orang pengawas.

[3 marks]

[3 markah]

Answer : (a).....

(b).....

23. Four girls and three boys are to be seated in a row. Calculate the number of possible arrangements if

Empat orang perempuan dan tiga orang lelaki akan duduk dalam satu barisan. Cari bilangan susunan jika

(a) all the three boys have to be seated together

semua lelaki akan duduk bersebelahan antara satu sama lain.

(b) a boy has to be seated at the centre

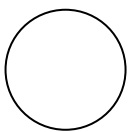
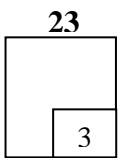
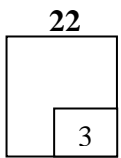
seorang lelaki akan duduk di tengah barisan itu.

[3 marks]

[3 markah]

Answer : (a).....

(b).....



24. In a box of oranges, 15% of the fruits are rotten. If 10 oranges are chosen at random from the box, find the probability that

Dalam suatu kotak yang mengandungi buah oren, 15% daripada buah tersebut adalah busuk . Jika 10 biji oren dipilih secara rawak dari kotak itu, cari kebarangkalian

- (a) exactly 5 rotten oranges are chosen,
tepat 5 biji oren dipilih adalah busuk,
- (b) not more than 2 rotten oranges are chosen.
tidak lebih daripada 2 biji oren yang dipilih adalah busuk.

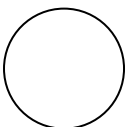
[4 marks]

[4 markah]

Answer : (a).....

(b).....

24
3



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

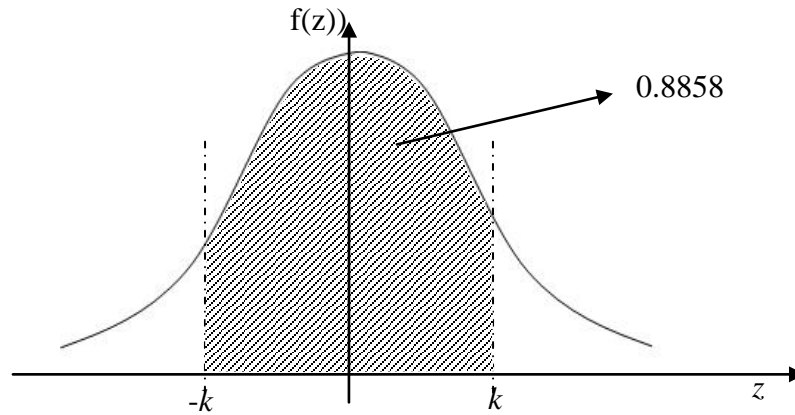


Diagram 25
Rajah 25

The probability represented by the area of the shaded region is 0.8858.
Kebarangkalian yang diwakili sebagai luas kawasan berlerek ialah 0.8858.

- (a) Find the value of $P(Z > k)$
Cari nilai bagi $P(Z > k)$
- (b) X is a continuous random variable which is normally distributed with a mean of μ and a variance of 4.

If the value of X is 85 when the Z -score is k , find the value of μ .
 X adalah pembolehubah rawak selanjar yang bertabur secara normal mempunyai min, μ dan varians, 4, cari nilai bagi μ .

[3 marks]

25
3

Answer: (a).....

(b).....

END OF QUESTION PAPER

INFORMATION FOR CANDIDATES

1. This question paper consists of 25 questions.
2. Answer **all** questions.
3. Give only **one** answer for each question.
4. Write your answers in the spaces provided in this question paper.
5. Show your working. It may help you to get marks.
6. If you wish to change your answer, cross out the answer that you have done. Then write down the new answer.
7. The diagrams in the questions provided are not drawn to scale unless stated.
8. The marks allocated for each question are shown in brackets.
9. A list of formulae is provided on pages 2 to 4.
10. Four-figure mathematical tables are allowed.
11. You may use a non-programmable scientific calculator.
12. Hand in this question paper to the invigilator at the end of the examination.

MAKLUMAT UNTUK CALON

1. *Kertas soalan ini mengandungi 25 soalan.*
2. *Jawab **semua** soalan.*
3. *Bagi setiap soalan beri **satu** jawapan sahaja.*
4. *Jawapan anda hendaklah ditulis pada ruang yang disediakan dalam kertas soalan ini.*
5. *Tunjukkan langkah-langkah penting dalam kerja mengira anda. Ini boleh membantu anda untuk mendapatkan markah.*
6. *Jika anda hendak menukar jawapan, batalkan dengan kemas jawapan yang telah dibuat. Kemudian tulis jawapan yang baharu.*
7. *Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.*
8. *Markah yang diperuntukkan bagi setiap soalan ditunjukkan dalam kurungan.*
9. *Satu senarai rumus disediakan di halaman 2 hingga 4.*
10. *Buku sifir matematik empat angka dibenarkan.*
11. *Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram.*
12. *Serahkan kertas soalan ini kepada pengawas peperiksaan pada akhir peperiksaan.*

3472/2
Matematik Tambahan
Kertas 2
Ogos
2010
2 jam 30 minit



BAHAGIAN PENGURUSAN
SEKOLAH BERASRAMA PENUH DAN SEKOLAH KLUSTER
KEMENTERIAN PELAJARAN MALAYSIA

PEPERIKSAAN PERCUBAAN SPM 2010

MATEMATIK TAMBAHAN
KERTAS 2

SIJIL PELAJARAN MALAYSIA 2010

Masa : 2 jam 30 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. *Tunjukkan langkah-langkah penting dalam kerja mengira anda. Ini boleh membantu anda untuk mendapatkan markah.*
5. *Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram.*

Jawab **semua** soalan dalam **Bahagian A**, mana-mana **empat** soalan daripada **Bahagian B** dan mana-mana **dua** soalan daripada **Bahagian C**.

Kertas soalan ini mengandungi **25** halaman bercetak

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

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

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

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

4 Area under a curve
Luas di bawah lengkung

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

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

5 Volume generated / *Isipadu janaan*

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

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

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

4 Area of triangle / Luas segitiga
$$= \frac{1}{2} |(x_1 y_2 + x_2 y_3 + x_3 y_1) - (x_2 y_1 + x_3 y_2 + x_1 y_3)|$$

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

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

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

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

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

TRIGONOMETRY / TRIGONOMETRI

- | | |
|---|--|
| <p>1 Arc length, $s = r \theta$
<i>Panjang lengkok, $s = j \theta$</i></p> | <p>8 $\sin(A \pm B) = \sin A \cos B \pm \cos A \sin B$
$\sin(A \pm B) = \sin A \cos B \pm \cos A \sin B$</p> |
| <p>2 Area of sector, $A = \frac{1}{2} r^2 \theta$
<i>Luas sektor, $L = \frac{1}{2} j^2 \theta$</i></p> | <p>9 $\cos(A \pm B) = \cos A \cos B \mp \sin A \sin B$
$\cos(A \pm B) = \cos A \cos B \mp \sin A \sin B$</p> |
| <p>3 $\sin^2 A + \cos^2 A = 1$
$\sin^2 A + \cos^2 A = 1$</p> | <p>10 $\tan(A \pm B) = \frac{\tan A \pm \tan B}{1 \mp \tan A \tan B}$</p> |
| <p>4 $\sec^2 A = 1 + \tan^2 A$
$\sec^2 A = 1 + \tan^2 A$</p> | <p>11 $\tan 2A = \frac{2 \tan A}{1 - \tan^2 A}$</p> |
| <p>5 $\operatorname{cosec}^2 A = 1 + \cot^2 A$
$\operatorname{kosek}^2 A = 1 + \cot^2 A$</p> | <p>12 $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$</p> |
| <p>6 $\sin 2A = 2 \sin A \cos A$
$\sin 2A = 2 \sin A \cos A$</p> | <p>13 $a^2 = b^2 + c^2 - 2bc \cos A$
$a^2 = b^2 + c^2 - 2bc \cos A$</p> |
| <p>7 $\cos 2A = \cos^2 A - \sin^2 A$
$= 2 \cos^2 A - 1$
$= 1 - 2 \sin^2 A$</p> <p>$\cos 2A = \cos^2 A - \sin^2 A$
$= 2 \cos^2 A - 1$
$= 1 - 2 \sin^2 A$</p> | <p>14 Area of triangle / <i>Luas segitiga</i>
$= \frac{1}{2} ab \sin C$</p> |

SECTION A / BAHAGIAN A

(40 marks/ markah)

Answer all question in this section / Jawab semua soalan dalam bahagian ini.

