

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

- 1 The following information refers to the sets  $P$  and  $Q$ .  
Maklumat berikut adalah berkaitan dengan set  $P$  dan set  $Q$ .

$$P = \{3, 5, 7\}$$

$$Q = \{5, 7, 8, 10, 13\}$$

Based on the information above, the relation between set  $P$  and  $Q$  is defined by the set of ordered pairs  $\{(3, 5), (3, 8), (5, 7), (5, 13), (7, 13)\}$ .

Berdasarkan maklumat di atas, hubungan antara set  $P$  dan set  $Q$  ditakrif dengan set pasangan tertib  $\{(3, 5), (3, 8), (5, 7), (5, 13), (7, 13)\}$ .

State

Nyatakan

- (a) the image of 5 ,  
imej bagi 5,  
  
(b) the type of the relation.  
jenis hubungan itu.

[2 marks]  
[2 markah]

Answer /Jawapan: (a).....

(b).....

1

	2
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- 2 Given that  $f^{-1} : x \rightarrow \frac{3-4x}{2}$ ,  
Diberi fungsi  $f^{-1} : x \rightarrow \frac{3-4x}{2}$ ,

Find

Cari

- (a) function  $f(x)$ ,  
fungsi  $f(x)$ ,  
  
(b) the value of  $f(5)$ .  
nilai  $f(5)$ .

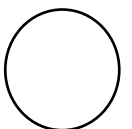
[3 marks]  
[3 markah]

Answer /Jawapan: (a).....

(b).....

2

	3
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[Lihat sebelah

SULIT

- 3 Given the function  $h: x \rightarrow 2x - 1$  and  $k: x \rightarrow 6x + 1$ .  
 Diberi fungsi  $h: x \rightarrow 2x - 1$  dan  $k: x \rightarrow 6x + 1$ .

Find the value of  $x$  when  $hk(x) = 4$ .

Cari nilai apabila  $x$  jika  $hk(x) = 4$ .

[3 marks]  
 [3 markah]

3

3

Answer /Jawapan: .....

- 4 The straight line  $y = p(1 - 2x)$  is a tangent to the curve  $y - x^2 = 2$ .

Garis lurus  $y = p(1 - 2x)$  adalah tangen kepada lengkung  $y - x^2 = 2$ .

Find the possible values of  $p$ .

Carikan nilai-nilai  $p$  yang mungkin.

[3 marks]  
 [3 markah]

4

3

Answer /Jawapan: .....

- 5 Solve the quadratic equation  $2x^2 - 6x = x(x + 3) - 4$ .

Selesaikan persamaan kuadratik  $2x^2 - 6x = x(x + 3) - 4$ .

Give your answer correct to four significant figures.

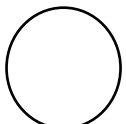
Berikan jawapan anda betul kepada empat angka bererti.

[3 marks]  
 [3 markah]

5

3

Answer /Jawapan: .....



[Lihat sebelah

SULIT

- 6 Diagram 6 shows the graph of the function  $y = (x + 3)^2 - p$  where  $p$  is a constant.  
 Rajah 6 menunjukkan fungsi  $y = (x + 3)^2 - p$ , dengan keadaan  $p$  ialah pemalar.

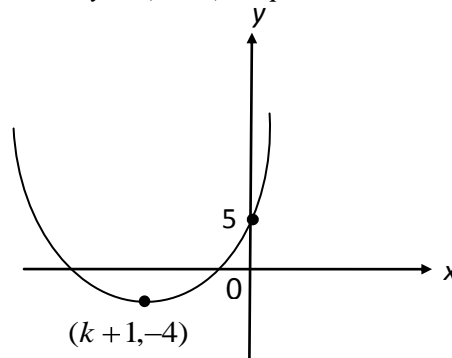


Diagram 6  
Rajah 6

Given that  $(k + 1, -4)$  is a minimum point of the curve  $y = (x + 3)^2 - p$ . Find  
 Diberi  $(k + 1, -4)$  ialah titik minimum kepada lengkung  $y = (x + 3)^2 - p$ . Cari

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

[3 marks]  
[3 markah]

Answer /Jawapan: (a).....  
 (b).....

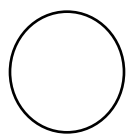
<b>6</b>
<div style="border: 1px solid black; width: 80%; margin: auto; height: 20px;"></div>
<div style="border: 1px solid black; width: 10%; margin: auto; height: 20px;"></div>

- 7 Solve the equation  $2^{4-x} - 2^{3-x} = \frac{1}{8}$ .  
 Selesaikan persamaan  $2^{4-x} - 2^{3-x} = \frac{1}{8}$ .

[3 marks]  
[3 markah]

Answer /Jawapan: .....

<b>7</b>
<div style="border: 1px solid black; width: 80%; margin: auto; height: 20px;"></div>
<div style="border: 1px solid black; width: 10%; margin: auto; height: 20px;"></div>



[Lihat sebelah

SULIT

- 8 Solve the equation  $\log_3(3x + 2) - \log_3(x - 1) = 2$ .  
 Selesaikan persamaan  $\log_3(3x + 2) - \log_3(x - 1) = 2$ .

[3 marks]  
 [3 markah]

8

3

Answer /Jawapan: .....

- 9 Given that  $\log_2 m = p$  and  $\log_3 m = r$ . Express  $\log_m 18$  in terms of  $p$  and  $r$ .  
 Diberi  $\log_2 m = p$  dan  $\log_3 m = r$ . Ungkapkan  $\log_m 18$  dalam sebutan  $p$  dan  $r$ .

[4 marks]  
 [4 markah]

9

4

Answer /Jawapan: .....

- 10 The first three terms of an arithmetic progression are  $y$ ,  $2y - 2$  and  $2y + 1$ .  
 Tiga sebutan pertama suatu jangjang aritmetik ialah  $y$ ,  $2y - 2$  dan  $2y + 1$ .

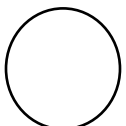
Find the value of  $y$ .  
 Cari nilai  $y$ .

[2 marks]  
 [2 markah]

10

2

Answer /Jawapan: .....



[Lihat sebelah

SULIT

- 11** The sum of the first three terms of a geometric progression is 35 and the common ratio is 2. Find  
*Hasil tambah tiga sebutan pertama suatu jangjang geometri ialah 35 dan nisbah sepunya ialah 2. Carikan*

- (a) the first term of the progression,  
*sebutan pertama jangjang tersebut,*
- (b) the eighth term.  
*sebutan ke lapan.*

[3 marks]  
 [3 markah]

Answer /Jawapan: (a).....

(b).....

11

	3
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- 12** The sum of the first n term,  $S_n$ , of a geometric progression is given by

*Hasil tambah n sebutan pertama,  $S_n$ , bagi suatu jangjang geometri diberi oleh*

$$S_n = 81 \left[ 1 - \left( \frac{2}{3} \right)^n \right]$$

Find

*Cari*

- a) the common ratio of the geometric progression,  
*nisbah sepunya jangjang geometri*
- b) the sum to infinity of the progression  
*jumlah sehingga ketak terhinggaan*

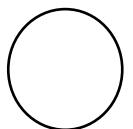
[4 marks]  
 [4 markah]

Answer /Jawapan: (a).....

(b).....

12

	4
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[Lihat sebelah

SULIT

- 13 The variables  $x$  and  $y$  are related by the equation  $y = px^{-\frac{1}{2}}$ , where  $p$  is a constant. Diagram 13 shows the straight line graph obtained by plotting  $\log_{10}y$  against  $\log_{10}x$ .

Pembolehubah  $x$  dan  $y$  dihubungkan oleh persamaan  $y = px^{-\frac{1}{2}}$ , dengan keadaan  $p$  ialah pemalar. Rajah 13 menunjukkan graf garis lurus yang diperolehi dengan memplot  $\log_{10}y$  melawan  $\log_{10}x$ .

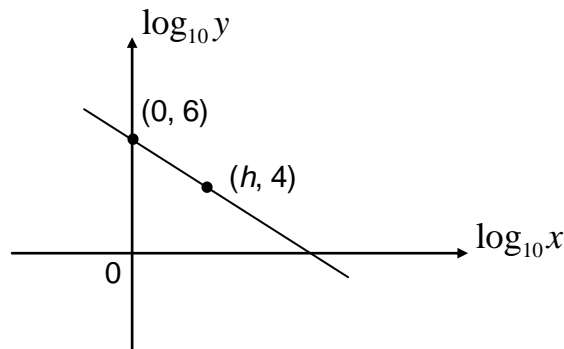


Diagram 13  
Rajah 13

- a) Reduce the equation  $y = px^{-\frac{1}{2}}$  to linear form.

Tukarkan persamaan  $y = px^{-\frac{1}{2}}$  kepada bentuk linear.

- b) Find the value of  
Cari nilai

- (i)  $\log_{10}p$ ,  
(ii)  $h$ .

[4 marks]  
[4 markah]

13

4

Answer/Jawapan: (a) .....

(b) (i)  $\log_{10}p = \dots\dots\dots$

(ii)  $h = \dots\dots\dots$

[Lihat sebelah

SULIT

- 14 Diagram 14 shows the straight line PQR.  
*Rajah 14 menunjukkan garis lurus PQR.*

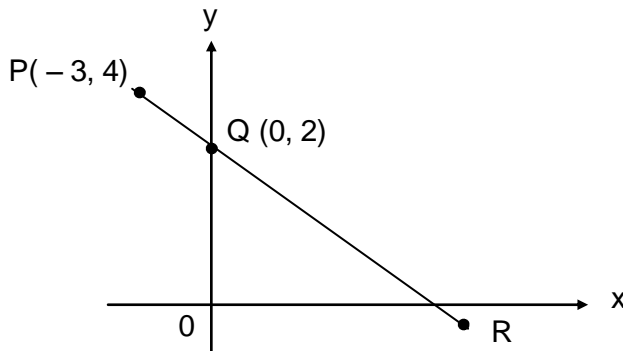


Diagram 14  
*Rajah 14*

Find the equation of the straight line which is perpendicular to PQR and passes through point P.

*Cari persamaan garis lurus yang berserenjang dengan PQR dan melalui titik P.*

[3 marks]  
 [3 markah]

14

	3
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Answer /Jawapan: .....

