

**SULIT**

**1449/1**  
**Mathematics**  
**Paper 1**  
**September 2009**  
1¼ jam



**JABATAN PELAJARAN NEGERI JOHOR**

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**PEPERIKSAAN PERCUBAAN SPM 2009**

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**MATHEMATICS**

Paper 1

One hour and fifteen minutes

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**JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU**

1. *Kertas soalan ini adalah dalam dwibahasa.*
2. *Soalan di bahagian atas adalah dalam bahasa Inggeris, diikuti oleh bahasa Melayu.*
3. *Calon dikehendaki membaca maklumat di halaman 2.*

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Kertas soalan ini mengandungi 32 halaman bercetak.

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**SULIT**

**1449/1**

## INFORMATION FOR CANDIDATES

## MAKLUMAT UNTUK CALON

1. This question paper consists of 40 questions  
*Kertas soalan ini mengandungi 40 soalan.*
2. Answer **all** questions.  
*Jawab **semua** soalan.*
3. Answer each question by blackening the correct space on the answer sheet.  
*Jawab dengan menghitamkan ruangan yang betul pada kertas jawapan.*
4. Blacken only **one** space for each question .  
*Bagi setiap soalan hitamkan **satu** ruangan sahaja.*
5. If you wish to change your answer, erase the blackened mark that you have made.  
*Sekiranya anda hendak menukarkan jawapan, padamkan tanda yang telah dibuat.*
6. Then blacken the space for the new answer.  
*Kemudian hitamkan jawapan yang baru.*
7. The diagrams in the questions provided are not drawn to the scale unless stated.  
*Rajah yang mengiringi setiap soalan tidak dilukiskan mengikut skala kecuali dinyatakan.*
8. A list of formulae is provided .  
*Satu senarai rumus disediakan.*
9. A booklet of four-figure mathematical tables is provided.  
*Sebuah buku sifir matematik empat angka disediakan.*
10. You may use a non-programmable scientific calculator.  
*Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram.*

**MATHEMATICAL FORMULAE**  
**RUMUS-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**

- |   |   |
|---|---|
| <p>1 <math>a^m \times a^n = a^{m+n}</math></p> <p>2 <math>a^m \div a^n = a^{m-n}</math></p> <p>3 <math>(a^m)^n = a^{mn}</math></p> <p>4 <math>A^{-1} = \frac{1}{ad-bc} \begin{pmatrix} d &amp; -b \\ -c &amp; a \end{pmatrix}</math></p> <p>5 <math>P(A) = \frac{n(A)}{n(S)}</math></p> <p>6 <math>P(A') = 1 - P(A)</math></p> <p>7 Distance = <math>\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}</math><br/> <i>Jarak</i></p> <p>8 Midpoint, <math>(x, y) = \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)</math><br/> <i>Titik tengah</i></p> <p>9 Average speed = <math>\frac{\text{distance travelled}}{\text{time taken}}</math><br/> <i>Purata laju = <math>\frac{\text{jarak yang dilalui}}{\text{masa yang diambil}}</math></i></p> <p>10 Mean = <math>\frac{\text{sum of data}}{\text{number of data}}</math><br/> <i>Min = <math>\frac{\text{hasil tambah nilai data}}{\text{bilangan data}}</math></i></p> <p>11 Mean = <math>\frac{\text{sum of (midpoint of interval} \times \text{frequency)}}{\text{sum of frequencies}}</math><br/> <i>Min = <math>\frac{\text{hasil tambah (nilai titik tengah} \times \text{kekerapan)}}{\text{hasil tambah kekerapan}}</math></i></p> | <p>12 Pythagoras Theorem <math>c^2 = a^2 + b^2</math><br/> <i>Teorem Pithagoras</i></p> <p>13 <math>m = \frac{y_2 - y_1}{x_2 - x_1}</math></p> <p>14 <math>m = -\left( \frac{y - \text{intercept}}{x - \text{intercept}} \right)</math><br/> <math>m = -\left( \frac{\text{pintasan} - y}{\text{pintasan} - x} \right)</math></p> |
|---|---|

**SHAPE 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 =  $\pi r^2$   
       *Luas bulatan* =  $\pi j^2$
  
- 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* =  $(n - 2) \times 180^\circ$

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

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

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

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

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

*Faktor skala,*

$$15 \quad \text{Area of image} = k^2 \times \text{area of object.}$$

$$\text{Luas imej} = k^2 \times \text{luas objek}$$

- 1 Round off 809430 correct to three significant figures.

*Bundarkan 809430 betul kepada tiga angka bererti.*

- A 809
- B 8094
- C 809000
- D 809400

- 2 Express 0.00000545 in standard form.

*Ungkapkan 0.00000545 dalam bentuk piawai.*

- A  $5.45 \times 10^{-5}$
- B  $5.45 \times 10^{-6}$
- C  $5.45 \times 10^{-7}$
- D  $5.45 \times 10^{-8}$

- 3  $4.7 \times 10^7 + 5600000 =$

- A  $1.03 \times 10^7$
- B  $4.76 \times 10^7$
- C  $5.26 \times 10^7$
- D  $6.07 \times 10^7$

- 4 Diagram 4, shows an empty perfume container which is a right prism, with trapezium is the uniform cross section of the prism.

*Rajah 4 menunjukkan sebuah bekas pewangi yang kosong dengan keratan rentas seragam berbentuk trapezium.*

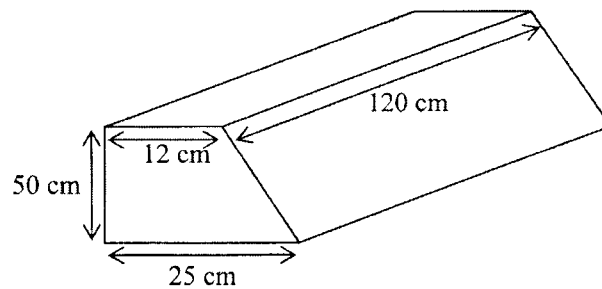


Diagram 4

*Rajah 4*

A worker fills up half full of the empty container with a perfume. Calculate the volume, in  $\text{cm}^3$ , the perfume in the container.

*Seorang pekerja telah memasukkan sejenis pewangi ke dalam bekas tersebut sehingga separuh penuh. Hitungkan isipadu pewangi, dalam  $\text{cm}^3$ , dalam bekas itu.*

- A  $4.625 \times 10^2$   
B  $5.55 \times 10^4$   
C  $7.5006 \times 10^4$   
D  $1.11 \times 10^5$
- 5  $110001_2 - 1011_2 =$
- A  $111100_2$   
B  $111010_2$   
C  $100101_2$   
D  $100110_2$

- 6 Given  $4 \times 5^4 + 3 \times 5^2 + 5p + 1 = 40321_5$ , find the value of  $p$ .

Diberi,  $4 \times 5^4 + 3 \times 5^2 + 5p + 1 = 40321_5$ , cari nilai  $p$ .

- A 1  
B 2  
C 3  
D 4

- 7 In Diagram 7,  $PQRWW$  is a regular pentagon and  $RSTUVW$  is a hexagon. Given that  $TS$  is parallel to  $UV$  and  $QRS$  is a straight line.

Dalam Rajah 7,  $PQRWW$  ialah sebuah pentagon sekata dan  $RSTUVW$  ialah sebuah heksagon.  $TS$  selari dengan  $UV$  dan  $QRS$  adalah satu garis lurus

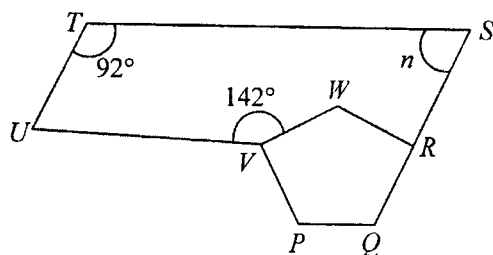


Diagram 7

Rajah 7

Find the value of  $n$ .

Cari nilai  $n$ .

- A  $38^\circ$   
B  $72^\circ$   
C  $74^\circ$   
D  $88^\circ$



- 8 In Diagram 8,  $JK$  is a tangent to the circle  $KML$  at  $K$ .  $JML$  is a straight line.  
 Dalam Rajah 8,  $JK$  ialah tangen kepada bulatan  $KML$  di  $K$ .  $JML$  ialah garis lurus.

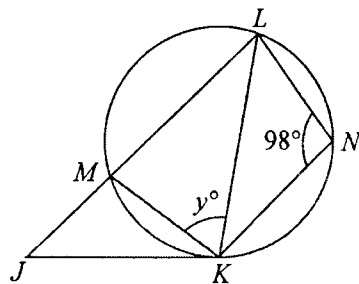


Diagram 8

Rajah 8

Given  $JM = MK$ , find the value of  $y$ .

Diberi  $JM = MK$ , cari nilai  $y$ .

- A  $41^\circ$
- B  $49^\circ$
- C  $57^\circ$
- D  $82^\circ$

- 9 In Diagram 9 shows two flags on a grid.

Rajah 9 menunjukkan dua buah bendera di atas kotak bergrid.

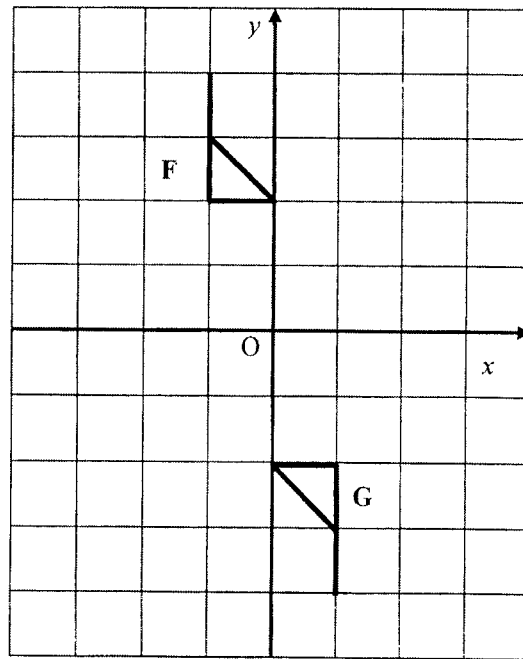


Diagram 9

Rajah 9

Flag G is the image of flag F under a one transformation. Which of the following correctly describe the transformation.

Bendera G ialah image bagi bendera F di bawah satu penjelmaan. Antara berikut yang manakah menghuraikan penjelmaan tersebut.

- A Translation  $\begin{pmatrix} 1 \\ -4 \end{pmatrix}$

Translasi  $\begin{pmatrix} 1 \\ -4 \end{pmatrix}$

- B Reflection on  $x$ -axis

Pantulan pada paksi- $x$

- C Enlargement with scale factor 1 about centre O

Pembesaran dengan faktor skala 1 berpusat di O

- D Rotation  $180^\circ$  clockwise about centre O

Putaran  $180^\circ$  ikut arah jam berpusat di O

- 10 Diagram 10 shows five trapezium drawn on the square grids. Which of the trapezium  $A$ ,  $B$ ,  $C$ , and  $D$  is the image of trapezium  $P$  under an enlargement.

Rajah 10 menunjukkan lima trapizium dilukis di atas grid sisiempat sama. Antara trapezium  $A$ ,  $B$ ,  $C$ , dan  $D$  yang manakah imej bagi trapezium  $P$  di bawah suatu pembesaran.

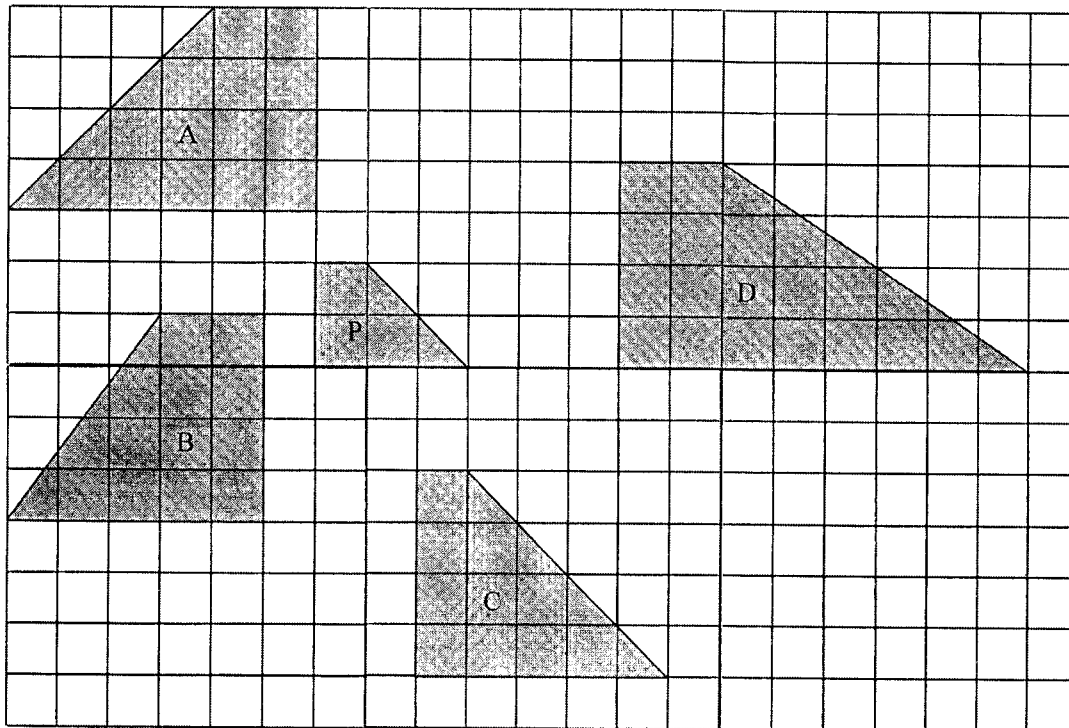


Diagram 10  
Rajah 10

- 11 Diagram 11 shows a right-angled triangle  $PSQ$  and  $PQR$  is a straight line and  $PQ = 15$  cm.

