

**MAJLIS PENGETUA SEKOLAH MENENGAH  
NEGERI KEDAH DARUL AMAN.**

**PROGRAM PENINGKATAN PRESTASI SPM 2011  
MATHEMATICS**

1449/1

Kertas 1

Ogos 2011

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

Satu jam lima belas minit

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**JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU**

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

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Kertas soalan ini mengandungi **32** halaman bercetak .

**RUMUS MATEMATIK**  
**MATHEMATICAL FORMULAE**

Rumus-rumus berikut boleh membantu anda untuk menjawab soalan. Simbol-simbol yang diberi adalah biasa digunakan.

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

**PERKAITAN**  
**RELATIONS**

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

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

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

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

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

10. Teorem Pithagoras  
*Pythagoras Theorem*  
 $c^2 = a^2 + b^2$

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

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

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

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

**BENTUK DAN RUANG**  
**SHAPES AND SPACE**

1. Luas trapezium =  $\frac{1}{2} \times$  hasil tambah dua sisi selari  $\times$  tinggi  
*Area of trapezium =  $\frac{1}{2} \times$  sum of parallel sides  $\times$  height*
2. Lilitan bulatan =  $\pi d = 2\pi r$   
*Circumference of circle =  $\pi d = 2\pi r$*
3. Luas bulatan =  $\pi r^2$   
*Area of circle =  $\pi r^2$*
4. Luas permukaan melengkung silinder =  $2\pi r h$   
*Curved surface area of cylinder =  $2\pi r h$*
5. Luas permukaan sfera =  $4\pi r^2$   
*Surface area of sphere =  $4\pi r^2$*
6. Isipadu prisma tegak = luas keratan rentas  $\times$  panjang  
*Volume of right prism = cross sectional area  $\times$  length*
7. Isipadu silinder =  $\pi r^2 h$   
*Volume of cylinder =  $\pi r^2 h$*
8. Isipadu kon =  $\frac{1}{3} \pi r^2 h$   
*Volume of cone =  $\frac{1}{3} \pi r^2 h$*
9. Isipadu sfera =  $\frac{4}{3} \pi r^3$   
*Volume of sphere =  $\frac{4}{3} \pi r^3$*
10. Isipadu piramid tegak =  $\frac{1}{3} \times$  luas tapak  $\times$  tinggi  
*Volume of right pyramid =  $\frac{1}{3} \times$  base area  $\times$  height*
11. Hasil tambah sudut pedalaman poligon =  $(n - 2) \times 180^\circ$   
*Sum of interior angles of a polygon =  $(n - 2) \times 180^\circ$*
12.  $\frac{\text{panjang lengkung}}{\text{lilitan bulatan}} = \frac{\text{sudut pusat}}{360^\circ}$   

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

**[Lihat halaman sebelah**  
**SULIT**

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

- 1 Bundarkan 3156 betul kepada tiga angka bererti.  
*Round off 3156 correct to three significant figures.*
- A 315  
B 316  
C 3150  
D 3160
- 2 Diberi bahawa  $12\,000\,000 = m \times 10^n$ , dengan keadaan  $m \times 10^n$  adalah nombor dalam bentuk piawai.  
Nyatakan nilai  $m$  dan nilai  $n$ .  
*Given that  $12\,000\,000 = m \times 10^n$ , where  $m \times 10^n$  is a number in standard form.  
State the value of  $m$  and of  $n$ .*
- A  $m = 12, n = -7$   
B  $m = 12, n = 7$   
C  $m = 12, n = -6$   
D  $m = 12, n = 6$
- 3  $0.0048 - 3 \times 10^{-4} =$
- A  $4.5 \times 10^{-4}$   
B  $1.8 \times 10^{-4}$   
C  $4.5 \times 10^{-3}$   
D  $1.8 \times 10^{-3}$

[Lihat halaman sebelah

- 4 Jisim bagi sebatang konkrit ialah  $3 \times 10^2 \times 10^3$  kg. Jisim, dalam g, bagi 40 batang konkrit yang serupa ialah

*The mass of a concrete bar is  $3 \times 10^2 \times 10^3$  kg. The mass, in g, of 40 concrete bar are*

- A  $1 \times 10^8 \times 10^3$   
 B  $1 \times 10^8 \times 10^5$   
 C  $1 \times 10^8 \times 10^6$   
 D  $1 \times 10^8 \times 10^8$
- 5 Ungkapkan  $8(5 + 8^2)$  sebagai nombor dalam asas lapan.  
*Express  $8(5 + 8^2)$  as a number in base eight.*

- A  $1010_8$   
 B  $1050_8$   
 C  $5010_8$   
 D  $5050_8$

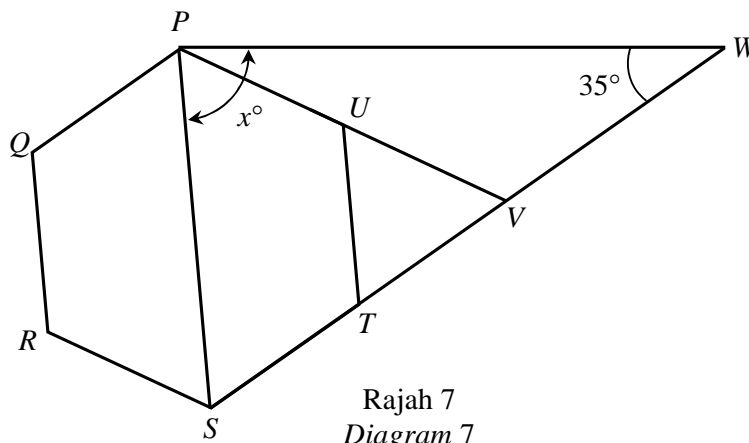
- 6 Diberi  $b_2 + 101_2 = 10110_2$ , maka  $b =$

*Given that  $b_2 + 101_2 = 10110_2$ , then  $b =$*

- A 10001  
 B 10011  
 C 11001  
 D 11011

- 7 Dalam Rajah 7,  $PQRSTU$  ialah sebuah heksagon sekata.  $PUV$  dan  $STVW$  adalah garis lurus.

*In Diagram 7,  $PQRSTU$  is a regular hexagon.  $PUV$  and  $STVW$  are straight lines.*



Cari nilai  $x$ .

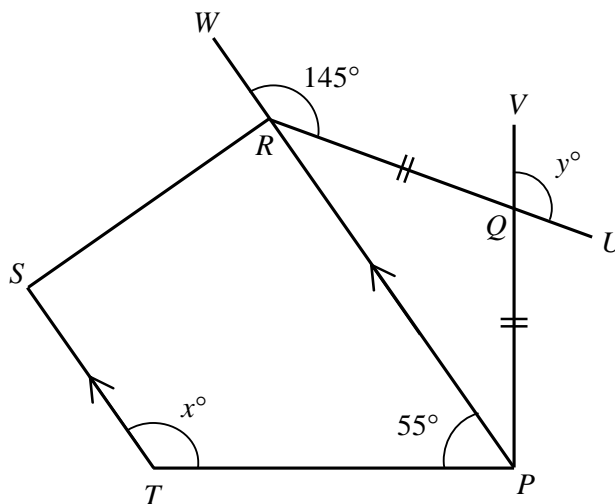
*Find the value of  $x$ .*

- A 70
- B 85
- C 90
- D 95

[Lihat halaman sebelah

- 8 Dalam Rajah 8,  $PQR$  ialah sebuah segi tiga sama kaki.  $PQV$ ,  $PRW$  dan  $UQR$  adalah garis lurus.  $PRW$  selari dengan  $TS$ .

*In Diagram 8,  $PQR$  is an isosceles triangle.  $PQV$ ,  $PRW$  and  $UQR$  are straight lines.  $PRW$  is parallel to  $TS$ .*



Rajah 8  
Diagram 8

Hitung nilai  $x + y$ .

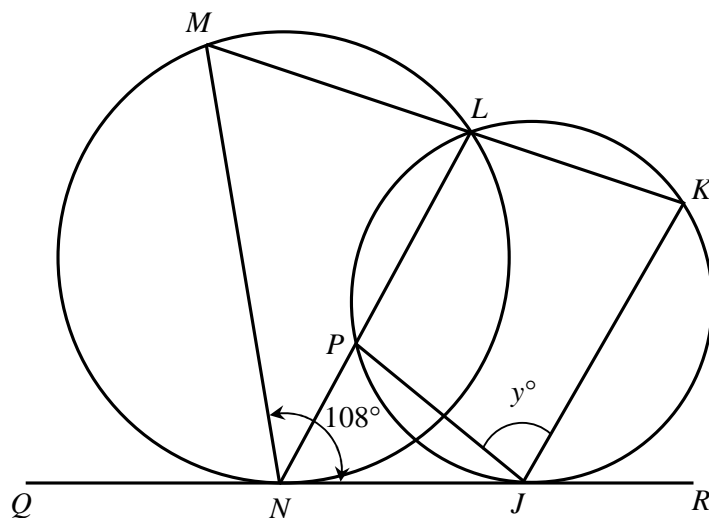
*Calculate the value of  $x + y$ .*

- A 165
- B 195
- C 235
- D 255



- 9 Rajah 9 menunjukkan dua buah bulatan.  $QNJR$  ialah tangen sepunya kepada kedua-dua bulatan itu di titik  $N$  dan titik  $J$ .  $KLM$  dan  $LPN$  ialah garis lurus.