- 15 Diagram 15 shows vector **OA** drawn on a Cartesian plane.  
*Rajah 15 menunjukkan vektor **OA** dilukis pada suatu satah Cartesan.*

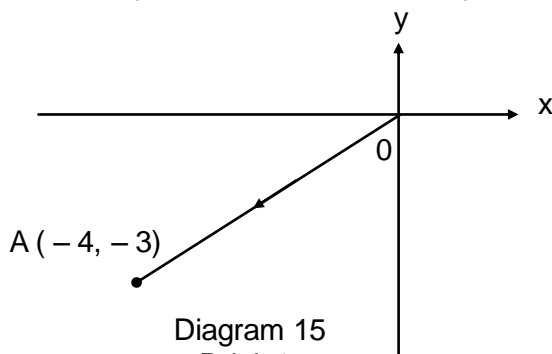


Diagram 15  
*Rajah 15*

- a) Express **OA** in the form  $xi + yj$ ,  
*Ungkapkan OA dalam bentuk  $xi + yj$ ,*
- b) Find the unit vector in the direction of **OA**.  
*Carikan vektor unit dalam arah OA.*

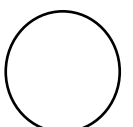
[2 marks]  
 [2 markah]

15

	2
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Answer /Jawapan: (a).....

(b).....



[Lihat sebelah

SULIT

- 16 The following information refers to the vectors  $\vec{a}$ ,  $\vec{b}$ ,  $\vec{p}$ ,  $\vec{q}$  and  $\vec{r}$ .

Maklumat berikut adalah berkaitan dengan vektor-vektor  $\vec{a}$ ,  $\vec{b}$ ,  $\vec{p}$ ,  $\vec{q}$  dan  $\vec{r}$ .

$$\vec{p} = 3\vec{a} + 4\vec{b}$$

$$\vec{q} = 2\vec{a} - \vec{b}$$

$$\vec{r} = m\vec{a} + (m - n)\vec{b}$$

where  $m$  and  $n$  are constants.

di mana  $m$  dan  $n$  adalah pemalar.

By using the information given, find the values of  $m$  and  $n$  when  $\vec{r} = 4\vec{p} - 2\vec{q}$ .

Dengan menggunakan maklumat di atas, cari nilai  $m$  dan nilai  $n$  jika  $\vec{r} = 4\vec{p} - 2\vec{q}$ .

[3marks]  
[3 markah]

16

3

Answer /Jawapan: .....

- 17 Solve the equation  $1 - 2 \cos 2x = \cos x$  for  $0^\circ \leq x \leq 360^\circ$ .

Selesaikan persamaan  $1 - 2 \cos 2x = \cos x$  for  $0^\circ \leq x \leq 360^\circ$ .

[4 marks]  
[4 markah]

17

4

Answer /Jawapan: .....

[Lihat sebelah

SULIT



- 18 Diagram 18 shows a circle  $ABCD$  with centre  $O$ .  
*Rajah 18 menunjukkan sebuah bulatan  $ABCD$  berpusat  $O$ .*

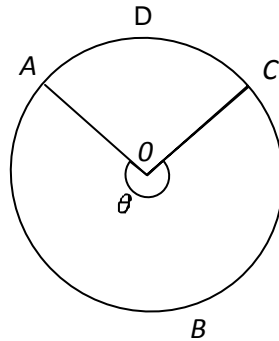


Diagram 18  
*Rajah 18*

Given the length of the arc  $ABC$  is 30 cm and the angle of the sector  $ADC$  is  $100^\circ$ .  
 Find

*Diberi panjang lengkok  $ABC$  ialah 30 cm dan sudut sektor  $ADC$  ialah  $100^\circ$ . Cari*

- (a) the value of  $\theta$ , in radian, correct to four significant figures,  
*nilai  $\theta$ , dalam radian, betul kepada empat angka bererti,*  
 (b) the length, in cm, of the radius of the circle.  
*panjang, dalam cm, jejari bulatan itu.*

[Use/Guna  $\pi = 3.142$ ]

[3 marks]  
 [3 markah]

Answer/Jawapan: (a)  $\theta = \dots\dots\dots$  radian  
 (b)  $\dots\dots\dots$  cm

18

3

- 19 Given that  $f(x) = 2(x + 1)^3$ , find  
*Diberikan bahawa  $f(x) = 2(x + 1)^3$ , cari*

- a)  $f'(x)$ .  
 b) the value of  $f''(4)$ .  
*nilai bagi  $f''(4)$ .*

[4 marks]  
 [4 markah]

Answer/Jawapan: (a)  $\dots\dots\dots$   
 (b)  $\dots\dots\dots$

19

4

[Lihat sebelah

SULIT

- 20** The radius of a circle increases at the rate of  $0.4 \text{ cms}^{-1}$ . Find the rate of change of the area of the circle when the radius is 10 cm.  
*Jejari suatu bulatan bertambah dengan kadar  $0.4 \text{ cms}^{-1}$ . Cari kadar perubahan luas bulatan apabila jejari ialah 10 cm.*

[3 marks]  
 [3 markah]

20

3

Answer /Jawapan: .....

- 21** Given that  $\int_1^2 h(x) dx = 3$ .

*Diberi bahawa  $\int_1^2 h(x) dx = 3$ .*

Find

*Cari*

- a)  $\int_2^1 h(x) dx$   
 b) the value of  $k$  if  $\int_1^2 [h(x) + k] dx = 7$   
*nilai  $k$  jika  $\int_1^2 [h(x) + k] dx = 7$*

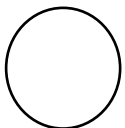
[ 4 marks]  
 [4 markah]

21

4

Answer/Jawapan: (a)  $k =$  .....

(b) .....



[Lihat sebelah

SULIT

- 22** A committee of 6 people is to be chosen from 5 men and 7 women. Find the number of ways the committee can be formed if

*Satu jawatankuasa terdiri dari 6 orang hendak dipilih dari 5 orang lelaki dan 7 orang perempuan. Cari bilangan cara yang berlainan jawatankuasa itu dibentuk jika*

- (a) there is no restriction,  
*tiada syarat dikenakan,*
- (b) the committee must have at most 2 men  
*jabatankuasa itu mengandungi selebih-lebihnya 2 orang lelaki*

[ 4 marks]  
[4 markah]

Answer /Jawapan: .....

22

	4
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- 23** The mean of a set of 8 numbers is 10. When two numbers  $k$  and  $k^2$  are added to the set, the mean remains unchanged. Find the possible values of  $k$ .

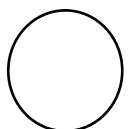
*Min bagi satu set yang mengandungi 8 nombor ialah 10. Apabila dua nombor  $k$  dan  $k^2$  ditambah ke dalam set nombor-nombor itu, minnya tidak berubah. Cari nilai-nilai  $k$  yang mungkin.*

[3 marks]  
[3 markah]

Answer /Jawapan: .....

23

	3
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- 24 Table 24 shows the number of coloured cards in a box.  
*Jadual 24 menunjukkan bilangan kad berwarna dalam sebuah kotak.*

Colour <i>Warna</i>	Number of cards <i>Bilangan kad</i>
Green <i>Hijau</i>	4
Black <i>Hitam</i>	5
Red <i>Merah</i>	6

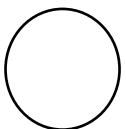
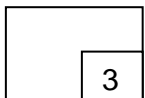
Table 24  
*Jadual 24*

Two cards are drawn at random from the box. Find the probability that both cards are **not** the same colour.

*Dua kad dikeluarkan secara rawak dari kotak itu. Cari kebarangkalian bahawa kedua-dua kad itu **tidak** sama warna.*

[3 marks]  
 [3 markah]

24



Answer /Jawapan: .....

[Lihat sebelah  
 SULIT

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

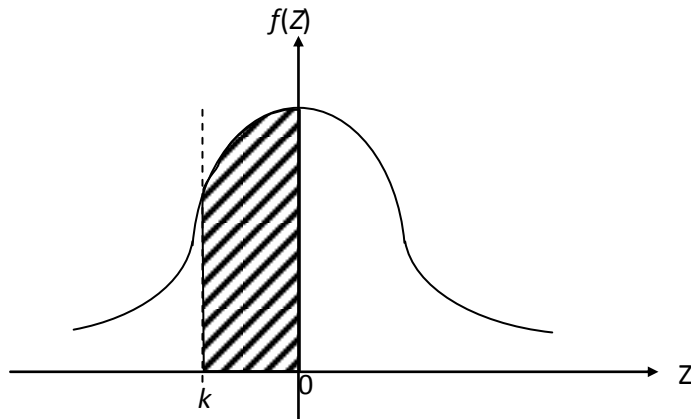


Diagram 25

The probability represented by the area of the shaded region is 0.1554. Find  
*Kebarangkalian yang diwakili luas oleh kawasan berlorek ialah 0.1554. Cari*

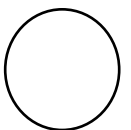
- (a) the value of  $k$ ,  
 nilai  $k$ ,
- (b)  $P(Z > k)$

[4 marks]  
 [4 markah]

Answer /Jawapan: (a).....

(b).....

5
3



**END OF QUESTION PAPER**

**KERTAS SOALAN TAMAT**

**Additional Mathematics**  
**Kertas 2**  
**Sept 2010**

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



Nama : .....

Tingkatan : .....

**JABATAN PELAJARAN NEGERI JOHOR**  
**PEPERIKSAAN PERCUBAAN SPM 2010**

**ADDITIONAL MATHEMATICS**  
**KERTAS 2**

**Dua jam tiga puluh minit**

**JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU**

1. *Tulis Nama dan Tingkatan anda 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 maklumat di halaman belakang kertas soalan ini.*

<b>Nombor Soalan</b>	<b>Markah Penuh</b>	<b>Markah Diperolehi</b>
1	5	
2	6	
3	7	
4	8	
5	6	
6	8	
7	10	
8	10	
9	10	
10	10	
11	10	
12	10	
13	10	
14	10	
15	10	
<b>Jumlah</b>		

Kertas soalan ini mengandungi 19 halaman bercetak.

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

## ALGEBRA

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

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

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

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

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

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

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

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

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

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

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

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

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

## CALCULUS

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

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

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

4 Area under a curve

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

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

5 Volume generated

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

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

## GEOMETRY

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

2 Midpoint

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

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

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

5 A point dividing a segment of a line

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

6 Area of triangle =

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

## STATISTICS

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

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

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

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

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

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

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

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

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

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

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

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

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

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

## TRIGONOMETRY

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

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

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

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

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

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

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

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

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

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

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

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

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

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



**Section A**  
**Bahagian A**

[40 marks]  
[40 markah]

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

- 1 Solve the following simultaneous equations:  
*Selesaikan persamaan serentak berikut :*

$$\begin{aligned}x - 2y &= 1 \\ x + 1 &= \frac{4}{y}\end{aligned}$$

[5 marks]  
[5 markah]

- 2 Given a quadratic function  $f(x) = 1 - 8x + 2x^2 = 2(x + m)^2 + mk$ , where  $m$  and  $k$  are constants.

*Diberi fungsi kuadratik  $f(x) = 1 - 8x + 2x^2 = 2(x + m)^2 + mk$ , dengan keadaan  $m$  dan  $k$  adalah pemalar.*

- (a) State  
*Nyatakan*

(i) the value of  $m$  and  $k$ ,  
*nilai  $m$  dan  $k$ ,*

(ii) the minimum point.  
*titik minimum.*

[3 marks]  
[3 markah]

- (b) Hence, sketch the graph of  $f(x) = 1 - 8x + 2x^2$ .