1. Solve the simultaneous equations
- $x + 2y = 1$
- and
- $2x^2 + y^2 + xy = 5$
- .

Give your answers correct to three decimal places.

*Selesaikan persamaan serentak $x + 2y = 1$ and $2x^2 + y^2 + xy = 5$.**Beri jawapan anda betul kepada tiga tempat perpuluhan.*

[5 marks]

[5 markah]

2. It is given that the quadratic function
- $f(x) = 21 + 4x - x^2$
- ,

Diberi fungsi kuadratik $f(x) = 21 + 4x - x^2$,

- (a) by using completing the square, express
- $f(x)$
- in the form of

$$f(x) = a(x + p)^2 + q$$

dengan menggunakan penyempurnaan kuasa dua ungkapkan

$f(x)$ dalam bentuk $f(x) = a(x + p)^2 + q$

[2 marks]

[2 markah]

- (b) Find the maximum or minimum value of the function
- $f(x)$
- .

Cari nilai maksimum atau minimum bagi fungsi $f(x)$.

[1 mark]

[1 markah]

- (c) Sketch the graph for
- $f(x) = 21 + 4x - x^2$
- such that
- $-3 \leq x \leq 7$

Lakarkan graf bagi $f(x) = 21 + 4x - x^2$ dengan keadaan $-3 \leq x \leq 7$

[3 marks]

[3 markah]

- (d) State the equation of the curve when the graph is reflected in the
- x
- axis.

*Nyatakan persamaan lengkung apabila graf tersebut dipantulkan pada**paksi $i - x$.*

[1 mark]

[1 markah]

3. Diagram 3 shows the arrangement of the first three of an infinite series of rectangles. The first rectangle is x cm long and y cm wide. The measurements of the length and the width of each subsequent rectangle are half of the measurements of its previous one.

Rajah 3 menunjukkan susunan berterusan bagi tiga segiempat tepat.

Segiempat yang pertama mempunyai x cm panjang dan y cm lebar.

Ukuran panjang dan lebar bagi setiap segiempat tepat yang seterusnya adalah separuh daripada ukuran yang pertama.

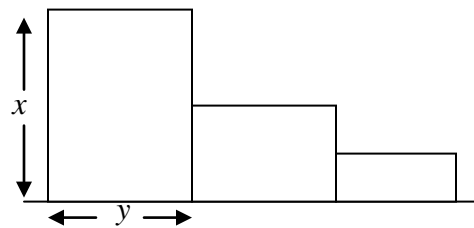


Diagram 3

Rajah 3

- (a) Show that the areas of the rectangles form a geometric progression and state the common ratio.

Buktikan luas segiempat tepat membentuk jantang geometri dan tentukan nisbah sepunya nya.

[2 marks]

[2 markah]

- (b) Given that $x = 160$ cm and $y = 80$ cm.

Diberi $x = 160$ cm dan $y = 80$ cm.

- (i) Determine which rectangle has an area of $\frac{25}{512}$ cm²

Kenalpasti segiempat tepat yang mempunyai luas $\frac{25}{512}$ cm²

[3 marks]

[3 markah]

(ii) Find the sum to infinity of the areas, in cm^2 , of the rectangles.

Cari jumlah luas segiempat tepat sehingga ketakterhinggaan dalam cm^2 .

[2 marks]

[2 markah]

4. (a) Prove that $(2 \cos \theta + 1)(2 \cos \theta - 1) - 1 = 2 \cos 2\theta$

Buktikan $(2 \cos \theta + 1)(2 \cos \theta - 1) - 1 = 2 \cos 2\theta$

[2 marks]

[2 markah]

(b) (i) Sketch the graph $y = 2 \cos 2\theta$ for $0 \leq \theta \leq 2\pi$

Lakarkan graf bagi $y = 2 \cos 2\theta$ untuk $0 \leq \theta \leq 2\pi$

(ii) Hence, using the same axes, sketch a suitable line to find the number of

solutions for the equation $(2 \cos \theta + 1)(2 \cos \theta - 1) = 2 - \frac{\theta}{\pi}$.

State the number of solutions.

Seterusnya, dengan menggunakan paksi yang sama, lakarkan satu garis lurus yang sesuai untuk mencari bilangan penyelesaian bagi persamaan

$(2 \cos \theta + 1)(2 \cos \theta - 1) = 2 - \frac{\theta}{\pi}$ untuk $0 \leq \theta \leq 2\pi$.

Nyatakan bilangan penyelesaian persamaan itu.

[5 marks]

[5 markah]

5. Table 5 shows the cumulative frequency distribution for the scores of 35 students in a competition.

Jadual 5 menunjukkan taburan kekerapan longgokan skor sekumpulan pelajar dalam satu pertandingan.

Score	< 10	< 20	< 30	< 40	< 50
Number of students	3	7	16	25	35

Table 5

Jadual 5

a) Based on Table 5, copy and complete Table 5A.

Berdasarkan pada Jadual 5, salin dan lengkapkan Jadual 5A

[1 marks]

[1 markah]

Score	0 - 9	10 - 19	20 - 29	30 - 39	40 - 49
Number of students					

Table 5A

Jadual 5A

b) Without drawing an ogive, find the interquartile range of the distribution.

Tanpa melakarkan ogif, dapatkan julat antara kuartil.

[5 marks]

[5 markah]

6. Figure 6 shows a quadrilateral $OAQR$. The lines PR and AB intersect at Q .

Rajah 6 menunjukkan sisiempat $OAQR$. Garis PR and AB bersilang di Q .

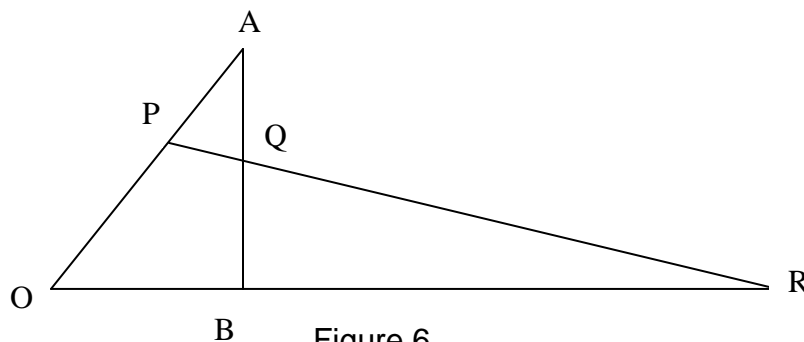


Figure 6

Rajah 6

It is given that $\vec{OA} = \underline{a}$, $\vec{OB} = \underline{b}$, $\vec{OP} = 4\vec{PA}$, $\vec{OR} = 3\vec{OB}$, $\vec{AQ} = m\vec{AB}$ and $\vec{PQ} = n\vec{PR}$.

Diberi $\vec{OA} = \underline{a}$, $\vec{OB} = \underline{b}$, $\vec{OP} = 4\vec{PA}$, $\vec{OR} = 3\vec{OB}$, $\vec{AQ} = m\vec{AB}$ dan $\vec{PQ} = n\vec{PR}$.

- (a) Express \vec{OQ} in terms of m , \underline{a} and \underline{b} .

Ungkapkan \vec{OQ} dalam sebutan m , \underline{a} dan \underline{b} .

[2 marks]

[2 markah]

- (b) Express \vec{OQ} in terms of n , \underline{a} and \underline{b} .

Ungkapkan \vec{OQ} dalam sebutan n , \underline{a} dan \underline{b} .

[2 marks]

[2 markah]

- (c) (i) Find the value of m and of n .

Cari nilai m dan nilai n .