*Diagram 9 shows two circles.  $QNJR$  is a common tangent to the circles at point  $N$  and point  $J$ .  $KLM$  and  $LPN$  are straight lines.*



Rajah 9  
Diagram 9

Cari nilai  $y$ .

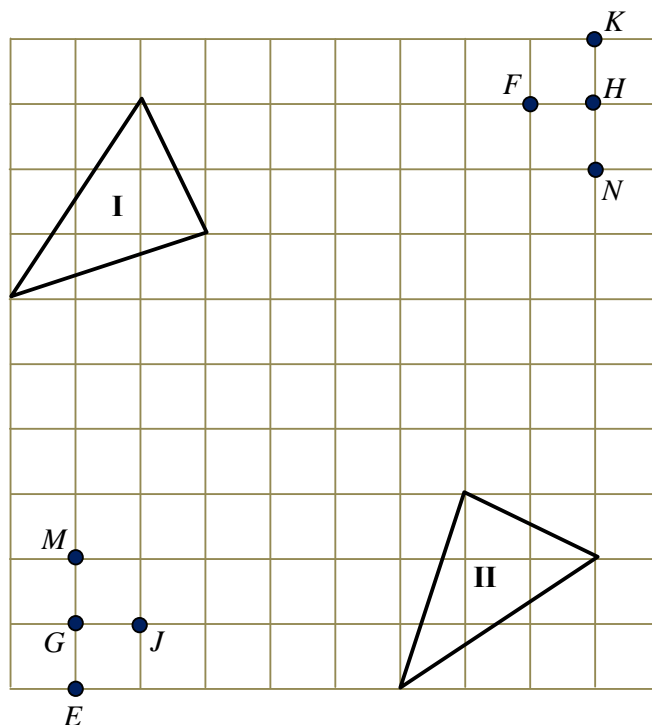
*Find the value of  $y$ .*

- A 36
- B 54
- C 63
- D 72

[Lihat halaman sebelah

- 10 Rajah 10 menunjukkan dua segi tiga, I dan II, dan lapan titik, E, F, G, H, J, K, M dan N dilukis pada grid segi empat sama. Segi tiga I adalah imej bagi segi tiga II di bawah suatu pantulan.

*Diagram 10 shows two triangles, I and II, and eight points, E, F, G, H, J, K, M and N are drawn on the square grids. Triangle I is the image of triangle II under a reflection.*



Rajah 10  
Diagram 10

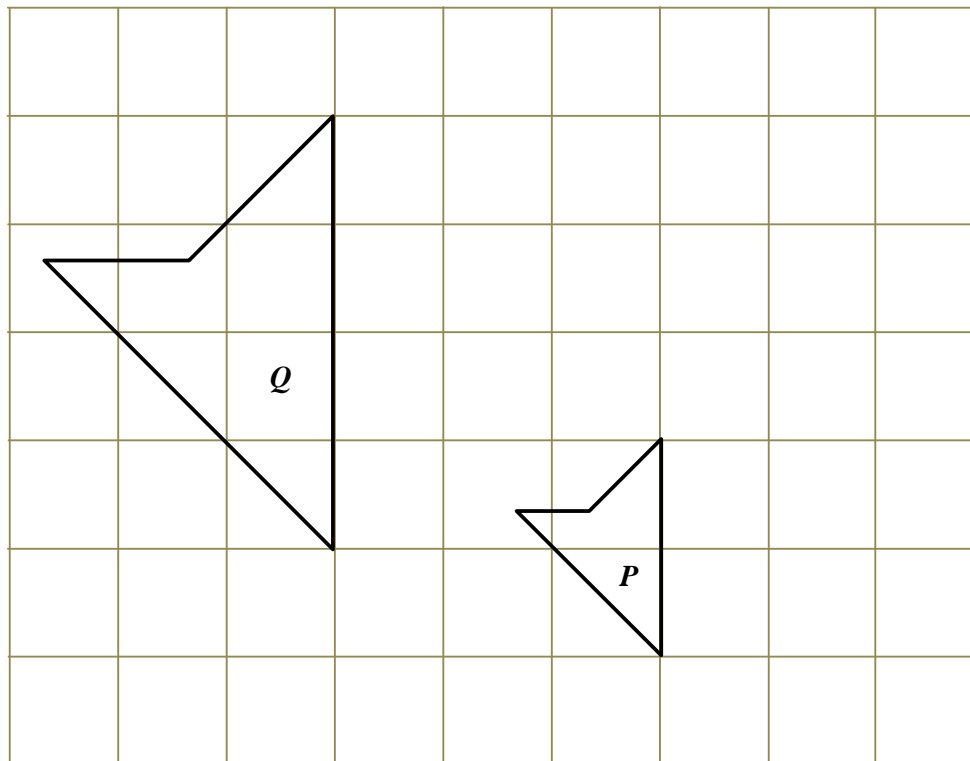
Pasangan titik yang manakah terletak pada paksi pantulan?

*Which pair of the points lie on the axis of reflection?*

- A E dan F  
E and F
- B M dan N  
M and N
- C J dan K  
J and K
- D G dan H  
G and H

- 11 Dalam Rajah 11, sisi empat  $Q$  ialah imej kepada sisi empat  $P$  di bawah suatu pembesaran dengan faktor skala  $k$ .

*In Diagram 11, quadrilaterals  $Q$  is the image of quadrilateral  $P$  under an enlargement with a scale factor of  $k$ .*



Rajah 11  
Diagram 11

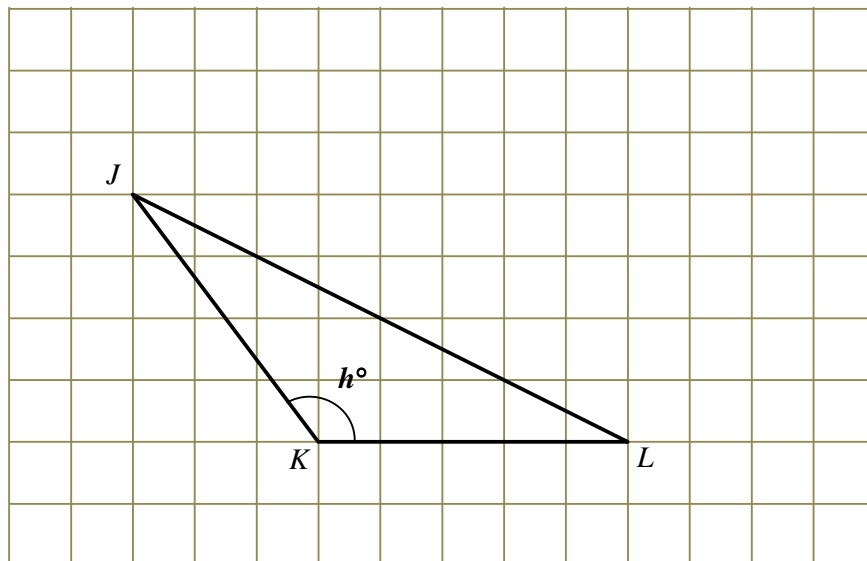
Cari nilai  $k$ .

*Find the value of  $k$ .*

- A 1/5
- B 2
- C 2/5
- D 3

[Lihat halaman sebelah

- 12 Dalam Rajah 12,  $JKL$  ialah sebuah segi tiga yang dilukis pada grid segi empat sama.  
*In Diagram 12,  $JKL$  is a triangle drawn on square grids.*



Rajah 12  
 Diagram 12

Cari nilai  $\tan h^\circ$ .

*Find the value of  $\tan h^\circ$ .*

A  $-\frac{4}{5}$

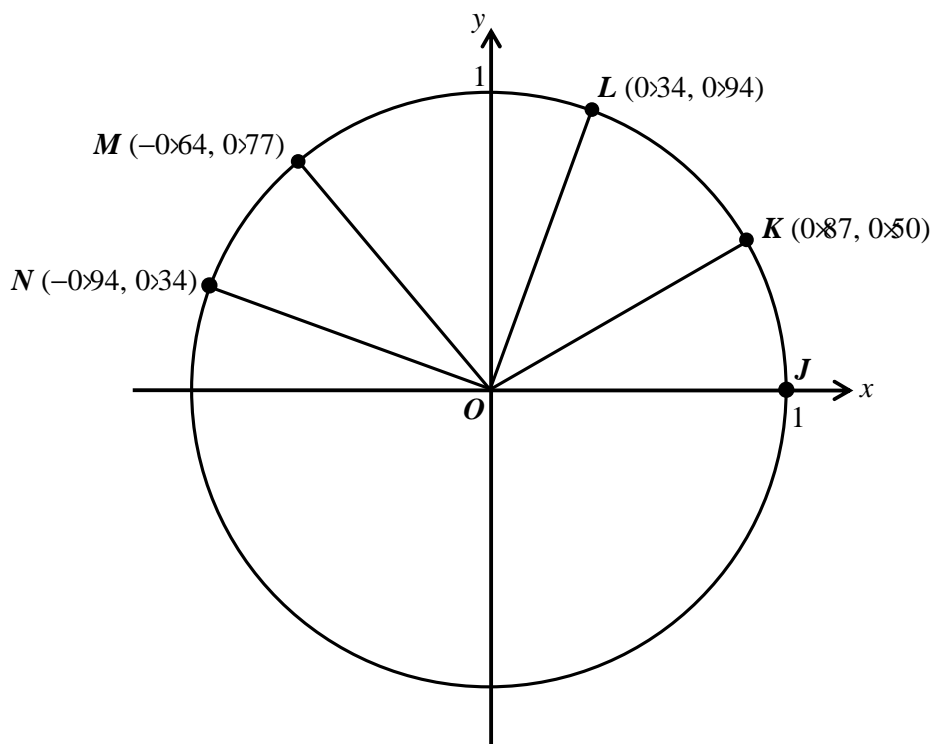
B  $-\frac{4}{3}$

C  $\frac{4}{5}$

D  $\frac{4}{3}$

- 13 Rajah 13 menunjukkan sebuah bulatan unit berpusat asalan,  $O$ , dilukis pada suatu satah Cartesian.

