

1449/1
Mathematics
Kertas 1
September 2012

$1\frac{1}{4}$ jam

PEPERIKSAAN PERCUBAAN SPM 2012

TINGKATAN LIMA

MATEMATIK

Kertas 1

Satu jam lima belas minit

**JANGAN BUKA KERTAS SOALAN INI
SEHINGGA DIBERITAHU**

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



Kertas soalan ini mengandungi 21 halaman bercetak.

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MATHEMATICAL FORMULAE
RUMUS MATEMATIK

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.

RELATIONS
PERKAITAN

1 $a^m \times a^n = a^{m+n}$

2 $a^m \div a^n = a^{m-n}$

3 $(a^m)^n = a^{mn}$

4 $A^{-1} = \frac{1}{ad-bc} \begin{pmatrix} d & -b \\ -c & a \end{pmatrix}$

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

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

7 Average speed = $\frac{\text{distance travelled}}{\text{time taken}}$
Purata laju = $\frac{\text{jarak yang dilalui}}{\text{masa yang diambil}}$

8 Mean = $\frac{\text{sum of data}}{\text{number of data}}$
Min = $\frac{\text{hasil tambah nilai data}}{\text{bilangan data}}$

9 Mean = $\frac{\text{sum of (class mark} \times \text{frequency)}}{\text{sum of frequencies}}$
Min = $\frac{\text{hasil tambah (nilai titik tengah kelas} \times \text{kekerapan)}}{\text{hasil tambah kekerapan}}$

10 Pythagoras Theorem:
Teorem Pithagoras:

$$c^2 = a^2 + b^2$$

11 $P(A) = \frac{n(A)}{n(S)}$

12 $P(A') = 1 - P(A)$

13 $m = \frac{y_2 - y_1}{x_2 - x_1}$

$$m = -\frac{\text{y-intercept}}{\text{x-intercept}}$$

14 $m = -\frac{\text{pintasan-y}}{\text{pintasan-x}}$



SHAPES AND SPACE
BENTUK DAN RUANG

1 Area of trapezium = $\frac{1}{2} \times \text{sum of parallel sides} \times \text{height}$
Luas trapezium = $\frac{1}{2} \times \text{hasil tambah dua sisi selari} \times \text{tinggi}$

2 Circumference of circle = $\pi d = 2\pi r$
Lilitan bulatan = $\pi d = 2\pi j$

3 Area of circle = πr^2
Luas bulatan = πj^2

4 Curved surface area of cylinder = $2\pi r h$
Luas permukaan melengkung silinder = $2\pi j t$

5 Surface area of sphere = $4\pi r^2$
Luas permukaan sfera = $4\pi j^2$

6 Volume of right prism = cross sectional area \times length
Isipadu prisma tegak = luas keratan rentas \times panjang

7 Volume of cylinder = $\pi r^2 h$
Isipadu silinder = $\pi j^2 t$

8 Volume of cone = $\frac{1}{3} \pi r^2 h$

Isipadu kon = $\frac{1}{3} \pi j^2 t$



- 9
Volume of sphere = $\frac{4}{3}\pi r^3$
Isipadu sfera = $\frac{4}{3}\pi j^3$
- 10
Volume of right pyramid = $\frac{1}{3} \times \text{base area} \times \text{height}$
Isipadu piramid tegak = $\frac{1}{3} \times \text{luas tapak} \times \text{tinggi}$
- 11
Sum of interior angles of a polygon = $(n-2) \times 180^\circ$
Hasil tambah sudut pedalaman poligon = $(n-2) \times 180^\circ$
- 12
$$\frac{\text{arc length}}{\text{circumference of circle}} = \frac{\text{angle subtended at centre}}{360^\circ}$$

$$\frac{\text{panjang lengkok}}{\text{lilitan bulatan}} = \frac{\text{sudut pusat}}{360^\circ}$$
- 13
$$\frac{\text{area of sector}}{\text{area of circle}} = \frac{\text{angle subtended at centre}}{360^\circ}$$

$$\frac{\text{luas sektor}}{\text{luas bulatan}} = \frac{\text{sudut pusat}}{360^\circ}$$
- 14
Scale factor, $k = \frac{PA'}{PA}$
Faktor skala, $k = \frac{PA'}{PA}$
- 15
Area of image = $k^2 \times \text{area of object}$
Luas imej = $k^2 \times \text{luas objek}$

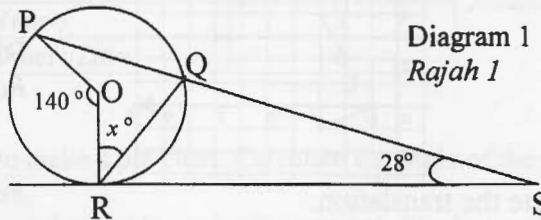


6 $1100110_2 + 11011_2 =$

A 1111101_2
 B 1001011_2

C 11010010_2
 D 10000001_2

- 7 In Diagram 1, RS is a tangent to the circle PQR with centre O.
 Dalam Rajah 1, RS ialah tangen kepada bulatan PQR berpusat O.



Calculate the value of x .
 Hitung nilai bagi x .

A 20°
 B 42°

C 48°
 D 55°

- 8 In diagram 2, PQRST is a regular pentagon, TSVU is a rhombus and SRV is a straight line.
 Dalam rajah 2, PQRST ialah pentagon sekata, TSVU ialah rombus dan SRV ialah garis lurus.

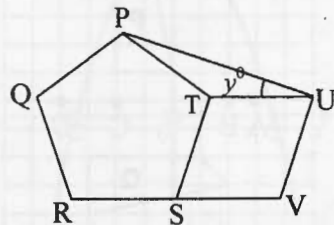


Diagram 2
Rajah 2

Find the value of y .
 Cari nilai y .

A 18
 B 30

C 60
 D 72



- 9 In diagram 3, pentagons K and L are drawn on a Cartesian plane. Pentagon L is the image of pentagon K under a translation.
 Dalam rajah 3, pentagon K dan pentagon L dilukis pada satah Cartesian. Pentagon L ialah imej bagi pentagon K di bawah satu translasi.

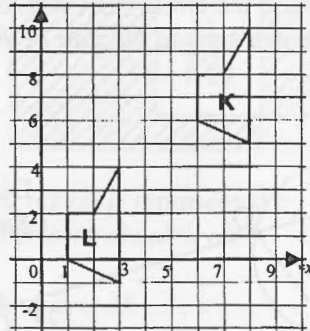


Diagram 3
Rajah 3

State the translation.
Nyatakan translasinya.

A $\begin{pmatrix} 5 \\ 6 \end{pmatrix}$

C $\begin{pmatrix} -5 \\ -6 \end{pmatrix}$

B $\begin{pmatrix} 3 \\ 4 \end{pmatrix}$

D $\begin{pmatrix} -3 \\ -4 \end{pmatrix}$

- 10 Diagram 4 shows two quadrilaterals P and Q drawn on a square grid. Rajah 4 menunjukkan sisi empat P dan sisi empat Q yang dilukis pada grid segi empat sama.

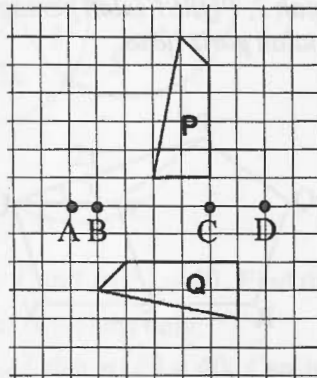


Diagram 4
Rajah 4

Quadrilateral Q is the image of quadrilateral P under an anticlockwise rotation of 90° . Which of points A, B, C or D is the centre of rotation?
 Sisi empat Q ialah imej kepada sisi empat P di bawah satu putaran arah lawan jam pada 90° .
 Antara titik A, B, C dan D, yang manakah pusat bagi pembesaran tersebut?

- 11 In Diagram 5, QPU, QRS and PTR are straight lines.
 Dalam Rajah 5, QPU, QRS dan PTR adalah garis lurus.

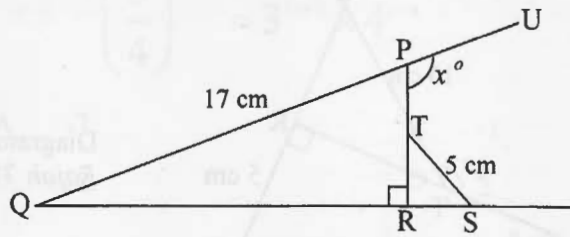


Diagram 5
Rajah 5

It is given that $PT=TR$ and $\cos \angle TSR = \frac{3}{5}$. Find $\tan x^\circ$.

Diberi bahawa $PT=TR$ dan $\cos \angle TSR = \frac{3}{5}$. Cari $\tan x^\circ$.

- | | | | |
|---|-----------------|---|----------------|
| A | $-\frac{8}{17}$ | C | $\frac{8}{17}$ |
| B | $-\frac{15}{8}$ | D | $\frac{15}{8}$ |

- 12 Diagram 6 shows part of a plot of a trigonometric graph drawn on a Cartesian plane.

Rajah 6 menunjukkan sebahagian plot daripada graf trigonometri yang dilukis pada satah Cartesian.

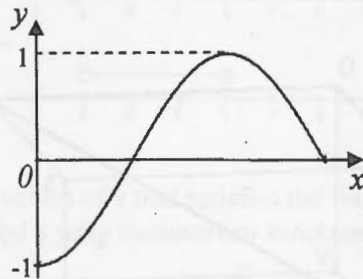


Diagram 6
Rajah 6

State the equation and range of the trigonometric graph.

Nyatakan persamaan dan julat bagi graf trigonometri tersebut.

- | | | | |
|---|---|---|--|
| A | $y = \cos x, 0^\circ \leq x \leq 180^\circ$ | C | $y = -\cos x, 0^\circ \leq x \leq 180^\circ$ |
| B | $y = \cos x, 0^\circ \leq x \leq 270^\circ$ | D | $y = -\cos x, 0^\circ \leq x \leq 270^\circ$ |



- 13 In Diagram 7, PTR is a straight line and $PT=TR$.
 Dalam Rajah 7, PTR ialah garis lurus dan $PT=TR$.

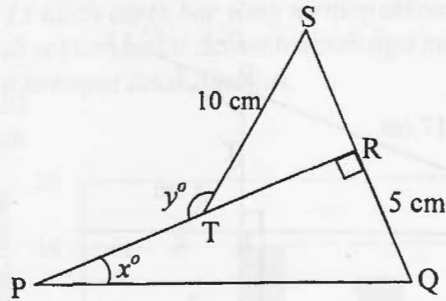


Diagram 7
Rajah 7.

It is given that $\sin x = \frac{5}{13}$, find the value of $\cos y$.

Diberi bahawa $\sin x = \frac{5}{13}$, cari nilai bagi $\cos y$.