[3 marks]

[3 markah]

- (ii) Hence, state \vec{OQ} in terms of \underline{a} and \underline{b} .

Seterusnya, nyatakan \vec{OQ} dalam sebutan \underline{a} dan \underline{b} .

[1 marks]

[1 markah]

SECTION B / BAHAGIAN B(40 marks/ *markah*)Answer any **four** questions from this section.*Jawab mana-mana empat soalan daripada bahagian ini.*

- 7 Diagram 7 shows the curve $x = y(2 - y)$ intersects the straight line $y = x$ at point $A(1, 1)$ and the origin O .

Rajah 7 menunjukkan lengkung $x = y(2 - y)$ bersilang dengan garis lurus $y = x$ di titik $A(1, 1)$ dan asalan O .

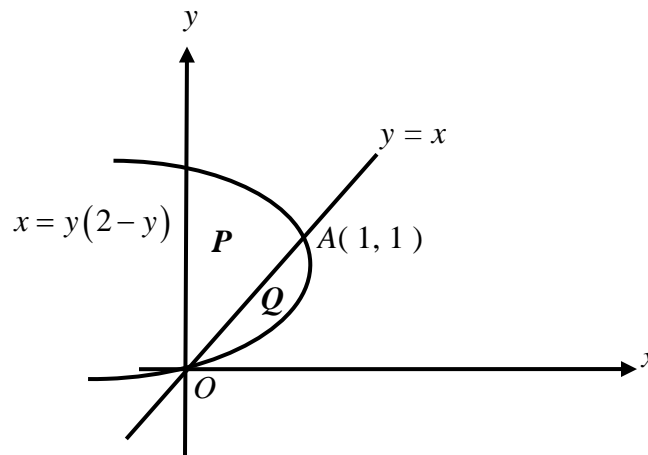


Diagram 7
Rajah 7

It is given that the line segment OA divides the region, enclosed between the curve $x = y(2 - y)$ and the y -axis, into two regions P and Q .

Diberi bahawa garis lurus OA membahagi rantau yang dibatasi oleh lengkung $x = y(2 - y)$ dan paksi $-y$ kepada dua bahagian iaitu P dan Q .

(a) Calculate the area of the region

Kira luas rantau

(i) enclosed between the curve $x = y(2 - y)$ and the y -axis,

yang dibatasi oleh lengkung $x = y(2 - y)$ dan paksi $-y$,

[2 marks]

[2 markah]

(ii) P ,

[3 marks]

[3 markah]

(b) Hence, find the ratio of the area of the region P to the area of the region Q .

Seterusnya, cari nisbah luas rantau P kepada luas rantau Q .

[2 marks]

[2 markah]

(c) Calculate the volume of revolution, in terms of π , when the region bounded by the curve $x = y(2 - y)$, the y -axis and the line $y = 1$ is revolved through 360° about the y -axis.

Kira isipadu janaan, dalam sebutan π , apabila rantau yang dibatasi oleh

lengkung $x = y(2 - y)$, paksi- y dan garis lurus $y = 1$ dikisarkan melalui 360°

pada paksi- y .

[3 marks]

[3 markah]

8 Use graph paper to answer this question.

Gunakan kertas graf bagi menjawab soalan ini.

Table 8 shows the values of two variables, x and y obtained from an experiment. Variables x and y are related by the equation $y = k(p^{\frac{1}{3}\sqrt{x}})$, where k and p are constants.

Jadual 8 menunjukkan nilai-nilai bagi dua pembolehubah x dan y , yang diperoleh daripada satu eksperimen. Pembolehubah x dan y dihubungkan oleh persamaan $y = k(p^{\frac{1}{3}\sqrt{x}})$, di mana k dan p adalah pemalar.

x	0.0	0.5	1.0	2.0	3.0
y	10.0	21.38	30.0	47.0	67.0

Table 8

Jadual 8

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

Plot $\log_{10} y$ melawan \sqrt{x} , dengan menggunakan skala 2 cm kepada 1 unit pada kedua-dua paksi \sqrt{x} . Seterusnya, lukiskan garis lurus penyuaian terbaik.

[5 marks]

[5 markah]

- (b) Use your graph from 8(a) to find the value of
Gunakan graf di 8(a) untuk mencari nilai

- (i) p
(ii) k

[5 marks]

[5 markah]

- 9 Diagram 9 shows a semicircle $OABCD$ with centre O and the tangent DF to the semicircle at D . An arc CE , of a circle, with centre D meets the tangent DF at E .

Rajah 9 menunjukkan sebuah semibulatan $OABCD$ berpusat O dan garis tangent DF bertemu semibulatan pada titik D . Panjang lengkok CE bagi suatu bulatan yang berpusat pada D bertemu garis tangen DF pada titik E .

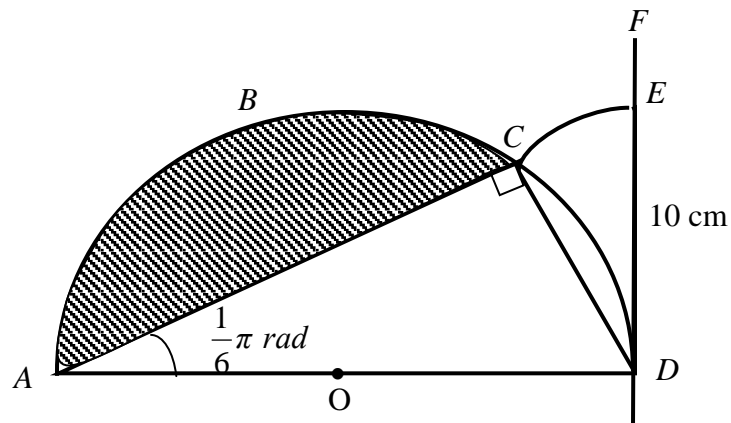


Diagram 9
Rajah 9

It is given that $DE = 10 \text{ cm}$ and $\angle CAD = \frac{1}{6} \pi \text{ rad}$.

Diberi bahawa panjang $DE = 10 \text{ cm}$ dan $\angle CAD = \frac{1}{6} \pi \text{ rad}$.

[Use/Guna $\pi = 3.142$]

Calculate

Kira

- (a) $\angle COD$ in radian,
 $\angle COD$ dalam radian,

[2 marks]

[2 markah]

- (b) (i) the perimeter, in cm, of the shaded segment,
perimeter , dalam cm, segmen berlorek,

[3 marks]

[3 markah]

- (ii) the area, in cm^2 , of the shaded segment,
luas , dalam cm^2 , segmen berlorek

[2 marks]

[2 markah]

- (c) the area, in cm^2 , of the sector CDE .
luas, dalam , cm^2 , sektor CDE .

[3 marks]

[3 markah]

10. **Solution by scale drawing is not accepted.**

Penyelesaian secara lukisan berskala tidak diterima

Diagram 10 shows an isosceles triangle PQR . Points P , Q and R have coordinates $(6, 6)$, $(6, 1)$ and $(2, 3)$ respectively. Given that the line QS is parallel to the line PR and T is the midpoint of RQ .

Rajah 10 menunjukkan sebuah segitiga sama kaki PQR . Titik P , Q dan R masing-masing mempunyai koordinat $(6, 6)$, $(6, 1)$ dan $(2, 3)$. Diberi bahawa garis lurus QS adalah selari dengan garis lurus PR dan T ialah titik tengah RQ .