Diagram 13 shows a unit circle with centre origin,  $O$ , drawn on a Cartesian plane.



Rajah 13  
Diagram 13

Antara pernyataan berikut, yang manakah **BENAR** mengenai rajah itu?

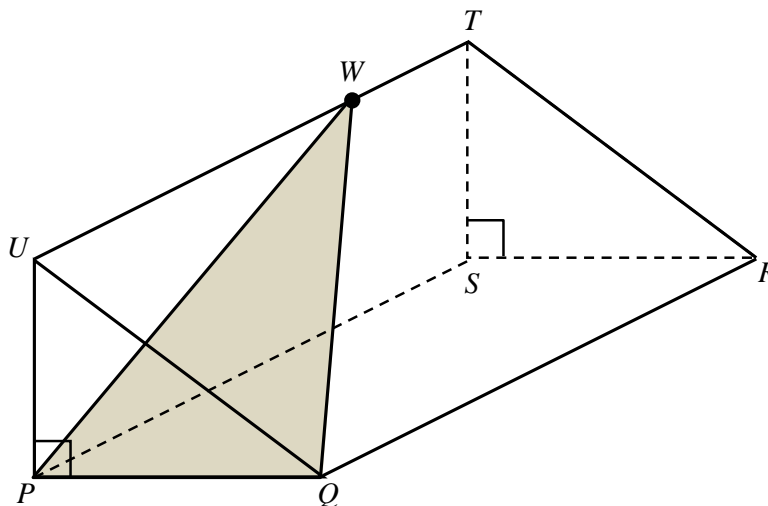
Among the following statements, which of the statement is **TRUE** about the diagram?

- A  $\cos \angle JOL = 0.34$   
 $\cos \angle JOL = 0.84$
- B  $\cos \angle JOK = 0.50$   
 $\cos \angle JOK = 0.80$
- C  $\sin \angle JOM = -0.64$
- D  $\sin \angle JON = -0.94$

[Lihat halaman sebelah

- 14 Rajah 14 menunjukkan sebuah prisma dengan tapak segi empat tepat  $PQRS$ . Titik  $W$  terletak di atas garis  $TU$ .

*Diagram 14 shows a prism with a rectangular base  $PQRS$ . Point  $W$  lies on  $TU$ .*



Rajah 14  
Diagram 14

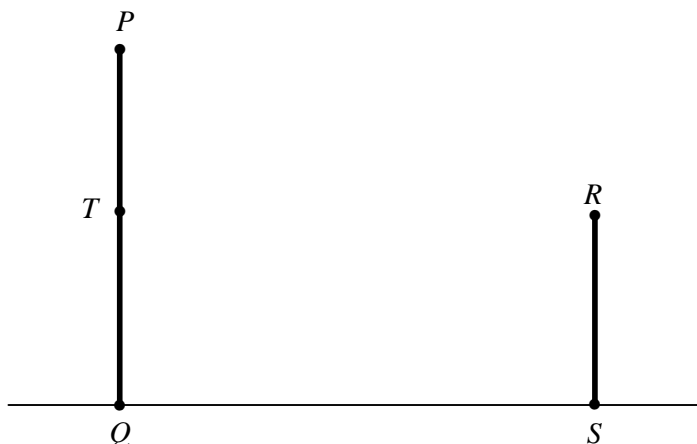
Namakan sudut di antara satah  $PQW$  dengan satah  $PQRS$ .

*Name the angle between the plane  $PQW$  and the plane  $PQRS$ .*

- A  $\angle WQR$
- B  $\angle WQS$
- C  $\angle WPR$
- D  $\angle WPS$

- 15 Dalam Rajah 15,  $PTQ$  dan  $RS$  ialah dua batang tiang tegak yang terletak pada satah mengufuk.  $T$  ialah satu titik pada  $PQ$  dengan keadaan  $TQ = RS$ .

*In Diagram 15,  $PTQ$  and  $RS$  are two vertical poles on a horizontal plane.  $T$  is a point on  $PQ$  such that  $TQ = RS$ .*



Rajah 15  
Diagram 15

Namakan sudut yang setara dengan sudut tunduk  $S$  dari  $P$ .

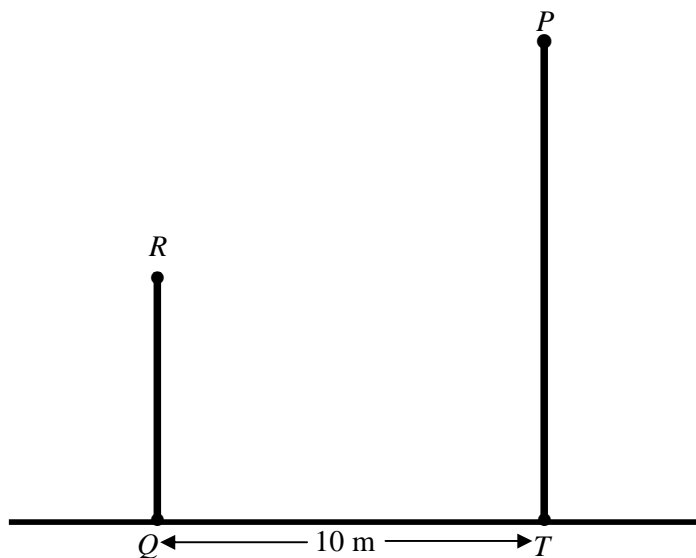
*Name the angle which is equivalent to the angle of depression of  $S$  from  $P$ .*

- A  $\angle SPQ$
- B  $\angle RPQ$
- C  $\angle PSQ$
- D  $\angle QRP$

[Lihat halaman sebelah

- 16 Rajah 16,  $PT$  dan  $RQ$  ialah dua batang tiang tegak yang terletak pada satu satah mengufuk. Tinggi  $PT$  ialah dua kali tinggi  $RQ$ . Sudut dongak  $P$  dari  $R$  ialah  $63^\circ$ .

*Diagram 16,  $PT$  and  $RQ$  are two vertical poles on a horizontal plane. The height of  $PT$  is twice the height of  $RQ$ . The angle of elevation of  $P$  from  $R$  is  $63^\circ$ .*



Rajah 16  
Diagram 16

Hitung tinggi, dalam meter,  $PT$ .

*Calculate the height, in metre, of  $PT$ .*

- A 4.45
- B 8.91
- C 19.63
- D 39.25



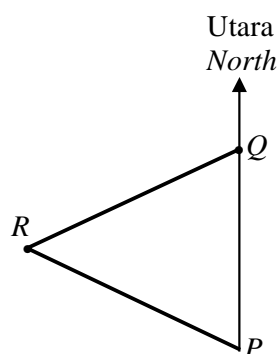
- 17  $P$ ,  $Q$  dan  $R$  ialah tiga titik pada satah mengufuk. Diberi  $P$  terletak di selatan  $R$  dan bearing  $Q$  dari  $R$  ialah  $120^\circ$ .

Antara rajah berikut, yang manakah menunjukkan kedudukan  $P$ ,  $Q$  dan  $R$ ?

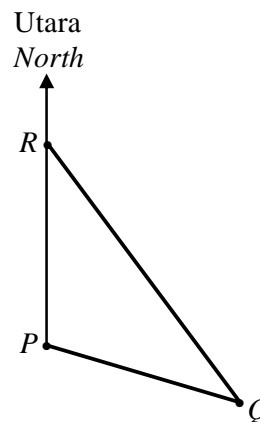
$P$ ,  $Q$  and  $R$  are three points on a horizontal plane. It is given that  $P$  is south of  $R$  and the bearing of  $Q$  from  $R$  is  $120^\circ$ .

Which of the following diagrams shows the positions of  $P$ ,  $Q$  and  $R$ ?

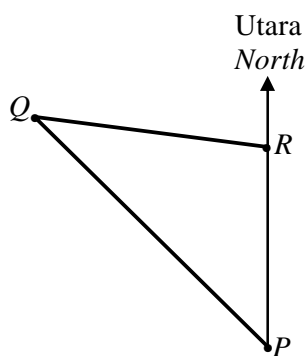
A



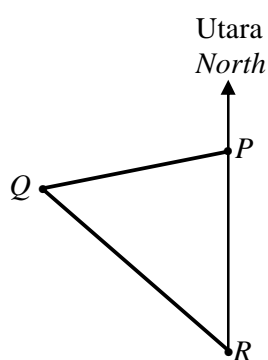
B



C



D

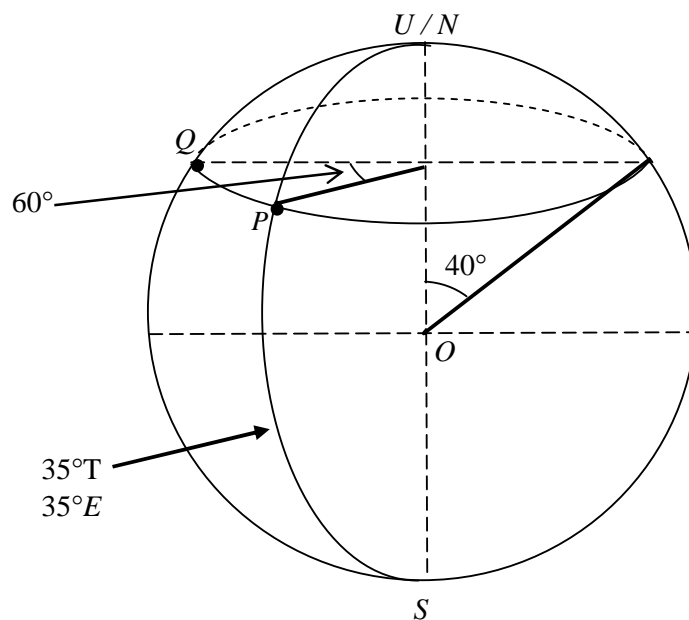


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SULIT

18 Dalam Rajah 18,  $U$  ialah Kutub Utara,  $S$  ialah Kutub Selatan dan  $UOS$  ialah paksi bumi.

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



Rajah 18  
Diagram 18

Cari kedudukan  $Q$ .