- | | | | |
|---|----------------|---|----------------|
| A | $\frac{4}{3}$ | C | $\frac{3}{5}$ |
| B | $-\frac{4}{3}$ | D | $-\frac{3}{5}$ |

- 14 Diagram 8 shows a cuboid with a rectangular base TUVW. Points K and L are the midpoints of VW and UT respectively.
 Rajah 8 menunjukkan sebuah kuboid dengan tapak segiempat tepat TUVW. Titik K dan titik L adalah titik tengah VW dan UT masing-masing.

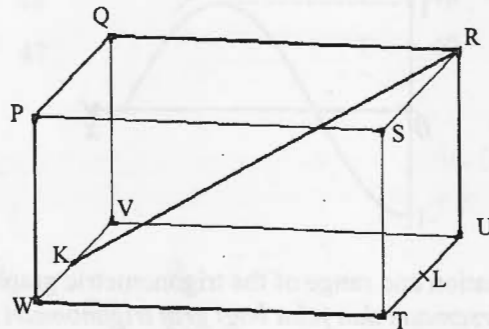


Diagram 8
Rajah 8

Name the angle between the line RK and the plane RSTU.
 Namakan sudut antara garis RK dan satah RSTU.

- | | | | |
|---|--------------|---|--------------|
| A | $\angle KRL$ | C | $\angle RKL$ |
| B | $\angle KRU$ | D | $\angle RKU$ |



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- 15 Diagram 9 shows two vertical poles, MN and PQ, on a horizontal plane. R is a point on MN.
Rajah 9 menunjukkan dua batang tiang tegak, MN dan PQ, yang terletak pada satah ufuk. R ialah titik pada MN.

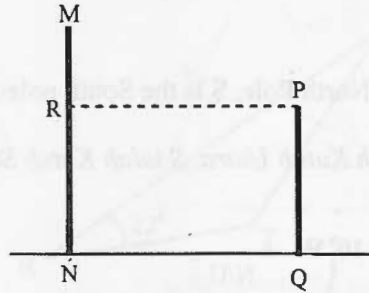


Diagram 9
Rajah 9

Name the angle of depression of N from P.
Namakan sudut tunduk N dari P.

- | | | | |
|---|--------------|---|--------------|
| A | $\angle MPN$ | C | $\angle PNM$ |
| B | $\angle RPN$ | D | $\angle PRM$ |

- 16 Diagram 10 shows a hot air balloon lifting off and a vertical tower on the horizontal ground. M and K are vertically above N and L respectively.

Rajah 10 menunjukkan sebuah belon udara panas sedang berlepas dan sebuah menara tegak di atas satah ufuk. M dan K adalah mencancang di atas N dan L.

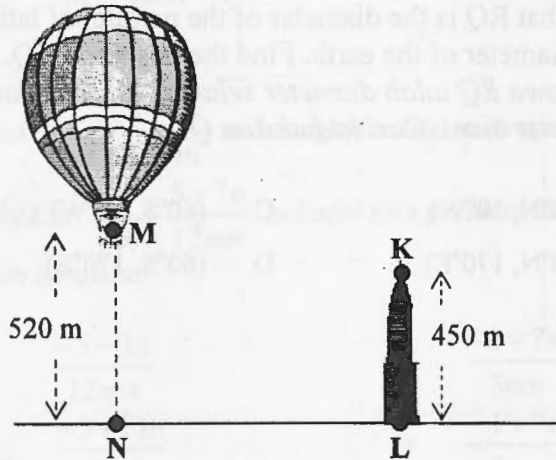


Diagram 10
Rajah 10

Given the angle of elevation of M from K is 10° , find the distance, in m, of NL.

Diberi sudut dongak M dari K ialah 10° , cari jarak, dalam m, bagi NL.

- | | | | |
|---|-------|---|-------|
| A | 512 m | C | 403 m |
| B | 414 m | D | 397 m |

- 17 In diagram 11, N is the North Pole, S is the South pole and O is the centre of the earth.

Dalam rajah 11, U ialah Kutub Utara, S ialah Kutub Selatan dan O ialah pusat bumi.

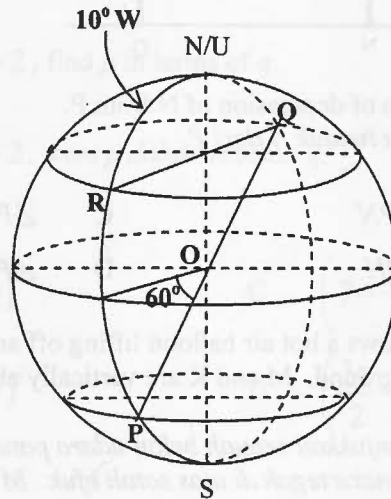


Diagram 11
Rajah 11

It is given that RQ is the diameter of the parallel of latitude and PQ is the diameter of the earth. Find the position of Q.

Diberi bahawa RQ ialah diameter selarian latitude dan PQ ialah diameter bumi. Cari kedudukan Q.

- | | | | |
|---|---------------|---|---------------|
| A | (60°N, 10°W) | C | (60°S, 10°W) |
| B | (60°N, 170°E) | D | (60°S, 170°E) |



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- 18 Diagram 12 shows three points R, S and T on a horizontal plane. S lies due north of T and the bearing of S from R is 050° .
Rajah 12 menunjukkan titik R, titik S dan titik T yang terletak pada satah mengufuk. S berada ke utara T dan bearing S dari R ialah 050° .

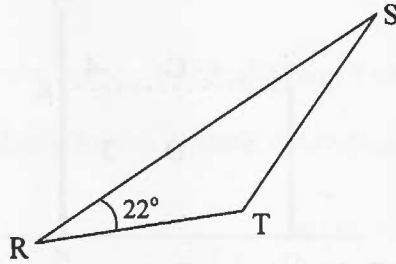


Diagram 12
Rajah 12

Find the bearing of R from T.
Cari bearing R dari T.

- | | | | |
|---|-------------|---|-------------|
| A | 072° | C | 158° |
| B | 108° | D | 252° |
- 19 $(3m - n)^2 - 2m(m - n) =$
- | | | | |
|---|--------------------|---|--------------------|
| A | $7m^2 + 2mn + n^2$ | C | $7m^2 - 4mn + n^2$ |
| B | $7m^2 - 2mn - n^2$ | D | $7m^2 - 8mn + n^2$ |
- 20 Express $\frac{1}{3m} - \frac{5-7n}{12mn}$ as a single fraction in its simplest form.
Ungkapkan $\frac{1}{3m} - \frac{5-7n}{12mn}$ sebagai satu pecahan tunggal dalam sebutan termudah.

- | | | | |
|---|-----------------------|---|---------------------|
| A | $\frac{-5-3n}{12mn}$ | C | $\frac{-1-7n}{3mn}$ |
| B | $\frac{-5+11n}{12mn}$ | D | $\frac{-1+7n}{3mn}$ |



21 Given that $\frac{x+2}{7} = 3x-2$, find the value of x .

Diberi bahawa $\frac{x+2}{7} = 3x-2$, cari nilai x .

A $\frac{4}{5}$

C -4

B $\frac{1}{5}$

D 3

22 Given $\frac{3q}{7-\sqrt{p}} = 2$, find p in terms of q .

Diberi $\frac{3q}{7-\sqrt{p}} = 2$, cari p dalam sebutan q .

A $(5-3q)^2$

C $\left(7-\frac{3q}{2}\right)^2$

B $(9-3q)^2$

D $\left(\frac{3q}{2}-7\right)^2$

23 Simplify

Permudahkan

$$\sqrt{\left(\frac{5}{7}\right)^{-3}}$$

A $\left(\frac{7}{5}\right)^{\frac{3}{2}}$

C $\left(\frac{7}{5}\right)^{\frac{3}{2}}$

B $\left(\frac{7}{5}\right)^{\frac{2}{3}}$

D $\left(\frac{7}{5}\right)^{\frac{2}{3}}$



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- 27 Diagram 13 is a bar chart showing the number of computers sold at a shop over three weeks. The sale in the fourth week is not shown. *Rajah 13 ialah carta bar yang menunjukkan bilangan komputer yang dijual di sebuah kedai dalam tempoh tiga minggu. Jualan pada minggu keempat tidak ditunjuk.*

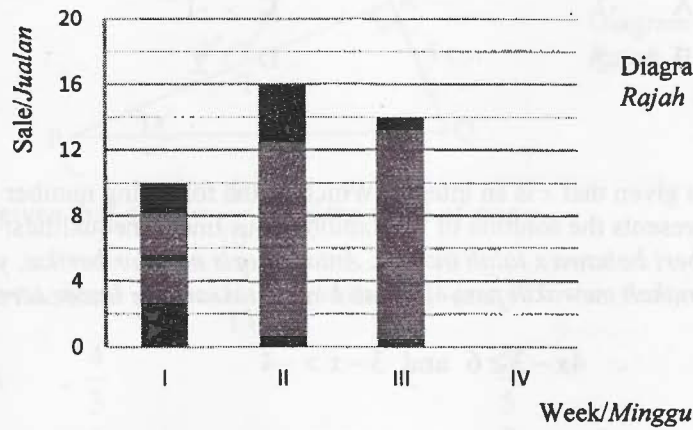


Diagram 13
Rajah 13

The sale on the fourth week was half the sale on the second week.
Find the total number of computers sold in the four weeks.

Jualan pada minggu keempat adalah separuh daripada jualan pada minggu kedua. Cari jumlah bilangan komputer yang dijual dalam tempoh empat minggu.

- | | | | |
|---|----|---|----|
| A | 48 | C | 46 |
| B | 47 | D | 40 |



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- 30 Diagram 15 is a Venn diagram showing sets K, L and M.
Rajah 15 ialah gambar rajah Venn yang menunjukkan set K, set L dan set M.

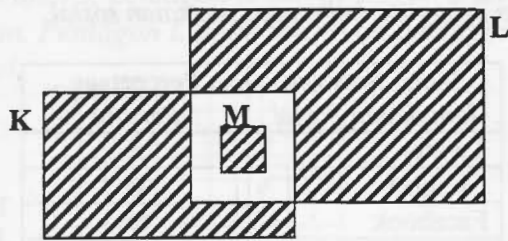


Diagram 15
 Rajah 15

The shaded region is represented by
Kawasan berlorek diwakili oleh

- | | | | |
|---|--------------------|---|---------------------|
| A | $K \cup L \cup M$ | C | $K' \cup L' \cup M$ |
| B | $K \cap S' \cup M$ | D | $K' \cup L' \cap M$ |

- 31 Diagram 16 is a Venn diagram showing the number of members in three school clubs. Set R = {members of the Radio Club}, set S = {members of the Science Club} and set T = {Tennis players}.
Rajah 16 ialah gambarajah Venn yang menunjukkan bilangan ahli dalam tiga buah kelab sekolah. Set R = {ahli Kelab Radio}, set S = {ahli Kelab Sains} dan set T = {pemain Tennis}

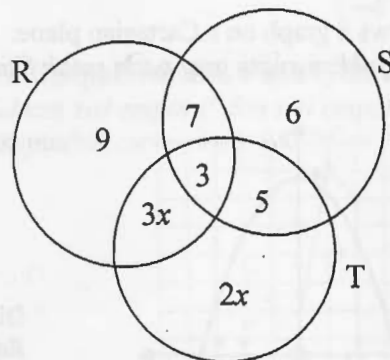


Diagram 16
 Rajah 16

It is given that $\xi = R \cup S \cup T$ and $n(\xi) = 40$. Find the number of students who are members of two clubs only.