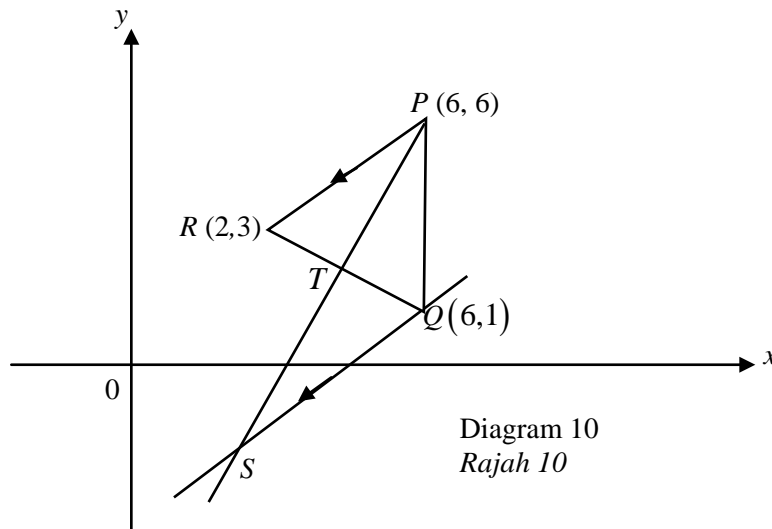


Diagram 10
Rajah 10

[Lihat Halaman Sebelah
SULIT

- (a) Find the coordinates of T and of S ,
Cari koordinat-koordinat T dan S ,

[3 marks]

[3 markah]

- (b) Find the equation of the perpendicular bisector RQ
Cari persamaan pembahagi dua sama seranjang RQ .

[2 marks]

[2 markah]

- (c) The straight line PS is extended to a point U such that $PS : SU = 3 : 4$.
 Find the coordinates of U .

*Garis lurus PS dipanjangkan ke suatu titik U dengan keadaan
 $PS : SU = 3 : 4$. Cari koordinat U .*

[3 marks]

[3 markah]

- (d) A point $P(x, y)$ moves such that its distance from point S is always twice its distance from point T . Find the equation of the locus of P .

Suatu titik $P(x, y)$ bergerak dengan keadaan jaraknya dari titik S ialah dua kali ganda jaraknya dari titik T . Cari persamaan lokus bagi P .

[2 marks]

[2 markah]

**[Lihat Halaman Sebelah
 SULIT**

- 11 (a) In a survey carried out in a certain college, it is found that 3 out of 5 students stay in a hostel.

Dalam suatu kajian yang dijalankan di sebuah kolej tertentu, didapati bahawa 3 daripada 5 pelajar tinggal di asrama.

- (i) If 10 students from that college are chosen at random, find the probability that at least 2 of them stay in the hostel.

Jika 10 orang pelajar daripada kolej itu dipilih secara rawak, Hitungkan kebarangkalian bahawa sekurang-kurangnya 2 daripada mereka tinggal di asrama.

[3 marks]

[3 markah]

- (ii) If there are 800 students in the college, find the number of students who do not stay in the hostel.

Jika bilangan pelajar dalam kolej itu adalah 800 orang, cari bilangan pelajar yang tidak tinggal di asrama.

[2 marks]

[2 markah]

- (b) The imported oranges from China are graded as shown in Table 11 below.

Buah oren yang diimport dari China telah digredkan seperti dalam Jadual 11 dibawah.

Grade	A	B	C
Diameter, x (cm)	$x > 6$	$6 \geq x \geq 4$	$4 \geq x \geq t$

Table 11

Jadual 11

It is given that the diameters of the oranges have a normal distribution with mean 4.5 cm and variance 1.44 cm^2 .

Diberi bahawa diameter buah oren tersebut bertabur secara normal dengan min 4.5 cm dan varians 1.44 cm^2 .

- (i) If an orange is chosen at random, calculate the probability that it is of grade B.

Jika sebiji oren dipilih secara rawak, hitungkan kebarangkalian bahawa oren itu adalah gred B.

[2 marks]

[2 markah]

- (ii) If 79.77% of the oranges have diameters greater than t cm, find the value of t .

Jika 79.77% buah oren mempunyai diameter lebih daripada t cm, cari nilai t .

[3 marks]

[3 markah]

**[Lihat Halaman Sebelah
SULIT**

SECTION C / BAHAGIAN C(20 marks/ *markah*)Answer any **two** questions from this section.*Jawab mana-mana dua soalan daripada bahagian ini.*

- 12** Diagram 12 shows a triangle ABC . Given the area of triangle ABC is 21 cm^2 and $\angle BAC$ is obtuse.

Rajah 12 menunjukkan satu segi tiga ABC . Diberi luas segi tiga ABC ialah 21 cm^2 dan $\angle BAC$ adalah sudut cakah.

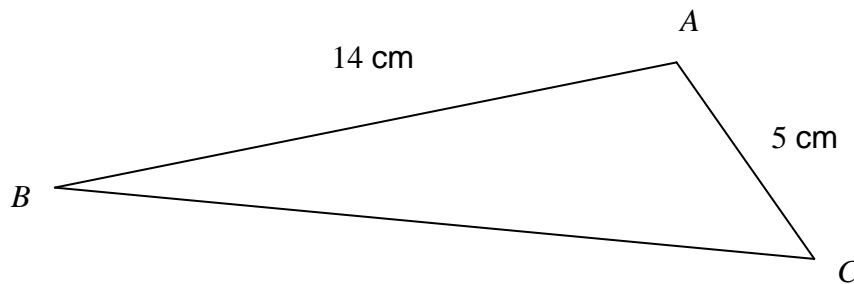


Diagram 12
Rajah 12

- (a) Find
Cari

- (i) $\angle BAC$,
 $\angle BAC$,

[3 marks]

[3 *markah*]

- (ii) the length, in cm, of BC ,
panjang, dalam cm, BC ,

[2 marks]

[2 *markah*]

- (iii) $\angle ABC$.
 $\angle ABC$.

[2 marks]

[2 markah]

- (b) Triangle $A'B'C'$ has a different shape from triangle ABC such that $A'B'=AB$, $A'C'=AC$ and $\angle A'B'C' = \angle ABC$.

Segi tiga $A'B'C'$ mempunyai bentuk yang berlainan daripada segi tiga ABC dengan keadaan $A'B'=AB$, $A'C'=AC$ dan $\angle A'B'C' = \angle ABC$.

- (i) Sketch triangle $A'B'C'$.
Lakar segi tiga $A'B'C'$.

[1 mark]

[1 markah]

- (ii) Calculate the $\angle A'C'B'$.
Hitung $\angle A'C'B'$.

[2 marks]

[2 markah]

**[Lihat Halaman Sebelah
SULIT**

- 13 Table 13 shows the prices, price indices and weightages of four main ingredients, P , Q , R and S used in making biscuits of a particular type.

Jadual 13 menunjukkan harga, indeks harga dan pemberat empat bahan utama, P , Q , R dan S , yang digunakan untuk membuat sejenis biskut.

Ingredient Bahan	Price per kg (RM) Harga se kg (RM)		Price index in the year 2010 based on the year 2008 <i>Indeks harga pada tahun 2010 berasaskan tahun 2008</i>	Weightage Pemberat
	Year 2008 Tahun 2008	Year 2010 Tahun 2010		
P	2.00	2.20	110	7
Q	3.50	4.55	m	x
R	5.00	6.00	120	$x+1$
S	4.00	n	112	2

Table 13
Jadual 13

- (a) Find the values of m and n .
Carikan nilai-nilai m dan n .

[3 marks]

[3 markah]

- (b) The composite index for the cost of making these biscuits in the year 2010 based on the year 2008 is 116.5

Calculate the value of x .

Indeks gubahan bagi kos membuat biskut tersebut pada tahun 2010 berasaskan tahun 2008 ialah 116.5.

Hitungkan nilai x .

[2 marks]

[2 markah]

- (c) Given the composite index for the cost of making these biscuits increased by 40% from the year 2006 to 2010. Calculate

Diberi indeks gubahan bagi kos membuat biskut ini telah meningkat sebanyak 40% dari tahun 2006 ke tahun 2010. Hitungkan

- (i) the composite index for the cost of making these biscuits in the year 2008 based on the year 2006,
indeks gubahan bagi kos membuat biskut itu pada tahun 2008 berasaskan tahun 2006,

[3 marks]

[3 markah]

- (ii) the price of a box of these biscuits in the year 2010 if its corresponding price in the year 2006 is RM25.

harga sekotak biskut ini pada tahun 2010 jika harganya pada tahun 2006 ialah RM25.

[2 marks]

[2 markah]

14 Use graph paper to answer this question.

Gunakan kertas graf untuk menjawab soalan ini.