Rajah 11 menunjukkan sebuah segitiga bersudut tegak  $PSQ$  dan  $PQR$  ialah garis lurus dan  $PQ = 15$  cm.

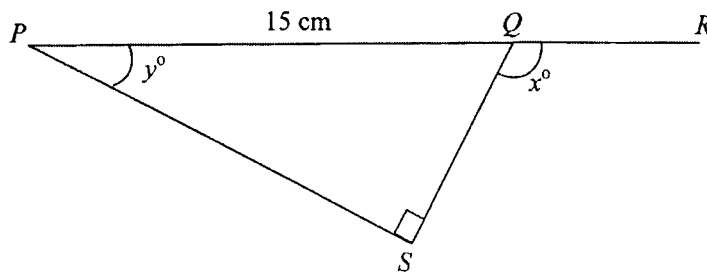


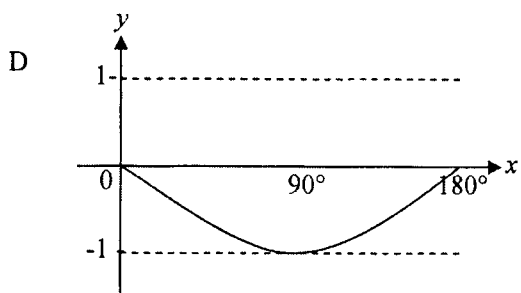
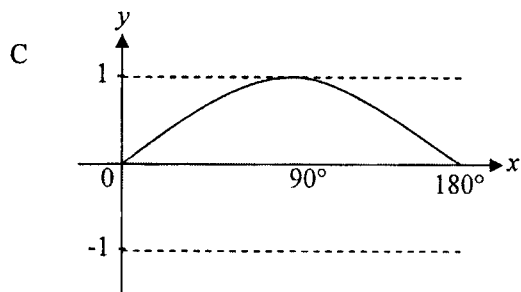
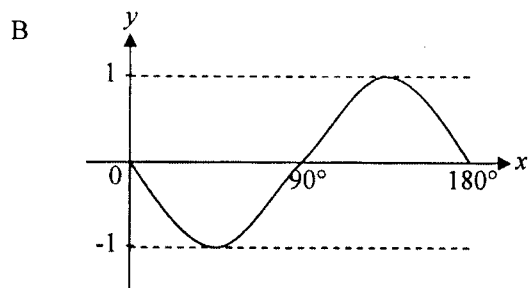
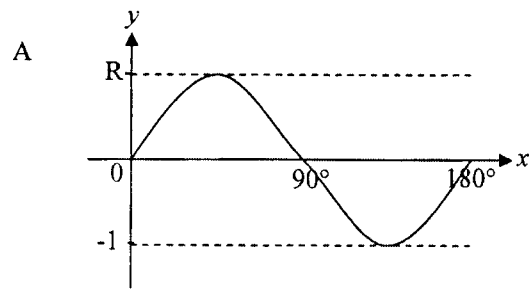
Diagram 11  
Rajah 11

Given that  $\cos x^\circ = -\frac{3}{5}$ , find the value of  $\tan y^\circ$ .

Diberi  $\cos x^\circ = -\frac{3}{5}$ , cari nilai bagi  $\tan y^\circ$ .

- A  $\frac{1}{3}$
- B  $\frac{3}{4}$
- C  $\frac{4}{5}$
- D  $\frac{6}{5}$
- 12  $\tan \theta = -0.5658$  and  $180^\circ \leq \theta \leq 360^\circ$ . Find the value of  $\theta$ .
- $\tan \theta = -0.5658$  dan  $180^\circ \leq \theta \leq 360^\circ$ . Cari nilai  $\theta$ .
- A  $209^\circ 30'$
- B  $240^\circ 30'$
- C  $299^\circ 30'$
- D  $330^\circ 30'$

- 13 Which of the following graphs represents the graph of  $y = \sin x^\circ$  for  $0^\circ \leq x \leq 180^\circ$ .  
*Antara berikut yang manakah mewakili graf  $y = \sin x^\circ$  bagi  $0^\circ \leq x \leq 180^\circ$ .*



- 14 Diagram 14 shows a right prism with the horizontal base  $PQRS$ .  
*Rajah 14 menunjukkan sebuah prisma tegak dengan tapak mengufuk PQRS.*

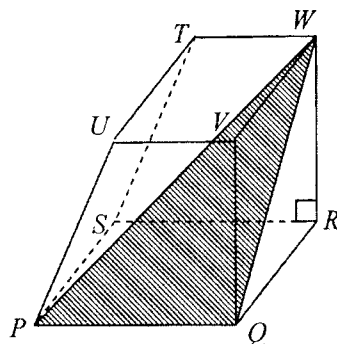


Diagram 14

*Rajah 14*

What is the angle between the plane  $PQW$  and the plane  $RSTW$ ?

*Apakah sudut di antara satah  $PQW$  dengan satah  $RSTW$ ?*

- A  $\angle SWQ$
- B  $\angle PWR$
- C  $\angle TWP$
- D  $\angle RWQ$

- 15 Diagram 15 shows two telecommunication substations on a horizontal plane. Point  $P$  and  $Q$  are the two tips of the substations. The height of the towers are 15 m and 20 m. *Rajah 15 menunjukkan dua buah pencawang telekomunikasi di atas satu permukaan mengufuk. Titik  $P$  dan  $Q$  berada di puncak pencawang tersebut. Tinggi kedua-dua puncak pencawang tersebut ialah 15 m dan 20 m.*

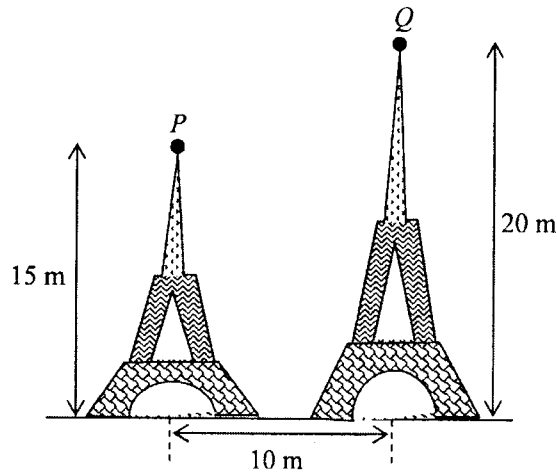


Diagram 15

*Rajah 15*

Calculate the angle of elevation of point  $Q$  from point  $P$ .

*Hitung sudut dongakan titik  $Q$  dari titik  $P$ .*

- A  $26^{\circ} 34'$
- B  $63^{\circ} 26'$
- C  $53^{\circ} 08'$
- D  $36^{\circ} 52'$

- 16 Diagram 16 shows a flag  $RS$ . The points  $P$ ,  $Q$ , and  $R$  lie on a horizontal plane.  
*Rajah 16 menunjukkan sebuah bendera  $RS$ . Titik  $P$ ,  $Q$  and  $R$  terletak di atas satah mengufuk.*

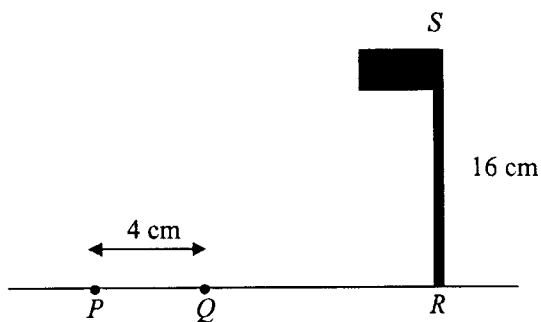


Diagram 16

*Rajah 16*

The angle of depression  $Q$  from  $S$  is  $50^\circ$ .

*Sudut tunduk  $Q$  dari titik  $S$  ialah  $50^\circ$ .*

Calculate the distance  $PR$ .

*Kirakan jarak  $PR$ .*

- A 13.43
- B 17.43
- C 19.07
- D 23.09



- 17 Diagram 17 shows three points  $P$ ,  $Q$ , and  $R$  on a horizontal plane.  
*Rajah 17 menunjukkan tiga titik  $P$ ,  $Q$ , dan  $R$  pada satah mengufuk*

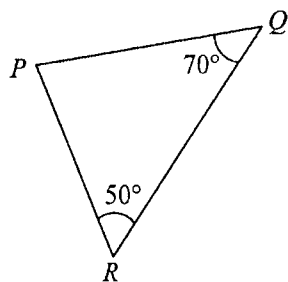


Diagram 17

*Rajah 17*

$P$  is a point due west of  $Q$ . Find the bearing of  $R$  from  $Q$ .

$P$  adalah suatu titik yang terletak ke barat  $Q$ . Cari bearing  $R$  dari  $Q$ .

- A 020°
- B 060°
- C 120°
- D 200°

- 18 In Diagram 18,  $N$  is the North Pole.  $S$  is the South Pole and  $NOS$  is the axis of the earth.

Dalam rajah 18,  $N$  ialah Kutub Utara.  $S$  ialah Kutub Selatan dan  $NOS$  ialah paksi bumi.

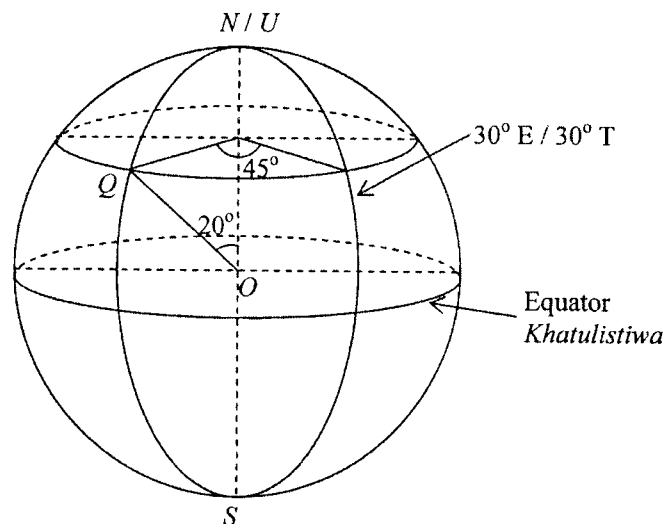


Diagram 18

Rajah 18

Find the position of point  $Q$ .

Cari kedudukan titik  $Q$ .

- A  $(20^\circ N, 15^\circ W)$   
 $(20^\circ U, 15^\circ B)$
- B  $(20^\circ N, 75^\circ W)$   
 $(20^\circ U, 75^\circ B)$
- C  $(70^\circ N, 15^\circ W)$   
 $(70^\circ U, 15^\circ B)$
- D  $(70^\circ N, 75^\circ W)$   
 $(70^\circ U, 75^\circ B)$
- 19  $2(1 + 3x)(2 - 5x) =$
- A  $2 + x - 15x^2$
- B  $4 + 2x - 30x^2$
- C  $8 + 4x - 60x^2$
- D  $10 - 19x - 15x^2$

- 20 Express  $\frac{2(4-r)}{r} - \frac{r+6}{3r}$  as a single fraction in its simplest form.

Ungkapkan  $\frac{2(4-r)}{r} - \frac{r+6}{3r}$  sebagai satu pecahan tunggal dalam sebutan termudah.

A  $\frac{14-2r}{3r}$

B  $\frac{14-3r}{3r}$

C  $\frac{18-7r}{3r}$

D  $\frac{30-7r}{3r}$

- 21 Given that  $\sqrt{\frac{3+r}{r+q}} = s$ , express  $r$  in terms of  $s$  and  $q$ .

Diberi  $\sqrt{\frac{3+r}{r+q}} = s$ , ungkapkan  $r$  dalam sebutan  $s$  dan  $q$ .

A  $r = \frac{s^2q-3}{1-s^2}$

B  $r = \frac{q-3}{1-s^2}$

C  $r = \frac{sq-3}{1-s}$

D  $r = \frac{q-3}{1-s}$

- 22 Given that  $\frac{2m+1}{3} + 1 = 3m$ , calculate the value of  $m$ .

Diberi  $\frac{2m+1}{3} + 1 = 3m$ , hitung nilai  $m$ .

A  $-\frac{2}{3}$

B  $-\frac{4}{3}$

C  $\frac{2}{7}$

D  $\frac{4}{7}$

- 23 Given that  $\sqrt{p^3} = 6^{\frac{q}{r}}$ , find the value of  $p$ ,  $q$ , and  $r$ .