Diberi bahawa $\xi = R \cup S \cup T$ dan $n(\xi) = 40$. Cari bilangan murid yang menjadi ahli bagi dua kelab sahaja.

- | | | | |
|---|----|---|----|
| A | 15 | C | 18 |
| B | 17 | D | 19 |



- 32 It is given that the universal set $\xi = \{x : 11 < x \leq 20, x \text{ is an integer}\}$.
Set $R = \{x : x \text{ is a prime number}\}$. Set $S = \{x : \text{sum of the digits is an even number}\}$.

Find $(R \cup S)$.

Diberi bahawa set semesta $\xi = \{x : 11 < x \leq 20, x \text{ ialah integer}\}$.

Set $R = \{x : x \text{ ialah nombor perdana}\}$. Set $S = \{x : \text{hasil tambah digit-digit ialah nombor genap}\}$.

Cari $(R \cup S)$.

- | | | | |
|---|--------------------------|---|------------------------------|
| A | $\{13, 15, 17, 19\}$ | C | $\{11, 13, 15, 17, 19\}$ |
| B | $\{13, 15, 17, 19, 20\}$ | D | $\{11, 13, 15, 17, 19, 20\}$ |

- 33 Find the gradient of the straight line $2y - 7x = 10$.

Cari kecerunan bagi garis lurus $2y - 7x = 10$.

- | | | | |
|---|----------------|---|----------------|
| A | $-\frac{2}{7}$ | C | $-\frac{7}{2}$ |
| B | $\frac{2}{7}$ | D | $\frac{7}{2}$ |

- 34 In Diagram 17, PQ is a straight line with gradient of $-\frac{2}{3}$.

Dalam Rajah 17, PQ ialah garis lurus dengan kecerunan $-\frac{2}{3}$.

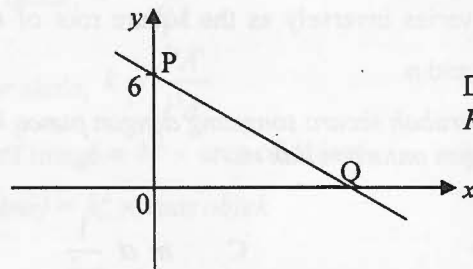


Diagram 17
Rajah 17

Find the x-intercept of the straight line PQ.

Cari pintasan-x bagi garis lurus PQ.

- | | | | |
|---|---------------|---|---------------|
| A | 4 | C | 9 |
| B | $\frac{1}{4}$ | D | $\frac{1}{9}$ |



- 35 A box contains 7 green marbles, 2 yellow marbles and 4 black marbles. A marble is picked at random from the box. Find the probability that the marble picked is **not** black.
Sebuah kotak mengandungi 7 guli hijau, 2 guli kuning dan 4 guli hitam. Sebiji guli dipilih secara rawak dari kotak itu. Cari kebarangkalian guli yang dipilih itu bukan hitam.

A $\frac{4}{13}$

C $\frac{1}{9}$

B $\frac{9}{13}$

D $\frac{4}{9}$

- 36 A bag contains some blue buttons and 28 red buttons. A button is picked at random from the bag. The probability of picking a blue button is $\frac{3}{7}$. Find the number of blue buttons are in the bag?

Sebuah beg mengandungi beberapa butang biru dan 28 butang merah. Sebiji butang dipilih secara rawak dari beg itu. Kebarangkalian memilih sebiji butang biru ialah $\frac{3}{7}$. Cari bilangan butang biru di dalam beg itu.

A 49

C 16

B 21

D 12

- 37 It is given that m varies inversely as the square root of n . State the relation between m and n .

Diberi bahawa m berubah secara songsang dengan punca kuasa dua n . Nyatakan hubungan antara m dan n .

A $m \propto \frac{1}{\sqrt{n}}$

C $m \propto \frac{1}{n^2}$

B $m \propto \sqrt{n}$

D $m \propto n^2$



INFORMATION FOR CANDIDATES
MAKLUMAT UNTUK CALON

1. This question paper consists of **40** questions.
Kertas ini mengandungi 40 soalan.
2. Answer **all** questions.
Jawab semua soalan.
3. Answer each question by blackening the correct space on the objective sheet.
Jawab setiap soalan dengan menghitamkan ruangan yang betul pada kertas jawapan objektif.
4. Blacken only **one** space for each question.
Hitamkan satu ruangan sahaja bagi setiap soalan.
5. If you wish to change your answer, erase the blackened mark that you have done. Then blackened the space for the new answer.
Sekiranya anda hendak menukar jawapan, padamkan tanda yang telah dibuat. Kemudian hitamkan jawapan yang baru.
6. The diagram in the questions provided are not drawn to scale unless stated.
Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.
7. You may use a non-programmable scientific calculator.
Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogramkan.



NAMA :

NO. KAD PENGENALAN :

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1449/2
PEPERIKSAAN PERCUBAAN SPM 2012
MATHEMATICS
Kertas 2
SEPTEMBER 2012

2 ½ jam

Dua jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Tulis nama dan kad pengenalan 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*

Untuk Kegunaan Pemeriksa			
Bahagian	Soalan	Markah Penuh	Markah Diperoleh
A	1	3	
	2	4	
	3	3	
	4	5	
	5	4	
	6	6	
	7	4	
	8	6	
	9	6	
	10	5	
	11	6	
B	12	12	
	13	12	
	14	12	
	15	12	
	16	12	
Jumlah			



Kertas soalan ini mengandungi 29 halaman bercetak

MATHEMATICAL FORMULAE
RUMUS MATEMATIK

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.

RELATIONS
PERKAITAN

1 $a^m \times a^n = a^{m+n}$

2 $a^m \div a^n = a^{m-n}$

3 $(a^m)^n = a^{mn}$

4 $A^{-1} = \frac{1}{ad-bc} \begin{pmatrix} d & -b \\ -c & a \end{pmatrix}$

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

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

7 Average speed = $\frac{\text{distance travelled}}{\text{time taken}}$
Purata laju = $\frac{\text{jarak yang dilalui}}{\text{masa yang diambil}}$

8 Mean = $\frac{\text{sum of data}}{\text{number of data}}$
Min = $\frac{\text{hasil tambah nilai data}}{\text{bilangan data}}$

Mean = $\frac{\text{sum of (class mark} \times \text{frequency)}}{\text{sum of frequencies}}$

Min = $\frac{\text{hasil tambah (nilai titik tengah kelas} \times \text{kekerapan)}}{\text{hasil tambah kekerapan}}$

Pythagoras Theorem:

10 Teorem Pithagoras:

$$c^2 = a^2 + b^2$$

11 $P(A) = \frac{n(A)}{n(S)}$

12 $P(A') = 1 - P(A)$

13 $m = \frac{y_2 - y_1}{x_2 - x_1}$

$$m = -\frac{\text{y-intercept}}{\text{x-intercept}}$$

14 $m = -\frac{\text{pintasan-y}}{\text{pintasan-x}}$



SHAPES AND SPACE
BENTUK DAN RUANG

1 Area of trapezium = $\frac{1}{2} \times \text{sum of parallel sides} \times \text{height}$

Luas trapezium = $\frac{1}{2} \times \text{hasil tambah dua sisi selari} \times \text{tinggi}$

2 Circumference of circle = $\pi d = 2\pi r$

Lilitan bulatan = $\pi d = 2\pi j$

3 Area of circle = πr^2

Luas bulatan = πj^2

4 Curved surface area of cylinder = $2\pi r h$

Luas permukaan melengkung silinder = $2\pi j t$

5 Surface area of sphere = $4\pi r^2$

Luas permukaan sfera = $4\pi j^2$

6 Volume of right prism = cross sectional area \times length

Isipadu prisma tegak = *luas keratan rentas* \times *panjang*

7 Volume of cylinder = $\pi r^2 h$

Isipadu silinder = $\pi j^2 t$

8 Volume of cone = $\frac{1}{3} \pi r^2 h$

Isipadu kon = $\frac{1}{3} \pi j^2 t$

9 Volume of sphere = $\frac{4}{3} \pi r^3$

Isipadu sfera = $\frac{4}{3} \pi j^3$

10 Volume of right pyramid = $\frac{1}{3} \times \text{base area} \times \text{height}$

Isipadu piramid tegak = $\frac{1}{3} \times \text{luas tapak} \times \text{tinggi}$

11 Sum of interior angles of a polygon = $(n-2) \times 180^\circ$
Hasil tambah sudut pedalaman poligon = $(n-2) \times 180^\circ$

12
$$\frac{\text{arc length}}{\text{circumference of circle}} = \frac{\text{angle subtended at centre}}{360^\circ}$$

$$\frac{\text{panjang lengkok}}{\text{lilitan bulatan}} = \frac{\text{sudut pusat}}{360^\circ}$$

13
$$\frac{\text{area of sector}}{\text{area of circle}} = \frac{\text{angle subtended at centre}}{360^\circ}$$

$$\frac{\text{luas sektor}}{\text{luas bulatan}} = \frac{\text{sudut pusat}}{360^\circ}$$

14 Scale factor, $k = \frac{PA'}{PA}$

Faktor skala, $k = \frac{PA'}{PA}$

15 Area of image = $k^2 \times$ area of object
Luas imej = $k^2 \times$ luas objek



Section A
Bahagian A
[52 marks / 52 markah]

For
Examiner's
Use

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

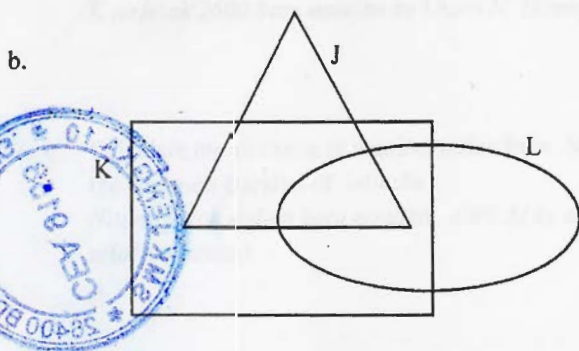
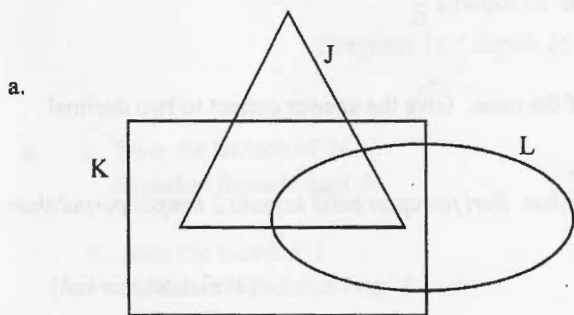
1. The Venn diagram in the answer space shows sets J , K and L such that the universal set, $\xi = J \cup K \cup L$.
Gambar rajah Venn di ruang jawapan menunjukkan set J , K dan L dengan keadaan semesta, $\xi = J \cup K \cup L$.