A school wants to send a few of its PMR and SPM students to participate a certain course. The number of participants from the PMR students is x and for the SPM students is y . The participation of the students is based on the following constraints:

Sebuah sekolah ingin menghantar beberapa pelajar PMR dan SPM menyertai suatu kursus. Bilangan peserta PMR ialah x orang dan peserta SPM ialah y orang. Penyertaan pelajar adalah berdasarkan kekangan berikut.

I : The total number of the participants is not more than 70.

Jumlah peserta tidak melebihi 70 orang.

II : The number of PMR participants is not more than twice the number of SPM participants.

Bilangan peserta PMR tidak melebihi dua kali ganda bilangan peserta SPM.

III : The number of SPM participants must exceed twice the number of PMR participants by at most 10.

Bilangan peserta SPM mesti melebihi dua kali ganda bilangan peserta PMR selebih - lebihnya 10 orang.

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

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

[3 marks]

[3 markah]

- (b) By using a scale of 2 cm to 10 participants on both axes, construct and shade the region R that satisfies all the above constraints.

Dengan menggunakan skala 2 cm kepada 10 orang peserta pada kedua-dua paksi, bina dan lorekkan rantau R yang memenuhi semua kekangan di atas.

[3 marks]

[3 markah]

- (c) By using your graph from (b), find

Dengan menggunakan graf anda dari (b), carikan

- (i) the range of the number of SPM participants if the number of PMR participants is 30.

julat bilangan peserta SPM jika bilangan peserta PMR ialah 20 orang.

- (ii) the maximum total fees need to be paid by the school if the fee for each PMR and SPM participant is RM10 and RM20 respectively.

jumlah yuran maksimum yang perlu dibayar oleh sekolah jika yuran untuk setiap peserta PMR dan SPM masing-masing ialah RM10 dan RM20.

[4 marks]

[4 markah]

- 15 A particle moves in a straight line and passes through a fixed point O . The velocity of the particle, $v \text{ cm s}^{-1}$, is given by $v = -3t^2 + 21t - 30$, where t is the time in seconds, after passing through O . The particle stops at point P and then at Q .

Suatu zarah bergerak di sepanjang suatu garis lurus dan melalui satu titik tetap O . Halaju zarah itu, $v \text{ cm s}^{-1}$, diberi oleh $v = -3t^2 + 21t - 30$, dengan keadaan t ialah masa dalam saat selepas melalui O . Zarah itu berhenti di titik P dan kemudiannya di Q .

[Assume motion to the right is positive]

[Anggapkan gerakan ke arah kanan sebagai positif]

Find

Cari

- (a) the initial velocity, in cm s^{-1} , of the particle,
halaju awal, dalam cm s^{-1} , zarah itu,

[1 mark]

[1 markah]

- (b) the range of values of t during which the particle moves to the right,

julat nilai t ketika zarah bergerak ke kanan,

[2 marks]

[2 markah]

- (c) the acceleration, in cm s^{-2} , of the particle at Q,
pecutan, dalam cm s^{-2} , zarah itu di Q,

[3 marks]

[3 markah]

- (d) the total distance, in m, traveled by the particle in the first 5 seconds, after passing through O.
jumlah jarak, dalam m, yang dilalui oleh zarah itu dalam 5 saat pertama, selepas melalui O.

[4 marks]

[4 markah]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

3472/1
Matematik Tambahan
Kertas 1
Ogos
2010



BAHAGIAN PENGURUSAN
SEKOLAH BERASRAMA PENUH DAN SEKOLAH KLUSTER
KEMENTERIAN PELAJARAN MALAYSIA

PEPERIKSAAN PERCUBAAN
SIJIL PELAJARAN MALAYSIA 2010

MATEMATIK TAMBAHAN KERTAS 1
(SKEMA PEMARKAHAN)

[Lihat Halaman Sebelah
SULIT

MARKS SCHEME FOR ADD MATHS PAPER 1 TRIAL SPM (SBP) 2010

No.		Penyelesaian	Sub-markah	Markah penuh
1	(a)	3	1	2
	(b)	-1	1	
2	(a)	$3x^2 - 6x + 1$ $3(x-1)^2 - 2$	2 B1	4
	(b)	$1, \frac{4}{3}$ $3x^2 - 6x + 1 + 3 = x$	2 B1	
3	(a)	33	1	4
	(b)	$0, -2$ $2x^2 + 5x = x$	2 B1	
4		$p < -8, p > 8$ $(p)^2 - 4(1)(16) < 0$ $x^2 + px + 16 = 0$	3 B2 B1	3
5	(a)	$\frac{1}{2}$	1	2
	(b)	$x = \frac{1}{2}$	1	
6		$k = -8$ and, $h = -\frac{1}{4}$ $k = -8$ or $hk = 2$ $2(x+2)^2 - 8$	3 B2 B1	3

		<p>OR</p> $k = -8 \text{ and } h = -\frac{1}{4}$ $4hk = 8 \text{ or } 2h^2k^2 - 8 = 0$ $2x^2 + 4hcx + 2h^2k^2 + k$	<p>3 B2 B1</p>	
7		<p>0.4195</p> $4^{2x} = 3.2$ $4^{2x} \left(\frac{1}{4} + 1 \right) = 4$	<p>3 B2 B1</p>	3
8		$6r + 2 - 8p$ $\frac{3 \log_m 5}{\log_m \sqrt{m}} + \frac{\log_m m}{\log_m \sqrt{m}} - \frac{4 \log_m 3}{\log_m \sqrt{m}}$ $\frac{3 \log 5}{\log \sqrt{m}} \text{ or } \frac{\log m}{\log \sqrt{m}} \text{ or } \frac{4 \log 3}{\log \sqrt{m}} \text{ (any base) or}$ $\log 125 + \log m \text{ or } \log m - \log 81 \text{ or } \log 125 + \log 81 \text{ or}$ $\log_m \sqrt{m} = \frac{1}{2}$	<p>3 B2 B1</p>	3
9	(a)	$h = 12$ $h + 1 - (2h - 6) = h - 4 - (h + 1)$	<p>2 B1</p>	3
	(b)	-5	1	
10		<p>5.85</p> $r = 2.5$ $0.6r^3 = 9.375$	<p>3 B2 B1</p>	3

11	(a)	0.75 or $\frac{3}{4}$ $T_1 = \frac{9}{16}$ or $T_2 = \frac{27}{64}$ or $T_3 = \frac{81}{256}$ or any relevant terms	2 B1	4
	(b)	$\frac{2.25}{1 - \frac{3}{4}}$	2 B1	
12	(a)	2.44 $2x + 30.5 = 55.5$ or <i>radius</i> = 12.5	2 B1	4
	(b)	190.625 $\frac{1}{2}(12.5)^2(2.44)$	2 B1	
13	(a)	$m = -\frac{5}{2}$ $(5\underset{\sim}{i} - 12\underset{\sim}{j}) = \lambda(m\underset{\sim}{i} + 6\underset{\sim}{j})$	2 B1	3
	(b)	$\frac{5\underset{\sim}{i} - 12\underset{\sim}{j}}{13}$ Magnitude = 13	2 B1	
14	(a)	$-\underset{\sim}{6b} + \underset{\sim}{12a}$ $\vec{SP} + \vec{PQ}$	2 B1	4
	(b)	$\vec{QS} = \frac{1}{3}(-\underset{\sim}{12a} + \underset{\sim}{6b})$	2 B1	