*Seterusnya, lakar graf  $f(x) = 1 - 8x + 2x^2$ .*

[2 marks]  
[2 markah]

- (c) State the new equation of the graph if the graph is reflected on  $x$ -axis.  
*Nyatakan persamaan baru bagi graf jika graf tersebut dipantulkan pada paksi-  $x$ .*

[1 mark]  
[1 markah]

- 3 Bijak Book Store launched a sale for exercise book from January 2009 to December 2009. Bijak Book Store sold 500 exercise books in January 2009 and its sales increased constantly by 50 exercise books every subsequent month.

*Bijak Book Store melancarkan jualan buku latihan dari bulan Januari 2009 sehingga bulan Disember 2009. Bijak Book Store telah menjual 500 buah buku latihan dalam bulan Januari 2009 dan jualanannya bertambah secara malar sebanyak 50 buah buku setiap bulan berikutnya*

- (a) (i) Determine the number of exercise books sold by the Bijak Book Store in the month of June, [2 marks]

*Tentukan jumlah buku latihan yang berjaya dijual oleh Bijak Book Store pada bulan Jun,* [2 markah]

- (ii) Bijak Book Store sold 1000 books in the  $n^{\text{th}}$  month. Find the value of  $n$ . [3 marks]

*Bijak Book Store telah menjual 1000 buah buku pada bulan ke  $n$ . Cari nilai  $n$ .* [3 markah]

- (b) Given that the Bijak Book Store earns a profit of 8 cents from each of the exercise books sold. Find the total profit gained by the Bijak Book Store in the year of 2009. [3 marks]

*Diberi bahawa Bijak Book Store mendapat keuntungan sebanyak 8 sen bagi setiap buku yang dijual. Kirakan jumlah keuntungan yang diperolehi oleh Bijak Book Store sepanjang tahun 2009.* [3 markah]

- 4 Table 4 shows the distribution of the heights of plants in an orchard.  
*Jadual 4 menunjukkan taburan ke ketinggian pokok-pokok di sebuah ladang.*

Height of plants <i>Ketinggian pokok-pokok</i> (cm)	Frequency <i>Kekerapan</i>
5 – 9	4
10 – 14	$p$
15 – 19	17
20 – 24	10
25 – 29	15
30 – 35	9

**Table 4**  
**Jadual 4**

Given the median is 21.5.  
*Diberi median adalah 21.5.*

- (a) Find the value of  $p$ .

[4 marks]

*Kirakan nilai  $p$ .*

[4 markah]

- (b) Use graph paper to answer this question.

*Gunakan kertas graf untuk menjawab soalan ini.*

Using a scale of 2 cm to 5 cm on the horizontal axis and 2 cm to 2 units on the vertical axis, draw a histogram to represent the frequency distribution of the height of plants in the orchard.

*Dengan menggunakan skala 2 cm kepada 5 cm pada paksi mengufuk dan 2 cm kepada 2 unit pada paksi mencancang, lukis histogram untuk menunjukkan taburan kekerapan ketinggian pokok-pokok tersebut.*

From the graph, find the modal height of the plants.

[3 marks]

*Daripada graf, tentukan mod ketinggian pokok-pokok.*

[3 markah]

5 (a) Prove that  $\cot x - \tan x = 2 \cot 2x$ .

*Buktikan bahawa  $\cot x - \tan x = 2 \cot 2x$ .*

[2 marks]

[2 markah]

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

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

(ii) Hence, using the same axes, sketch a suitable straight line to find the number of solutions for the equation  $\sin \frac{3x}{2} = \frac{1}{2} - \frac{x}{4\pi}$  for  $0 \leq x \leq 2\pi$ .

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

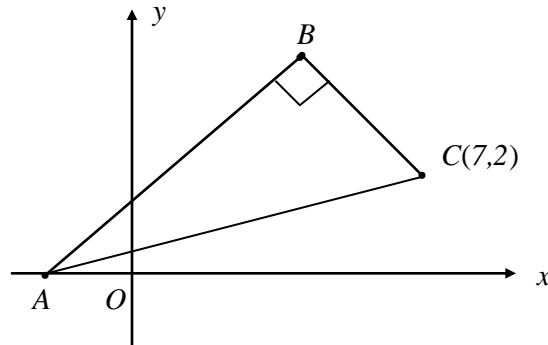
$$\sin \frac{3x}{2} = \frac{1}{2} - \frac{x}{4\pi} \quad \text{untuk } 0 \leq x \leq 2\pi.$$

[6 marks]

[6 markah]

- 6 Solutions by scale drawing will not be accepted.  
*Penyelesaian secara lukisan berskala tidak diterima.*

Diagram 6 shows a triangle  $ABC$ .  
*Rajah 6 menunjukkan segitiga  $ABC$ .*



**Diagram 6**  
**Rajah 6**

The equation of  $AB$  is  $2y = x + 12$ .  
*Persamaan garis lurus  $AB$  ialah  $2y = x + 12$ .*

- (a) Find  
*Cari*

(i) the equation of  $BC$ ,  
*persamaan garis lurus  $BC$ ,*

[3 marks]  
 [3 markah]

(ii) the coordinates of  $B$ .  
*koordinat bagi  $B$ .*

[2 marks]  
 [2 markah]

- (b) The straight line  $BC$  is extended to a point  $D$  such that  $BC : CD = 3 : 1$ .  
 Find the coordinates of  $D$ .

[ 3 marks]

*Garis lurus  $BC$  diperpanjangkan ke titik  $D$  dengan keadaan  $BC : CD = 3 : 1$ .  
 Cari koordinat bagi titik  $D$ .*

[3 markah]

## Section B

## Bahagian B

[40 marks]

[40 markah]

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

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

- 7 In Diagram 7, the straight line  $PAQ$  is a normal to the curve  $y = 4 - x^2$  at point  $A(1, 3)$   
 Dalam Rajah 7, garis lurus  $PAQ$  adalah normal kepada lengkung  $y = 4 - x^2$  pada titik  $A(1, 3)$ .

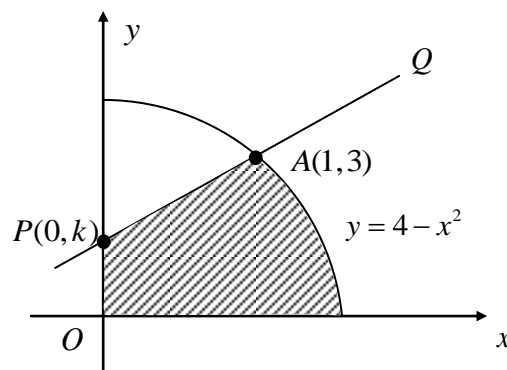


Diagram 7  
Rajah 7

Find  
Cari

- (a) the value of  $k$ , [3 marks]  
 nilai  $k$ , [3 markah]
- (b) the area of the shaded region, [4 marks]  
 luas rantau berlorek, [4 markah]
- (c) the volume generated in terms of  $\pi$ , when the region bounded by the curve, the  $y$ -axis and  $y = 3$  is revolved  $360^\circ$  about the  $y$ -axis. [3 marks]

Isipadu janaan, dalam sebutan  $\pi$ , apabila rantau yang dibatasi oleh lengkung itu, paksi- $y$  dan  $y = 3$  dikisarkan melalui  $360^\circ$  pada paksi- $y$ . [3 markah]

8 Table 8 shows the values of two variables,  $x$  and  $y$ , obtained from an experiment.

Variables  $x$  and  $y$  are related by the equation  $2y - a = \frac{b}{x}$ , where  $a$  and  $b$  are constants.

*Jadual 8 menunjukkan nilai dua pembolehubah,  $x$  dan  $y$  didapati daripada satu*

*eksperimen. Pembolehubah  $x$  dan  $y$  dihubungkan dengan persamaan,  $2y - a = \frac{b}{x}$ , dengan keadaan  $a$  dan  $b$  adalah pemalar.*

$x$	1	2	4	5	6	8
$y$	6.00	3.90	3.00	2.80	2.75	2.50

**Table 8**

**Jadual 8**

(a) Plot  $xy$  against  $x$ , using a scale of 2 cm to 1 unit on the  $x$ -axis, and 1 cm to 1 unit on the  $y$ -axis.

Hence, draw the line of best fit.

[4 marks]

*Plotkan graf  $xy$  lawan  $x$ , dengan menggunakan skala 2 cm kepada 1 unit pada paksi-  $x$  dan 1 cm kepada 1 unit pada paksi-  $y$ .*

*Seterusnya, lukiskan garis lurus penyuaiian terbaik.*

[4 markah]

(b) Use your graph in 8(a), to find the value of  
Gunakan graf anda di 8(a), untuk mencari nilai

(i)  $a$ ,

(ii)  $b$ ,

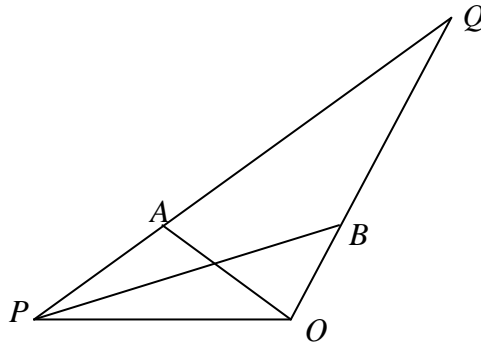
(iii)  $y$  when  $x = 2.7$ .

[6 marks]

$y$  apabila  $x = 2.7$ .

[6 markah]

- 9 Diagram 9 shows triangle  $OPQ$ . The straight line  $OA$  intersect the straight line  $PB$  at point  $X$ .  
 Rajah 9 menunjukkan segitiga  $OPQ$ . Garis lurus  $OA$  bersilang dengan garis lurus  $PB$  di titik  $X$ .



**Diagram 9**  
**Rajah 9**

It is given that  $\vec{OB} = \frac{1}{4}\vec{OQ}$ ,  $\vec{PA} = \frac{1}{5}\vec{PQ}$ ,  $\vec{OP} = 5\vec{p}$  and  $\vec{OQ} = 3\vec{q}$ .

Diberi bahawa  $\vec{OB} = \frac{1}{4}\vec{OQ}$ ,  $\vec{PA} = \frac{1}{5}\vec{PQ}$ ,  $\vec{OP} = 5\vec{p}$  dan  $\vec{OQ} = 3\vec{q}$ .

- (a) Express in terms of  $\vec{p}$  and or  $\vec{q}$ :

Ungkapkan dalam sebutan  $\vec{p}$  dan/atau  $\vec{q}$ :

(i)  $\vec{PB}$ ,

(ii)  $\vec{OA}$ .