Diberi bahawa  $\sqrt{p^3} = 6^{\frac{q}{r}}$ , cari nilai  $p$ ,  $q$ , dan  $r$ .

A  $p = 6, q = 3, r = 2$

B  $p = 6, q = 2, r = 3$

C  $p = 6, q = 3, r = 1$

D  $p = 6, q = 1, r = 3$

- 24 Simplify  $\frac{(p^3q^{-2})^3}{(pq^2)^{-1}}$

Ringkaskan  $\frac{(p^3q^{-2})^3}{(pq^2)^{-1}}$ .

A  $p^6q^{-9}$

B  $p^7q^2$

C  $p^8q^4$

D  $p^{10}q^{-4}$

- 25 List all the integers that satisfy the inequalities  $5 + 2x \leq 11$  and  $x - 1 \geq -2$ .

Senaraikan semua integer yang memuaskan ketaksamaan  $5 + 2x \leq 11$   
 $x - 1 \geq -2$ .

- A -1, 0, 1, 2, 3
- B -3, -2, -1, 0, 1, 2, 3,
- C -3, -2, -1
- D 1, 2, 3

- 26 Diagram 26 shows the percentage of savings done by Ahmad for the first five month of year 2009.

Rajah 26 menunjukkan peratus simpanan oleh Ahmad bagi lima bulan pertama Mei dalam tahun 2009.

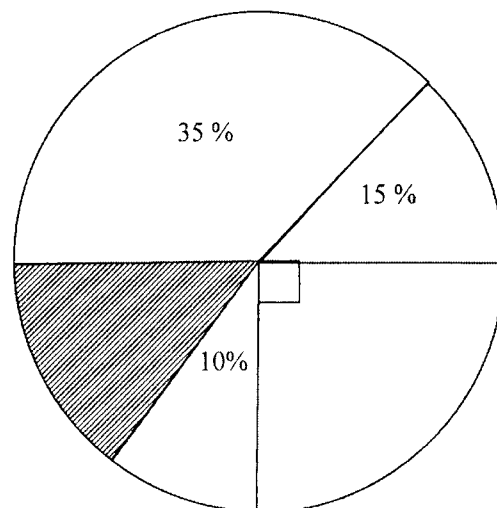


Diagram 26  
Rajah 26

If the total saving for that first five months is RM450, calculate the saving in RM that represents by the shaded sector.

Jika jumlah simpanan bagi lima bulan tersebut ialah RM450, hitung simpanan dalam RM yang diwakili oleh kawasan berlorek.

- A 18.75
- B 37.5
- C 67.5
- D 135

27 Table 27 shows the distribution scores of a group of students in a quiz .

*Jadual 27 menunjukkan taburan skor sekumpulan pelajar dalam satu kuiz.*

Score Skor	0	1	2	3	4	5
Frequency Kekerapan	3	5	10	12	7	3

Table 27

*Rajah 27*

The mean of the score is

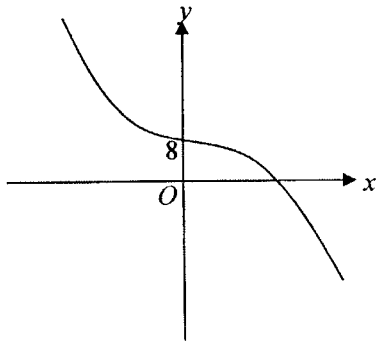
*Min bagi skor ialah*

- A 2.17
- B 2.50
- C 2.60
- D 2.67

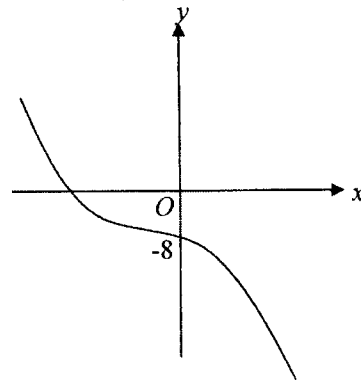
28 Which graph represent  $y = 8 - 5x^3$ ?

Graf manakah yang mewakili  $y = 8 - 5x^3$ ?

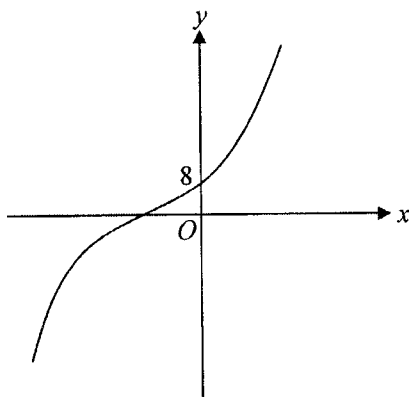
A



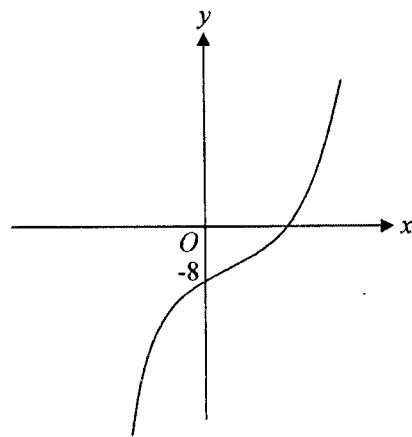
B



C



D



- 29 Venn Diagram in Diagram 29 shows relation between set  $X$ ,  $Y$ , and  $Z$ .

*Gambar rajah Venn dalam Rajah 29 menunjukkan hubungan antara set  $X$ ,  $Y$ , dan  $Z$ .*

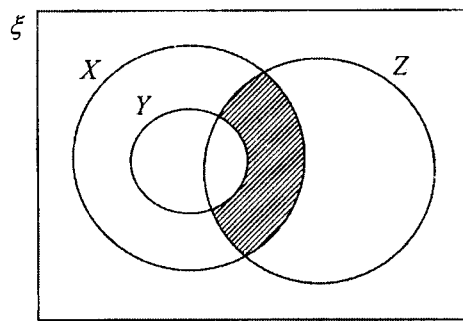


Diagram 29  
Rajah 29

The shaded area represents

*Rantau yang berlorek mewakili*

- A  $X \cap Z \cap Y'$
- B  $X \cap Y \cap Z$
- C  $X \cup Z \cap Y'$
- D  $X \cup Y \cap Z$



- 30 Diagram 30 is a Venn diagram showing the elements of the universal set  $\xi$ , set  $A$  and set  $B$ .

Rajah 30 ialah gambar rajah Venn yang menunjukkan unsur-unsur dalam set semesta  $\xi$ , set  $A$  dan set  $B$ .

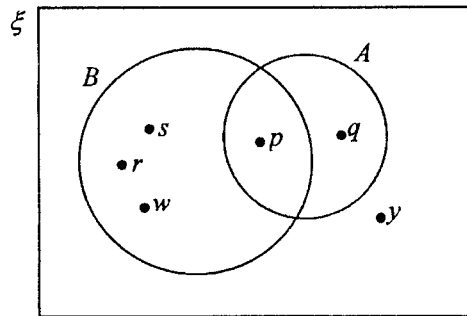


Diagram 30

Rajah 30

List all the elements of set  $A'$

Senaraikan semua unsur bagi set  $A'$

- A  $\{y\}$
- B  $\{s, r, w\}$
- C  $\{s, r, w, y\}$
- D  $\{s, r, w, y, q\}$

- 31 Diagram 31, shows the relation between set  $\xi$ , set  $P$ , and set  $Q$ .

Rajah 31, menunjukkan hubungan di antara set  $\xi$ , set  $P$ , dan set  $Q$ .

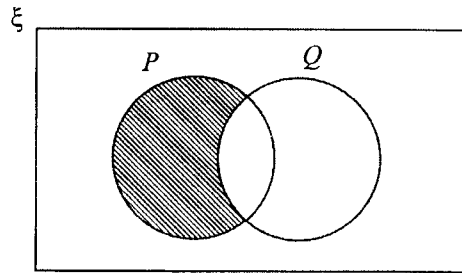


Diagram 31

Rajah 31

Given  $n(\xi) = 33$ ,  $n(P \cap Q) = 4$ ,  $n(Q) = 15$  and  $n(P \cup Q)' = 12$ , calculate the numbers of element in the shaded region.

Diberi  $n(\xi) = 33$ ,  $n(P \cap Q) = 4$ ,  $n(Q) = 15$  dan  $n(P \cup Q)' = 12$ , hitung bilangan elemen dalam kawasan berlorek.

- A 2
- B 6
- C 8
- D 10

- 32 In Diagram 32,  $MN$  is a straight line with gradient  $-\frac{2}{3}$ .

Dalam Rajah 32,  $MN$  ialah garis lurus dengan kecerunan  $-\frac{2}{3}$ .

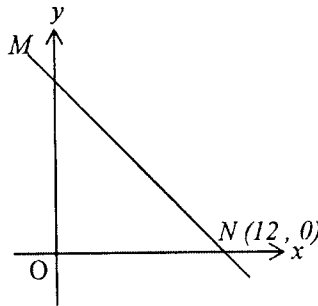


Diagram 32

Rajah 32

Find the  $y$ -intercept of the straight line  $MN$ .

Carikan pintasan- $y$  bagi garis  $MN$ .

- A 8  
B 9  
C 10  
D 18
- 33 Find the value of  $p$  if the line joining the points  $(4, 3)$  and  $(2, p)$  is parallel to the line  $y = 2 - 3x$ .

Cari nilai  $p$  jika garis yang menghubungkan titik  $(4, 3)$  dan  $(2, p)$  adalah selari dengan garis lurus  $y = 2 - 3x$ .

- A -3  
B -1  
C 5  
D 9

- 34 In one recent culture show, each audience is given the chance to pick a ball randomly from a bag contains 4 red balls, 7 green balls, and 9 blue balls. A present is given away to any audience who gets a red ball. The ball is return back into the bag before the next audience do their picking.

*Dalam satu petunjukan kebudayaan baru-baru ini, setiap penonton diberi peluang memilih secara rawak sebiji bola daripada sebuah beg yang berisi dengan 4 bola merah, 7 bola hijau, dan 9 bola biru. Hadiah akan diberi kepada penonton yang mendapat bola merah. Bola yang dipilih itu dipulang semula ke dalam beg sebelum penonton lain membuat pemilihan berikutnya.*

If 240 audiences attended the show, calculate the number of presents that will probably be given away on that day.

*Jika 240 penonton menghadiri pertunjukan tersebut, hitung bilangan hadiah yang mungkin diberi pada hari itu.*

- A 12
- B 48
- C 60
- D 80

- 35 Diagram 19 shows marbles that labelled with  $R$ ,  $S$ , or  $T$ .  
*Rajah 19 menunjukkan guli-guli yang berlabel  $R$ ,  $S$ , atau  $T$ .*

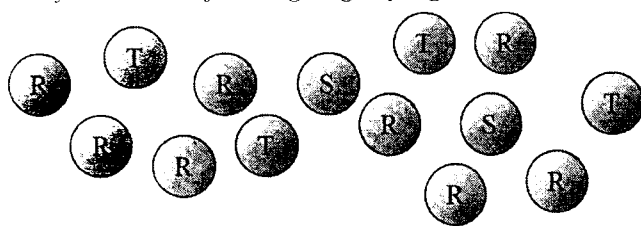


Diagram 35  
*Diagram 35*

A marble is chosen at random.

State the probability that the marbles chosen is **not** labelled with  $R$  or  $T$ .

*Sebiji guli dipilih secara rawak.*

*Nyatakan kebarangkalian bahawa guli yang dipilih itu **bukan** berlabel  $R$  atau  $T$ .*

- A  $\frac{6}{7}$   
B  $\frac{1}{7}$   
C  $\frac{1}{6}$   
D  $\frac{1}{2}$

- 36 Table 36 shows the values for variables  $x$  and  $y$ .

*Jadual 36 menunjukkan nilai-nilai bagi pembolehubah  $x$  dan  $y$ .*

$x$	4	6
$y$	48	$p$

Table 36  
*Jadual 36*

Given that  $y$  varies directly as  $x^2$ . Calculate the value of  $p$ .

*Diberi bahawa  $y$  berubah secara langsung dengan  $x^2$ . Hitung nilai  $p$ .*

- A 36
- B 72
- C 108
- D 216

- 37 Given  $m$  varies directly as  $n$  and varies inversely as square root of  $p$  when  $n = 8$ ,  $p = 4$  and  $m = 2$ , find the relation between  $m$ ,  $n$ , and  $p$ .

*Diberi  $m$  berubah secara langsung dengan  $n$  dan secara songsang dengan punca kuasa dua  $p$  apabila  $n = 8$ ,  $p = 4$ , dan  $m = 2$ , cari hubungan antara  $m$ ,  $n$ , dan  $p$ .*

- A  $m = \frac{n\sqrt{p}}{8}$
- B  $m = \frac{n}{2\sqrt{p}}$
- C  $m = \frac{1}{64}np^2$
- D  $m = \frac{4n}{p^2}$

- 38 Table 38 shows the relation between variables  $W$ ,  $R$ , and  $T$ . Given that  $W \propto RT$ . Calculate the value of  $x$ .