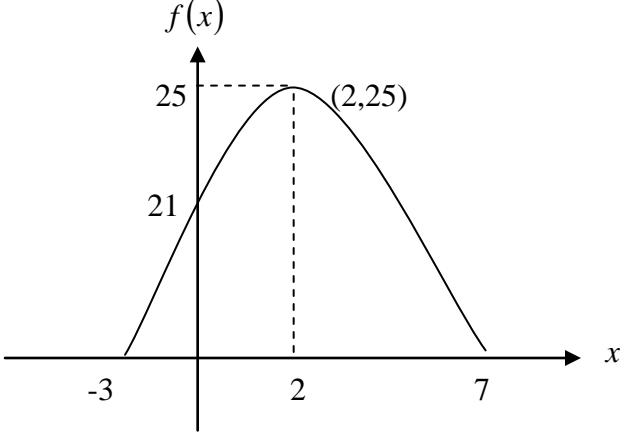
18		$6(x^2 + 3)(5x^2 + 3)$ $6x(x^2 + 3)^2$	2 B1	2
19		$h = 1$ $4(-1) + h = -3$	2 B1	2
20		$m = \frac{2}{3}$ $\frac{25m}{2} - \frac{m}{2} - 10 = -3m$ $\left[\frac{mx^2}{2}\right]_1^5 - 2(5) = -3m$	3 B2 B1	3
21		$K = 41.53$ $L = 37.5$ $G = 26$ $F = 54$	1 1 1 1	4
22	(a)	792	1	3
	(b)	160 $4C_1 \times 6C_3 \times 2C_1$	2 B1	
23	(a)	720	1	3
	(b)	260 $6! \times 3P_1$	2 B1	
24	(a)	0.008491 $10C_5 \times (0.15)^5 \times (0.85)^5$	2 B1	4
	(b)	0.8202 $P(X=0)+P(X=1)+P(X=2)$	2 B1	

25	(a)	0.0571	1	3
	(b)	81.84 $\frac{85 - \mu}{2} = 1.58$	2 B1	
		TOTAL MARKS/JUMLAH MARKAH		80

END OF MARKS SCHEME

SPM TRIAL EXAM 2010
MARK SCHEME ADDITIONAL MATHEMATICS PAPER 2

SECTION A (40 MARKS)		
No.	Mark Scheme	Total Marks
1	$x = 1 - 2y$ $2(1 - 2y)^2 + y^2 + (1 - 2y)(y) = 5$ $7y^2 - 7y - 3 = 0$ $y = \frac{-(-7) \pm \sqrt{(-7)^2 - 4(7)(-3)}}{2(7)}$ $y = 1.324, -0.324$ $x = -1.648, 1.648$ <p><u>OR</u></p> $y = \frac{1 - x}{2}$ $2x^2 + \left(\frac{1 - x}{2}\right) + x\left(\frac{1 - x}{2}\right) = 5$ $7x^2 - 19 = 0$ $x = \frac{-(0) \pm \sqrt{(0)^2 - 4(7)(-19)}}{2(7)}$ $x = -1.648, 1.648$ $y = 1.324, -0.324$	<p>P1</p> <p>K1</p> <p>K1</p> <p>N1</p> <p>N1</p> <p>P1</p> <p>K1</p> <p>K1</p> <p>N1</p> <p>N1</p>
		5

2	<p>(a)</p> $f(x) = -(x^2 - 4x - 21)$ $= -\left[x^2 - 4x + \left(\frac{-4}{2}\right)^2 - \left(\frac{-4}{2}\right)^2 - 21 \right]$ $= -(x-2)^2 + 25$ <p>(b) Max Value = 25</p> <p>(c)</p>  <p style="text-align: center;">Shape graph Max point $f(x)$ intercept or point (0,21)</p> <p>d) $f(x) = (x-2)^2 - 25$</p>	<p>K1</p> <p>N1</p> <p>N1</p> <p>N1</p> <p>N1</p> <p>N1</p>
		7
3	<p>a) List of Areas ; $xy, \frac{1}{4}xy, \frac{1}{16}xy$</p> $T_2 \div T_1 = T_3 \div T_2 = \frac{1}{4}$ <p>This is Geometric Progression and $r = \frac{1}{4}$</p> <p>b) $12800 \times \left(\frac{1}{4}\right)^{n-1} = \frac{25}{512}$</p>	<p>K1</p> <p>N1</p>

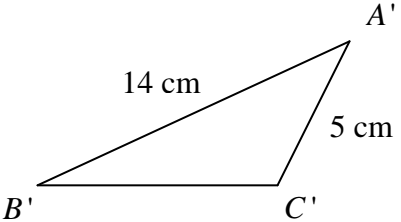
	$\left(\frac{1}{4}\right)^{n-1} = \frac{1}{262144}$ $\left(\frac{1}{4}\right)^{n-1} = \left(\frac{1}{4}\right)^9$ $n-1=9$ $n=10$ <p>(c) $S_{\infty} = \frac{12800}{1-\frac{1}{4}}$</p> $= 17066\frac{2}{3} \text{ cm}^2$	<p>K1</p> <p>K1</p> <p>N1</p> <p>K1</p> <p>N1</p>
		7
4	<p>a)</p> $4\cos^2 - 1 - 1$ $4\cos^2 - 2$ $2(2\cos^2 - 1)$ $2\cos 2\theta$ <p>b) i)</p> <p>- shape of cos graph</p> <p>- amplitude (max = 2 <u>and</u> min = -2)</p> <p>- 2 periodic/cycle in $0 \leq \theta \leq 2\pi$</p> <p>b) ii) $y = 1 - \frac{\theta}{\pi}$ (equation of straight line)</p> <p>Number of solution = 4 (without <u>any</u> mistake done)</p>	<p>K1</p> <p>N1</p> <p>P1</p> <p>P1</p> <p>P1</p> <p>K1</p> <p>N1</p>
		7

5	<p>a)</p> <table border="1" data-bbox="253 226 1105 306"> <thead> <tr> <th>Score</th> <th>0 – 9</th> <th>10 – 19</th> <th>20 – 29</th> <th>30 – 39</th> <th>40 – 49</th> </tr> </thead> <tbody> <tr> <td>Number</td> <td>3</td> <td>4</td> <td>9</td> <td>9</td> <td>10</td> </tr> </tbody> </table> <p>b) $Q_1 = 19.5 + \left(\frac{\frac{1}{4}(35) - 7}{9} \right) 10$ $= 21.44$</p> <p>$Q_3 = 39.5 + \left(\frac{\frac{3}{4}(35) - 25}{10} \right) 10$ $= 40.75$</p> <p>Interquartile range $= 40.75 - 21.44$ $= 19.31$</p>	Score	0 – 9	10 – 19	20 – 29	30 – 39	40 – 49	Number	3	4	9	9	10	<p>N1</p> <p>P1</p> <p>K1</p> <p>K1</p> <p>K1</p> <p>N1</p>
Score	0 – 9	10 – 19	20 – 29	30 – 39	40 – 49									
Number	3	4	9	9	10									
		6												
6	<p>(a) $\vec{OQ} = \vec{OA} + \vec{AQ}$ $\vec{OQ} = (1 - m)\vec{a} + m\vec{b}$</p> <p>(b) $\vec{PO} + \vec{OQ} = n(\vec{PO} + \vec{OR})$ $\vec{OQ} = \frac{4}{5}(1 - n)\vec{a} + 3n\vec{b}$</p> <p>(c)</p> <p>(i) $\left(\frac{4}{5} - \frac{4}{5}n \right) = 1 - m$ <u>or</u> $3n = m$ $m = \frac{3}{11}, n = \frac{1}{11}$</p> <p>(ii) $\vec{OQ} = \frac{8}{11}\vec{a} + \frac{3}{11}\vec{b}$</p>	<p>K1</p> <p>N1</p> <p>K1</p> <p>N1</p> <p>K1</p> <p>N1</p> <p>N1</p>												
		8												