*Find the position of  $Q$ .*

- A** (  $50^\circ U$ ,  $25^\circ B$  )  
(  $50^\circ N$ ,  $25^\circ W$  )
- B** (  $50^\circ U$ ,  $95^\circ T$  )  
(  $50^\circ N$ ,  $95^\circ E$  )
- C** (  $40^\circ U$ ,  $25^\circ B$  )  
(  $40^\circ N$ ,  $25^\circ W$  )
- D** (  $40^\circ U$ ,  $95^\circ T$  )  
(  $40^\circ N$ ,  $95^\circ E$  )

19  $(3-x)^2 - 2(x+3) =$

A  $x^2 - 8x + 3$

B  $x^2 + 4x + 3$

C  $x^2 - 4x + 15$

D  $x^2 - 8x + 15$

20 Ungkapkan  $\frac{m+3}{2m^2} - \frac{4-m}{m}$  sebagai satu pecahan tunggal dalam bentuk termudah.

Express  $\frac{m+3}{2m^2} - \frac{4-m}{m}$  as a single fraction in its simplest form.

A  $\frac{2m^2 - 7m + 3}{2m^2}$

B  $\frac{2m^2 + 9m + 3}{2m^2}$

C  $\frac{3 - 7m - 2m^2}{2m^2}$

D  $\frac{3 + 7m - 2m^2}{2m^2}$

21 Diberi  $\frac{4G-1}{2} = G + R$ , ungkapkan  $G$  dalam sebutan  $R$ .

Given that  $\frac{4G-1}{2} = G + R$ , express  $G$  in terms of  $R$ .

A  $G = \frac{R-1}{2}$

B  $G = \frac{R+1}{2}$

C  $G = \frac{2R-1}{2}$

D  $G = \frac{2R+1}{2}$

[Lihat halaman sebelah  
SULIT

22 Diberi  $\frac{p+2}{3} - (1-p) = 4$ , cari nilai  $p$ .

Given that  $\frac{p+2}{3} - (1-p) = 4$ , find the value of  $p$ .

A  $-\frac{13}{2}$

B  $-\frac{5}{2}$

C  $\frac{13}{4}$

D  $\frac{13}{2}$

23  $\sqrt[3]{\left(\frac{y}{x}\right)^{-2}}$  boleh ditulis sebagai  
 $\sqrt[3]{\left(\frac{y}{x}\right)^{-2}}$  can be written as

A  $\left(\frac{y}{x}\right)^{\frac{2}{3}}$

B  $\left(\frac{y}{x}\right)^{\frac{3}{2}}$

C  $\left(\frac{y}{x}\right)^{\frac{2}{3}}$

D  $\left(\frac{y}{x}\right)^{\frac{3}{2}}$

24 Ringkaskan:

*Simplify:*

$$\frac{(27g^{-6})^{\frac{1}{3}} \times 2f^2g^3}{2f}$$

A  $3fg$

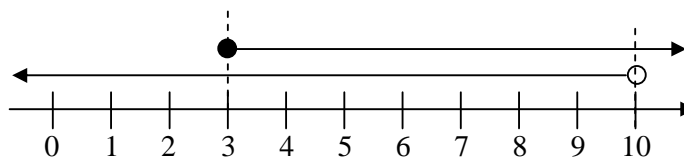
B  $3fg^5$

C  $\frac{3f}{g}$

D  $\frac{3g}{f}$

25 Rajah 25 menunjukkan satu garis nombor.

*Diagram 25 shows a number line.*



Rajah 25  
Diagram 25

Ketaksamaan linear serentak manakah yang mewakili garis nombor pada Rajah 25?

*Which simultaneous linear inequalities represent number line in Diagram 25?*

A  $3 \leq x \leq 10$

B  $3 < x \leq 10$

C  $3 \leq x < 10$

D  $3 < x < 10$

[Lihat halaman sebelah

- 26 Senaraikan semua integer  $x$  yang memuaskan kedua-dua ketaksamaan linear serentak  
 $3x < 10$  dan  $2x + 1 \geq -3$

List all the integers  $x$  which satisfy both the simultaneous linear inequalities  $-3x < 10$  and  $2x + 1 \geq -3$ .

- A  $-2, -1, 0, 1, 2, 3, 4$   
 B  $-2, -1, 0, 1, 2, 3$   
 C  $-1, 0, 1, 2, 3, 4$   
 D  $-1, 0, 1, 2, 3$
- 27 Jadual 27 menunjukkan taburan skor sekumpulan murid dalam satu kuiz.  
 Table 27 the distribution of the scores of a group of pupils in a quiz.

|                        |   |   |   |     |   |   |
|------------------------|---|---|---|-----|---|---|
| Skor<br>Score          | 1 | 2 | 3 | 4   | 5 | 6 |
| Kekerapan<br>Frequency | 1 | 3 | 6 | $n$ | 4 | 2 |

Jadual 27  
 Table 27

Diberi bahawa skor mod ialah 3 dan skor median ialah 4.

Cari nilai  $n$ .

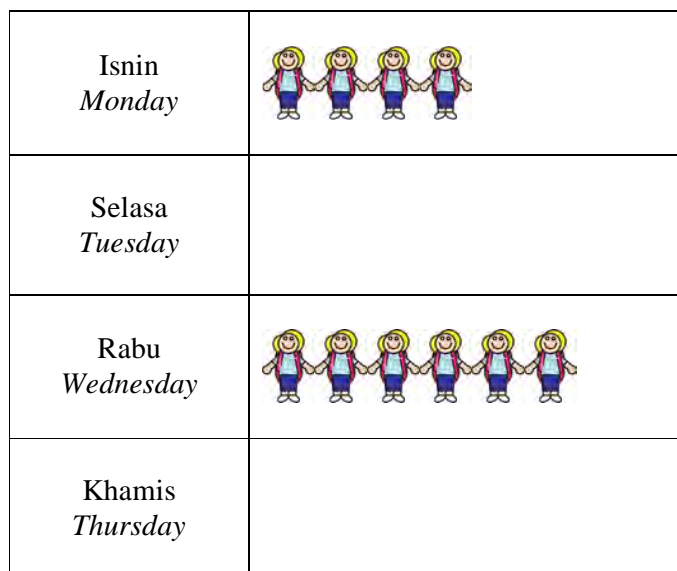
It is given that the mode score is 3 and the median score is 4.

Find the value of  $n$ .

- A 4  
 B 5  
 C 6  
 D 7

- 28 Rajah 28 ialah piktograf yang menunjukkan bilangan pengunjung ke sebuah pameran pendidikan dalam tempoh empat hari. Jumlah pengunjung ke pameran itu dalam tempoh empat hari itu ialah 6 600 orang.

*Diagram 28 is a pictograph showing the number of visitors to an educational fair during a period of four days. A total of 6 600 visitors went to the fair over the four days.*



Mewakili 300 pengunjung  
*Represents 300 visitors*

Rajah 28  
*Diagram 28*

Bilangan pengunjung pada hari Khamis adalah tiga kali bilangan pengunjung pada hari Selasa.  
Berapakah bilangan pengunjung pada hari Khamis?

*The number of visitors on Thursday is three times the number of visitors on Tuesday.  
How many visitors were there on Thursday?*

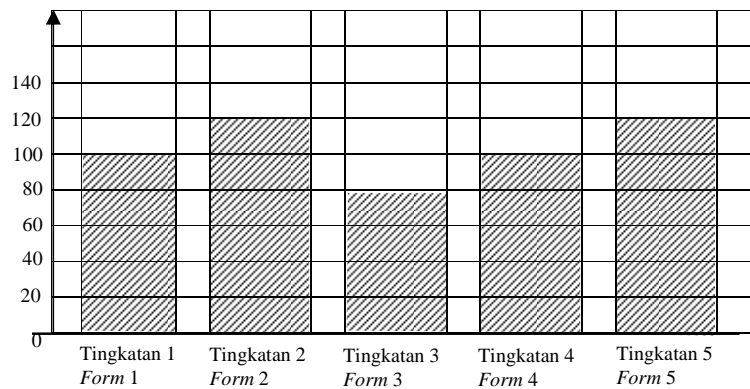
- A 900
- B 1 200
- C 1 800
- D 2 700

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SULIT

- 29 Rajah 29 ialah carta palang yang menunjukkan bilangan murid di dalam sebuah sekolah menengah.