*Jadual 38 menunjukkan hubungan di antara pembolehubah  $W$ ,  $R$ , dan  $T$ . Diberi bahawa  $W \propto RT$ . Hitungkan nilai  $x$ .*

$W$	9	15
$R$	2	5
$T$	3	$x$

Table 38  
*Jadual 38*

- A  $\frac{9}{2}$
- B  $\frac{2}{9}$
- C 3
- D 2
- 39  $(3 \ 2 \ -5) \begin{pmatrix} 5 \\ 4 \\ -1 \end{pmatrix} =$
- A  $(15 \ 8 \ 5)$
- B  $\begin{pmatrix} 15 \\ 8 \\ 5 \end{pmatrix}$
- C  $(28)$
- D  $(18)$

40 Given the matrix equation  $\begin{pmatrix} p \\ 7 \\ -4 \end{pmatrix} + \begin{pmatrix} 8 \\ 3 \\ q \end{pmatrix} = \begin{pmatrix} 10 \\ r \\ 3 \end{pmatrix}$ , find the value of  $p - q + r$ .

Diberi persamaan matriks  $\begin{pmatrix} p \\ 7 \\ -4 \end{pmatrix} + \begin{pmatrix} 8 \\ 3 \\ q \end{pmatrix} = \begin{pmatrix} 10 \\ r \\ 3 \end{pmatrix}$ , carikan nilai  $p - q + r$ .

- A     - 1
- B     5
- C     11
- D     15

**END OF QUESTION PAPER**  
***KERTAS SOALAN TAMAT***



**SULIT**

1449/1

1449/1  
Mathematics  
Paper 1  
Ogos/Sept 2009



**JABATAN PELAJARAN NEGERI JOHOR**

**PEPERIKSAAN PERCUBAAN SPM TAHUN 2009**

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## **SKEMA PEMARKAHAN**

**MATHEMATICS**

**Paper 1**

One hour and fifteen minutes

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Answers For Paper 1(Mathematics SPM Julang 2009)

No	Answer
1	C
2	B
3	C
4	B
5	D
6	B
7	C
8	C
9	D
10	A
11	B
12	D
13	C
14	D
15	A
16	B
17	D
18	C
19	B
20	D
21	A
22	C
23	A
24	D
25	A
26	C
27	C
28	A
29	A
30	C
31	B
32	A
33	D
34	B
35	B
36	C
37	B
38	D
39	C
40	B

1449/2  
Mathematics  
Paper 2  
September 2009  
2½ jam

Nama:.....

Tingkatan: .....,



JABATAN PELAJARAN NEGERI JOHOR

PEPERIKSAAN PERCUBAAN SPM 2009

MATHEMATICS

Paper 2

Two hours and thirty minutes

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. Tuliskan **nama** dan **tingkatan** pada ruang 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 Melayu atau bahasa Inggeris.
5. Calon dikehendaki membaca arahan di halaman 2.

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

Kertas soalan ini mengandungi 29 halaman bercetak

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 any **four** questions on **Section B**.  
*Jawab **semua** soalan dalam **Bahagian A** dan mana-mana **empat** soalan daripada **Bahagian B**.*
3. Write your answers clearly in the spaces provided in the question paper.  
*Tulis jawapan anda dengan jelas pada ruang yang disediakan dalam kertas soalan.*
4. Show your working. It may help you to get marks.  
*Tunjukkan 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.  
*Sekiranya 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 dilukiskan 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 ceraian soalan ditunjukkan dalam kurungan.*
8. A list of formulae is provided.  
*Satu senarai rumus disediakan.*
9. A booklet of four-figure mathematical tables is provided.  
*Sebuah buku sifir matematik empat angka disediakan.*
10. You may use a non-programmable scientific calculator.  
*Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram.*
11. This questions paper must be handed in at the end of the examination.  
*Kertas soalan ini hendaklah diserahkan pada akhir peperiksaan.*

**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)**

- |   |  |
|---|--|
| <p>1 <math>a^m \times a^n = a^{m+n}</math></p> <p>2 <math>a^m \div a^n = a^{m-n}</math></p> <p>3 <math>(a^m)^n = a^{m \cdot n}</math></p> <p>4 <math>A^{-1} = \frac{1}{ad-bc} \begin{pmatrix} d &amp; -b \\ -c &amp; a \end{pmatrix}</math></p> <p>5 <math>P(A) = \frac{n(A)}{n(S)}</math></p> <p>6 <math>P(A') = 1 - P(A)</math></p> <p>7 Distance = <math>\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}</math><br/><i>Jarak</i></p> <p>8 Midpoint, <math>(x, y) = \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)</math><br/><i>Titik tengah</i></p> <p>9 Average speed = <math>\frac{\text{distance travelled}}{\text{time taken}}</math><br/><br/><i>Purata laju = <math>\frac{\text{jarak yang dilalui}}{\text{masa yang diambil}}</math></i></p> <p>10 Mean = <math>\frac{\text{sum of data}}{\text{number of data}}</math><br/><br/><i>Min = <math>\frac{\text{hasil tambah nilai data}}{\text{bilangan data}}</math></i><br/><br/><i>Mean = <math>\frac{\text{sum of (midpoint of class interval} \times \text{frequency)}}{\text{sum of frequencies}}</math></i><br/><br/><i>Min = <math>\frac{\text{hasil tambah (nilai titik tengah selang kelas} \times \text{kekerapan)}}{\text{hasil tambah kekerapan}}</math></i></p> | <p>12 Pythagoras Theorem <math>c^2 = a^2 + b^2</math><br/><i>Teorem Pithagoras</i></p> <p>13 <math>m = \frac{y_2 - y_1}{x_2 - x_1}</math></p> <p>14 <math>m = -\left( \frac{y - \text{intercept}}{x - \text{intercept}} \right)</math><br/><br/><math>m = -\left( \frac{\text{pintasan} - y}{\text{pintasan} - x} \right)</math></p> |
|---|--|

SHAPE 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*      =       $\pi d = 2\pi r$
  
- 3      Area of circle      =       $\pi r^2$   
       *Luas bulatan*      =       $\pi r^2$
  
- 4      Curved surface area of cylinder      =       $2\pi rh$   
       *Luas permukaan melengkung silinder*      =       $2\pi rt$
  
- 5      Surface area of sphere      =       $4\pi r^2$   
       *Luas permukaan sfera* =       $4\pi r^2$
  
- 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*      =       $\pi r^2 t$
  
- 8      Volume of cone      =       $\frac{1}{3} \pi r^2 h$   
  
       *Isipadu kon*      =       $\frac{1}{3} \pi r^2 t$
  
- 9      Volume of sphere      =       $\frac{4}{3} \pi r^3$   
  
       *Isipadu sfera*      =       $\frac{4}{3} \pi r^3$
  
- 10     Volume of right pyramid      =       $\frac{1}{3} \times \text{base area} \times \text{height}$   
  
       *Isipadu pyramid 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*

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

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

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

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

$$14 \quad \begin{array}{ll} \text{Scale factor,} & k = \frac{PA'}{PA} \\ \text{Faktor skala,} & k = \frac{PA'}{PA} \end{array}$$

$$15 \quad \begin{array}{ll} \text{Area of image} = k^2 \times \text{area of object} \\ \text{Luas imej} = k^2 \times \text{luas objek} \end{array}$$

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

[52 marks]

[52 markah]

Answer **all** questions in this section.

Jawab **semua** soalan dalam bahagian ini.

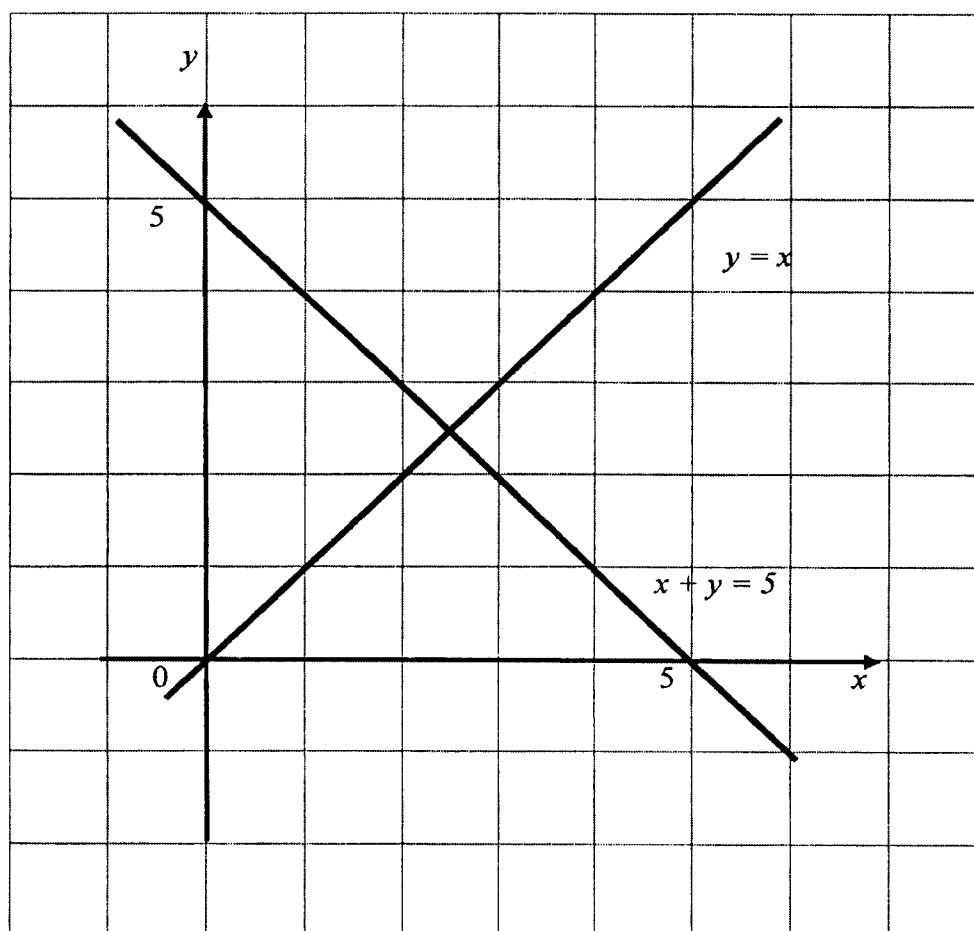
- 1 On the graph in the answer space, shade the region which satisfies the three inequalities  $x + y \geq 5$ ,  $y \leq x$  and  $x < 4$ .

Pada graf di ruang jawapan, lorekan rantau yang memuaskan ketiga-tiga ketaksamaan  $x + y \geq 5$ ,  $y \leq x$  dan  $x < 4$ .

[3 marks]

[3 markah]

Answer / Jawapan





- 2 Calculate the value of  $x$  and of  $y$  that satisfy the following simultaneous linear equations:

*Carikan nilai  $x$  dan nilai  $y$  yang memuaskan persamaan linear serentak berikut:*

$$4x + 3y = 11$$

$$3x - y = 5$$

[4 marks]

[4 markah]

Answer / Jawapan:

- 
- 3 Solve the following quadratic equation:

*Selesaikan persamaan kuadratik:*

$$4x^2 - 9x - 13 = 2(x - 5)$$

[4 marks]

[4 markah]

Answer / Jawapan:

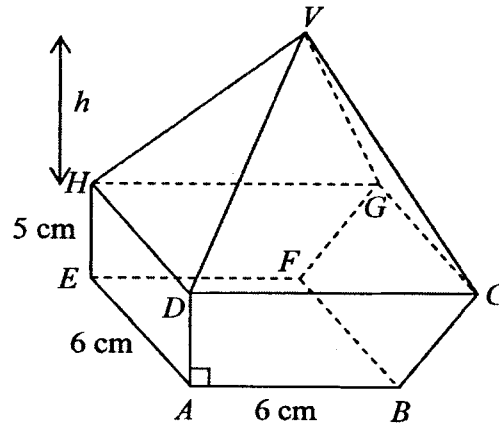


Diagram 4  
Rajah 4

Diagram 4 shows a combined solid consist of a right prism and a right pyramid, which are joined at the plane  $DCGH$ .  $V$  is vertically above the base  $DCGH$ . Trapezium  $ABCD$  is the uniform cross section of the prism.  $DC = 8$  cm.

Rajah 4 menunjukkan gabungan sebuah pepejal yang terdiri daripada sebuah prisma tegak dan sebuah piramid tegak yang tercantum pada satah  $DCGH$ .  $V$  berada tegak di atas tapak  $DCGH$ . Trapezium  $ABCD$  ialah keratan rentas seragam prisma itu.  $DC = 8$  cm.

Given the volume of the combined solid is  $322 \text{ cm}^3$ . Calculate the height,  $h$ , in cm, of the pyramid.

Diberi isipadu gabungan pepejal itu ialah  $322 \text{ cm}^3$ . Hitung tinggi,  $h$ , dalam cm, bagi piramid itu.

[4 marks]

[4 markah]

Answer / Jawapan:

- 5 (a) Complete the following statement using the quantifier “all” or “some” to make it a true statement.