[3 marks]

[3 markah]

- (b) (i) If  $\vec{PX} = m\vec{PB}$ , express  $\vec{PX}$  in terms of  $m$ ,  $\vec{p}$  and  $\vec{q}$ .

Jika  $\vec{PX} = m\vec{PB}$ , nyatakan  $\vec{PX}$  dalam sebutan  $m$ ,  $\vec{p}$  dan  $\vec{q}$ .

- (ii) If  $\vec{XA} = n\vec{OA}$ , express  $\vec{XA}$  in terms of  $n$ ,  $\vec{p}$  and  $\vec{q}$ .

[2 marks]

Jika  $\vec{XA} = n\vec{OA}$ , nyatakan  $\vec{XA}$  dalam sebutan  $n$ ,  $\vec{p}$  dan  $\vec{q}$ .

[2 markah]

- (c) By using  $\vec{PX} + \vec{XA} = \vec{PA}$ , find the value of  $m$  and of  $n$ .

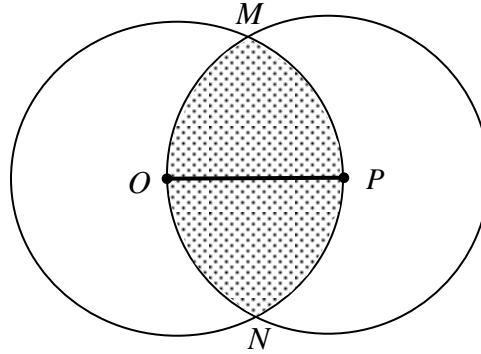
[5 marks]

Dengan menggunakan  $\vec{PX}$  dan  $\vec{XA}$  dari (b), cari nilai  $m$  dan nilai  $n$ .

[5 markah]



- 10 Diagram 10 shows two circles, centre  $O$  and  $P$ . Both circles have radius 5 cm.  $OP$  is a line joining centre  $O$  and  $P$ .  
*Rajah 10 menunjukkan dua buah bulatan masing-masing berpusat  $O$  dan  $P$ . Kedua-dua bulatan berjari 5 cm.  $OP$  ialah garis lurus yang menyambungkan pusat  $O$  dan pusat  $P$ .*



**Diagram 10**  
**Rajah 10**

- (a) Show that  $\angle MON = \frac{2}{3}\pi$  rad , [2 marks]  
*Tunjukkan bahawa,  $\angle MON = \frac{2}{3}\pi$  rad , [2 markah]*
- (b) Hence, by using  $\pi = 3.142$ , calculate  
*Seterusnya, dengan menggunakan  $\pi = 3.142$ , hitungkan*
- (i) the perimeter of the shaded region, in cm, [3 marks]  
*perimeter bagi kawasan berlorek, dalam cm, [3 markah]*
- (ii) the area, in  $\text{cm}^2$ , of the shaded region. [5 marks]  
*luas, dalam  $\text{cm}^2$ , bagi kawasan berlorek. [5 markah]*

- 11(a) A survey conducted in a certain school shows that one out of three students goes for tuition class.

*Satu tinjauan yang dijalankan di sebuah sekolah ke atas murid-murid mendapati bahawa seorang daripada tiga orang pelajar menghadiri kelas tuisyen.*

If 7 students are selected at random, calculate the probability that

*Jika 7 orang pelajar daripada sekolah itu dipilih secara rawak, hitung kebarangkalian bahawa*

- (i) exactly 4 students go for tuition class,  
*tepat 4 orang pelajar pergi ke kelas tuisyen,*

- (ii) at least 4 students go for tuition class.  
*Sekurang-kurangnya 4 pelajar menghadiri kelas tuisyen .*

[5 marks]  
[5 markah]

- (b) The height of the players in a basketball team are found to be normally distributed with mean 160 cm and standard deviation 10 cm

*Ketinggian pemain-pemain dalam satu pasukan bola keranjang adalah bertaburan secara normal dengan min 160 cm dan sisihan piawai 10 cm.*

- (i) A basketball player is chosen at random.  
*Seorang pemain bola keranjang dipilih secara rawak .*

Find the probability that the height of the player is less than 155 cm  
*Cari kebarangkalian bahawa pemain tersebut mempunyai ketinggian kurang dari 155 cm.*

- (ii) It is found that 90% of the basketball players have height more than  $h$  cm .  
find the value of  $h$ .

*Didapati bahawa 90% pemain-pemain bola keranjang tersebut mempunyai ketinggian lebih dari  $h$  cm, cari nilai  $h$ .*

[5 marks]  
[5 markah]

**Section C**  
**Bahagian C**

[20 marks]  
[20 markah]

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

- 12 An object moves along a straight line and passes through a fixed point O. Its velocity,  $v \text{ ms}^{-1}$ , is given by  $v = 3t^2 - 12t - 15$ , where  $t$  is the time, in seconds, after passing through point O. The particle stops at rest after  $p$  seconds.  
*Suatu objek bergerak di sepanjang suatu garis lurus dan melalui satu titik tetap O. Halajunya,  $v \text{ ms}^{-1}$ , diberi oleh  $v = 3t^2 - 12t - 15$ , dengan keadaan  $t$  ialah masa, dalam saat, selepas melalui titik O. Objek tersebut berhenti seketika pada  $p$  saat.*

Find  
Cari

- (a) the minimum velocity, in  $\text{ms}^{-1}$ , of the particle, [3 marks]  
*halaju minimum, dalam  $\text{ms}^{-1}$ , objek tersebut, [3 markah]*
- (b) the value of  $p$ , [2 marks]  
*nilai  $p$ , [2 markah]*
- (c) the displacement of the object when it is instantaneous at rest, [3 marks]  
*sesaran objek apabila ianya berehat, [3 markah]*
- (d) the distance, in m, travelled by the object in the first 7 seconds. [2 marks]  
*jarak, dalam m, yang dilalui oleh objek dalam 7 saat pertama. [2 markah]*

- 13 Table 13 shows the prices and the price indices of five ingredients  $A, B, C, D$  and  $E$ , to make a particular kind of snacks.

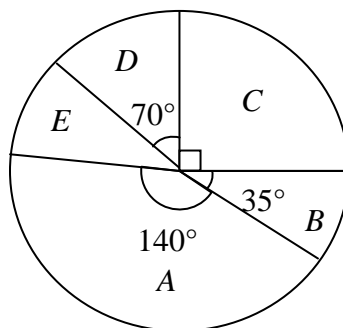
*Jadual 13 menunjukkan harga-harga dan indeks harga bagi lima jenis bahan  $A, B, C, D$  dan  $E$ , bagi membuat sejenis makanan ringan.*

Ingredient <i>Bahan</i>	Price RM for the year <i>Harga RM pada tahun</i>		Price index for the year 2008 based on the year 2006
	2006	2008	<i>Indeks harga pada tahun 2008 berdasarkan tahun 2006</i>
$A$	1.50	1.80	120
$B$	2.00	2.80	140
$C$	$p$	4.50	150
$D$	4.00	3.20	80
$E$	2.00	2.20	$q$

**Table 13**  
**Jadual 13**

Diagram 13 shows a pie chart which represents the relative quantity of the ingredient used.

*Rajah 13 menunjukkan carta pai yang mewakili kuantiti bahan yang digunakan.*

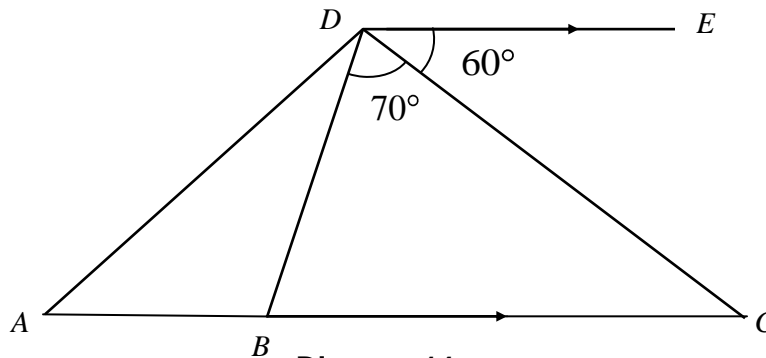


**Diagram 13**  
**Rajah 13**

- (a) Find the value of  $p$  and  $q$ ,  
*Carikan nilai  $p$  dan nilai  $q$ ,* [3 marks]  
[3 markah]
- (b) Calculate the composite index for the cost of making the snacks in the year 2008 based on the year 2006.  
*Hitung indeks gubahan bagi kos penghasilan makanan ringan pada tahun 2008 berdasarkan tahun 2006.* [3 marks]  
[3 markah]
- (c) The price of each ingredient increases by 25% from the year 2008 to the year 2010. Given that the cost of making the snacks in the year 2006 is RM30, calculate the corresponding cost in the year 2010.  
*Harga setiap bahan meningkat sebanyak 25% dari tahun 2008 ke tahun 2010. Diberi harga membuat setiap produk makanan pada tahun 2006 adalah RM 30, hitungkan harga kos tersebut pada tahun 2010.* [4 marks]  
[4 markah]

[ Lihat sebelah  
**SULIT**

- 14 Diagram 14 shows a triangle  $ACD$ .  
*Rajah 14 menunjukkan sebuah segitiga  $ACD$ .*



**Diagram 14**  
**Rajah 14**

Given that  $DE$  and  $BC$  are parallel lines.  $ABC$  is a straight line,  $BC = 10$  cm, and  $AB = 4$  cm.

*Rajah 14 menunjukkan segitiga  $ACD$ . Diberi bahawa  $DE$  dan  $BC$  adalah garis selari,  $ABC$  ialah garis lurus dengan  $BC = 10$  cm dan  $AB = 4$  cm.*

- (a) Find, in cm, the length of  $BD$ ,  
*Kirakan, dalam cm, panjang  $BD$ ,* [3 marks]  
 [3 markah]
- (b) Find  
*Cari*
- (i) the length of  $AD$ , in cm,  
*panjang  $AD$ , dalam cm,*
- (ii)  $\angle BAD$ . [4 marks]  
 [4 markah]
- (c)  $A'B'D'$  is a triangle has the same measurement as triangle  $ABD$  that is  $A'B' = AB$ ,  $B'D' = BD$ ,  $\angle BDA = \angle B'D'A'$ , but different in shape from triangle  $ABD$ .  
 *$A'B'D'$  ialah segitiga yang sama ukuran dengan segitiga  $ABD$  dengan keadaan  $A'B' = AB$ ,  $B'D' = BD$ ,  $\angle BDA = \angle B'D'A'$ , tetapi bentuk yang berbeza dari segitiga  $ABD$ .*
- (i) Sketch the triangle  $A'B'D'$ ,  
*Lakarkan segitiga  $A'B'D'$ ,*
- (ii) Calculate in  $\text{cm}^2$ , the area of triangle  $A'B'D'$ .  
*Kira, dalam  $\text{cm}^2$ , luas segitiga  $A'B'D'$ .*

[3 marks]  
 [3 markah]

15 Use graph paper to answer this question.

*Gunakan kertas graf untuk menjawab soalan ini.*

A florist produces  $x$  rosette  $A$  and  $y$  rosette  $B$  in her shop.