*Diagram 29 is a bar chart showing the number of pupils in secondary schools.*

Bilangan murid  
*Number of pupils*



Rajah 29  
*Diagram 29*

Sebuah pondok bacaan akan dibina di sekolah itu. Setiap murid dikehendaki menderma sejumlah wang seperti ditunjukkan dalam Jadual 29.

*A reading hut is to be built in a school. Each pupils has to donated the amount shown in Table 29.*

| Tingkatan<br><i>Form</i> | 1    | 2    | 3    | 4    | 5    |
|--------------------------|------|------|------|------|------|
| Derma<br><i>Donation</i> | RM 2 | RM 2 | RM 3 | RM 4 | RM 5 |

Jadual 29  
*Table 29*

Hitung jumlah kutipan derma.

*Calculate the total of donation.*

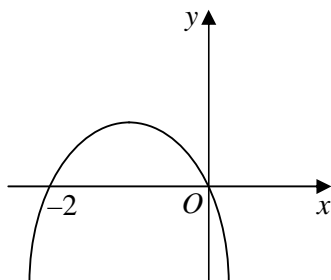
- A RM 1040
- B RM 1500
- C RM 1680
- D RM 2600



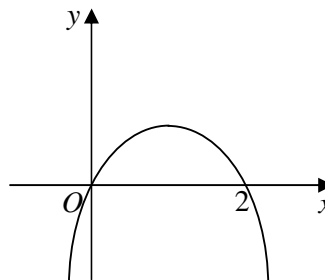
30 Graf manakah yang mewakili  $y = 2x - x^2$ ?

Which graph represents  $y = 2x - x^2$ ?

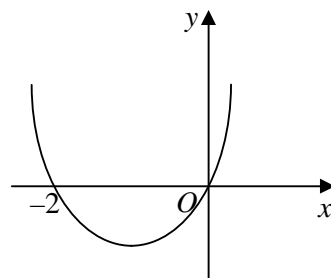
A



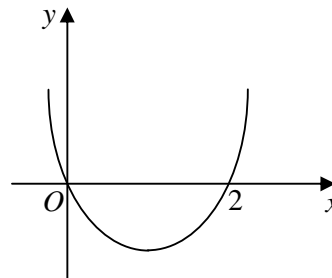
B



C



D



[Lihat halaman sebelah

31 Diberi set semesta,  $\xi = \{x : 10 \leq x \leq 20, x \text{ ialah integer}\}$ ,

Set  $M = \{x : x \text{ ialah nombor perdana}\}$ ,

Set  $R = \{x : x \text{ ialah nombor ganjil}\}$ .

Gambarajah Venn manakah yang mewakili hubungan antara set  $\xi$ , set  $M$  dan set  $R$ ?

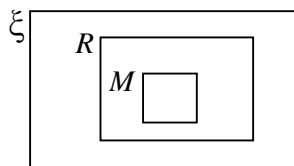
*Given universal set  $\xi = \{x : 10 \leq x \leq 20, x \text{ is an integer}\}$ ,*

*Set  $M = \{x : x \text{ is a prime number}\}$ ,*

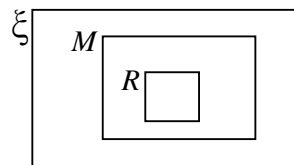
*Set  $R = \{x : x \text{ is an odd number}\}$ .*

*Which Venn diagram represents the relation between set  $\xi$ , set  $M$  and set  $R$ ?*

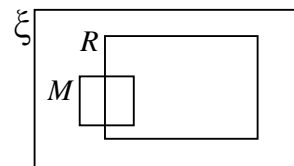
**A**



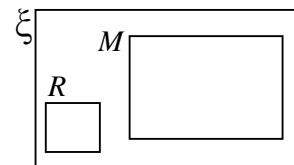
**B**



**C**



**D**

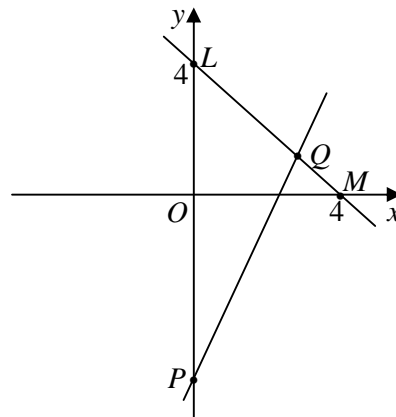


- 32 Diberi set  $P = \{s, k, o, r\}$ ,  
Cari bilangan subset bagi set  $P$ .

*Given that set  $P = \{s, k, o, r\}$ .  
Find the number of subsets for set  $P$ .*

- A 4  
B 8  
C 16  
D 32

- 33 Rajah 33 menunjukkan dua garis lurus,  $LM$  dan  $PQ$ , pada suatu satah Cartesan.  
*Diagram 33 shows two straight lines,  $LM$  and  $PQ$ , on a Cartesian plane.*



Rajah 33  
Diagram 33

Diberi bahawa  $LQ = 3QM$  dan kecerunan  $PQ$  ialah 2.  
Cari pintasan-y bagi  $PQ$ .

*It is given that  $LQ = 3QM$  and the gradient of  $PQ$  is 2.  
Find the y-intercept of  $PQ$ .*

- A -3  
B -4  
C -5  
D -6

[Lihat halaman sebelah  
SULIT

- 34 Cari kecerunan bagi garis lurus  $\frac{4}{3}y - 2x = 1$

Find the gradient of straight line  $\frac{4}{3}y - 2x = 1$ .

- A  $\frac{3}{2}$
- B  $\frac{2}{3}$
- C  $-\frac{2}{3}$
- D  $-\frac{3}{2}$
- 35 Jadual 35 menunjukkan bilangan murid dalam Kelab Sejarah, Kelab Sains dan Kelab Matematik di sebuah sekolah.

Table 35 shows the number of pupils of the History Club, Science Club and Mathematics Club in a school.

| Kelab Club                      | Sejarah History | Sains Science | Matematik Mathematics |
|---------------------------------|-----------------|---------------|-----------------------|
| Bilangan murid Number of pupils | 99              | 121           | 154                   |

Jadual 35  
Table 35

Seorang murid dipilih secara rawak daripada kumpulan itu.

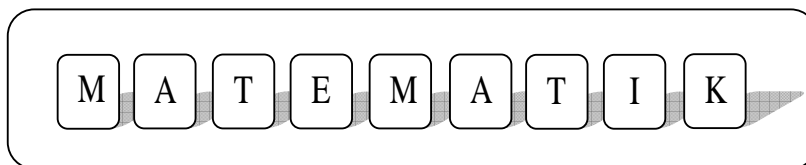
Cari kebarangkalian bahawa seorang murid yang dipilih itu adalah daripada Kelab Matematik.

A pupils is chosen at random from the group.

Find the probability that the pupil chosen is from the Mathematics Club.

- A  $\frac{9}{34}$
- B  $\frac{11}{34}$
- C  $\frac{7}{17}$
- D  $\frac{10}{17}$

- 36 Rajah 36 menunjukkan sembilan keping kad huruf di dalam sebuah kotak.  
Diagram 36 shows nine cards labelled with letters in a box.



Rajah 36  
Diagram 36

Beberapa keping kad yang berhuruf **M** ditambah ke dalam kotak itu. Sekeping kad dikeluarkan secara rawak daripada kotak itu. Kebarangkalian memilih kad berhuruf **A** ialah  $\frac{1}{7}$ .

Nyatakan bilangan kad yang berhuruf **M**.

*Some cards with the letter **M** is added into the box. A card is taken out at randomly from the box. The probability of choosing a card with the letter **A** is  $\frac{1}{7}$ .*

*Find the number of cards **M**.*

- A** 2  
**B** 5  
**C** 7  
**D** 9
- 37 Jadual 37 menunjukkan beberapa nilai bagi pembolehubah  $T$ ,  $U$  dan  $V$  dengan keadaan  $T$  berubah secara langsung dengan kuasa dua  $U$  dan berubah secara songsang dengan  $V$ .

*Table 37 shows some value of the variables  $T$ ,  $U$  and  $V$ , such that  $T$  varies directly as the square of  $U$  and varies inversely as the  $V$ .*

|     |   |     |
|-----|---|-----|
| $T$ | 3 | 27  |
| $U$ | 2 | $m$ |
| $V$ | 4 | 1   |

Jadual 37  
Table 37

Hitung nilai  $m$ .

*Calculate the value of  $m$ .*

- A** 1  
**B** 2  
**C** 3  
**D** 4

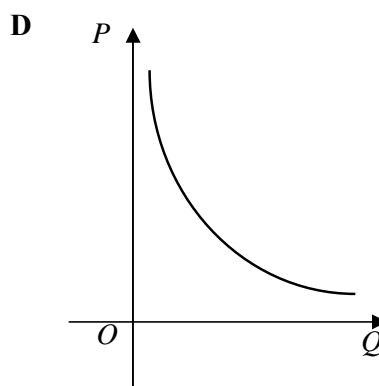
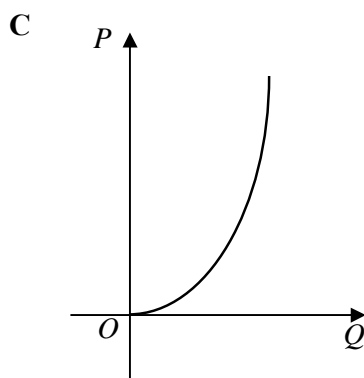
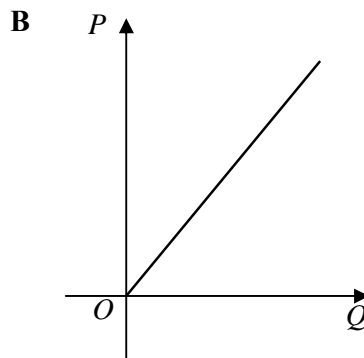
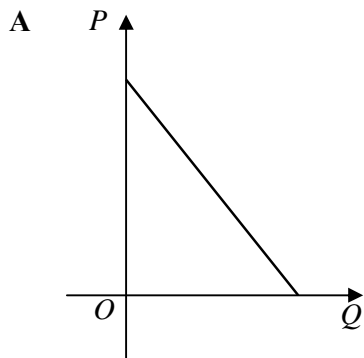
[Lihat halaman sebelah  
SULIT

- 38 Diberi bahawa  $\frac{P}{Q} = k$ , dengan keadaan  $k$  adalah pemalar.