On the diagrams in the answer space, shade
Pada rajah di ruang jawapan, lorekkan

[3 marks / 3 markah]

- (a) the set $(J \cup K)'$
set $(J \cup K)'$
- (b) the set $(J \cap L) \cup K'$
set $(J \cap L) \cup K'$

Answer / Jawapan:



For
Examiner's
Use

2. Diagram 2 shows a solid formed by combining a cone and a hemisphere. The volume of a combined solid is 2975 cm^3 .

Rajah 2 menunjukkan sebuah pepejal yang dibentuk dengan menggunakan sebuah gabungan kon dan sebuah hemisfera. . . Isipadu gabungan pepejal itu ialah 2975 cm^3 .

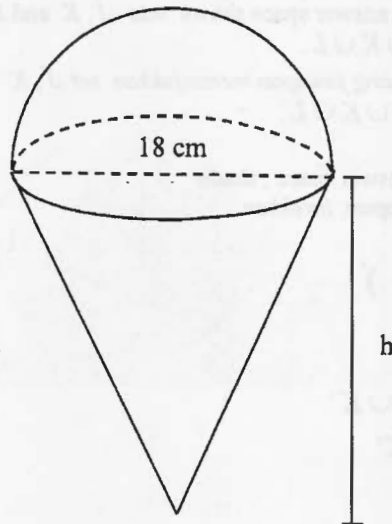


Diagram 2 / Rajah 2

Using $\pi = \frac{22}{7}$, calculate the height of the cone. Give the answer correct to two decimal places.

Menggunakan $\pi = \frac{22}{7}$, hitung tinggi kon. Beri jawapan betul kepada 2 tempat perpuluhan..

[4 marks/4 markah]

Answer / Jawapan:



For
Examiner's
Use

3. Diagram 3 shows a cuboid with a horizontal base $ABCD$. M is the midpoint of PQ .
Rajah 3 menunjukkan sebuah kuboid dengan tapak mengufuk $ABCD$, M ialah titik tengah PQ .

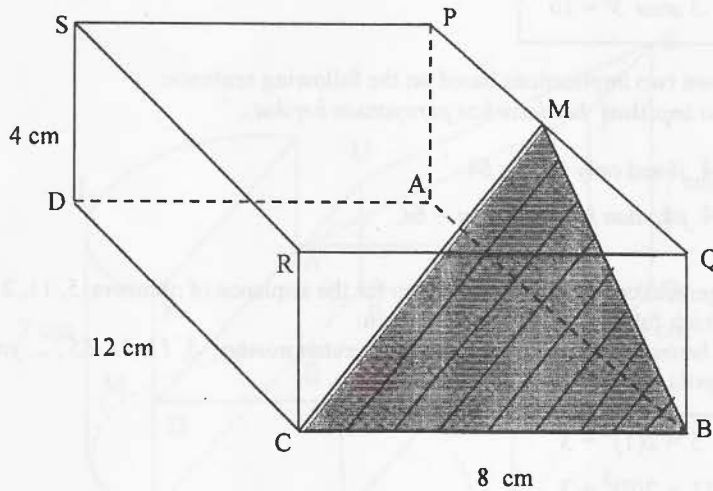


Diagram 3/ Rajah 3

- (a) Name the angle between the plane BCM and the plane $BCRQ$.
Namakan sudut di antara satah BCM dengan satah $BCRQ$.
- (b) Calculate the angle between the plane BCM and the plane base $BCRQ$.
Hitung sudut di antara satah BCM dengan satah $BCRQ$.

[3 marks / 3 markah]

Answer / Jawapan:

a.

b.



For
Examiner's
Use

4. a. State whether the following statement is true or false.
Nyatakan sama ada pernyataan berikut adalah benar atau palsu.

$-2 > -3$ or $5^2 = 10$ $-2 > -3$ atau $5^2 = 10$
--

- b. Write down two implications based on the following sentence:
Tulis dua implikasi berdasarkan pernyataan berikut:

$\sqrt[3]{m} = 4$ if and only if $m = 64$.
 $\sqrt[3]{m} = 4$ jika dan hanya jika $m = 64$.

- c. Make a general conclusion by induction for the sequence of numbers 5, 11, 21, 35, ... which follows the following pattern:
Buat satu kesimpulan secara aruhan untuk urutan nombor 5, 11, 21, 35, ... yang mengikut pola berikut :

$5 = 2(1)^2 + 3$ $11 = 2(2)^2 + 3$ $21 = 2(3)^2 + 3$ $35 = 2(4)^2 + 3$ $\dots = \dots\dots\dots$
--

[5 marks / 5 markah]

Answer / Jawapan

a)

b) Implication 1 / Implikasi 1 :

.....

Implication 2 / Implikasi 2 :

.....

.....



5. Calculate the value of m and n that satisfy the following simultaneous linear equations:

Hitung nilai m dan n yang memuaskan persamaan linear serentak berikut:

$$\begin{aligned}\frac{3}{2}m + n &= 8 \\ m - 2n &= 8\end{aligned}$$

Answer / Jawapan:

[4 marks / 4 markah]

*For
Examiner's
Use*



For
Examiner's
Use

6. In Diagram 6, JK, KL and LM are straight lines. J is on the y-axis and K is on the x-axis. KL is parallel to y-axis and JK is parallel to LM.

Dalam Rajah 6, JK, KL dan LM adalah garis lurus. J terletak pada paksi-y dan K terletak pada paksi-x. KL adalah selari dengan paksi-y dan JK adalah selari dengan LM.

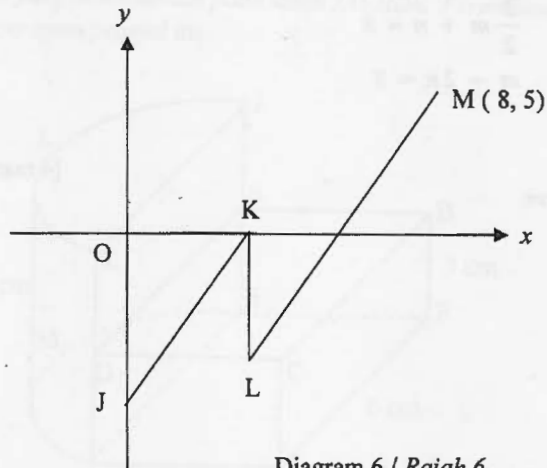


Diagram 6 / Rajah 6

The equation of JK is $3x - y = 7$.

Persamaan JK adalah $3x - y = 7$.

- State the equation of the straight line KL.
Nyatakan persamaan garis lurus KL.
- Find the equation of straight line LM and hence, x-intercept.
Cari persamaan garis lurus LM dan seterusnya nyatakan pintasan-x.

[6 marks/ 6 markah]

Answer/Jawapan

(a)

(b)



7. Using factorisation, solve the following quadratic equation :
 Menggunakan pemfaktoran, selesaikan persamaan kuadratik berikut:

$$\frac{3x^2 + 3x}{2} = x + 2$$

[4 marks / 4 markah]

Answer / Jawapan :

For
Examiner's
Use



For
Examiner's
Use

8. The inverse matrix of $\begin{pmatrix} 7 & 2 \\ -5 & -3 \end{pmatrix}$ is $\frac{1}{m} \begin{pmatrix} -3 & -2 \\ n & -7 \end{pmatrix}$

Matriks songsang bagi $\begin{pmatrix} 7 & 2 \\ -5 & -3 \end{pmatrix}$ ialah $\frac{1}{m} \begin{pmatrix} -3 & -2 \\ n & -7 \end{pmatrix}$

- a) Find the values of m and n
Cari nilai m dan n
- b) Write the following simultaneous linear equations as a matrix equation:
Tulis persamaan linear serentak berikut sebagai persamaan matriks:

$$\begin{aligned} 7x + 2y &= 8 \\ -5x - 3y &= -1 \end{aligned}$$

Hence, using the matrix method, calculate the values of x and y.
Seterusnya, dengan menggunakan kaedah matriks, hitung nilai x dan nilai y.

[6 marks / 6 markah]

Answer/Jawapan:

(a)

(b)



For
Examiner's
Use

9. In diagram 9, ORS and OPT are arcs of a circle with centre O. RPQ is a quadrant of a circle with centre R. OPR and OTS are straight lines. Given that $OT = TS = 7$ cm and $\angle ROS = 60^\circ$.

Dalam Rajah 9, ORS dan OPT ialah lengkok bagi bulatan berpusat O. RPQ ialah sukuan bulatan berpusat R. OPR dan OTS ialah garis lurus. Diberi bahawa $OT = TS = 7$ cm dan $\angle ROS = 60^\circ$.

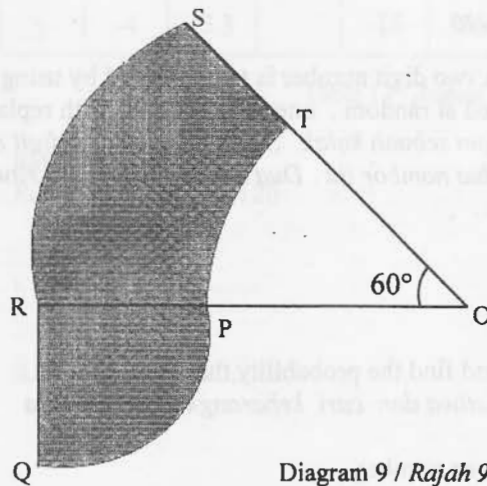


Diagram 9 / Rajah 9

Using $\pi = \frac{22}{7}$, calculate

Menggunakan $\pi = \frac{22}{7}$, hitung

- the perimeter, in cm, of the whole diagram,
perimeter, dalam cm, seluruh rajah itu,
- the area, in cm^2 , of the shaded region.
luas, dalam cm^2 , kawasan yang berlorek.

[6 marks / 6 markah]

Answer/Jawapan:

(a)



For
Examiner's
Use

10. Diagram 10 shows four number cards.
Rajah 10 menunjukkan empat kad nombor.

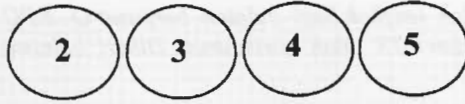


Diagram 10 / *Rajah 10*

All these cards are put into a box. A two digit number is to be formed by using any two of the numbers. Two cards are picked at random, one after another, with replacement.
Kesemua kad ini dimasukkan ke dalam sebuah kotak. Suatu nombor dua digit dibentuk dengan menggunakan mana-mana dua nombor itu. Dua kad dipilih secara rawak, satu persatu, dengan pengembalian.

- a. List the sample space.
Senaraikan ruang sampel.