The cost of making a rosette  $A$  is RM 6 and a rosette  $B$  is RM 9.

*Seorang penjual bunga menghasilkan  $x$  roset jenis  $A$  dan  $y$  roset jenis  $B$  di kedainya.*

*Kos membuat satu roset  $A$  ialah RM 6 dan satu roset  $B$  ialah RM 9.*

The production of her shop is based on the following constraints:

*Pengeluaran roset di kedainya adalah berdasarkan kekangan-kekangan berikut :*

- I Minimum number of rosette in her shop is 200.  
*Bilangan minimum roset di kedainya adalah 200.*
- II The maximum allocation of production is RM 1620.  
*Peruntukan maksimum penghasilan roset ialah RM 1620.*
- III The number of rosette  $A$  is not more than 2 times the number of rosette  $B$ .  
*Bilangan roset  $A$  adalah tidak melebihi 2 kali bilangan roset  $B$ .*

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

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

[3 markah]

(b) By using the scale of 2 cm to 20 rosetts on both axes, construct and shade the region  $R$  which satisfies the above constraints. [3 marks]

*Dengan menggunakan skala 2 cm kepada 20 roset di kedua-dua paksi, bina dan lorek rantau  $R$  yang memenuhi semua kekangan di atas.*

[3 markah]

(c) Use your graph in 15(b), to find  
*Gunakan graf anda di 15(b), untuk mencari*

(i) the range of number of rosette  $B$  produced if she has 120 rosette of  $A$  in her shop,  
*Julat bilangan roset  $B$  yang dihasilkan jika penjual bunga itu mempunyai 120 roset  $A$  di kedainya.*

(ii) the maximum profit can be obtained by the florist if all the rosettes are sold out, given that a rosette  $A$  is sold at RM 7 and a rosette  $B$  is sold at RM 12.

*Jumlah keuntungan maksimum yang boleh diperolehi olehnya jika dia dapat menjual kesemua roset apabila satu roset  $A$  dijual pada harga RM 7 dan satu roset  $B$  dijual pada harga RM 12.*

[4 marks]

[4 markah]

**END OF QUESTION PAPER**

[ Lihat sebelah

**SULIT**



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

1. This question paper consists of three sections: **Section A**, **Section B** and **Section C**.  
*Kertas soalan ini mengandungi tiga bahagian: **Bahagian A**, **Bahagian B** dan **Bahagian C**.*
  
2. Answer **all** questions in **Section A**, **four** questions from **Section B** and **two** questions from **Section C**.  
*Jawab **semua** soalan dalam **Bahagian A**, **empat** soalan daripada **Bahagian B** dan **dua** soalan daripada **Bahagian C**.*
  
3. Show your working. It may help you to get marks.  
*Tunjukkan langkah-langkah penting dalam kerja mengira anda. Ini boleh membantu anda untuk mendapatkan markah .*
  
4. The diagrams in the questions provided are not drawn to scale unless stated.  
*Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.*
  
5. The marks allocated for each question and sub-part of a question are shown in brackets.  
*Markah yang diperuntukkan bagi setiap soalan dan ceraian soalan ditunjukkan dalam kurungan.*
  
6. A list of formulae is provided on pages 2 to 3.  
*Satu senarai rumus disediakan di halaman 2 hingga 3 .*
  
7. Graph papers are provided.  
*Kertas graf disediakan.*
  
8. You may use a non – programmable scientific calculator.  
*Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram.*



No.	Penyelesaian	Sub-markah	Markah penuh
1	(a) 7,13 (ignore any bracket)	1	2
	(b) Many to many	1	
2	(a) $\frac{3-2x}{4}$ $y = \frac{3-4x}{2}$	2 B1	3
	(b) $-\frac{7}{4}$	1	
3	$\frac{1}{4}$ $2(6x+1)-1=4$ $2(6x+1)-1$	3 B2 B1	3
4	$-2, 1$ $(2p)^2 - 4(1)(2-p) = 0$ $x^2 + 2px + 2 - p = 0$	3 B2 B1	3
5	8.531 , 0.4689 $\frac{-(-9) \pm \sqrt{(-9)^2 - 4(1)(4)}}{2(1)}$ $x^2 - 9x + 4 = 0$	3 B2 B1	3
6	(a) $k = -4$ , $p = 4$	1, 1	3
	(b) $x = -3$	1	
7	6 $\frac{1}{2^x} = \frac{1}{64}$ $\frac{1}{2^x} (6-8) = \frac{1}{8}$	3 B2 B1	3

8		$\frac{11}{6}$ $\frac{3x+2}{x-1} = 9$ $\frac{3x+2}{x-1} \quad \text{or} \quad 9(x-1) \quad \text{or} \quad \frac{3x+2}{9}$	3 B2 B1	3
9		$\frac{2p+r}{pr}$ $\frac{\log_2 2}{\log_2 m} + 2 \frac{\log_3 3}{\log_3 m}$ $\log_m 2 + 2 \log_m 3$ $\log_m 2 + \log_m 3^2 \quad \text{or} \quad \frac{\log 2}{\log 3} \quad \text{or} \quad \frac{\log 3}{\log m}$	4 B3 B2 B1	4
10		$y = 5$ $2y + 1 - (2y - 2) = 2y - 2 - y \quad \text{or equivalent.}$	2 B1	2
11	(a)	$5$ $a(1 + 2 + 2^2) = 35 \quad @ \quad \frac{a[2^3-1]}{2-1} = 35$	2 B1	3
	(b)	640	1	
12	(a)	$\frac{2}{3}$ $S_1 = 27 \quad \text{or} \quad S_2 = 45$	2 B1	4
	(b)	$81$ $\frac{27}{1 - \frac{2}{3}}$	2 B1	

13	(a)	$\log y = \log p - \frac{1}{2} \log x$	1	4
	(b)	(i) 6  (ii) $h = 4$  $\frac{6-h}{0-h} = -\frac{1}{2} \quad \text{or} \quad 4 = 6 - \frac{1}{2}(h)$	1  2  B1	
14		$y = \frac{3}{2}x + \frac{17}{2}$  $y - 4 = \frac{3}{2}(x + 3)$  $m_2 = \frac{3}{2} \quad \text{or} \quad m_1 = -\frac{2}{3}$	3  B2 B1	3
15.	(a)	$-4i - 3j$	1	2
	(b)	$\frac{-4i - 3j}{5}$	1	
16		$m = 8 \quad \text{and} \quad n = -10$ $m = 8 \quad \text{or} \quad n = -10$ $m = 12 - 4 \quad \text{or} \quad m - n = 16 + 2$	3 B2 B1	3
17		$x = 41.41^\circ, 180^\circ, 318.59^\circ$  $\cos x = 0.75, \quad \cos x = -1$ $(4\cos x - 3)(\cos x + 1) = 0$ $2(2\cos^2 x - 1) + \cos x - 1 = 0$	4 B3 B2 B1	4
18	(a)	4.538 rad	1	3
	(b)	6.611 $r(4.538) = 30$	2 B1	
19	(a)	$6(x + 1)^2$ $2[3(x + 1)^2]$	2 B1	4
	(b)	60 $12(x + 1)$	2 B1	

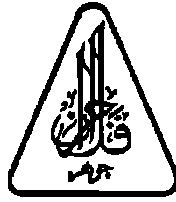
20		$8\pi$  $20\pi(0.4)$  $2\pi r$	3  B2  B1	<b>3</b>
21	(a)	-3	1	<b>4</b>
	(b)	4 $3 + [2k - k] = 7$ $\int_1^2 h(x)dx + \int_1^2 k dx$ or $[kx]$	3 B2  B1	
22	(a)	924 ${}^{12}C_6$	2 B1	<b>4</b>
	(b)	462 ${}^5C_0 {}^7C_6$ or ${}^5C_1 {}^7C_5$ or ${}^5C_2 {}^7C_4$	2 B1	
23		$k = 4, -5$  $\frac{k + k^2 + 80}{10} = 10$  $\frac{\sum x}{8} = 10$ or $\sum x = 80$	3  B2  B1	<b>3</b>
24		$\frac{74}{105}$ $1 - \left[ \left( \frac{4}{15} \right) \left( \frac{3}{14} \right) + \left( \frac{5}{15} \right) \left( \frac{4}{14} \right) + \left( \frac{6}{15} \right) \left( \frac{5}{14} \right) \right]$ or $1 - \frac{{}^4C_2 + {}^5C_2 + {}^6C_2}{{}^{15}C_2}$  $\left( \frac{4}{15} \right) \left( \frac{3}{14} \right)$ or $\left( \frac{5}{15} \right) \left( \frac{4}{14} \right)$ or $\left( \frac{6}{15} \right) \left( \frac{5}{14} \right)$ or ${}^4C_2 + {}^5C_2 + {}^6C_2$	3  B2  B1	<b>3</b>

25	(a)	$k = -0.4$ $0.5 - 0.1554$ or $0.3446$	2 B1	<b>4</b>
	(b)	$0.6554$ $0.1554 + 0.5$ or $1 - 0.3446$	2 B1	

**SULIT**

3472/2

3472/2  
Additional  
Mathematics  
Kertas 2  
September 2010  
2 ½ Jam



JABATAN PELAJARAN NEGERI JOHOR  
PEPERIKSAAN PERCUBAAN SPM 2010

ADDITIONAL MATHEMATICS  
Kertas 2

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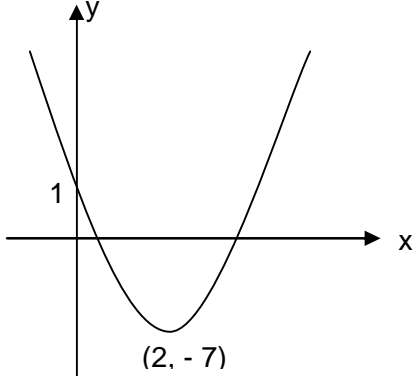
**MARKING SCHEME**

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Kertas soalan ini mengandungi 17 halaman bercetak