*Lengkapkan pernyataan berikut dengan menggunakan pengkuantiti “semua” atau “sebilangan” untuk membentuk suatu pernyataan benar.*

..... elements in  $\{1, 2, 6, 9\}$  are even numbers.  
 ..... unsur dalam  $\{1, 2, 6, 9\}$  adalah nombor genap.

- (b) Write down Premise 2 to complete the following argument :

*Tulis Premis 2 untuk melengkapkan hujah berikut:*

Premise 1: All regular polygons have equal sides.

*Premis 1 : Semua poligon sekata mempunyai sisi yang sama.*

Premise 2: .....

*Premis 2: .....*

Conclusion: Triangle  $ABC$  has an equal sides.

*Kesimpulan : Segitiga  $ABC$  mempunyai sisi yang sama.*

- (c) It is given that the number of subsets which has  $n$  elements is  $2^n$ . Write down one conclusion by deduction on set  $A = \{a, e, i, o, u\}$ .

*Diberi bilangan subset untuk suatu set yang mempunyai bilangan unsur  $n$  ialah  $2^n$ . Tulis satu kesimpulan secara deduksi, bilangan subset untuk set  $A = \{a, e, i, o, u\}$ .*

[5 marks]

[5 markah]

Answer/Jawapan :

(a) .....

(b) Premise 2: .....

(c) .....

- 6 Diagram 6 shows a straight line  $PS$  and a straight line  $QR$  drawn on a Cartesian plane. The straight line  $PS$  is parallel to the straight line  $QR$ .  $Q$  lies on  $x$ -axis.

*Rajah 6 menunjukkan garis lurus  $PS$  dan garis lurus  $QR$  dilukis pada suatu satah Cartesian. Garis lurus  $PS$  selari dengan garis lurus  $QR$ .  $Q$  terletak pada paksi- $x$ .*

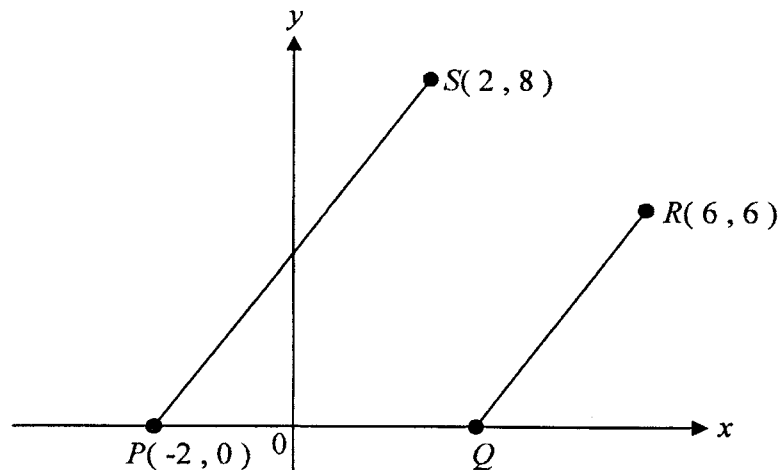


Diagram 6

*Rajah 6*

Find,

*Cari,*

- (a) the equation of the straight line  $QR$ ,

*persamaan bagi garis lurus  $QR$ ,*

- (b) the coordinates of  $Q$ .

*koordinat bagi  $Q$ .*

[5 marks]

[5 markah]

Answer / Jawapan:

(a)

(b)

- 7 Diagram 7 shows a rectangle  $ABCD$ . Point  $D$  and point  $B$  are the centre of quadrants and sector of circle with radius 7 cm and 14 cm respectively. Given that  $AE = 8$  cm and  $CG = 12$  cm.

*Rajah 7 menunjukkan segiempat  $ABCD$ . Titik  $D$  dan  $B$  adalah pusat bagi sukuan dan sektor bulatan dengan jejari 7 cm and 14 cm masing-masing. Diberi bahawa  $AE = 8$  cm and  $CG = 12$  cm.*

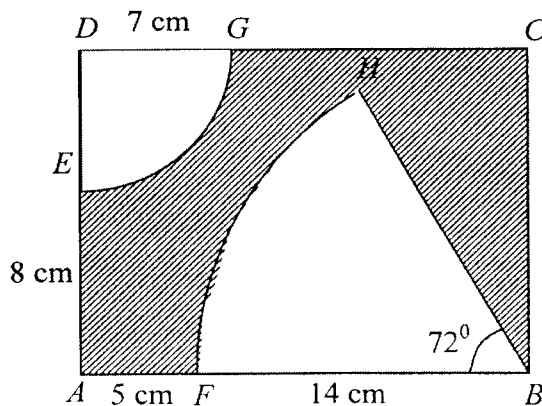


Diagram 7  
Rajah 7

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

Guna  $\pi = \frac{22}{7}$ , kira,

- (a) the perimeter, in cm, of the shaded region.

*perimeter, dalam cm, kawasan berlorek.*

- (b) the area, in  $\text{cm}^2$ , of the shaded region.

*luas, dalam  $\text{cm}^2$ , kawasan berlorek.*

[6 marks]  
[6 markah]

For  
examiner's  
use

**SULIT**

**12**

Answer/Jawapan:

7 (a)

(b)

- 8 (a)  $m \begin{pmatrix} 3 & n \\ -2 & 5 \end{pmatrix}$  is the inverse matrix of  $\begin{pmatrix} 5 & -1 \\ 2 & 3 \end{pmatrix}$ . Find the value of  $m$  and value of  $n$ .

*Diberi bahawa matriks  $m \begin{pmatrix} 3 & n \\ -2 & 5 \end{pmatrix}$  ialah matriks songsang bagi  $\begin{pmatrix} 5 & -1 \\ 2 & 3 \end{pmatrix}$ .*

*Cari nilai  $m$  dan nilai  $n$ .*

- (b) Write the following simultaneous linear equations as matrix equation:

*Tulis persamaan linear serentak berikut dalam bentuk persamaan matriks:*

$$5x - y = 30$$

$$2x + 3y = -5$$

Hence, using matrix method, calculate the value of  $x$  and of  $y$ .

*Seterusnya, menggunakan kaedah matriks, hitung nilai  $x$  dan nilai  $y$ .*

[6 marks]

[6 markah]

Answer / Jawapan :

(a)

(b)

- 9 Diagram 9 shows the speed-time graph for the movement of a particle for a period of 16 seconds.

Rajah 9 menunjukkan graf laju-masa bagi pergerakan satu zarah dalam tempoh 16 saat.

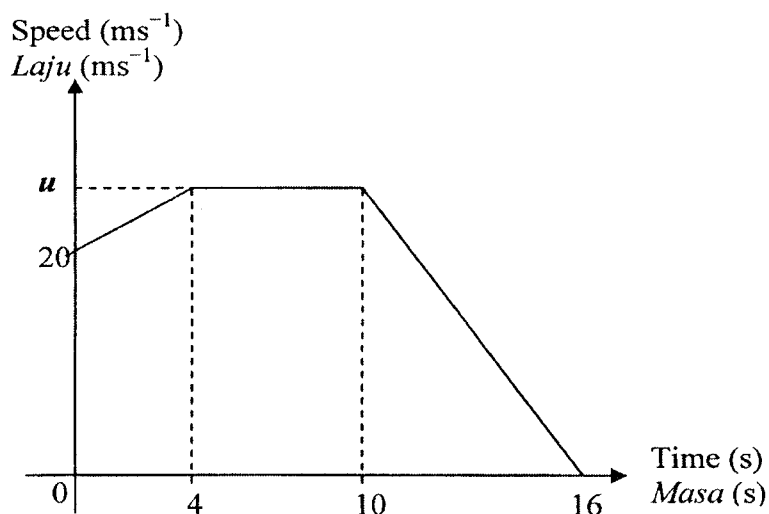


Diagram 9  
Rajah 9

- (a) State the length of time, in s, that the particle moves with uniform speed.  
*Nyatakan tempoh masa, dalam s, zarah itu bergerak dengan laju seragam.*
- (b) If the total distance travelled by the particle in the last 6 seconds is 90 m, find the value of  $u$ .  
*Jika jumlah jarak yang dilalui oleh zarah dalam 6 saat terakhir ialah 90 m, cari nilai bagi  $u$ .*
- (c) Calculate the average speed of the particle, in  $\text{ms}^{-1}$ , for the period of 16 seconds.  
*Hitungkan purata laju, dalam  $\text{ms}^{-1}$ , zarah itu dalam tempoh 16 saat.*

[6 marks]  
[6 markah]

Answer / Jawapan :

(a)

(b)

(c)



- 10 Diagram 10 shows four cards labelled with letters in box *M* and three numbered cards in box *N*.

*Rajah 10, menunjukkan empat kad berlabel dengan huruf di dalam kotak M dan tiga kad berlabel nombor di dalam kotak N.*

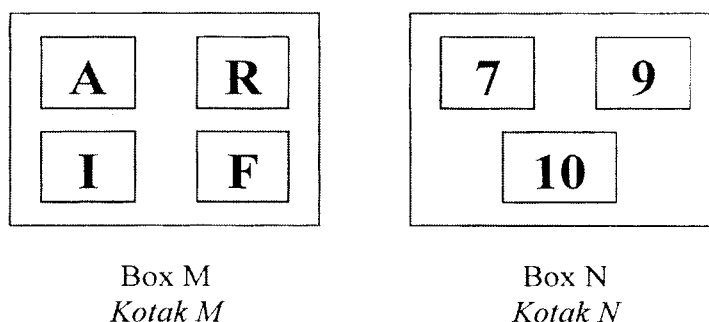


Diagram 10  
*Rajah 10*

A card is picked at random from box *M* and then a card is picked at random from box *N*.

*Satu kad dipilih secara rawak daripada kotak M dan kemudian satu kad dipilih secara rawak daripada kotak N.*

By listing the sample of all the possible outcomes of the event, find the probability that

*Dengan menyenaraikan sampel bagi semua kesudahan peristiwa yang mungkin, cari kebarangkalian*

- (a) a card with a vowel **and** a card with a two-digit numbers are picked,  
*satu kad huruf vokal **dan** satu kad nombor dua digit dipilih,*
- (b) a card with a consonant **or** a card with an odd number are picked.  
*satu kad huruf konsonan **atau** satu kad nombor ganjil dipilih.*

[5 marks]  
[5 markah]

Answer / Jawapan :

(a)

(b)

11

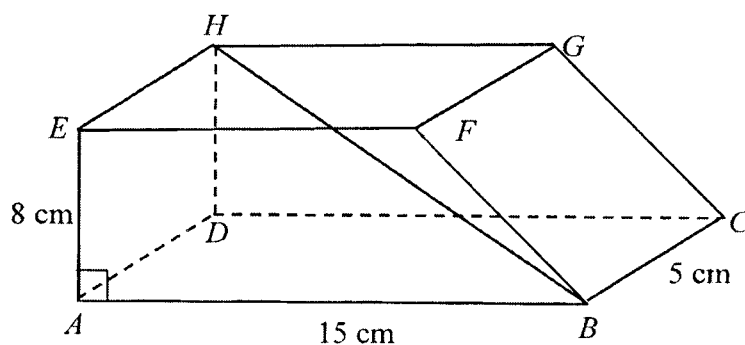


Diagram 11  
Rajah 11

Diagram 11, shows a right prism. Trapezium  $ABFE$  is the uniform cross section of the prism.  $ABCD$  is the horizontal base of the right prism.  $AE = 8$  cm,  $AB = 15$  cm, and  $BC = 5$  cm.

Rajah 11 menunjukkan sebuah prisma tegak. Trapezium  $ABFE$  ialah keratan rentas seragam prisma itu.  $ABCD$  adalah tapak mengufuk bagi prisma itu.  $AE = 8$  cm,  $AB = 15$  cm, dan  $BC = 5$  cm.

Identify and calculate the angle between the line  $HB$  and the plane  $ABFE$ .  
Kenalpasti dan hitung sudut di antara garis  $HB$  dengan satah  $ABFE$ .