List all the outcomes of the events and find the probability that
Senaraikan semua kesudahan peristiwa dan cari kebarangkalian bahawa

- b. i. the number formed is an even number,
nombor yang dibentuk itu ialah nombor genap,
ii. the number formed is multiple of 3 or a prime number
nombor yang dibentuk itu ialah gandaan 3 atau nombor perdana

[5 marks / 5 markah]

Answer / *Jawapan :*

a.

b. i.



11. The diagram shows the speed-time graph of a particle for a period of t seconds.
Rajah di bawah menunjukkan graf laju-masa pergerakan suatu zarah dalam tempoh t saat.

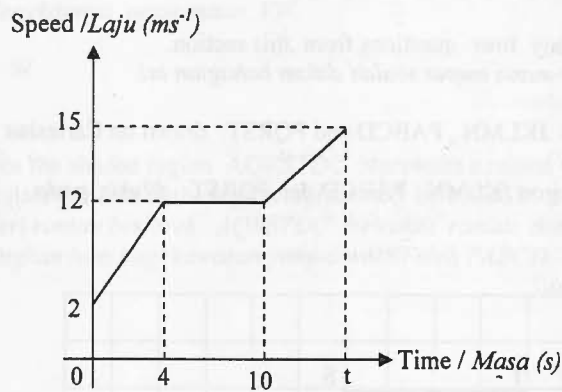


Diagram 11 / Rajah 11

- State the length of time, in s, when the particle moves at a uniform speed.
Nyatakan tempoh masa, dalam s, apabila zarah itu bergerak dengan laju seragam.
- Calculate the rate of change in speed, in ms^{-2} , in the first 4 seconds.
Hitung kadar perubahan laju, dalam ms^{-2} , dalam 4 saat yang pertama.
- Calculate the value of t if the total distance travelled for the period of t seconds is 154 m.
Hitung nilai t jika jumlah jarak yang dilalui dalam tempoh t saat itu ialah 154 m.

[6 marks / 6 markah]

Answer / Jawapan :

a.

b.



For
Examiner's
Use

Section B
Bahagian B
[48 marks/ 48 markah]

Answer any **four** questions from this section.
Jawab mana-mana empat soalan dalam bahagian ini.

12. Diagram 12 shows pentagons JKLMN, PABCD and PQRST drawn on Cartesian plane.
Rajah 12 menunjukkan pentagon JKLMN, PABCD dan PQRST dilukis pada satah Cartesian.

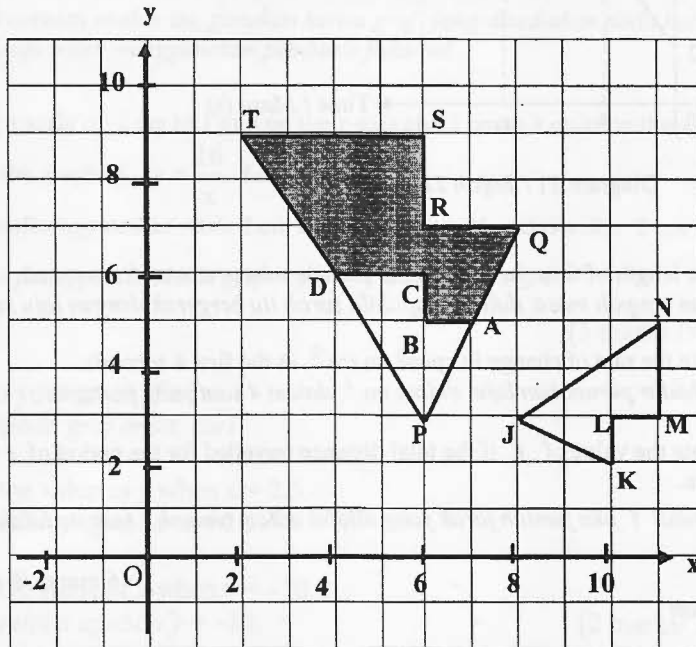


Diagram 12 / Rajah 12

- a.) Transformation T is translation $\begin{pmatrix} -3 \\ 1 \end{pmatrix}$ and transformation R is an anticlockwise rotation 90° about the centre (4,3). State the image of point (8 , 1) under each of the following transformation :

Penjelmaan T ialah translasi $\begin{pmatrix} -3 \\ 1 \end{pmatrix}$ dan penjelmaan R ialah putaran 90° lawan arah jam pada pusat (4,3). Nyatakan koordinat imej bagi titik (8 , 1) di bawah penjelmaan berikut.

ii.) TR

[3 marks/ 3 markah]

For
Examiner's
Use

- b. i) PQRS is the image of JKLMN under combined transformation VW. Describe in full transformation VW.

PQRS ialah imej JKLMN bagi di bawah gabungan penjelmaan VW. Huraikan selengkapnya penjelmaan VW.

a. W

b. V

[6 marks /6 markah]

- ii. Given the shaded region AQRSTDC represents a region with an area of 78cm^2 , calculate the area of the region represented by PABCD.

Diberi rantau berlorek AQRSTDC mewakili rantau dengan luas 78cm^2 , hitungkan luas bagi kawasan yang diwakili oleh PABCD.

[3 marks /3 markah]

Answer / Jawapan

a. i.

ii.

b. i. a.

b.

ii.



For
Examiner's
Use

13. a. Complete Table 13 in the answer space for the equation $y = \frac{16}{x}$ by writing down the values of y when $x = -2$ and $x = 1.5$.

Lengkapkan Jadual 13 di ruang jawapan untuk persamaan $y = \frac{16}{x}$ dengan menulis nilai-nilai y apabila $x = -2$ dan $x = 1.5$.

[2 marks / 2 markah]

- b. For this part of the question, use the graph paper provided on page 20. You may use a flexible curve rule.

Untuk ceraihan soalan ini, gunakan kertas graf yang disediakan pada halaman 20. Anda boleh menggunakan pembaris fleksibel.

Using a scale of 2 cm to 1 unit on the x -axis and 2 cm to 4 units on the y -axis,

draw the graph of $y = \frac{16}{x}$ for $-4 \leq x \leq 4$.

Dengan menggunakan skala 2 cm kepada 1 unit pada paksi- x dan 2 cm kepada 4 unit pada paksi- y , lukis graf $y = \frac{16}{x}$ bagi $-4 \leq x \leq 4$.

[5 marks / 5 markah]

- c. From your graph, find
Daripada graf anda, cari

i. the value of y when $x = 2.5$.
nilai y apabila $x = 2.5$.

ii. the value of x when $y = -10$.
nilai x apabila $y = -10$.

[2 marks / 2 markah]

- d. Draw a suitable straight line on your graph to find a value of x which satisfies the equation $4x^2 + 3x = 16$ for $-4 \leq x \leq 4$.

State these values of x .

Lukis satu garis lurus yang sesuai pada graf anda untuk mencari nilai-nilai x yang memuaskan persamaan $4x^2 + 3x = 16$ bagi $-4 \leq x \leq 4$.

Nyatakan nilai-nilai x itu.

[3 marks / 3 markah]



Answer/Jawapan:

a.

x	-4	-3	-2	-1	1	1.5	2	3	4
y	-4	-5.3		-16	16		8	5.3	4

Table 13 / Jadual 13

b. Refer graph on page 20
Rujuk graf di halaman 20

c. i. $y = \dots\dots\dots$

ii. $x = \dots\dots\dots$

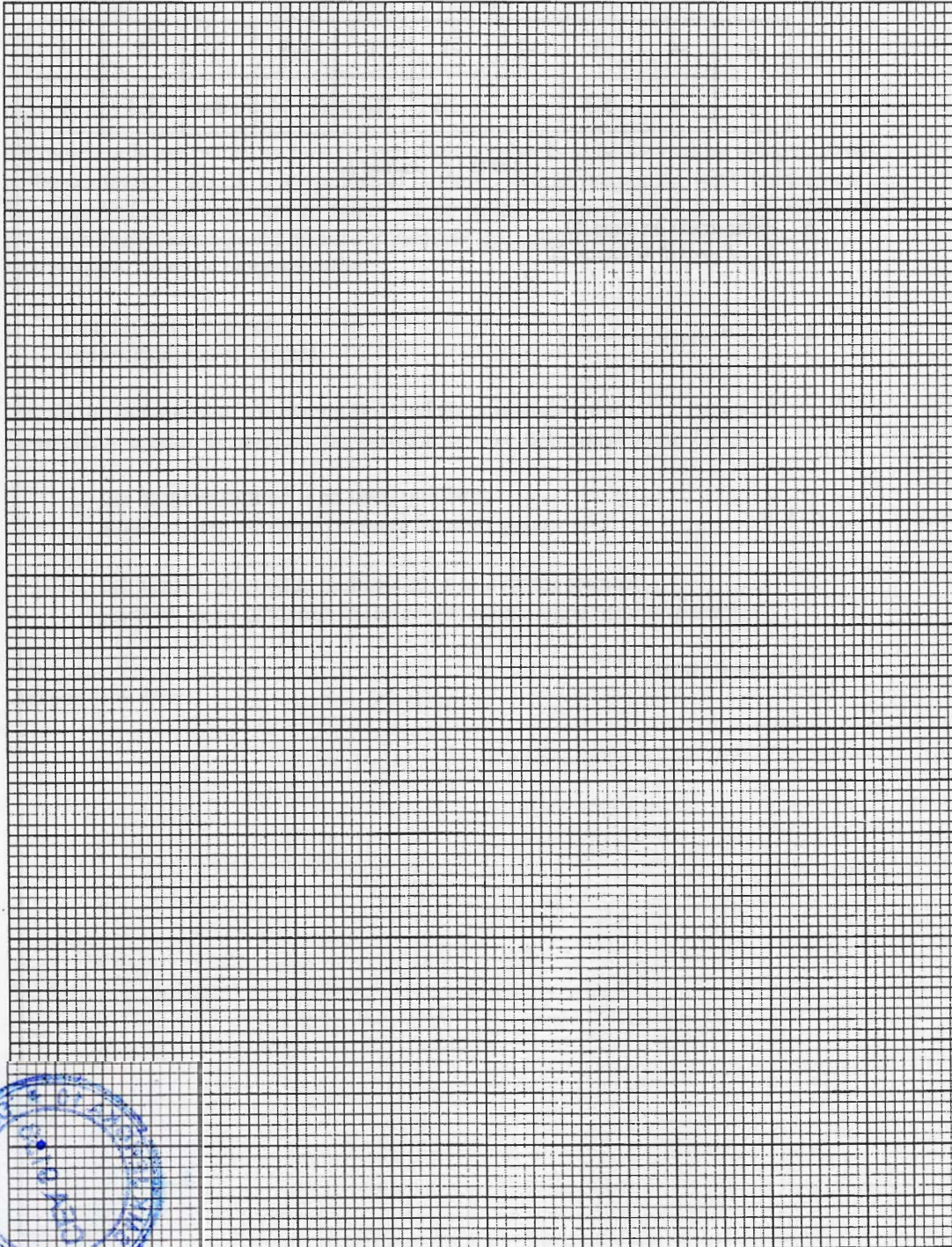
d. $x = \dots\dots\dots, \dots\dots\dots$

For
Examiner
's Use



For
Examiner's
Use

Graph for Question 13
Graf untuk soalan 13



14. The data in Diagram 14 shows the mass, in kg, of old newspapers collected by 40 students in a recycling campaign.

Data dalam Rajah 14 menunjukkan jisim, dalam kg, surat khabar lama yang dikutip oleh 40 pelajar dalam suatu kempen kitar semula.