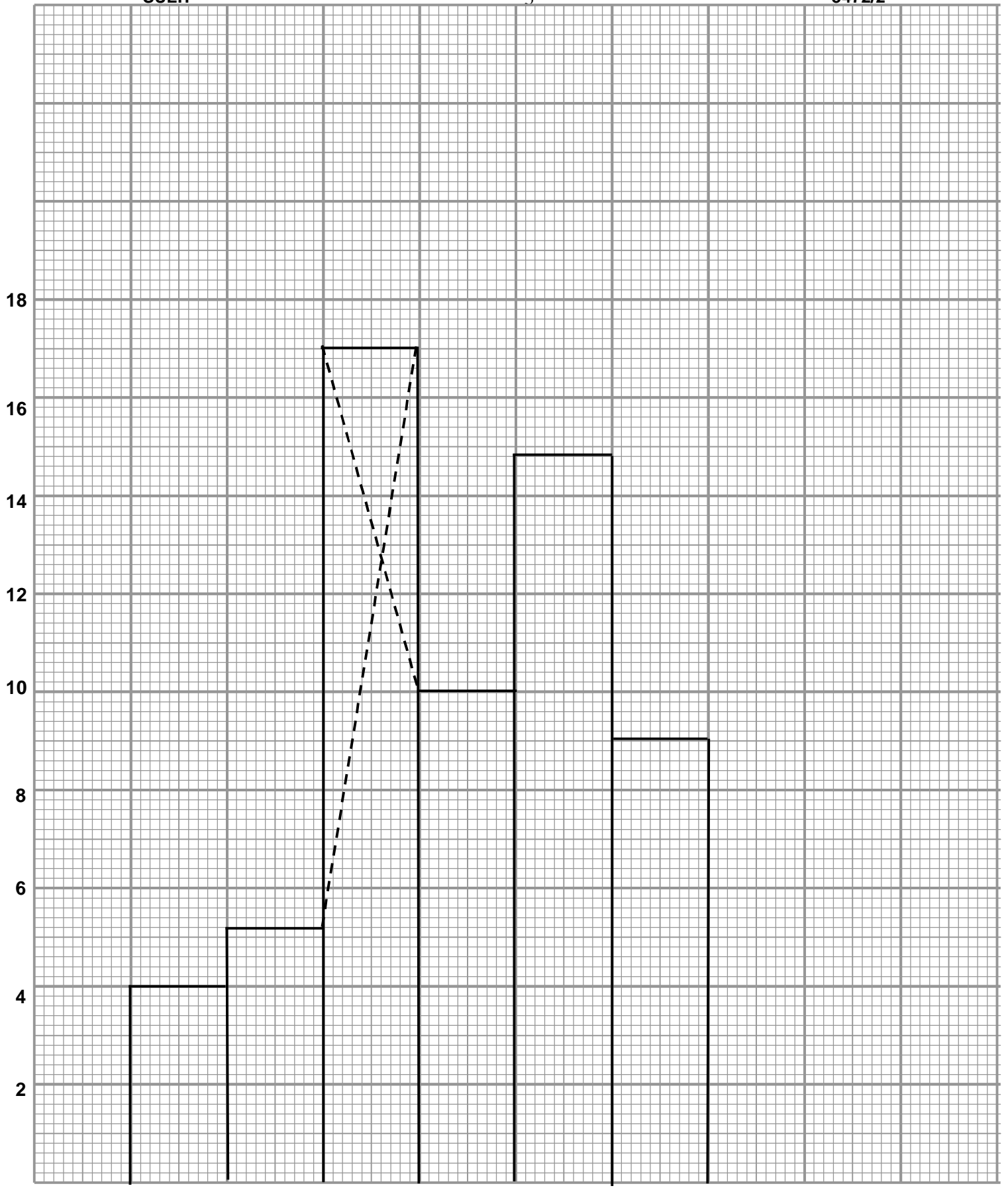
## BAHAGIAN A

No	Solution	Sub marks	Total marks
1	<p> <math>x = 1 + 2y</math> Or <math>y = \frac{x-1}{2}</math> Or <math>y = \frac{4}{x+1}</math> Or <math>x = \frac{4}{y} - 1</math> <span style="border: 1px solid black; padding: 2px;">P1</span> </p> <p>Eliminate x or y</p> <p> <math>*(1 + 2y)y + y = 4</math> <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">K1</span>            Or  <math>x + 1 = \frac{4}{\left(\frac{x-1}{2}\right)}</math>            Or            or equivalent  <math>2y^2 + 2y - 4 = 0</math>  <math>x^2 - 9 = 0</math> </p> <p> <math>(x - 3)(x + 3) = 0</math>  <math>(2y - 2)(y + 2) = 0</math> </p> <p> <math>x = 3, -3</math>  <math>y = -2, y = 1</math>            or  <math>y = -2, y = 1</math>            or  <math>x = 3, -3</math> <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">N1</span> </p> <p> <math>x = 3, -3</math> <span style="border: 1px solid black; padding: 2px;">N1</span> </p> <p>           Solve the quadratic equation by using the factorization @ quadratic formula @ completing the square         </p> <p><b>Note :</b></p> <p><b>OW-1</b> if the working of solving quadratic equation is not shown.</p>	5	5

No	Solution	Sub marks	Total marks
<p><b>2</b> <b>a)</b></p>	<p><math>2(x-2)^2 - 7</math> <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">K1</span></p> <p><math>m = 2</math> <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">N1</span></p> <p><math>k = -7.</math> <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">N1</span></p> <p>OR equivalent method</p> <p><b>b)</b></p>  <p>Shape : U <span style="border: 1px solid black; padding: 2px;">P1</span></p> <p>Minimum point : (2, -7) <span style="border: 1px solid black; padding: 2px;">P1</span></p> <p><b>c)</b> <math>-2(x-2)^2 + 7</math> Or equivalent <span style="border: 1px solid black; padding: 2px;">N1</span></p>	<p><b>3</b></p> <p><b>2</b></p> <p><b>1</b></p>	<p><b>6</b></p>
<p><b>3</b> <b>a) i)</b></p>	<p><math>d = 50</math> <span style="border: 1px solid black; padding: 2px;">P1</span></p> <p>Use <math>T_n = a + (n-1)d</math></p> <p><math>T_6 = 500 + 5(50)</math> <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">K1</span></p> <p>750 <span style="border: 1px solid black; padding: 2px;">N1</span></p> <p>OR other valid method.</p> <p><b>ii)</b></p> <p>Use <math>T_n = a + (n-1)d = 1000</math> <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">K1</span></p> <p><math>\frac{1000 - 500}{50} + 1</math></p> <p>11. <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">N1</span></p> <p>Or November 2009.</p>	<p><b>1</b></p> <p><b>2</b></p> <p><b>2</b></p>	

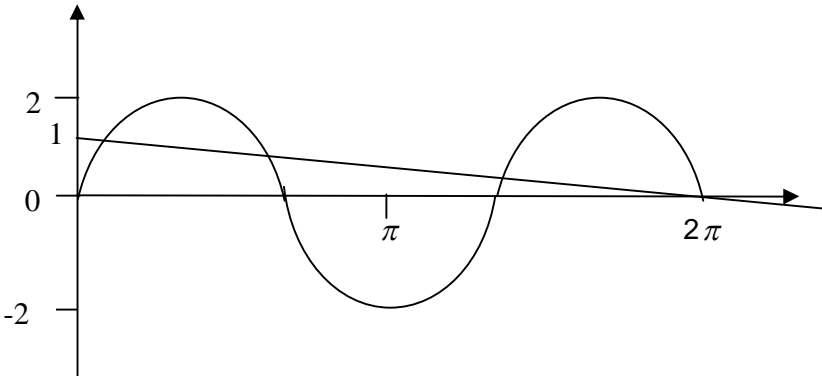


No	Solution	Sub marks	Total marks
b)	<p>Use <math>S_n = \frac{n}{2} [2a + (n - 1)d]</math></p> $\frac{12}{2} [2(500) + (11)(50)]$ <div style="text-align: center;"> </div> <p><b>Note :</b> If listing method is used all terms must be correctly listed, accept for correct answer.</p>	3	8
4 a)	<p>*L = 19.5 or *F = 21 + p or *f<sub>m</sub> = 10</p> <div style="text-align: center;"> </div> <p>Use median formula</p> $21.5 = *19.5 + \left( \frac{\frac{55+p}{2} - *(21+p)}{*10} \right) 5$ <p>With *f<sub>m</sub> and F corresponding to *L</p> <p style="text-align: right;">8 = 13 - p</p> <p>p = 5</p>	4	
b)	<p>Draw histogram with scale given. Sekurang-kurangnya 6 bars.</p> <p>Find the mode from his histogram.</p> <div style="text-align: center;"> </div> <p>17.75</p> <p>Accept in the range (17.50 – 18.00)</p>	3	7