[4 marks]

[4 markah]

Answer / Jawapan :

**Section B**  
**Bahagian B**

[48 marks]

[48 markah]

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

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

- 12** (a) Complete Table 12 in the answer space for the equation  $y = 2 + 7x - x^2$  by writing down the values of  $y$  when  $x = -1$  and  $x = 3$ . [2 marks]  
*Lengkapkan Jadual 12 di ruang jawapan bagi persamaan  $y = 2 + 7x - x^2$  dengan menulis nilai-nilai  $y$  apabila  $x = -1$  dan  $x = 3$ . [2 markah]*
- (b) For this part of the question, use the graph paper provided on page 19. You may use a flexible curve rule.  
*Untuk ceraihan soalan ini, gunakan kertas graf yang disediakan pada halaman 19. Anda boleh menggunakan pembaris boleh lentur.*
- Using a scale of 2 cm to 1 unit on the  $x$ -axis and 2 cm to 2 units on the  $y$ -axis, draw the graph of  $y = 2 + 7x - x^2$  for  $-1 \leq x \leq 7$ . [4 marks]  
*Menggunakan skala 2 cm kepada 1 unit pada paksi- $x$  dan 2 cm kepada 2 unit pada paksi- $y$ , lukis graf  $y = 2 + 7x - x^2$  untuk  $-1 \leq x \leq 7$ . [4 markah]*
- (c) From your graph in **12(b)**, find  
*Dari graf di 12(b), cari*
- (i) the value of  $y$  when  $x = 2.5$ ,  
*nilai  $y$  apabila  $x = 2.5$ ,*
- (ii) the value of  $x$  when  $y = -4$ .  
*Nilai  $x$  apabila  $y = -4$ .*
- [2 marks]  
[2 markah]
- (d) Draw a suitable straight line on the graph in **12(b)** to find the values of  $x$  which satisfy the equation  $2 = 6x - x^2$  for  $-1 \leq x \leq 7$ .  
 State these values of  $x$ . [4 marks]  
*Lukis satu garis lurus yang sesuai pada graf 12(b) untuk mencari nilai-nilai  $x$  yang memuaskan persamaan  $2 = 6x - x^2$  bagi  $-1 \leq x \leq 7$ .  
 Nyatakan nilai-nilai  $x$  itu. [4 markah]*

Answer / Jawapan:

12  
(a)

$x$	-1	0	1	2	3	4	5	6	7
$y$		2	8	12		14	12	8	2

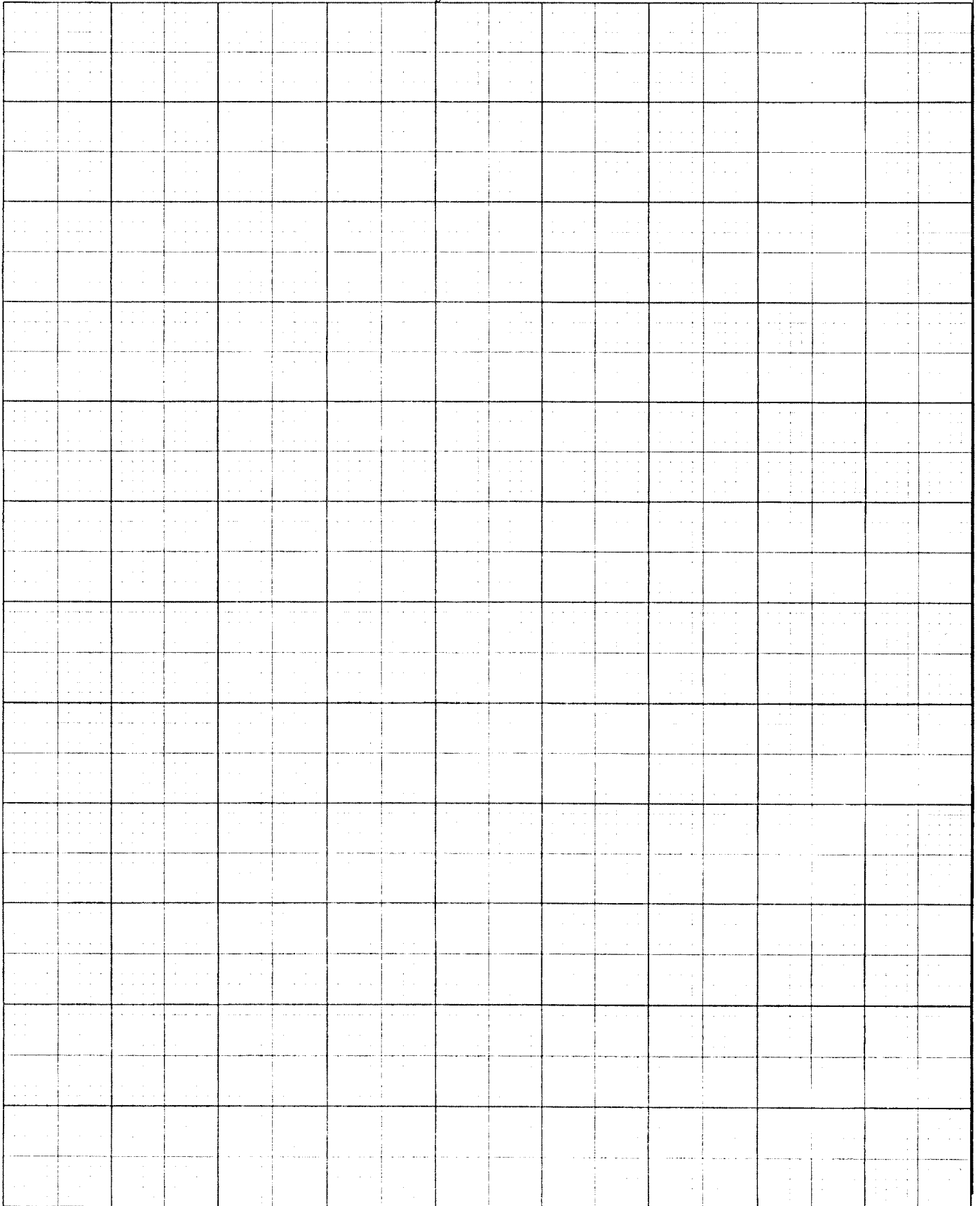
Table 12  
*Jadual 12*

- (b) Refer graph on page 19.  
*Rujuk graf di halaman 19.*
- (c) (i)  $y =$  \_\_\_\_\_  
(ii)  $x =$  \_\_\_\_\_
- (d)  $x =$  \_\_\_\_\_ , \_\_\_\_\_

Graph for Question 12  
*Graf untuk soalan 12*

← 2 cm →

For  
examiner  
use



- 13 (a) Transformation **M** is a translation  $\begin{pmatrix} 5 \\ 2 \end{pmatrix}$ .

Transformation **N** is a reflection in the line  $y = 3$ .

Penjelmaan **M** ialah translasi  $\begin{pmatrix} 5 \\ 2 \end{pmatrix}$ .

Penjelmaan **N** ialah pantulan pada garis lurus  $y = 3$ .

Find the coordinates of the image of point  $(-3, 1)$  under the following combined transformations:

Cari koordinat imej bagi titik  $(-3, 1)$  di bawah gabungan penjelmaan berikut:

(i)  $\mathbf{M}^2$

[4 marks]

(ii)  $\mathbf{MN}$

[4 markah]

- (b) Diagram 13 shows three triangle,  $ABC$ ,  $PQR$  and  $PTS$ , drawn on a Cartesian plane.

Rajah 13 menunjukkan tiga segitiga  $ABC$ ,  $PQR$  dan  $PTS$ , dilukis pada suatu satah Cartesian.

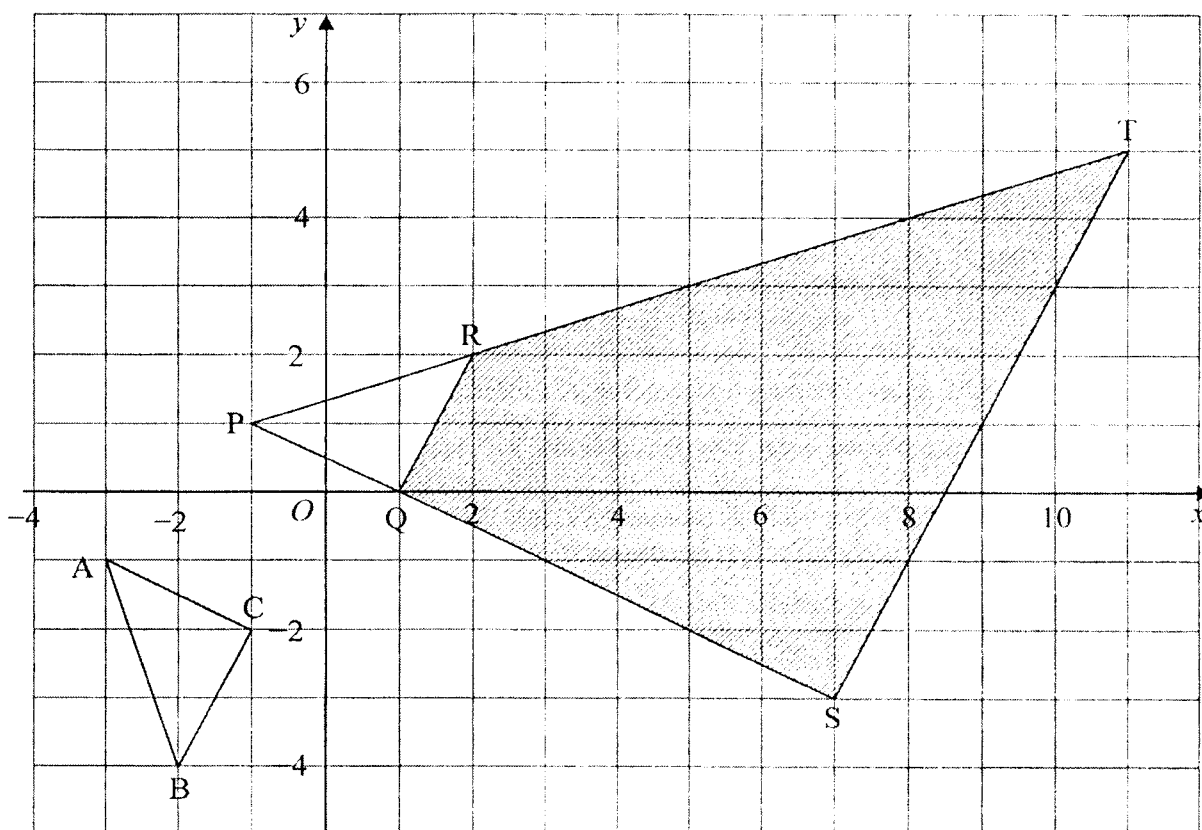


Diagram 13  
Rajah 13

- (i) *TPS* is the image of *ABC* under a combined transformation *VW*.  
*TPS ialah imej bagi ABC di bawah gabungan penjelmaan VW.*  
 Describe in full transformation  
*Huraikan selengkapnya penjelmaan*
- (a) **W**,
- (b) **V**.
- (ii) It is given that the area of the shaded region is  $165 \text{ cm}^2$ .  
 Calculate the area, in  $\text{cm}^2$ , of triangle *PQR*.  
*Diberi bahawa luas kawasan yang berlorek ialah  $165 \text{ cm}^2$ .*  
*Hitung luas, dalam  $\text{cm}^2$ , segitiga *PQR*.*

[8 marks]

[8 markah]

Answer / Jawapan :

13 (a) (i)

(ii)

(b) (i) (a)

(i) (b)

(ii)

- 14 Table 14(a) shows the frequency distribution of the age, in years, of 40 visitors at a book exhibition.

*Jadual 14(a) menunjukkan taburan umur, dalam tahun, bagi 40 pelawat ke satu pameran buku.*

Age (Years) <i>Umur ( Tahun )</i>	Frequency <i>Kekerapan</i>
5 – 9	0
10 – 14	1
15 – 19	3
20 – 24	6
25 – 29	10
30 – 34	11
35 – 39	7
40 – 44	2

Table 14(a)  
*Jadual 14(a)*

- (a) Calculate the estimated mean of the age of the visitors. [5 marks]  
*Hitung min anggaran umur bagi pelawat-pelawat itu. [5 markah]*
- (b) Based on Table 14(a), complete Table 14(b) in the answer space to show the cumulative frequency distribution of the massess. [1 marks]  
*Berdasarkan Jadual 14(a), lengkapkan Jadual 14(b) pada ruang jawapan untuk menunjukkan kekerapan longgokan jisim itu. [1 markah]*
- (c) For this part of the question, use the graph paper on page 24.  
*Untuk ceraiian soalan ini, guna kertas graf yang disediakan pada halaman 24.*  
  
By using the scale of 2 cm to 5 years on the horizontal axis and 2 cm to 5 visitors on the vertical axis, draw an ogive for the data. [4 marks]  
*Dengan menggunakan skala 2 cm kepada 5 tahun pada paksi mengufuk dan 2 cm kepada 5 pelawat pada paksi mencancang, lukis satu ogif bagi data tersebut. [4 markah]*
- (d) Based on your ogive, find the total number of the visitors whose age are more than 33 years old. [2 marks]  
*Berdasarkan daripada ogif anda, cari bilangan pelawat yang berumur melebihi 33 tahun. [2 markah]*



Answer / Jawapan:

14 (a) Mean =  
Min

(b)

Upper Boundary <i>Sempadan atas</i>	Cumulative frequency <i>Kekerapan Longgokan</i>
9.5	
14.5	