21	29	11	30	16	37	25	30
12	31	25	40	22	27	45	23
28	42	27	32	14	33	19	35
36	26	21	26	32	33	23	18
22	38	20	27	19	28	24	15

Diagram 14 / Rajah 14

- a. Based on the data in Diagram above and by using a class interval of 5, complete Table 14(a) in the answer space.

Berdasarkan data dalam Rajah di atas dan dengan menggunakan selang kelas 5, lengkapkan Jadual 14(a) di ruang jawapan.

[3 marks/ 3 markah]

- b. Based on Table in (a), calculate the estimated mean mass of old newspapers collected by a student correct to two decimal places.

Berdasarkan Jadual dalam (a), hitung min anggaran berat surat khabar lama yang dikutip oleh seorang pelajar betul kepada 2 tempat perpuluhan..

[3 marks/ 3 markah]

- c. For this part of the question, use graph paper provided in page 23.

Untuk ceraiian soalan ini, gunakan kertas graf yang disediakan pada halaman 23.

Using a scale of 2 cm to 5 kg on the horizontal axis and 2 cm to 1 student on the vertical axis, draw a frequency polygon for the data.

Dengan menggunakan skala 2 cm kepada 5 kg pada paksi mengufuk dan 2 cm kepada 1 pelajar pada paksi mencancang, lukis satu poligon kekerapan bagi data itu.

[5 marks/ 5 markah]

- d. Based on the frequency polygon in (c), state the number of students who collected more than 30 kg of old newspapers.

Berdasarkan poligon kekerapan di (c), nyatakan bilangan pelajar yang dikutip lebih daripada 30 kg surat khabar lama.

[1 mark / 1 markah]

For
Examiner's
Use

Answer / Jawapan :

14. a

Class Interval Selang kelas	Midpoint Titik Tengah	Frequency Kekerapan
11 – 15	13	

Table 14 (a) / Jadual 14(a)

(b)

(c) Refer graph on page 23 .
Rujuk graf di halaman 23.

(d)



Graph for Question 14
Graf untuk soalan 14

For
Examiner
's Use



For
Examiner's
Use

15. You are not allowed to use graph paper to answer this question.
Anda tidak dibenarkan menggunakan kertas graf untuk menjawab soalan ini.

Diagram 15(i) shows a solid consisting of a cuboid and a half-cylinder which are joined at the plane JAEHDK. The base EFGHM is the uniform cross section of the solid.
Rajah 15(i) menunjukkan sebuah pepejal terdiri daripada sebuah kuboid dan sebuah separuh silinder yang dicantumkan pada satah JAEHDK. Permukaan EFGHM ialah keratan rentas seragam pepejal itu.

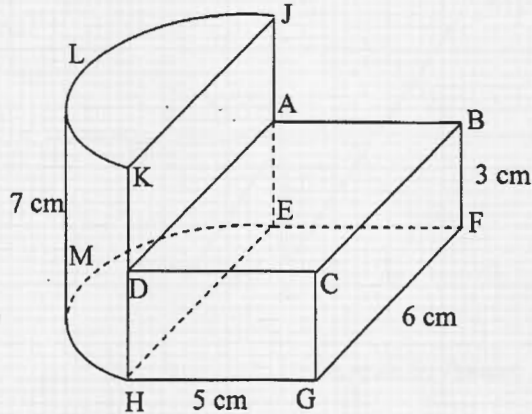


Diagram 15(i) / Rajah 15(i)

- a. Draw to full scale, the plan of the solid
Lukis dengan skala penuh, pelan pepejal itu.

[3 marks / 3 markah]

Answer/ Jawapan

a.)



15. b A solid right prism is joined to the solid at the vertical plane ABFE as shown. Trapezium JPEA is the uniform cross section of the prism and JSUA is an inclined plane. The base HGFPQREMH an horizontal plane and $FP = 3$ cm. *Sebuah pepejal prisma dicantumkan kepada pepejal itu pada satah tegak ABFE seperti ditunjukkan. Trapezium JSUA adalah keratan rentas seragam prisma itu dan JSUA adalah satah condong. Tapak HGFPQREMH adalah satah mengufuk dan $FP = 3$ cm.*

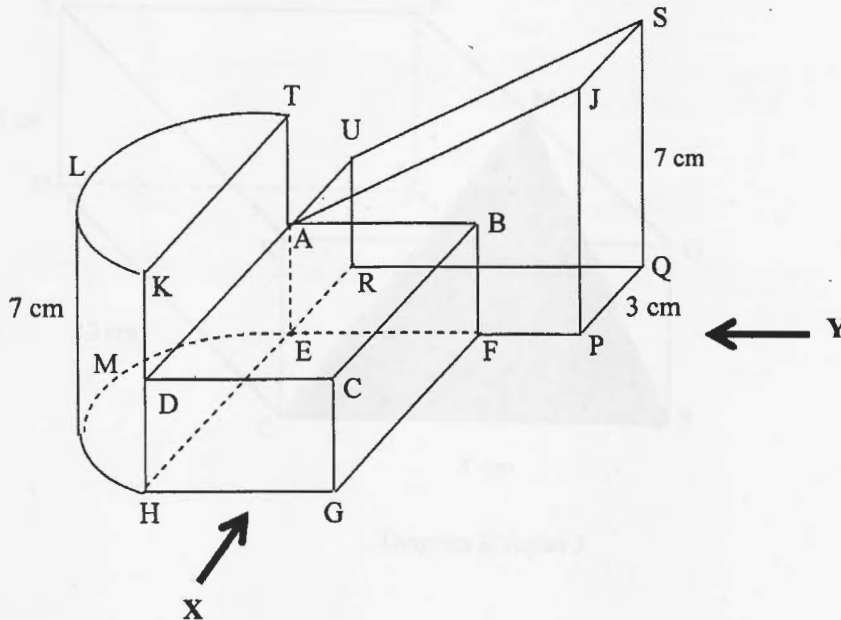


Diagram 15(ii) / Rajah 15(ii)

Draw in full scale,
Lukiskan dengan skala penuh,

- i.) the elevation of the combined solid on vertical plane parallel to HG as viewed from X
dongakan gabungan pepejal itu pada satah mencancang yang selari dengan HG seperti dilihat dari X.

[4 marks / 4 markah]

- ii.) the elevation of the combined solid on vertical plane parallel to PQ as viewed from Y
dongakan gabungan pepejal itu pada satah mencancang yang selari dengan PQ seperti dilihat dari Y.

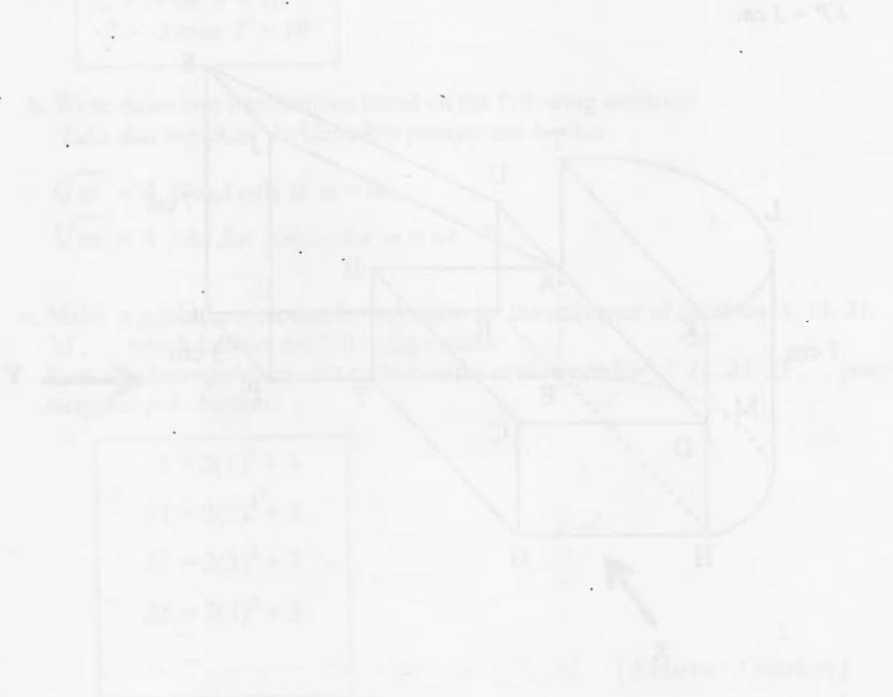
[5 marks / 5 markah]



For
Examiner's
Use

Answer/ Jawapan

b) i.



ii.)



16. Diagram 16 shows the location of three points, L, M, and N on earth surface. O is earth's centre. The longitude of N is 85°E .
Rajah 16 menunjukkan tiga titik L, M, and N di atas permukaan bumi. O ialah pusat bumi. Longitud N ialah 85°E .

For
Examiner's
Use

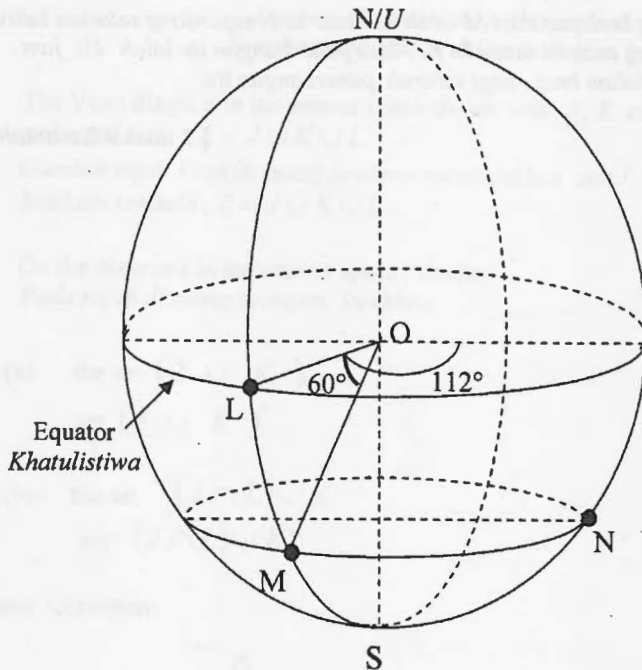


Diagram 16 / Rajah 16

- a. i. State the latitude of N
Nyatakan latitude bagi N
- ii. State the location L
Nyatakan kedudukan bagi L [4 marks/ 4 markah]
- b. K lies 2600 nautical miles due north of N. Calculate the latitude K.
K terletak 2600 batu nautika ke Utara N. Hitung latitud bagi K. [3 marks/3 markah]
- c. Calculate the distance in nautical miles from M due east to N measured along the common parallel of latitude
Hitung jarak dalam batu nautika, dari M ke arah timur ke N diukur sepanjang selarian latitud. [3 marks/ 3 markah]

For
Examiner's
Use

- d. An aeroplane took off from M and flew due east to N along the common parallel latitude and then due north to K. The time taken for the flight is $4\frac{1}{2}$ hours. Calculate the average speed, in knot, for the whole flight.