Graf manakah yang mengaitkan hubungan antara  $P$  dan  $Q$ ?

*It is given that  $\frac{P}{Q} = k$ , where  $k$  is a constant.*

*Which graph shows the relation between  $P$  and  $Q$ ?*



$$39 \quad \begin{pmatrix} 3 & -1 \\ 4 & 2 \end{pmatrix} + 2M = \begin{pmatrix} 7 & 5 \\ -6 & 0 \end{pmatrix}$$

$M =$

**A**  $\begin{pmatrix} 2 & 3 \\ -5 & -1 \end{pmatrix}$

**B**  $\begin{pmatrix} 4 & 2 \\ -1 & 1 \end{pmatrix}$

**C**  $\begin{pmatrix} 4 & 4 \\ -2 & 2 \end{pmatrix}$

**D**  $\begin{pmatrix} 2 & 6 \\ -10 & -2 \end{pmatrix}$

$$40 \quad (-5 \ -1) \begin{pmatrix} -2 & 0 \\ 3 & -4 \end{pmatrix} =$$

**A**  $(7 \ 4)$

**B**  $(7 \ -4)$

**C**  $\begin{pmatrix} 7 \\ 4 \end{pmatrix}$

**D**  $\begin{pmatrix} 7 \\ -4 \end{pmatrix}$

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

**MAKLUMAT UNTUK CALON  
INFORMATION FOR CANDIDATES**

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



**MAJLIS PENGETUA SEKOLAH MENENGAH  
NEGERI KEDAH DARUL AMAN**

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**PROGRAM PENINGKATAN PRESTASI SPM 2011  
MATEMATIK  
JAWAPAN UNTUK KERTAS 1**

**1449/1**

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

**ANALISIS**

|   |    |
|---|----|
| A | 10 |
| B | 11 |
| C | 10 |
| D | 9  |

$$\text{NOTA: MARKAH PELAJAR} = \frac{(K1+K2)}{140} \times 100$$

SULIT

1449/2

NAMA

:.....

ANGKA GILIRAN

:..... TINGKATAN : 5.....

**MAJLIS PENGETUA SEKOLAH MENENGAH  
NEGERI KEDAH DARUL AMAN.**

**PROGRAM PENINGKATAN PRESTASI SPM 2011****1449/2****MATHEMATICS****Kertas 2****Ogos 2011** $2\frac{1}{2}$  jam**Dua jam tiga puluh minit**

**JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU**

1. *Tulis nama, tingkatan dan angka giliran anda pada ruang yang disediakan.*
2. *Kertas soalan ini adalah dalam dwibahasa.*
3. *Soalan dalam bahasa Melayu mendahului soalan yang sepadan dalam bahasa Inggeris.*
4. *Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam bahasa Melayu atau bahasa Inggeris.*
5. *Calon dikehendaki membaca arahan di halaman belakang kertas soalan ini.*

| <i>Untuk Kegunaan Pemeriksa</i> |        |              |                  |
|---------------------------------|--------|--------------|------------------|
| <b>Bahagian</b>                 | Soalan | Markah Penuh | Markah Diperoleh |
| <b>A</b>                        | 1      | 3            |                  |
|                                 | 2      | 3            |                  |
|                                 | 3      | 4            |                  |
|                                 | 4      | 4            |                  |
|                                 | 5      | 4            |                  |
|                                 | 6      | 6            |                  |
|                                 | 7      | 5            |                  |
|                                 | 8      | 5            |                  |
|                                 | 9      | 6            |                  |
|                                 | 10     | 6            |                  |
|                                 | 11     | 6            |                  |
| <b>B</b>                        | 12     | 12           |                  |
|                                 | 13     | 12           |                  |
|                                 | 14     | 12           |                  |
|                                 | 15     | 12           |                  |
|                                 | 16     | 12           |                  |
| <b>Jumlah</b>                   |        |              |                  |

Kertas soalan ini mengandungi **40** halaman bercetak.

**RUMUS MATEMATIK**  
**MATHEMATICAL FORMULAE**

Rumus-rumus berikut boleh membantu anda untuk menjawab soalan. Simbol-simbol yang diberi adalah yang biasa digunakan.

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

**PERKAITAN**  
**RELATIONS**

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

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

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

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

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

10 Teorem Pithagoras  
Pythagoras Theorem  
 $c^2 = a^2 + b^2$

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

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

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

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

**BENTUK DAN RUANG**  
**SHAPES AND SPACE**

- 1 Luas trapezium  
 $= \frac{1}{2} \times \text{hasil tambah dua sisi selari} \times \text{tinggi}$   
*Area of trapezium*  
 $= \frac{1}{2} \times \text{sum of parallel sides} \times \text{height}$
- 2 Lilitan bulatan =  $\pi d = 2\pi j$   
*Circumference of circle =  $\pi d = 2\pi r$*
- 3 Luas bulatan =  $\pi j^2$   
*Area of circle =  $\pi r^2$*
- 4 Luas permukaan melengkung silinder =  $2\pi j t$   
*Curved surface area of cylinder =  $2\pi r h$*
- 5 Luas permukaan sfera =  $4\pi j^2$   
*Surface area of sphere =  $4\pi r^2$*
- 6 Isipadu prisma tegak = Luas keratan rentas  $\times$  panjang  
*Volume of right prism = cross sectional area  $\times$  length*
- 7 Isipadu silinder =  $\pi j^2 t$   
*Volume of cylinder =  $\pi r^2 h$*
- 8 Isipadu kon =  $\frac{1}{3} \pi j^2 t$   
*Volume of cone =  $\frac{1}{3} \pi r^2 h$*
- 9 Isipadu sfera =  $\frac{4}{3} \pi j^3$   
*Volume of sphere =  $\frac{4}{3} \pi r^3$*
- 10 Isipadu piramid tegak =  $\frac{1}{3} \times \text{luas tapak} \times \text{tinggi}$   
*Volume of right pyramid =  $\frac{1}{3} \times \text{base area} \times \text{height}$*
- 11 Hasil tambah sudut pedalaman poligon =  $(n - 2) \times 180^\circ$   
*Sum of interior angles of a polygon =  $(n - 2) \times 180^\circ$*
- 12  $\frac{\text{panjang lengkok}}{\text{lilitan bulatan}} = \frac{\text{sudut pusat}}{360^\circ}$   
 $\frac{\text{arc length}}{\text{circumference of circle}} = \frac{\text{angle subtended at centre}}{360^\circ}$
- 13  $\frac{\text{luas sektor}}{\text{luas bulatan}} = \frac{\text{sudut pusat}}{360^\circ}$   
 $\frac{\text{area of sector}}{\text{area of circle}} = \frac{\text{angle subtended at centre}}{360^\circ}$
- 14 Faktor skala,  $k = \frac{PA'}{PA}$   
*Scale factor,  $k = \frac{PA'}{PA}$*
- 15 Luas imej =  $k^2 \times \text{luas objek}$   
*Area of image =  $k^2 \times \text{area of object}$*

**[Lihat halaman sebelah**  
**SULIT**

SULIT

Untuk  
Kegunaan  
Pemeriksa

For  
Examiner's  
Use

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

[ 52 markah / marks ]

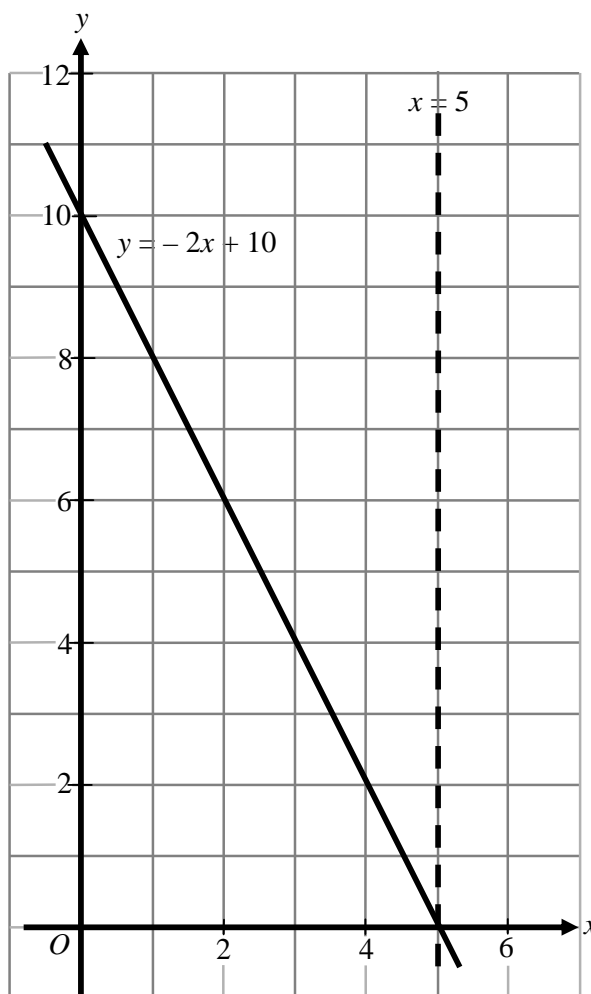
Jawab **semua** soalan dalam bahagian ini.  
*Answer all questions in this section.*

- 1 Pada graf di ruang jawapan, lorekkan rantau yang memuaskan ketiga-tiga ketaksamaan  $y \geq -2x + 10$ ,  $x < 5$  dan  $y < 2x$ .