7	<p>(a)(i) $Area = \int_0^2 (2y - y^2) dy$</p> $= \left[y^2 - \frac{y^3}{3} \right]_0^2$ $= \frac{4}{3} unit^2$ <p>(ii) $Area\ region\ P = \int_0^1 y\ dy + \int_1^2 (2y - y^2) dy$</p> $= \left(\frac{1}{2} \times 1 \times 1 \right) + \left[y^2 - \frac{y^3}{3} \right]_1^2$ $= \frac{7}{6} unit^2$ <p>(b) $Area\ region\ Q = \frac{4}{3} - \frac{7}{6} = \frac{1}{6} unit^2$</p> $= \frac{7}{6} : \frac{1}{6}$ $= 7 : 1$ <p>(c) $Volume = \pi \int_0^1 (2y - y^2)^2 dy$</p> $= \pi \left[\frac{4y^3}{3} - y^4 + \frac{y^5}{5} \right]_0^1$ $= \frac{8}{15} \pi unit^3$	<p>K1</p> <p>N1</p> <p>K1</p> <p>N1</p> <p>K1</p> <p>N1</p> <p>K1</p> <p>K1</p> <p>N1</p>												
		10												
8	<p>(a)</p> <table border="1" data-bbox="370 1486 1091 1608"> <tbody> <tr> <td>\sqrt{x}</td> <td>0.000</td> <td>0.7071</td> <td>1.000</td> <td>1.414</td> <td>1.732</td> </tr> <tr> <td>$\log_{10} y$</td> <td>1.000</td> <td>1.330</td> <td>1.477</td> <td>1.672</td> <td>1.826</td> </tr> </tbody> </table> <p>Using the correct, uniform scale and axes All points plotted correctly Line of best fit</p> <p>(b) $\log_{10} y = \frac{1}{3} \sqrt{x} \log_{10} p + \log_{10} k$</p>	\sqrt{x}	0.000	0.7071	1.000	1.414	1.732	$\log_{10} y$	1.000	1.330	1.477	1.672	1.826	<p>N1</p> <p>N1</p> <p>P1</p> <p>P1</p> <p>P1</p> <p>P1</p>
\sqrt{x}	0.000	0.7071	1.000	1.414	1.732									
$\log_{10} y$	1.000	1.330	1.477	1.672	1.826									

	<p>(i) <i>use</i> $*c = \log_{10} k$ $k = 10.0$</p> <p>(ii) <i>use</i> $*m = \frac{1.83-1.0}{1.73-0} = 0.47977 = \frac{1}{3} \log_{10} p$ $p = 27.5$</p>	<p>K1 N1</p> <p>K1 N1</p>
		10
9	<p>(a) $\angle COD = 2\left(\frac{1}{6}\pi\right)$ $= \frac{1}{3}\pi = 1.047rad$</p> <p>(b) (i) $Arc\ ABC = 10\left(\pi - \frac{1}{3}\pi\right) or = \frac{20}{3}\pi$</p> <p>$Length\ AC = \sqrt{20^2 - 10^2} or\ 20\cos\left(\frac{1}{6}\pi rad\right)$</p> <p>$Perimeter = \frac{20}{3}\pi + 20\cos\frac{1}{6}\pi = 38.267cm$</p> <p>(ii) $Area\ of\ shaded\ region = \frac{1}{2}(10^2)\left(\frac{2}{3}\pi - \sin\frac{2}{3}\pi\right)$ $= 61.432cm^2$</p> <p>(c) $\angle CDE = \angle CAD = \frac{1}{6}\pi rad$ (alternate segments)</p> <p>$Area = \frac{1}{2}(10^2)\left(\frac{1}{6}\pi\right)$ $= 26.183cm^2$</p>	<p>K1</p> <p>N1</p> <p>K1</p> <p>K1</p> <p>N1</p> <p>K1</p> <p>K1</p> <p>N1</p>
		10

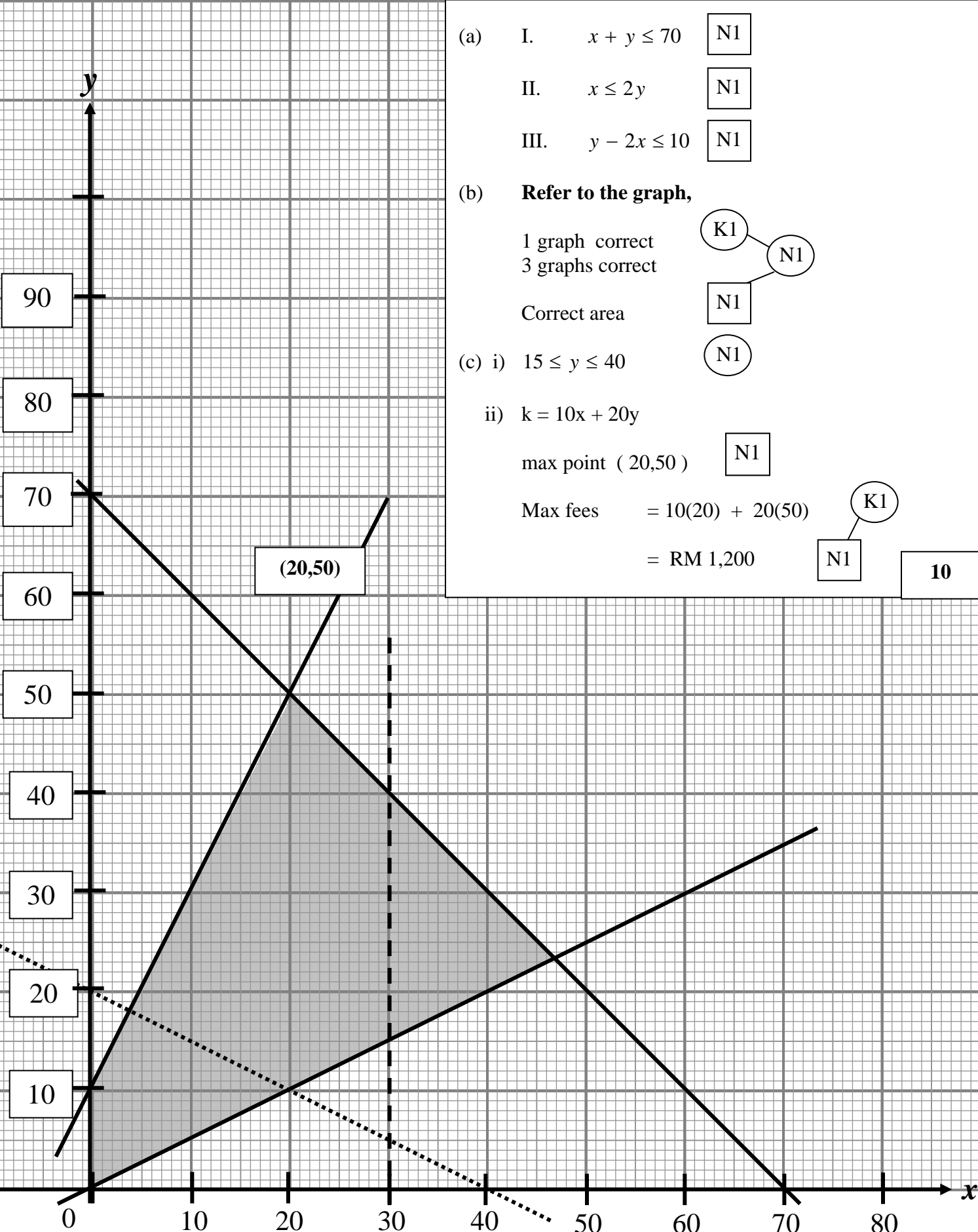
10	<p>(a) $T(4, 2)$ $\frac{6+x}{2} = 4, \frac{6+y}{2} = 2$ $S(2, -2)$</p> <p>(b) $y - 2 = 2(x - 4)$ $y = 2x - 6$</p> <p>(c) $\frac{3x+24}{7} = 2$ or $\frac{3y+24}{7} = -2$</p> <p>$U\left(-\frac{10}{3}, -\frac{38}{3}\right)$</p> <p>(d) $\sqrt{(x-2)^2 + (y+2)^2} = 2\sqrt{(x-4)^2 + (y-2)^2}$ $3x^2 + 3y^2 - 28x - 20y + 72 = 0$</p>	<p>P1</p> <p>K1</p> <p>N1</p> <p>K1 K1</p> <p>N1</p> <p>K1</p> <p>N1</p> <p>K1</p> <p>N1</p>
		10
11	<p>(a) (i) $P(X = 0) = {}^{10}C_0(0.6)^0(0.4)^{10}$ or $P(X = 1) = {}^{10}C_1(0.6)^1(0.4)^9$ $P(X \geq 2) = 1 - [P(X = 0) + P(X = 1)]$ $= 1 - {}^{10}C_0(0.6)^0(0.4)^{10} - {}^{10}C_1(0.6)^1(0.4)^9$ $= 0.9983$</p> <p>(ii) $800 \times \frac{2}{5}$ $= 320$</p> <p>(b)(i) $P(-0.417 \leq z \leq 1.25)$ $= 1 - 0.3383 - 0.1057$ $= 0.556$</p> <p>(ii) $P(X > t) = 0.7977$ $Z = -0.833$ $-0.833 = \frac{t - 4.5}{1.2}$ $t = 3.5004$</p>	<p>K1</p> <p>K1</p> <p>N1</p> <p>K1</p> <p>N1</p> <p>K1</p> <p>N1</p> <p>K1</p> <p>P1</p> <p>K1</p> <p>N1</p>
		10