Sebuah kapal terbang berlepas dari M arah ke timur ke N sepanjang selarian latitud dan kemudian terbang arah ke utara ke K. Masa penerbangan itu ialah $4\frac{1}{2}$ jam.. Hitung purata laju, dalam knot, bagi seluruh penerbangan itu.

[2 marks/ 2 markah]

Answer/ Jawapan

a. i.

ii.

b.

c.

d.



END OF THE QUESTION PAPER
KERTAS SOALAN TAMAT

INFORMATION FOR CANDIDATES
MAKLUMAT UNTUK CALON

1. This question paper consists of two sections: Section A and Section B.
Kertas soalan ini mengandungi dua bahagian : Bahagian A dan Bahagian B.
2. Answer **all** questions in **Section A** and **4** questions in **Section B**.
Jawab semua soalan dalam Bahagian A dan empat soalan daripada Bahagian B.
3. Write your answers in the space provided in the question paper.
Jawapan anda hendaklah ditulis pada ruang yang disediakan dalam kertas soalan ini.
4. 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.
5. If you wish to change your answer, cross out the answer that you have done. Then write down the new answer.
Jika anda hendak menukar jawapan, batalkan jawapan yang telah dibuat. Kemudian tulis jawapan yang baru.
6. The diagrams in the questions provided are not drawn to scale unless stated.
Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.
7. The marks allocated for each question and sub-part of a question are shown in brackets.
Markah yang diperuntukkan bagi setiap soalan dan ceraihan soalan ditunjukkan dalam kurungan.
8. A list of formulae is provided on page 2 to 4.
Satu senarai rumus disediakan di halaman 2 hingga 4.
9. You may use a non-programmable scientific calculator.
Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram.
10. Hand this question paper to the invigilator at the end of the examination.
Serahkan kertas soalan ini kepada pengawas peperiksaan pada akhir peperiksaan.



PEPERIKSAAN PERCUBAAN SPM 2012

MATHEMATICS PAPER 1

Question Number	Key	Question Number	Key
1	C	21	A
2	B	22	C
3	B	23	A
4	D	24	B
5	B	25	B
6	D	26	D
7	C	27	A
8	A	28	C
9	C	29	B
10	D	30	C
11	B	31	C
12	D	32	B
13	D	33	D
14	A	34	C
15	B	35	B
16	D	36	B
17	B	37	A
18	D	38	D
19	C	39	C
20	B	40	D

1449/2
MATHEMATICS
Kertas 2
SEPT 2012

PEPERIKSAAN PERCUBAAN SPM 2012

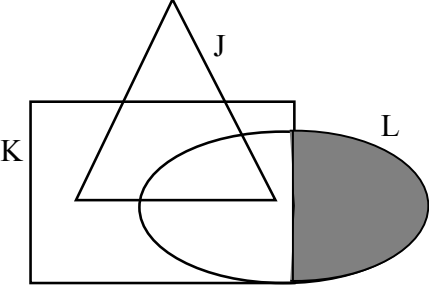
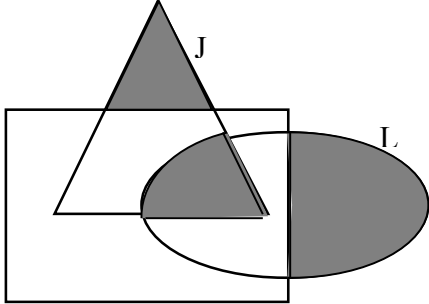
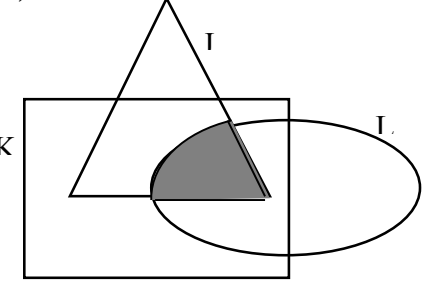
TINGKATAN 5

SKEMA PEMARKAHAN

MATHEMATICS
KERTAS 2

Kertas ini mengandungi 12 halaman bercetak

Section A
(52 marks)

No	Marking scheme	Marks	
1	<p>a)</p>  <p>b)</p>  <p>Note : $(J \cap L)$ correctly shaded award 1 mark</p> 	1m	3
2	<p>Volume of cone = $\frac{1}{3} \times \frac{22}{7} \times 9 \times 9 \times h$</p> <p>Volume of hemisphere = $\frac{2}{3} \times \frac{22}{7} \times 9 \times 9 \times 9$</p> <p>$\frac{1}{3} \times \frac{22}{7} \times 9 \times 9 \times h + \frac{2}{3} \times \frac{22}{7} \times 9 \times 9 \times 9 = 2975$</p> <p>$h = 17.06 \text{ cm}$</p>	1m 1m 1m 1m	4

3	<p>a. Identify $\angle MBQ$</p> <p>b. $\tan \angle MBQ = \frac{6}{4}$</p> <p>$\angle MBQ = 56.31^\circ$ or $56^\circ 18'$</p>	1m 1m 1m	3
4	<p>a) True</p> <p>b) b. If $\sqrt[3]{m} = 4$ then $m = 64$. If $m = 64$ then $\sqrt[3]{m} = 4$.</p> <p>c) $2n^2 + 3$, $n = 1, 2, 3, 4, \dots$</p>	1m 1m 1m 1m,1m	5
5	<p>$3m + 2n = 16$ or $m = 8 + 2n$ or equivalent</p> <p>$4m = 24$ or equivalent</p> <p>$m = 6$</p> <p>$n = -1$</p>	1m 1m 1m 1m	4
6	<p>a) $x = \frac{7}{3}$</p> <p>b) $mLM = 3$</p> <p>$y - 5 = 3(x - 8)$ or $5 = 3(8) + c$</p> <p>$y = 3x - 19$</p> <p>$0 = 3x - 19$</p> <p>x- intercept = $\frac{19}{3}$</p>	1m 1m 1m 1m 1m 1m	6

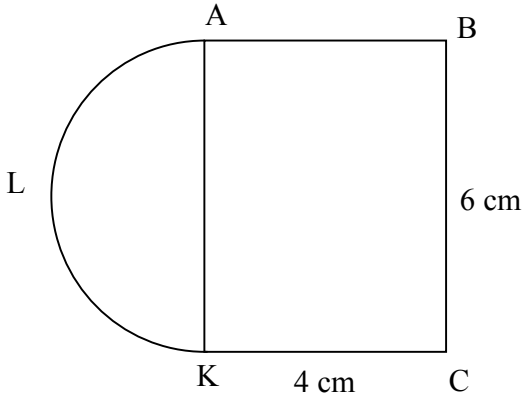
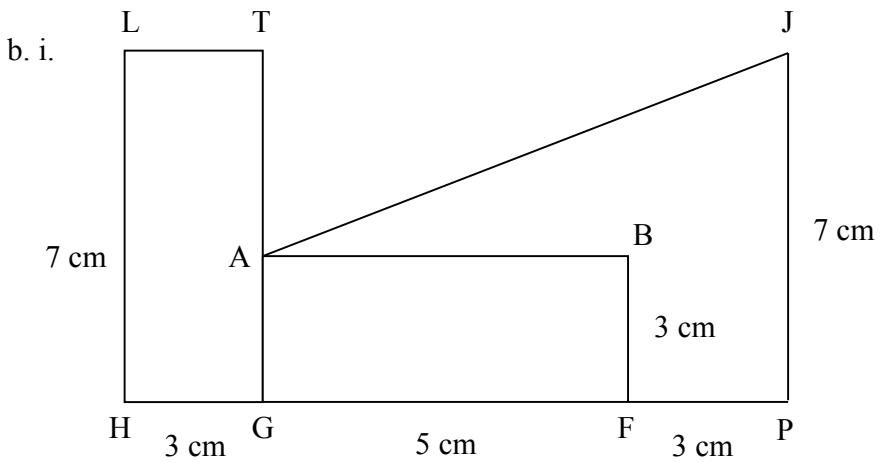
7	$3x^2 + x - 4 = 0$ $(3x+4)(x-1) = 0$ $x = \frac{-4}{3}, x = 1$	1m 1m 1m,1m	4
8	<p>a. $m = -11$</p> <p>$n = 5$</p> <p>b. $\begin{pmatrix} 7 & 2 \\ -5 & -3 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 8 \\ -1 \end{pmatrix}$</p> $\begin{pmatrix} x \\ y \end{pmatrix} = -\frac{1}{11} \begin{pmatrix} -3 & -2 \\ 5 & -7 \end{pmatrix} \begin{pmatrix} 8 \\ -1 \end{pmatrix}$ <p>$x = 2$, $y = -3$</p> <p>Note :</p> <p>$\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 2 \\ -3 \end{pmatrix}$ as a final answer , award 1 mark</p>	1m 1m 1m 1m 1m , 1m	6
9	<p>a) $\frac{60}{360} \times 2 \times \frac{22}{7} \times 14$ or $\frac{90}{360} \times 2 \times \frac{22}{7} \times 7$</p> $= \frac{60}{360} \times 2 \times \frac{22}{7} \times 14 + \frac{90}{360} \times 2 \times \frac{22}{7} \times 7 + 7 + 7 + 7 + 7$ $= 53.67 \text{ cm.}$ <p>b. $\frac{60}{360} \times \frac{22}{7} \times 14 \times 14$ or $\frac{90}{360} \times \frac{22}{7} \times 7 \times 7$ or $\frac{60}{360} \times \frac{22}{7} \times 7 \times 7$</p> $= \frac{60}{360} \times \frac{22}{7} \times 14 \times 14 - \frac{60}{360} \times \frac{22}{7} \times 7 \times 7 + \frac{90}{360} \times \frac{22}{7} \times 7 \times 7$ $= 115.5 \text{ cm}^2$	1m 1m 1m 1m 1m	6