Table 14(b)  
*Jadual 14(b)*

(c) Refer to graph graph on page 24.  
*Rujuk graf pada muka surat 24.*

(d) Age = \_\_\_\_\_  
*Umur*

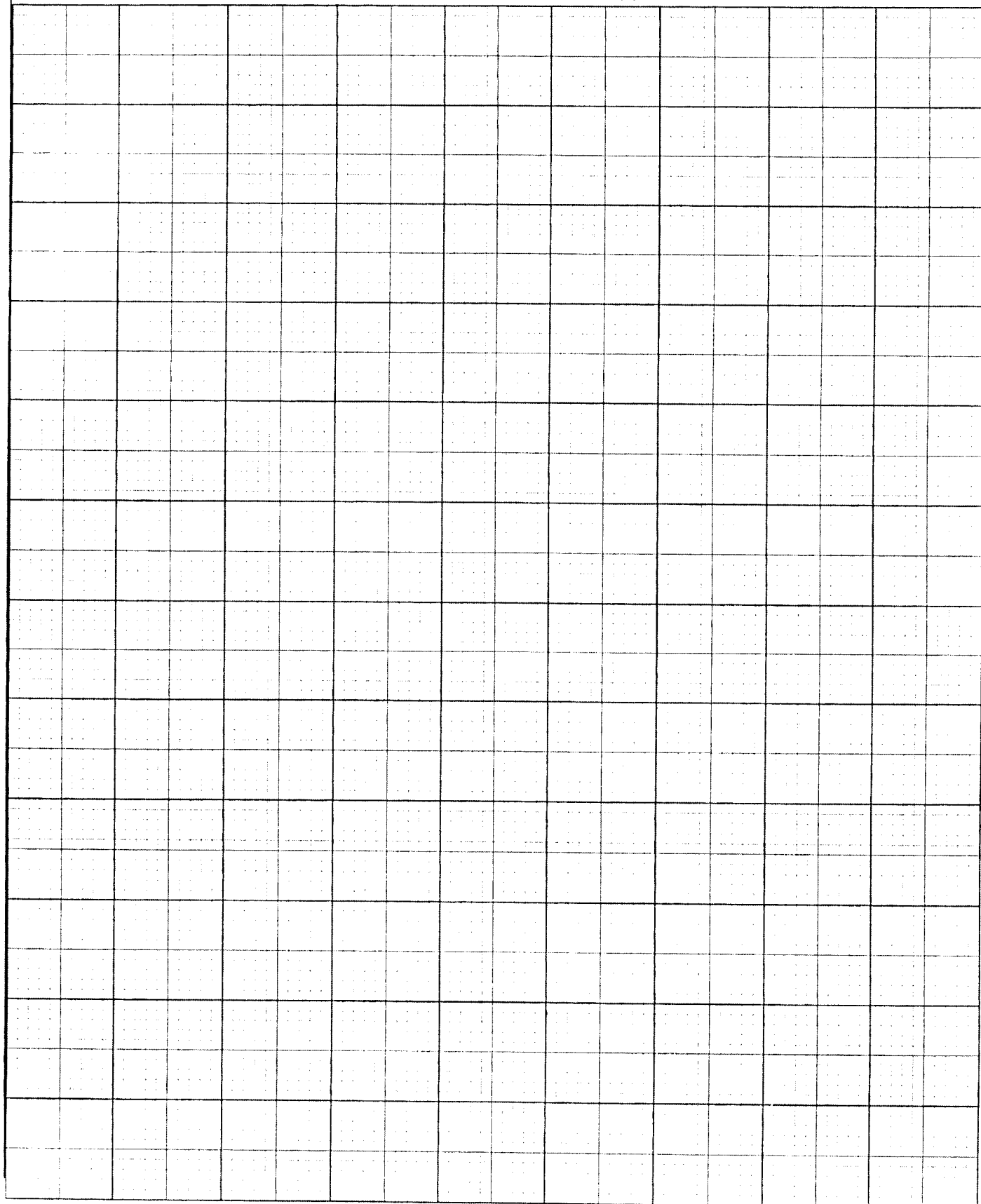
For  
examiner's  
use

**SULIT**

**24**

**Graph for Question 14(c)**  
**Graf untuk Soalan 14 (c)**

← 2 cm →



1449/2

**SULIT**

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

- (a) Diagram 15(i) shows a solid right prism with a rectangular base  $ABCD$  on a horizontal plane. Rectangle  $ADEF$  is an inclined plane and the rectangle  $GHJK$  is a horizontal plane. The edges  $CJ$ ,  $BK$ ,  $FG$  and  $EH$  are verticals.  $AB = DC = 6$  cm,  $BK = CJ = 6$  cm,  $EH = FG = 2$  cm,  $JK = HG = EF = DA = CB = 4$  cm and  $HJ = GK = 3$  cm.

Rajah 15(i) menunjukkan sebuah pepejal berbentuk prisma tegak dengan tapak segi empat tepat  $ABCD$  terletak di atas satah mengufuk. Segiempat tepat  $ADEF$  ialah satah condong dan segi empat tepat  $GHJK$  ialah satah mengufuk. Tepi  $CJ$ ,  $BK$ ,  $FG$  and  $EH$  adalah tegak.  $AB = DC = 6$  cm,  $BK = CJ = 6$  cm,  $EH = FG = 2$  cm,  $JK = HG = EF = DA = CB = 4$  cm and  $HJ = GK = 3$  cm.

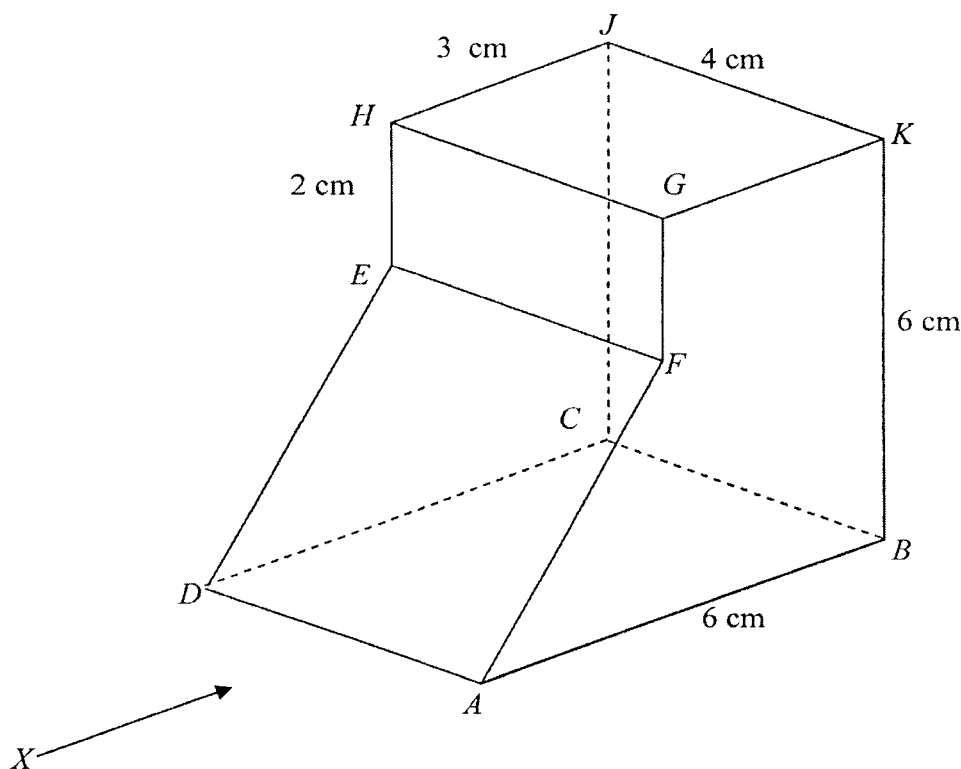


Diagram 15 (i)  
Rajah 15 (i)

Draw to full scale, the elevation of the solid on a vertical plane parallel to  $DA$  as viewed from  $X$ . [3 marks]  
Lukis dengan skala penuh, dongakan pepejal itu pada satah mencancang yang selari dengan  $DA$  sebagaimana dilihat dari  $X$ . [3 markah]

- (b) A half-cylinder is cut and removed from the solid in Diagram 15(i). The remaining solid is shown in Diagram 15(ii). Semi-circle  $LQM$  and  $PRN$  is the uniform cross-section of the half-cylinder. The radius of the semi circle is 2 cm.  $AL = MB = DP = NC = 1$  cm.

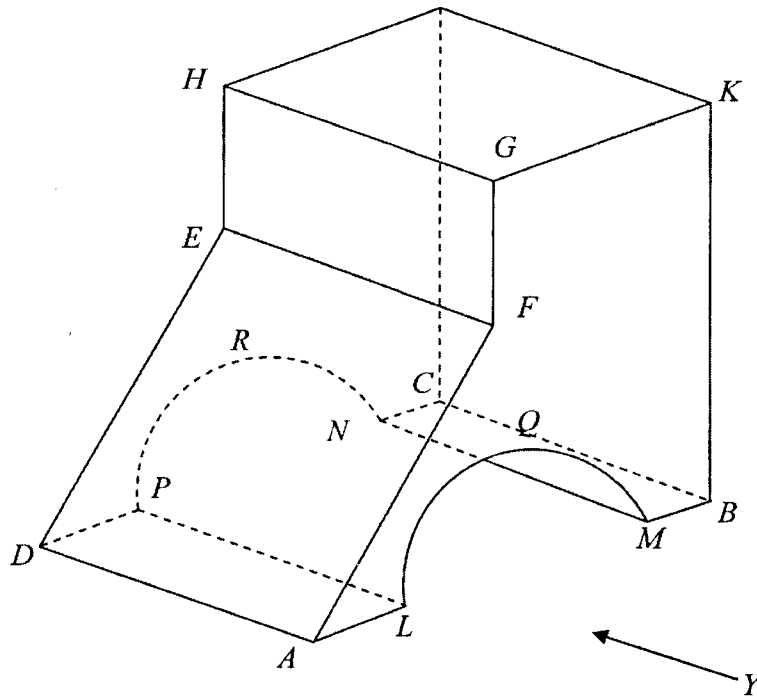


Diagram 15 (ii)  
Diagram 15 (ii)

Draw to full scale,  
*Lukis dengan skala penuh,*

- (i) the elevation of the remaining solid on a vertical plane parallel to  $AB$  as viewed from  $Y$ . [4 marks]  
*dongakan pepejal yang tinggal itu pada satah mencancang yang selari dengan  $AB$  sebagaimana dilihat dari  $Y$ .* [4 markah]
- (ii) the plan of the remaining solid. [5 marks]  
*pelan pepejal yang tinggal itu.* [5 markah]

Answer / *Jawapan* :

15 (a)

(b) (i)

(ii)

- 16  $G(35^\circ N, 70^\circ E)$ ,  $H$  and  $J$  are three points on the surface of the earth.  $GJ$  is the diameter of the earth.  $GH$  is the diameter of the parallel of latitude  $35^\circ N$ .

$G(35^\circ U, 70^\circ T)$ ,  $H$ , dan  $J$  adalah tiga titik di atas permukaan bumi.  $GJ$  adalah diameter bumi.  $GH$  adalah diameter selarian latitud  $35^\circ U$ .

- (a) State the longitude of  $J$ . [2 marks]  
*Nyatakan longitud bagi  $J$ .* [2 markah]

- (b) Calculate the shortest distance, in nautical miles, from  $G$  to  $H$  measured along the surface of the earth. [3marks]  
*Hitung jarak terdekat, dalam batu nautika, dari  $G$  ke  $H$  diukur sepanjang permukaan bumi.* [3 markah]

- (c) An aeroplane took off from  $G$  and flew due west to  $H$  along the common parallel of latitude and then flew due south to  $J$ .  
*Sebuah kapal terbang berlepas dari  $G$  dan terbang ke arah barat ke  $H$  sepanjang selarian latitud sepunya dan kemudian terbang ke arah selatan ke  $J$ .*

Calculate

*Kira*

- (i) the distance, in nautical miles, from  $G$  to  $H$  measured along the common parallel of latitude.  
*jarak, dalam batu nautika, dari  $G$  ke  $H$  diukur sepanjang selarian latitud sepunya.*

- (ii) the time taken for the whole flight if the average speed of the whole flight is 710 knots.  
*masa yang diambil, untuk keseluruhan penerbangan jika purata laju keseluruhan penerbangan ialah 710 knot .*

[7 marks]

[7 markah]

*Answer / Jawapan:*

16 (a)

(b)

(c) (i)

(ii)

**END OF QUESTION PAPER**  
***KERTAS SOALAN TAMAT***

SULIT

1449/2

1449/2  
Mathematics  
Paper 2  
September 2009



JABATAN PELAJARAN NEGERI JOHOR

PEPERIKSAAN PERCUBAAN SPM TAHUN 2009

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## SKEMA PEMARKAHAN

MATHEMATICS

Paper 2

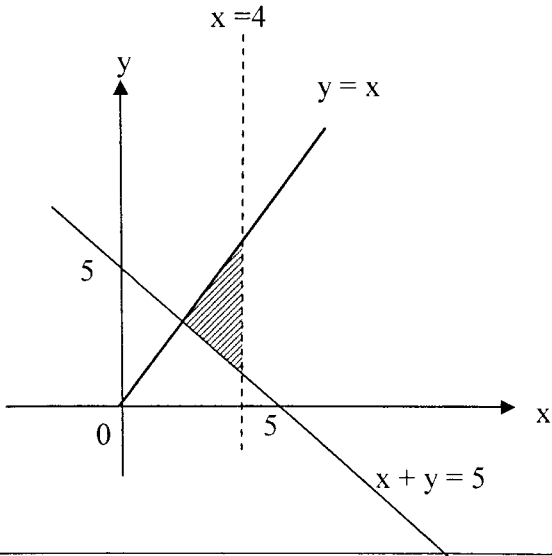
Two hours and thirty minutes

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1449/2

SULIT



No	Answers	Marks
1		<p>P1 ( for line <math>x = 4</math> dotted/solid line)</p> <p>P2 (area shaded and <math>x = 4</math> must be dotted line) Note : Award P1 for <math>x = 4</math> solid line.</p>
	Subtotal	3
2	$9x - 3y = 15$ or $y = 3x - 5$ or equivalent $13x = 26$ or equivalent $x = 2$ $y = 1$	<p>K1</p> <p>K1</p> <p>N1</p> <p>N1</p>
	Subtotal	4
3	$4x^2 - 11x - 3 = 0$ $(4x + 1)(x - 3) = 0$ $x = -\frac{1}{4}, x = 3$	<p>K1</p> <p>K1</p> <p>N1 N1</p>
	Subtotal	4
4	$\frac{1}{2} \times (6 + 8) \times 5 \times 6$ $\frac{1}{3} \times 6 \times 8 \times h$ $\frac{1}{2} \times (6 + 8) \times 5 \times 6 + \frac{1}{3} \times 6 \times 8 \times h = 322$ $h = 7$	<p>K1</p> <p>K1</p> <p>K1</p> <p>N1</p>
	Subtotal	4