No	Mark Scheme	Sub Marks	Total Mark
12a i)	$\frac{1}{2}(14)(5)\sin\theta = 21$ $\theta = 36.87^\circ \text{ or } 36^\circ 52'$ $\angle BAC = 180^\circ - 36.87^\circ$ $= 143.13^\circ \text{ or } 143^\circ 8'$	K1 K1 N1	3
	ii) $BC^2 = 14^2 + 5^2 - 2(14)(5)\cos 143.13^\circ$ $BC^2 = 333$ $BC = 18.25 \text{ cm}$	K1 N1	2
iii)	$\frac{\sin\theta}{5} = \frac{\sin 143.13^\circ}{18.25}$ $\theta = 9.46^\circ \text{ or } 9^\circ 28'$	K1 N1	2
b i)		N1	1
ii)	$\angle ACB = 180^\circ - 143.13^\circ - 9.46^\circ$ $= 27.41^\circ$ $\angle A'C'B' = 180^\circ - 27.41^\circ$ $= 152.59^\circ \text{ or } 152^\circ 35'$	K1 N1	2
			10

No	Mark Scheme	Sub Marks	Total Mark
13 a)	$m = \frac{4.55}{3.50} \times 100$ or $\frac{n}{4} \times 100 = 112$ $m = 130$ $n = \text{RM}4.48$	K1	3
		N1 N1	
b)	$\frac{110(70) + 130(x) + 120(x+1) + 112(2)}{7+x+x+1+2} = 116.5$ $x = 3$	K1 N1	2
c i)	See 140	P1	3
	$\frac{x(116.5)}{100} = 140$ $x = 120.17 / 120.2$	K1 N1	
ii)	$\frac{x}{25} \times 100 = 140$ $x = \text{RM}35$	K1 N1	2
			10

No	Mark Scheme	Sub Marks	Total Mark
15 a)	$v_0 = -30ms^{-1}$	N1	1
b)	$-3t^2 + 21t - 30 > 0$ $(t-5)(t-2) < 0$ $2 < t < 5$	K1 N1	2
c)	$a = -6t + 21$ $a_5 = -6(5) + 21$ $a_5 = -9ms^{-2}$	K1 K1 N1	3
d)	$S = \frac{-3t^3}{3} + \frac{21t^2}{2} - 30t$ $S = -t^3 + \frac{21t^2}{2} - 30t$ $S_3 = -(3)^3 + \frac{21(3)^2}{2} - 30(3) = -22.5$ or $S_5 = -(5)^3 + \frac{21(5)^2}{2} - 30(5) = -12.5$ Total distance = $ -22.5 + (-22.5) - (-12.5) $ = 32.5 m	K1 K1 K1 N1	4 10

Answer for question 14



- (a) I. $x + y \leq 70$ N1
- II. $x \leq 2y$ N1
- III. $y - 2x \leq 10$ N1

(b) **Refer to the graph,**

1 graph correct K1

3 graphs correct N1

Correct area N1

(c) i) $15 \leq y \leq 40$ N1

ii) $k = 10x + 20y$

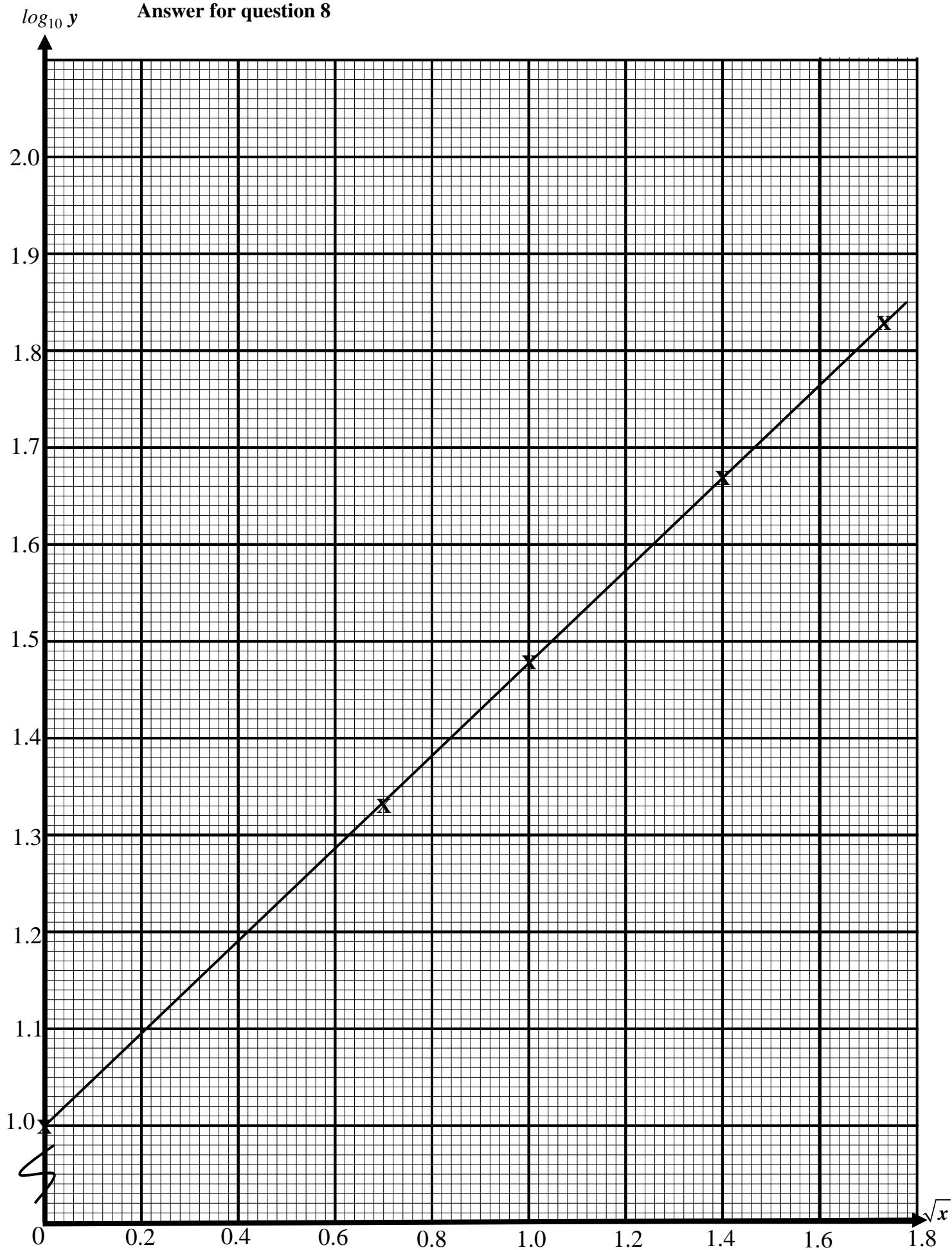
max point (20,50) N1

Max fees = $10(20) + 20(50)$ K1

= RM 1,200 N1

10

Answer for question 8



3472/2
Matematik Tambahan
Kertas 2
Ogos
2010



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**PEPERIKSAAN PERCUBAAN
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**MATEMATIK TAMBAHAN KERTAS 2
(SKEMA PEMARKAHAN)**

[Lihat Halaman Sebelah
SULIT