4.5 9.5 14.5 19.5 24.5 29.5 34.5  
3472/2 Hak Cipta JPNJ 2010

[Lihat sebelah  
SULIT

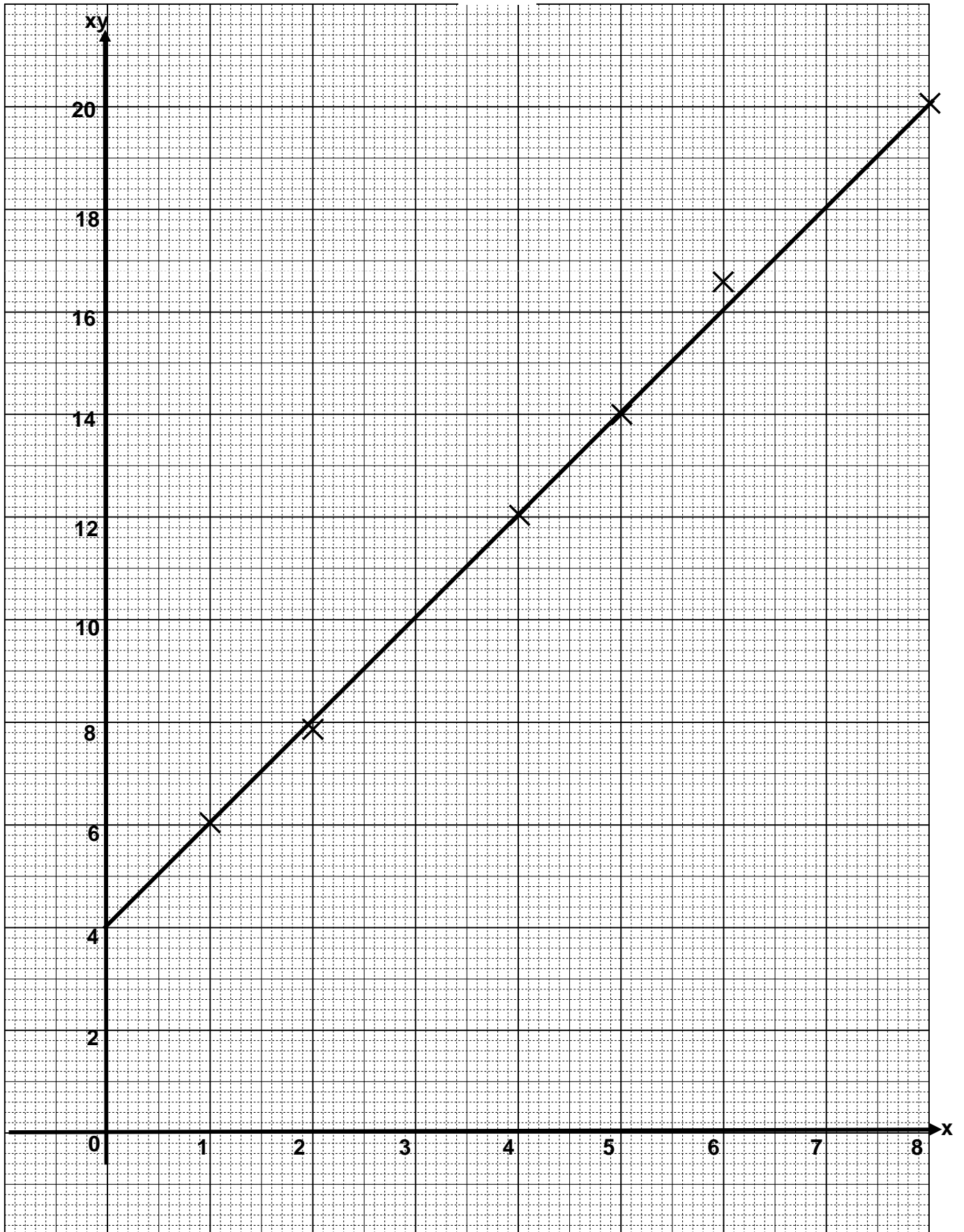
No	Solution	Sub marks	Total marks
<p>5</p> <p>a)</p> <p>b) i)</p> <p>ii)</p>	<p>Use identity  <math>\cos^2 x - \sin^2 x = \cos 2x</math>                      Or <math>2 \sin x \cos x = \sin 2x</math></p> <p style="text-align: center;"> <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">K1</span>  <span style="border: 1px solid black; padding: 2px;">N1</span>                      LHS = RHS  <b>No mistake allowed</b> </p>  <p style="margin-left: 40px;">                     Graph Sin                      2 period in <math>0 \leq x \leq 2\pi</math> <span style="border: 1px solid black; padding: 2px;">P1</span>                      Amplitude 2 <span style="border: 1px solid black; padding: 2px;">P1</span>                      Max = 2 and min = -2 <span style="border: 1px solid black; padding: 2px;">P1</span> </p> <p style="margin-left: 40px;">                     Drawing of the straight line from the equation involving                      x and y, either gradient OR y intercept of straight                      Line must be correct. <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">K1</span>  <math>y = 1 - \frac{x}{2\pi}</math> <span style="border: 1px solid black; padding: 2px;">N1</span>                      Straight line drawn correctly and                      Number of solutions = 4 <span style="border: 1px solid black; padding: 2px;">N1</span>  <b>All must be correct</b> </p>	<p style="text-align: center;">2</p> <p style="text-align: center;">3</p> <p style="text-align: center;">3</p>	<p style="text-align: center;">8</p>

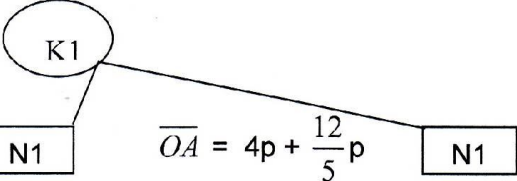
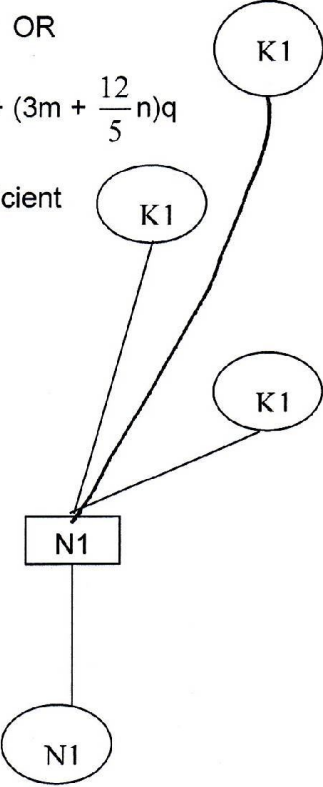
No	Solution	Sub marks	Total marks
<p><b>6</b> <b>a) i)</b></p>	<p><math>M_{BC} = -2</math> <span style="border: 1px solid black; padding: 2px;">P1</span></p> <p>Use <math>y - y_1 = m(x - x_1)</math> Or equivalent method, and substitute <math>x = 7</math> and <math>y = 2</math></p> <p><math>y - 2 = -2(x - 7)</math></p> <p style="text-align: right;"><math>y = -2x + 16</math></p> <p><b>K1</b> (circled) points to <b>N1</b> (boxed)</p>	<b>3</b>	
<p><b>ii)</b></p>	<p>Solve simultaneous equation <math>y = \frac{1}{2}x + 6</math> <math>y = -2x + 16</math></p> <p><math>\frac{1}{2}x + 6 = -2x + 16</math> <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">K1</span></p> <p><math>x = 4, y = 8</math></p> <p style="text-align: right;"><b>B (4, 8)</b> <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">N1</span></p>	<b>2</b>	
<p><b>b)</b></p>	<p>Use <math>C (7, 2) = \left[ \frac{3(x) + 1(4)}{4}, \frac{3(y) + 1(8)}{4} \right]</math> <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">K1</span></p> <p><math>\frac{3(x) + 1(4)}{4} = 7</math> OR <math>\frac{3(y) + 1(8)}{4} = 2</math> <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">K1</span></p> <p style="text-align: right;"><b>D (8, 0)</b> <span style="border: 1px solid black; padding: 2px;">N1</span></p>	<b>3</b>	<b>8</b>
	<p>OW – 1 for correct answer without working.</p>		

BAHAGIAN B

No	Solution	Sub marks	Total marks
<p><b>7</b> <b>a)</b></p>	<p><math>y = 4 - x^2</math>  <math>\frac{dy}{dx} = -2x</math>  <math>= -2</math></p> <p><math>m_{PQ} = \frac{1}{2}</math>  <math>\frac{3-k}{1-0} = \frac{1}{2}</math></p> <p><math>k = \frac{5}{2}</math></p> <p><i>(Handwritten annotations: K1 circles around the derivative and slope equations, N1 box around the final k value)</i></p>	<p><b>3</b></p>	
<p><b>b)</b></p>	<p>Integrate <math>(4 - x^2)</math></p> <p>Use limit <math>\int_1^{*2}</math> in to <math>*[4x - \frac{(x)^3}{3}]</math></p> <p><math>A1 = \frac{5}{3}</math></p> <p>A2 = find the area of Trapezium  <math>= \frac{1}{2} (\frac{5}{2} + 3)(1) = \frac{11}{4}</math></p> <p>OR          Area of shaded region = <math>A1 + A2</math>.</p> <p><math>= \frac{53}{12} \approx 4.42</math></p> <p><i>(Handwritten annotations: K1 circles around the integration step, the limit integral, the area A1, and the trapezium area calculation. N1 box around the final sum result)</i></p>	<p><b>4</b></p>	
<p><b>c)</b></p>	<p>Integrate <math>\pi x^2</math></p> <p><math>\pi [4y - \frac{(y)^2}{2}]</math></p> <p>Use limit <math>\int_3^4</math> in <math>\pi * [4y - \frac{(y)^2}{2}]</math></p> <p><math>\frac{1}{2} \pi</math></p> <p><i>(Handwritten annotations: K1 circles around the integration step and the limit integral. N1 box around the final result)</i></p>	<p><b>3</b></p>	<p><b>10</b></p>

No	Solution	Sub marks	Total marks														
<p>8</p> <p>a)</p>	<table border="1" data-bbox="300 376 1106 481"> <tr> <td>x</td> <td>1.0</td> <td>2.0</td> <td>4.0</td> <td>5.0</td> <td>6.0</td> <td>8.0</td> </tr> <tr> <td>xy</td> <td>6.00</td> <td>7.80</td> <td>12.00</td> <td>14.00</td> <td><del>16.20</del> 16.50</td> <td>20.00</td> </tr> </table> <p data-bbox="1129 365 1209 409">N1</p> <p data-bbox="300 517 1198 577"><b>Note:</b> If table is not shown award N mark if all the points are plotted correctly.</p>	x	1.0	2.0	4.0	5.0	6.0	8.0	xy	6.00	7.80	12.00	14.00	<del>16.20</del> 16.50	20.00	1	
x	1.0	2.0	4.0	5.0	6.0	8.0											
xy	6.00	7.80	12.00	14.00	<del>16.20</del> 16.50	20.00											
<p>b)</p>	<p data-bbox="300 645 730 712">Plot xy against x (Correct axes and uniform scales)</p> <p data-bbox="300 741 632 775">6 *points plotted correctly</p> <p data-bbox="520 875 703 909">Line of best fit</p>	3															
<p>c)</p>	<p data-bbox="300 1010 576 1077"><math>xy = \frac{a}{2}x + \frac{b}{2}</math> P1</p> <p data-bbox="300 1088 435 1122">Or implied.</p>																
<p>i)</p>	<p data-bbox="300 1167 451 1234">Use *m = <math>\frac{a}{2}</math></p> <p data-bbox="424 1312 488 1346">a = 4</p> <p data-bbox="895 1178 1198 1211">From graph xy against x</p> <p data-bbox="895 1234 1206 1301"><math>\frac{b}{2}</math> = xy- intercept</p> <p data-bbox="943 1346 1007 1379">b = 8</p>																
<p>ii)</p>	<p data-bbox="300 1547 408 1581">xy = 9.4</p> <p data-bbox="576 1615 695 1648">y = 3.481</p>	6															
	<p data-bbox="300 1682 1090 1805"><b>Note:</b> SS – 1 if, Part of the scale is not uniform at the x-axis and/or the xy-axis. OR not using the given scales. OR not using graph paper.</p>		10														



No	Solution	Sub marks	Total marks
<p>9 a) i) ii)</p>	<p>Use the triangle law For <math>\overline{PB}</math> or <math>\overline{OA}</math></p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p><math>\overline{PB} = -5p + 3q</math></p> <div style="border: 1px solid black; padding: 2px;">N1</div> </div> <div style="text-align: center;"> <p><math>\overline{OA} = 4p + \frac{12}{5}p</math></p> <div style="border: 1px solid black; padding: 2px;">N1</div> </div> </div> 	3	
<p>b)i) ii)</p>	<p><math>\overline{PX} = -5mp + 3mq</math> <span style="border: 1px solid black; padding: 2px;">N1</span></p> <p><math>\overline{XA} = 4np + \frac{12}{5}nq</math> <span style="border: 1px solid black; padding: 2px;">N1</span></p>	2	
<p>c)</p>	<p><math>\overline{PA} = -p + \frac{12}{5}p</math> OR</p> <p><math>\overline{PA} = (4n - 5m)p + (3m + \frac{12}{5}n)q</math></p> <p>Compare the coefficient of p and q.</p> <p><math>4m - 5n = -1</math> OR</p> <p><math>3m + \frac{12}{5}n = \frac{12}{5}</math></p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p><math>n = \frac{3}{8}, m = \frac{1}{2}</math></p> <div style="border: 1px solid black; padding: 2px;">N1</div> </div> <div style="text-align: center;"> <p><math>m = \frac{1}{2}, n = \frac{3}{8}</math></p> <div style="border: 1px solid black; padding: 2px;">N1</div> </div> </div> <p><b>(Both are correct)</b></p>  <p style="margin-left: 400px;">Solve the simultaneous Equation.</p>	5	
			10