5	(a)	Some	P1
	(b)	Premise 2 : Triangle ABC is a regular polygon.	P2
	(c)	$2^5$ 32 ( note : without working award K1N1)	K1 N1
		Subtotal	5
6	(a)	$m_{PS} = m_{QR} = \frac{8-0}{2-(-2)} = 2$  $6 = 2(6) + c$ or equivalent  $y = 2x - 6$	K1  K1 N1
	(b)	$0 = 2x - 6$ or equivalent ( 3 , 0 )	K1 N1
		Subtotal	5
7	(a)	$\frac{1}{4} \times 2 \times \frac{22}{7} \times 7$ or $\frac{72}{360} \times 2 \times \frac{22}{7} \times 14$  $\frac{1}{4} \times 2 \times \frac{22}{7} \times 7 + \frac{72}{360} \times 2 \times \frac{22}{7} \times 14 + 14 + 15 + 12 + 8 + 5$  $\frac{413}{5}$ or $82\frac{3}{5}$ or 82.6 cm.	K1  K1 N1
	(b)	$\frac{1}{4} \times \frac{22}{7} \times 7^2$ or $\frac{72}{360} \times \frac{22}{7} \times 14^2$ or $19 \times 15$  $19 \times 15 - \frac{1}{4} \times \frac{22}{7} \times 7^2 - \frac{72}{360} \times \frac{22}{7} \times 14^2$  $\frac{1233}{10}$ or $123\frac{3}{10}$ or 123.3 cm <sup>2</sup>	K1 K1 N1
		Subtotal	6

8	(a)	$m = \frac{1}{17}$ $n = 1$	P1 P1
	(b)	$\begin{pmatrix} 5 & -1 \\ 2 & 3 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 30 \\ -5 \end{pmatrix}$	P1
		$\begin{pmatrix} x \\ y \end{pmatrix} = \frac{1}{5(3) - (-1)(2)} \begin{pmatrix} 3 & 1 \\ -2 & 5 \end{pmatrix} \begin{pmatrix} 30 \\ -5 \end{pmatrix}$	K1
		$x = 5$ $y = -5$	N1 N1
		Subtotal	6
9	(a)	6 s	P1
	(b)	$\frac{1}{2} \times u \times 6 = 90$	K1
		$u = 30$	N1
	(c)	$\frac{\frac{1}{2}(20 + 30)4 + (6 \times 30) + 90}{16}$	K2
		$23\frac{1}{8}$ or 23.125	N1
		Subtotal	6
10		Listing $S = \{ (A,7), (A,9), (A,10)$ $(R,7), (R,9), (R,10)$ $(I,7), (I,9), (I,10)$ $(F,7), (F,9), (F,10) \}$	P1
	(a)	$\{(A,10), (I,10)\}$	K1
		$\frac{2}{12}$ or $\frac{1}{6}$	N1
	(b)	$\{(A,7), (A,9), (R,7), (R,9), (I,7), (I,9), (F,7), (F,9),$ $(R,10), (F,10)\}$	K1
		$\frac{10}{12}$ or $\frac{5}{6}$	N1
		Subtotal	5

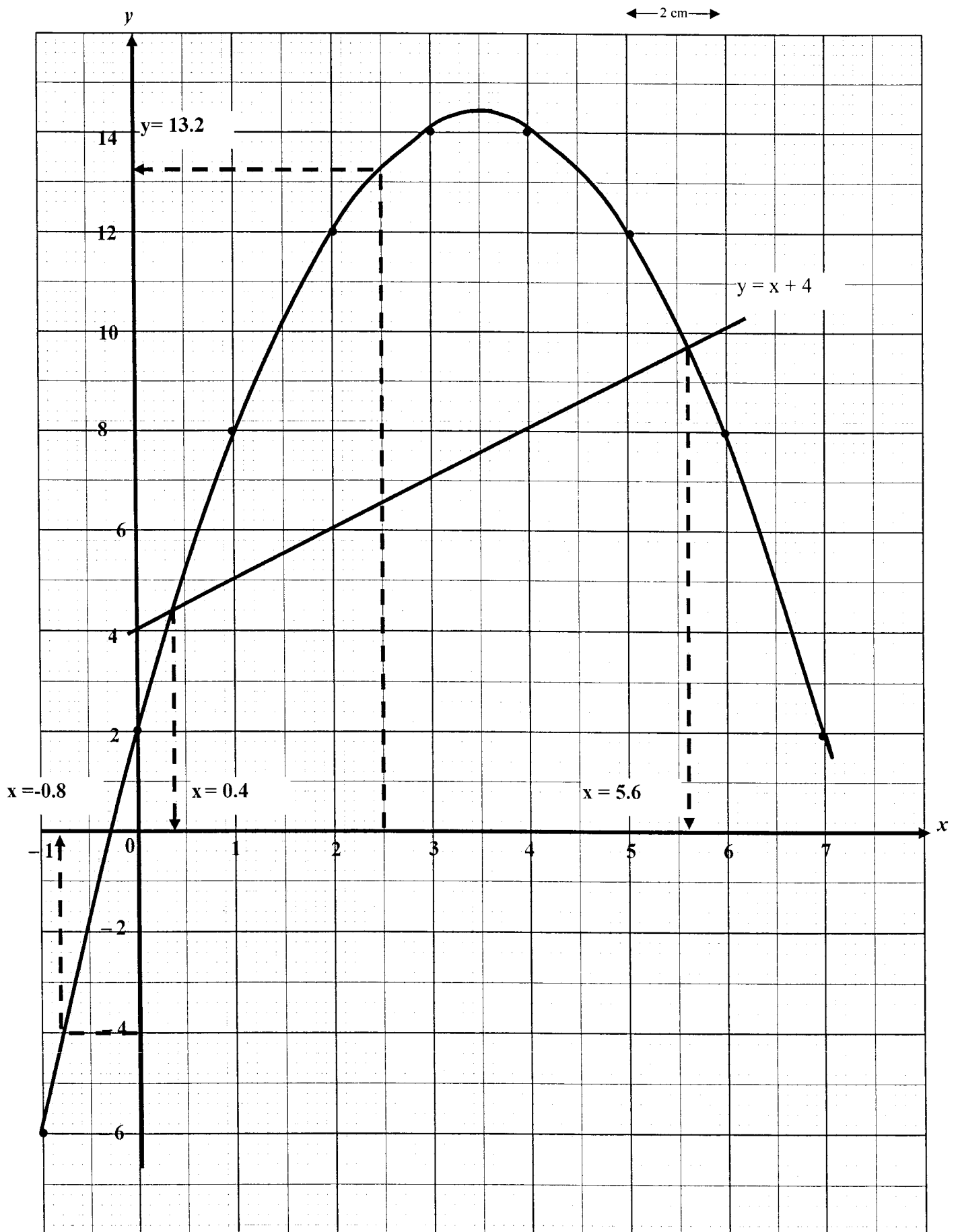
11		$\angle HBE$  $BE = 17 \text{ cm}$ $\tan \angle HBE = \frac{5}{17}$ $\angle 16.39^\circ \text{ or } 16^\circ 23'$	P1  P1 K1  N1				
		Subtotal	4				
12	(a)	<table border="1"><tr><td>-1</td><td>3</td></tr><tr><td>-6</td><td>14</td></tr></table>	-1	3	-6	14	K1K1
-1	3						
-6	14						
	b)	<u>Graph ( Refer to the graph )</u> The axes drawn in the right direction with a uniform scale for $-1 \leq x \leq 7$ 7 points and *2 points plotted correctly or the curve passes through the 9 points in the range of $-1 \leq x \leq 7$ Note: If 7 points are plotted correctly, award K1 If 6 points or less are plotted correctly, award K0 Smooth and continuous curve that passes through all the 8 points correctly without any straight segment in the range of $-1 \leq x \leq 7$ , Ignore that are out of the range.	K1  K2  N1				
	(c)	(i) $y = 13.2 \pm 0.2$ (ii) $x = -0.8 \pm 0.1$	N1 N1				
	(d)	$y = x + 4$ The straight line $y = x + 4$ drawn correctly. ( Judgment : straight line that's passes 2 points marks correctly ) Values of $x = 0.4 \pm 0.1$ $x = 5.6 \pm 0.1$	K1 K1  N1 N1				
		Subtotal	12				
13	(a)	i) ( 7, 5 ) Note : ( 2 , 3 ) get P1 ii) ( 2, 7 ) Note : ( -3 , 5 ) get P1	P2  P2				
	(b)	i) W – Rotation $90^\circ$ clockwise about ( 1 , - 2 ) ( Note : (i) Rotation $90^\circ$ clockwise / Rotation about ( 1 , - 2 ) award P2) (ii) Rotation Award P1. V – Enlargement at centre ( -1,1) with scale factor 4 (Note : (i) Enlargement at centre ( -1,1) or Enlargement with scale factor 4 award P2) (ii) Enlargement award P1 ii) $4^2 \times PQR - PQR = 165$ Area of PQR = 11 unitt <sup>2</sup>	P3  P3  K1 N1				
		Subtotal	12				

14	(a)	<table><tr><th>Upper Boundary <i>Sempadan Atas</i></th><th>Cumulative Frequency <i>Kekerapan Longgokan</i></th></tr><tr><td>9.5</td><td>0</td></tr><tr><td>14.5</td><td>1</td></tr><tr><td>19.5</td><td>4</td></tr><tr><td>24.5</td><td>10</td></tr><tr><td>29.5</td><td>20</td></tr><tr><td>34.5</td><td>31</td></tr><tr><td>39.5</td><td>38</td></tr><tr><td>44.5</td><td>40</td></tr></table>	Upper Boundary <i>Sempadan Atas</i>	Cumulative Frequency <i>Kekerapan Longgokan</i>	9.5	0	14.5	1	19.5	4	24.5	10	29.5	20	34.5	31	39.5	38	44.5	40	
Upper Boundary <i>Sempadan Atas</i>	Cumulative Frequency <i>Kekerapan Longgokan</i>																				
9.5	0																				
14.5	1																				
19.5	4																				
24.5	10																				
29.5	20																				
34.5	31																				
39.5	38																				
44.5	40																				
		<p>Table 14 <i>Jadual 14</i></p> <p>Upper Boundary Cumulative frequency</p> <p>Mean Age = <math display="block">\frac{(12)(1) + (17)(3) + (22)(6) + (27)(10) + (32)(11) + (37)(7) + (42)(2)}{40}</math></p> <p>29</p> <p>Ogive ( <i>Refer to the graph</i> ) Correct labeling of the horizontal axis. All points correctly plotted. Point is plotted correctly and the ogive passes through it. Smooth curve that passes through all the points Note: If 6 points are plotted correctly, entitle K1 If 5 points or less are plotted correctly, assign K0</p> <p><math display="block">\frac{40 - 28}{12}</math></p>	P1 P2  K2  N1  K1 K2 N1  K1 N1																		
		Subtotal	12																		

15	(a)		<p>K1 Correct shape</p> <p>K1 DH=AG&gt;DA=H G &gt; EH=FG N1 Accurate measurement ( ± 0.2 cm)</p>
	(b)		<p>K1 Correct shape * Accept sketching of semi circle</p> <p>K1 BK&gt;GK&gt;FG&gt;AL=MB * Accept only drawing of semi circle</p> <p>N2 ( Accurate measurement)</p>
	(c)		<p>K1 (correct shape ) Ignore dotted line LP and MN</p> <p>K1 ( Both Dotted line LP and MN)</p> <p>K1 DJ&gt;AK&gt;AD=GH=KJ &gt; AG=GK =DH=HJ N2(Accurate measurement)</p>
		Sub total	12

16	(a)	110°W	P1P1
	(b)	180 – 35 – 35 110 × 60 6600 n.m	K1 K1 N1
	(c)	(i) $180 \times 60 \times \cos 35^\circ$ 8846.84 n.m	K1 K1 N1
		(ii) $70 \times 60$ $\frac{70 \times 60 + 8846.84}{710}$	P1 K2
		18.38 hours or 18H 23 Min.	N1
		Subtotal	12

Q 12 (b),(c) and (d)





Q 14 (b) & (d)