*On the graph in the answer space, shade the region which satisfy the three inequalities  $y \geq -2x + 10$ ,  $x < 5$  and  $y < 2x$ .*

[3 markah/marks]

Jawapan/Answer:



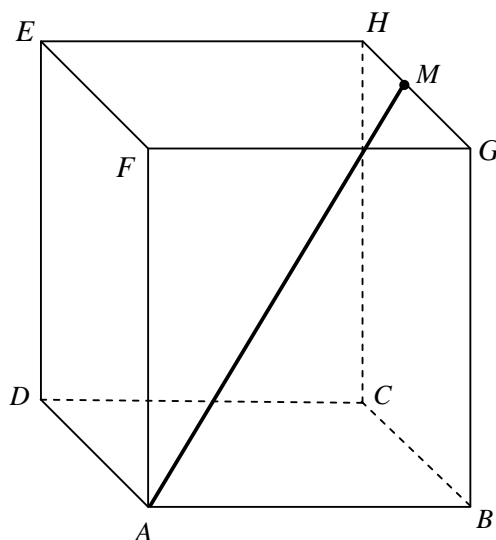
SULIT

5

1449/2

- 2 Rajah 2 menunjukkan sebuah kuboid.  $M$  terletak pada sisi  $GH$ .  
Diberi  $AM = 13$  cm dan  $CD = 12$  cm.

*Diagram 2 shows a cuboid.  $M$  lies on the side  $GH$ .  
Given  $AM = 13$  cm and  $CD = 12$  cm.*



Rajah 2  
Diagram 2

- (a) Namakan sudut di antara garis  $AM$  dengan satah  $BCHG$ .  
*Name the angle between the line  $AM$  and the plane  $BCHG$ .*
- (b) Seterusnya, hitung sudut di antara garis  $AM$  dengan satah  $BCHG$ .

*Hence, calculate the angle between the line  $AM$  and the plane  $BCHG$ .*

[3 markah/marks]

Jawapan/Answer:

(a)

(b)

Untuk  
Kegunaan  
Pemeriksa

For  
Examiner's  
Use

[Lihat halaman sebelah  
SULIT

Untuk  
Kegunaan  
Pemeriksa

For  
Examiner's  
Use

- 3 Selesaikan persamaan kuadrat berikut:

*Solve the following quadratic equation:*

$$3x^2 - 16 = 2(5x - 4)$$

[4 markah/marks]

Jawapan/Answer:

- 4 Hitung nilai  $x$  dan nilai  $y$  yang memuaskan persamaan linear serentak berikut:

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

$$x - \frac{3}{2}y = -6$$

$$4x + 5y = -2$$

[4 markah/marks]

Jawapan/Answer:

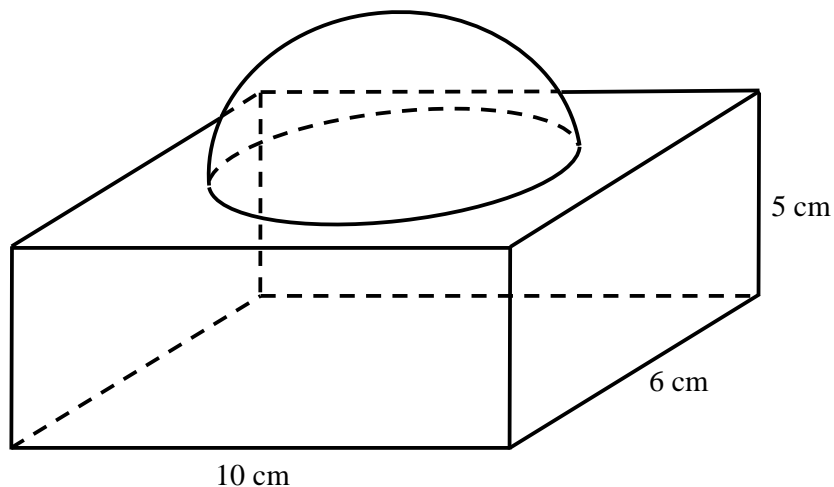
SULIT

7

1449/2

- 5 Rajah 5, menunjukkan suatu pepejal yang terdiri daripada cantuman sebuah hemisfera kepada kuboid.

*Diagram 5, shows a solid, formed by joining a hemisphere to cuboid.*



Rajah 5  
Diagram 5

[Guna / Use  $\pi = \frac{22}{7}$ ]

- (a) Hitung isipadu, dalam  $\text{cm}^3$ , kuboid itu.

*Calculate the volume, in  $\text{cm}^3$ , of the cuboid.*

- (b) Diberi bahawa isipadu gabungan pepejal itu ialah  $356\frac{4}{7} \text{ cm}^3$ .

Hitung jejari, dalam cm, hemisfera itu.

*It is given that the volume of the combined solid is  $356\frac{4}{7} \text{ cm}^3$ .*

*Calculate the radius, in cm, of the hemisphere.*

[4 markah/marks]

Jawapan / Answer:

(a)

(b)

Untuk  
Kegunaan  
Pemeriksa

For  
Examiner's  
Use

[Lihat halaman sebelah  
SULIT



Untuk  
Kegunaan  
Pemeriksa

For  
Examiner's  
Use

- 6 (a) Lengkapi pernyataan berikut dengan menggunakan pengkuantiti “semua” atau “sebilangan”, untuk membentuk suatu pernyataan benar.

Complete the following statement using the quantifier “all ” or “some”, to make it a true statement.

|                                       |
|---------------------------------------|
| _____ gandaan 3 adalah nombor ganjil. |
| _____ multiples of 3 are odd numbers. |

- (b) Tulis Premis 2 untuk melengkapkan hujah berikut.

Write down Premise 2 to complete the following argument.

Premis 1 : Jika sebuah sisi empat ialah trapezium, maka ia mempunyai dua sisi selari.

Premise 1 : *If a quadrilateral is a trapezium, then it has two parallel sides.*

Premis 2 :

Premise 2 : .....

Kesimpulan : *PQRS* mempunyai dua sisi selari.

Conclusion : *PQRS* has two parallel sides.

- (c) Buat satu kesimpulan umum secara aruhan bagi urutan nombor 5, 11, 21, ... yang mengikut pola berikut:

Make a general conclusion by induction for the sequence of numbers 5, 11, 21, ... which follows the following pattern:

$$5 = 2(1)^2 + 3$$

$$11 = 2(2)^2 + 3$$

$$21 = 2(3)^2 + 3$$

$$\dots = \dots$$

- (d) Tulis dua implikasi berdasarkan pernyataan berikut:

Write down two implications based on the following compound statement:

|  |
|--|
| $m^3 = -27 \text{ if and only if } m = -3$ $m^3 = -27 \text{ jika dan hanya jika } m = -3$ |
|--|

[6 markah/marks]

Jawapan / Answer:

Untuk  
Kegunaan  
Pemeriksa

For  
Examiner's  
Use

(a) \_\_\_\_\_ gandaan 3 adalah nombor ganjil.  
 \_\_\_\_\_ multiples of 3 are odd numbers.

(b) Premis 2 : .....  
 Premise 2 : .....

(c) .....  
 .....

(d) Impilikasi 1 : .....  
 Implication 1 : .....  
 Implikasi 2 : .....  
 Implication 2 : .....

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Untuk  
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Pemeriksa

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Use

- 7 Rajah 7 menunjukkan trapezium  $PQRS$  yang dilukis pada suatu satah Cartesian. Titik  $Q$  terletak pada paksi- $x$ . Persamaan garis lurus  $SR$  ialah  $y = -2x + 15$ .

Diagram 7 shows a trapezium  $PQRS$  drawn on a Cartesian plane. Point  $Q$  lies on the  $x$ -axis. The equation of straight line  $SR$  is  $y = -2x + 15$ .

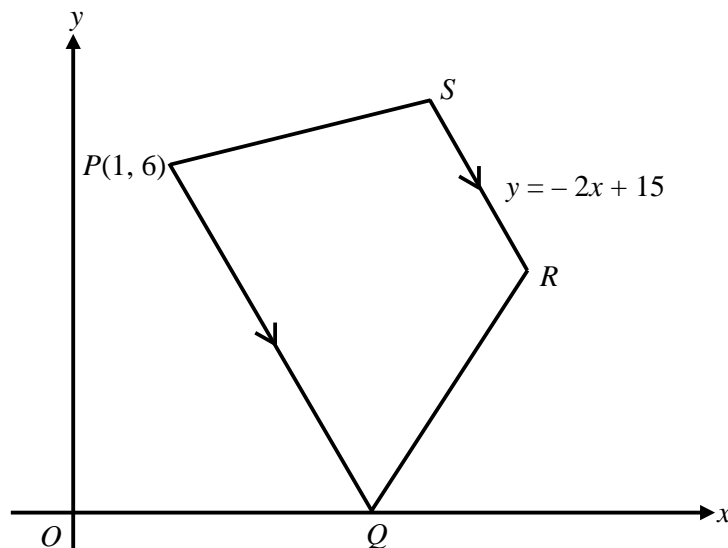


Diagram 7  
Rajah 7

Cari

Find

- (a) pintasan- $x$  bagi garis lurus  $SR$ ,  
the  $x$ -intercept of the straight line  $SR$ ,
- (b) persamaan bagi garis lurus  $PQ$ .  
the equation of the straight line  $PQ$ .