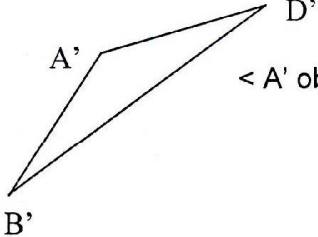
No	Solution	Sub marks	Total marks
<p>10 a)</p> <p>b) i)</p> <p>ii)</p>	<p><math>\angle MOP = 60^\circ</math> <span style="border: 1px solid black; padding: 2px;">P1</span></p> <p><math>\angle MON = 120^\circ \times \frac{\pi}{180}</math></p> <p><math>= \frac{2}{3} \pi \text{ rad}</math> <span style="border: 1px solid black; padding: 2px;">P1</span></p> <p>Use <math>S = r\theta</math> to find the length of arc MO or ON or NP or PM</p> <p><math>5\left(\frac{\pi}{3}\right)</math></p> <p>Perimeter of the shaded region <span style="border: 1px solid black; padding: 2px;">K1</span></p> <p><math>(5.2367 \times 4)</math></p> <p>20.9472 <span style="border: 1px solid black; padding: 2px;">N1</span></p>	2	
	<p>Use <math>A_1 = \frac{1}{2}r^2\theta</math> to find the area sector MOP Or NOP</p> <p><math>= \frac{1}{2} (25)\left(\frac{\pi}{3}\right)</math> <span style="border: 1px solid black; padding: 2px;">K1</span></p> <p><math>= 13.0917</math></p> <p>Use <math>A_2 = \frac{1}{2}r^2\sin 60^\circ</math> to find the area Of triangle OPM or ONP</p> <p><math>= \frac{1}{2}(25)\sin 60^\circ</math> <span style="border: 1px solid black; padding: 2px;">K1</span></p> <p><math>= 10.825</math></p> <p>Area of segment PON or POM <span style="border: 1px solid black; padding: 2px;">K1</span></p> <p><math>A_1 - A_2</math></p> <p><math>13.0917 - 10.825</math></p> <p><math>= 2.26667</math></p> <p>Area of shaded region <span style="border: 1px solid black; padding: 2px;">K1</span></p> <p><math>2(A_1) + 2(\text{area of segment})</math></p> <p><math>2(13.0917) + 2(2.26667)</math></p> <p>30.7167 // 30.72 <span style="border: 1px solid black; padding: 2px;">N1</span></p>	3	5
			10

No	Solution	Sub marks	Total marks
<p>11</p> <p>a)</p> <p>i)</p>	<p><math>\frac{1}{3}</math> or <math>\frac{2}{3}</math> <span style="border: 1px solid black; padding: 2px;">P1</span></p> <p>Use Binomial formula <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">K1</span></p> <p><math>{}^7C_4 \left(\frac{1}{3}\right)^4 \left(\frac{2}{3}\right)^3</math></p> <p><span style="border: 1px solid black; padding: 2px;">N1</span> 0.1280</p> <p>ii) Use <math>P(X \geq 4) = P(X = 4) + P(X = 5) + P(X = 6) + P(X = 7)</math> <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">K1</span></p> <p>0.1733 <span style="border: 1px solid black; padding: 2px;">N1</span></p>	5	
<p>b)</p> <p>i)</p>	<p>Use Z <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">K1</span></p> <p><math>P(Z &lt; \frac{155-160}{10})</math></p> <p>0.3085 <span style="border: 1px solid black; padding: 2px;">N1</span></p>	2	
<p>ii)</p>	<p><math>P(X &gt; h) = 0.9</math></p> <p><math>P(Z &gt; \frac{h-160}{10}) = 1.281 // 1.282</math> <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">K1</span></p> <p><math>\frac{h-160}{10} = 1.281 // 1.282</math> <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">K1</span></p> <p><math>h = 147.19 // 147.18</math> <span style="border: 1px solid black; padding: 2px;">N1</span></p>	3	
			10

BAHAGIAN C

No	Solution	Sub marks	Total marks
<p>12 a)</p>	<p>Use <math>\frac{dv}{dt} = 0</math>, to find t</p> <p><math>6t - 12 = 0</math></p> <p><math>t = 2</math></p> <p>Substitute <math>t = 2</math> into V</p> <p><math>v = 3(2)^2 - 12(2) - 15</math></p> <p><math>= -27</math></p> <p>(K1) → (K1) → (N1)</p>	<p>3</p>	
<p>b)</p>	<p>Use <math>v = 0</math> to find t // p</p> <p><math>3t^2 - 12t - 15 = 0</math></p> <p>(K1) → (N1)</p> <p><math>t = 5 \text{ s}</math></p>	<p>2</p>	
<p>c)</p>	<p>Integrate v to find S</p> <p><math>s = \int (3t^2 - 12t - 15) dt</math></p> <p>(K1) → (K1) → (N1)</p> <p>Substitute <math>t = 5</math> or use the limit</p> <p><math>s = \int_0^5 (3t^2 - 12t - 15) dt</math></p> <p><math>= -100 \text{ m}</math></p>	<p>3</p>	
<p>d)</p>	<p>Use <math>t = 5</math> or <math>t = 7</math> to find S</p> <p>- 100 m, - 56 m.</p> <p>or equivalent</p> <p>the distance traveled in the first 7 seconds</p> <p><math>100 + (100 - 56)</math></p> <p>(K1) → (N1)</p> <p>144</p>	<p>2</p>	
			<p>10</p>

No	Solution	Sub marks	Total marks
13 a)	<p>Use <math>\frac{4.50}{p} \times 100 = 150</math> or <math>\frac{2.20}{2.00} \times 100 = q</math> <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">K1</span></p> <p style="margin-left: 100px;"><math>p = 3.00</math> <span style="border: 1px solid black; padding: 2px;">N1</span>      <math>q = 110</math> <span style="border: 1px solid black; padding: 2px;">N1</span></p>	3	
b)	<p><math>\sum IW = (120)28 + (140)7 + (150)18 + (110)5</math> <span style="border: 1px solid black; padding: 2px;">P1</span></p> <p>Use <math>\bar{I} = \frac{\sum IW}{\sum W} = \frac{8710}{72}</math> <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">K1</span></p> <p style="margin-left: 150px;"><span style="border: 1px solid black; padding: 2px;">N1</span> 120.97</p>	3	
c)	<p><math>\frac{x}{125} = \frac{120.97}{100}</math> <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">K1</span></p> <p style="margin-left: 100px;"><math>x = 151.21</math> <span style="border: 1px solid black; padding: 2px;">N1</span></p>	2	
	<p><math>\frac{y}{151.21} = \frac{30}{120.97}</math> <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">K1</span></p> <p style="margin-left: 100px;"><math>y = 37.50</math> <span style="border: 1px solid black; padding: 2px;">N1</span></p>	3	10

No	Solution	Sub marks	Total marks
14	<p data-bbox="284 353 938 398">&lt;BCD = 60° or &lt;CBD = 50° or &lt;BDC = 70° <span style="border: 1px solid black; padding: 2px;">P1</span></p> <p data-bbox="209 421 718 633">           a) Use sine rule to find the length of BD <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">K1</span>  <math display="block">\frac{BD}{\sin 60^\circ} = \frac{10}{\sin 70^\circ}</math> <math display="block">BD = 9.216</math> <span style="border: 1px solid black; padding: 2px;">N1</span> </p> <p data-bbox="209 689 1034 869">           b)i) Use cosine rule to find the length of AD <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">K1</span>  <math display="block">AD^2 = 4^2 + (9.216)^2 - 2(4)(9.216)\cos 130^\circ</math> <math display="block">AD = 12.18</math> <span style="border: 1px solid black; padding: 2px;">N1</span> </p> <p data-bbox="209 925 790 1126">           ii) Use sine rule to find the &lt;BAD <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">K1</span>  <math display="block">\frac{\sin &lt;BAD}{9.216} = \frac{\sin 130^\circ}{12.18}</math> <math display="block">&lt;BAD = 35.12^\circ // 35^\circ 25'</math> <span style="border: 1px solid black; padding: 2px;">N1</span> </p> <p data-bbox="209 1182 798 1417">           c)i)  <span style="border: 1px solid black; padding: 2px;">P1</span>            &lt; A' obtuse         </p> <p data-bbox="209 1473 989 1641">           ii) Area of triangle A'B'D' = <math>\frac{1}{2} (4)(9.216)\sin 20^\circ 50'</math> <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">K1</span>  <math display="block">= 6.555</math> <span style="border: 1px solid black; padding: 2px;">N1</span> </p>	3	
		2	
		2	
		3	
			10

No	Solution	Sub marks	Total marks
15 (a)	I. $x + y \geq 30$ or equivalent <span style="float: right; border: 1px solid black; padding: 2px;">N1</span> II. $6x + 9y \leq 1620$ or equivalent <span style="float: right; border: 1px solid black; padding: 2px;">N1</span> III. $x \leq 2y$ or equivalent <span style="float: right; border: 1px solid black; padding: 2px;">N1</span>	3	
(b)	Draw correctly at least one straight line from the *inequalities which involves x and y. <span style="float: right; border: 1px solid black; border-radius: 50%; padding: 2px;">K1</span>  Draw correctly all three *straight lines. Note : Accept dotted lines. <span style="float: right; border: 1px solid black; border-radius: 50%; padding: 2px;">N1</span>  The correct region R shaded <span style="float: right; border: 1px solid black; padding: 2px;">N1</span>	3	
c) i)	$80 \leq y \leq 100$ <span style="float: right; border: 1px solid black; padding: 2px;">N1</span>		
ii)	Maximum point (60, 140) <span style="float: right; border: 1px solid black; padding: 2px;">N1</span>  Use $x + 3y$ for point in the *region R <span style="float: right; border: 1px solid black; border-radius: 50%; padding: 2px;">K1</span>  RM480 <span style="float: right; border: 1px solid black; padding: 2px;">N1</span>	4	
	<p><b>Note:</b></p> <p>SS – 1 if</p> <p style="padding-left: 20px;">In (a) the symbol “ = ” is not used at all or more than three Inequalities are given.</p> <p style="padding-left: 20px;">In (b) does not use the scale given or does not use graph paper Or interchange between the x-axis and the y-axis.</p>		<b>10</b>