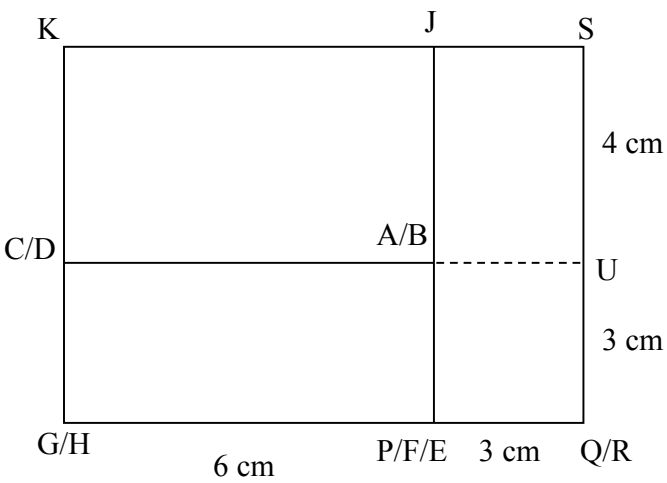
10	<p>a) { 22, 23, 24, 25, 32, 33, 34, 35, 42, 43, 44, 45, 52, 53, 54, 55 }</p> <p>b) i. { 22, 24, 32, 34, 42, 44, 52, 54 }</p> $= \frac{8}{16}$ <p>ii. { 23, 24, 33, 43, 45, 53, 54 }</p> $= \frac{7}{16}$	<p>1m</p> <p>1m</p> <p>1m</p> <p>1m</p> <p>1m</p>	5
11	<p>a) 6 s</p> <p>b) $\frac{12-2}{4}$ $\frac{5}{2}$ or 2.5 ms^{-2}</p> <p>c) $\frac{1}{2} \times (2+12) \times 4 + 6 \times 12 + \frac{1}{2} \times (12+15) \times (t-10) = 154$ $t = 14 \text{ s}$</p>	<p>1m</p> <p>1m</p> <p>1m</p> <p>2m</p> <p>1m</p>	6

Section B
(48 marks)

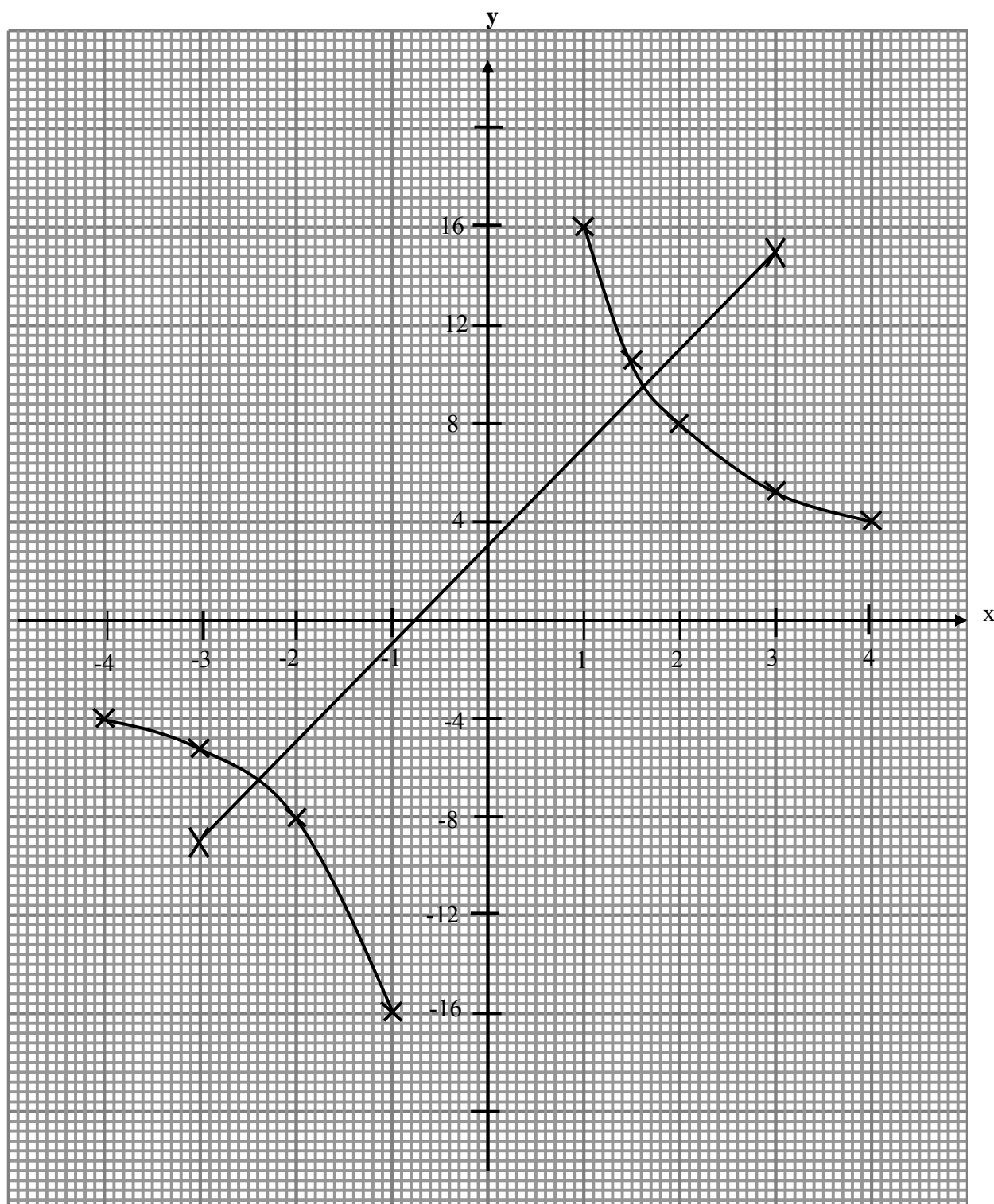
No	Marking scheme	Marks								
12	<p>a) i. (5 , 2)</p> <p>ii. (3 , 8) Accept (6 , 7) for 1 mark</p> <p>b. i. W = Rotation , 90° anticlockwise , centre (7 , 2).</p> <p style="padding-left: 40px;">V = Enlargement , Centre P / (6,3) , Scale factor 2</p> <p>c. $x + 78 = 2^2 \times x$ or equivalent</p> <p style="padding-left: 40px;">$x = \frac{78}{3}$</p> <p style="padding-left: 40px;">Area PABCD = 26cm²</p>	1m	2m	1m,1m,1m	1m,1m,1m	1m	1m	1m	12	
13	<p>a. $y = -8, 10.67$</p> <p>b. Refer graph</p> <p style="padding-left: 40px;">Axes drawn in correct directions and uniform scale for $-4 \leq x \leq 4$ and $-16 \leq y \leq 16$</p> <p style="padding-left: 40px;">All 7 points and *2 points correctly plotted or the curve passes through these points $-4 \leq x \leq 4$ and $-16 \leq y \leq 16$</p> <p style="padding-left: 40px;">A smooth and continuous curve without any straight line and passes through all 9 correct points using the given scale for $-4 \leq x \leq 4$ and $-16 \leq y \leq 16$.</p> <p style="padding-left: 40px;">Note : 1. 7 or 8 points correctly plotted , award 1 mark 2. Ignore curve out of range</p> <p>c. i. $5.5 \leq y \leq 6.5$</p> <p style="padding-left: 40px;">ii. $-1.75 \leq x \leq -1.65$</p> <p>d. Identify equation $y = 4x + 3$ Straight line $y = 4x + 3$ correctly drawn Values of x: $1.55 \leq x \leq 1.65$ $-2.45 \leq x \leq -2.35$</p>	1m , 1m	1m	2m	1m	1m	1m	1m	1m	12

14	a)	<table border="1"> <thead> <tr> <th>Class Interval</th> <th>Midpoint</th> <th>Frequency</th> <th></th> </tr> </thead> <tbody> <tr> <td>11 - 15</td> <td>13</td> <td>4</td> <td>I</td> </tr> <tr> <td>16 - 20</td> <td>18</td> <td>5</td> <td>II</td> </tr> <tr> <td>21 - 25</td> <td>23</td> <td>10</td> <td>III</td> </tr> <tr> <td>26 - 30</td> <td>28</td> <td>9</td> <td>IV</td> </tr> <tr> <td>31 - 35</td> <td>33</td> <td>6</td> <td>V</td> </tr> <tr> <td>36 - 40</td> <td>38</td> <td>4</td> <td>VI</td> </tr> <tr> <td>41 - 45</td> <td>43</td> <td>2</td> <td>VII</td> </tr> </tbody> </table>	Class Interval	Midpoint	Frequency		11 - 15	13	4	I	16 - 20	18	5	II	21 - 25	23	10	III	26 - 30	28	9	IV	31 - 35	33	6	V	36 - 40	38	4	VI	41 - 45	43	2	VII		
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	36 - 40	38	4	VI																																
	41 - 45	43	2	VII																																
		Class Interval : I – VII			1m																															
		Frequency : I –VII			2m																															
		Midpoint: I –VII			1m																															
		Note : Allow one mistake in frequency for 1 mark																																		
		b) $\frac{4(13)+5(18)+9(23)+10(28)+6(33)+4(38)+2(43)}{4+5+9+10+6+4+2}$ or $\frac{1065}{40}$			2m																															
	= 26.63			1m																																
	c) Refer to graph																																			
	Axes drawn in correct directions and uniform scale for $13 \leq x \leq 43$ and $0 \leq y \leq 10$			1m																																
	*7 points correctly plotted			2m																																
	A complete polygon which passes through 9 correct points.			1m																																
	d. 12 students			1m																																
				12																																

<p>15</p>	<p>a.</p>  <p>Correct shape with semicircle and rectangle KCBA All solid lines</p> <p>$CB = KA > KC = AB$</p> <p>Measurements correct to ± 0.2 cm (one way) and all angles at the vertices of rectangles are $90^\circ \pm 1^\circ$.</p> <p>b. i.</p>  <p>Correct shape with rectangle HGTL and GFBA and trapezium GPJA. All solid lines</p> <p>$AQ > PJ = HL = GT > GF = AB > BF = FP = GA = HG > AT$</p> <p>Measurements correct to ± 0.2 cm (one way) and all angles at the vertices of rectangles are $90^\circ \pm 1^\circ$.</p>	<p>1m</p> <p>1m</p> <p>1m</p>	<p>3</p> <p>4</p>
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	<p>ii.</p>  <p>Correct shape with rectangle GQSK , GPJK and PQSJ . All solid lines</p> <p>Note : Ignore straight line BU.</p> <p>B and U joined with dashed line to form BUPQ.</p> <p>$GQ > QS = GK > GP = KJ > BJ > BP$</p> <p>Measurements correct to ± 0.2 cm (one way) and all angles at the vertices of rectangles are $90^\circ \pm 1^\circ$.</p>	1m	
16	<p>a. i. 60° S</p> <p>ii. (0° , 27° E)</p> <p>Note : (0° , θ° E or (0° , 27°) , award 2 marks Or 0° or 27° , award 1 mark</p> <p>b. $\frac{2600}{60}$ or 43.33°</p> <p>$60^\circ - 43.33^\circ$</p> <p>16.67° S</p>	1m 3m 1m 1m 1m	5 12

16	<p>c. $112 \times 60 \times \cos 60^\circ$</p> <p>3360 nm</p> <p>Note :</p> <p>Using $\cos 60^\circ$, award 1 mark</p> <p>d. $\frac{2600 + 3360}{4.5}$</p> <p>1324.44 knot</p>	<p>2m</p> <p>1m</p> <p>1m</p> <p>1m</p>	<p>12</p>
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Answer for Question 13 (b)

Answer for Question 14 (c)