[5 markah/marks]

**SULIT**

11

**1449/2**

Jawapan / Answer:

(a)

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(b)

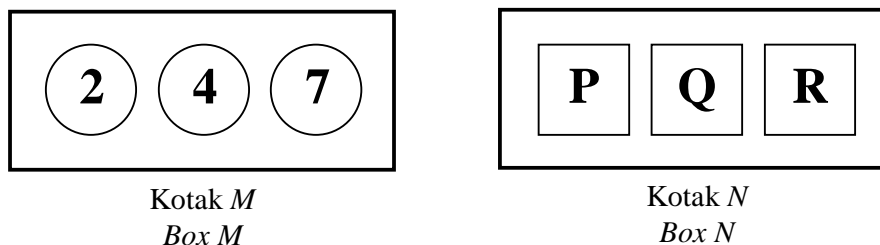
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Use

- 8 Rajah 8 menunjukkan tiga kad nombor di dalam kotak  $M$  dan tiga kad huruf di dalam kotak  $N$ .

Diagram 8 shows three numbered cards in box  $M$  and three cards labelled with letters in box  $N$ .



Rajah 8  
Diagram 8

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

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

- (a) Ruang jawapan (a) menunjukkan kesudahan peristiwa yang mungkin, yang tidak lengkap.

Lengkapkan kesudahan peristiwa yang mungkin itu.

Answer space (a) shows the incomplete possible outcomes of the event.

Complete the possible outcomes.

- (b) Menggunakan senarai lengkap kesudahan di ruang jawapan 8(a), cari kebarangkalian

Using the complete possible outcomes in the answer space 8(a), find the probability that

- (i) satu kad nombor genap dan satu kad berlabel **R** dipilih,  
a card with an even number and a card labelled **R** are picked,
- (ii) satu kad nombor ganjil atau satu kad berlabel **Q** dipilih.  
a card with an odd number or the card labelled **Q** are picked.

[5 markah/marks]

**SULIT**

13

**1449/2**

Jawapan / Answer:

$$(a) S = \{ (2, \mathbf{R}), (7, \mathbf{Q}), (4, \mathbf{P}), (7, \mathbf{R}), (4, \mathbf{Q}), (2, \mathbf{P}), (7, \mathbf{P}), \\ \text{—————, —————} \}$$

(b) (i)

(ii)

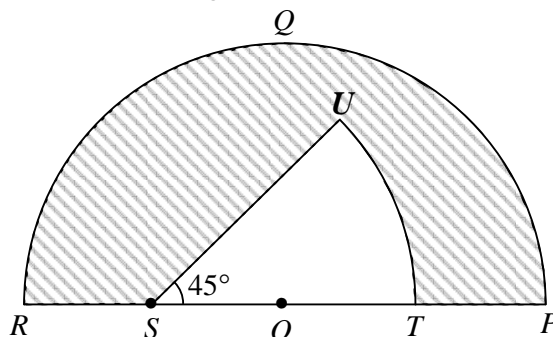
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- 9 Dalam Rajah 9,  $PQR$  ialah semibulatan berpusat  $O$  dan  $STU$  ialah sektor kepada bulatan berpusat  $S$ .  $RSOTP$  ialah garis lurus.

In Diagram 9,  $PQR$  is a semicircle with centre  $O$  and  $STU$  is a sector of a circle with centre  $S$ .  $RSOTP$  is a straight line.



Rajah 9  
Diagram 9

Diberi bahawa  $RS = SO = OT = 7$  cm.

It is given that  $RS = SO = OT = 7$  cm.

Guna/use  $\pi = \frac{22}{7}$ .

Hitung

Calculate

- (a) perimeter, dalam cm, kawasan yang berlorek,  
*the perimeter, in cm, of the shaded region,*
- (b) luas, dalam  $\text{cm}^2$ , kawasan yang berlorek.  
*the area, in  $\text{cm}^2$ , of the shaded region.*

[6 markah/marks]

**SULIT**

15

**1449/2**

Jawapan / Answer:

(a)

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(b)

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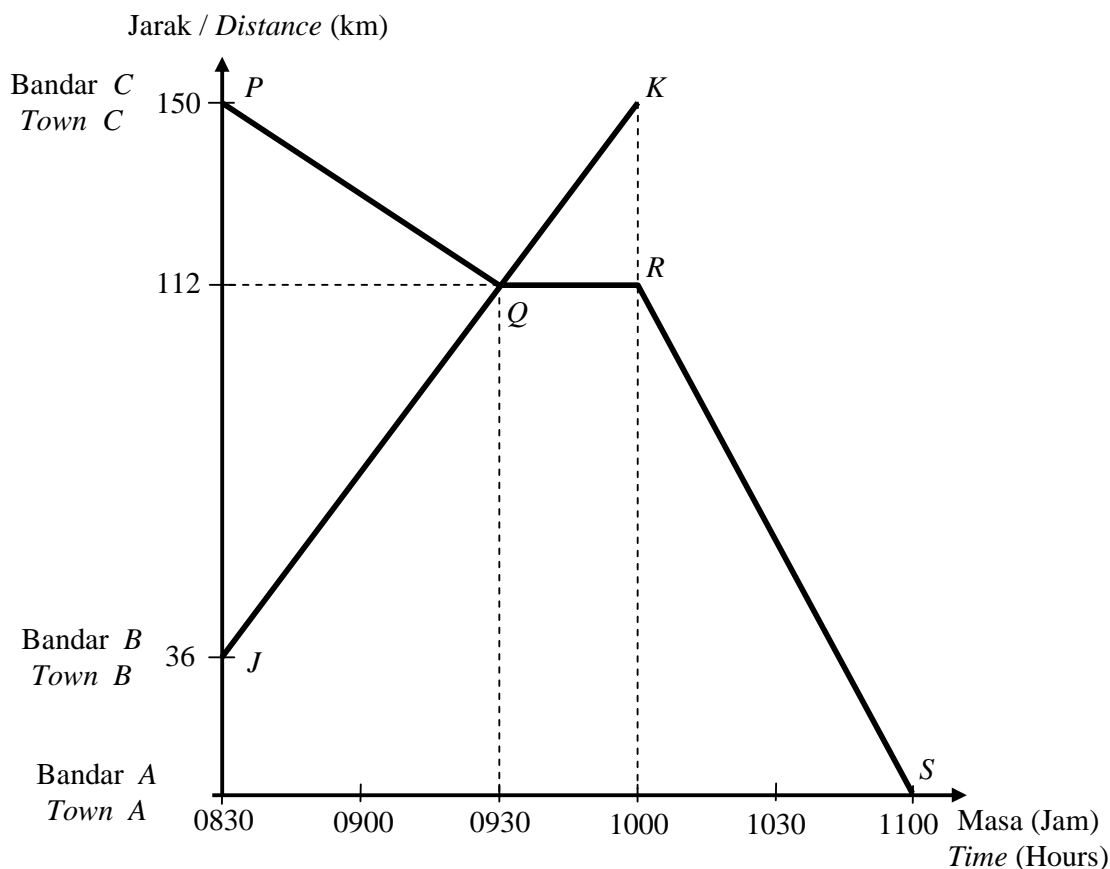


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- 10 Rajah 10 menunjukkan graf jarak–masa bagi perjalanan sebuah kereta dan sebuah bas.

Diagram 10 shows the distance-time graph of the journey of a car and a bus.



Rajah 10  
Diagram 10

Graf  $JK$  mewakili perjalanan kereta dari Bandar  $B$  ke Bandar  $C$ .  
Graf  $PQRS$  mewakili perjalanan bas dari Bandar  $C$  ke Bandar  $A$ .  
Kereta itu bertolak dari Bandar  $B$  dan bas itu bertolak dari Bandar  $C$  pada jalan yang sama.

The graph  $JK$  represents the journey of the car from Town  $B$  to Town  $C$ .  
The graph  $PQRS$  represents the journey of the bus from Town  $C$  to Town  $A$ .  
The car left Town  $B$  and the bus left Town  $C$  at along the same road.

- (a) (i) Nyatakan tempoh masa, dalam minit, bas itu berhenti.

State the length of time, in minutes, during which the bus is stationary.

- (ii) Nyatakan waktu kedua-dua kenderaan itu bertemu.

State the time when both vehicles meet.

SULIT

- (b) (i) Cari jarak, dalam km, dari bandar C bila kedua-dua kenderaan itu bertemu.

*Find the distance, in km, from town C when the vehicles meet.*

- (ii) Hitung laju, dalam  $\text{kmj}^{-1}$ , kereta itu bagi satu jam yang pertama.

*Calculate the speed, in  $\text{kmh}^{-1}$ , of the car for the first hour.*

- (c) Hitung purata laju, dalam  $\text{kmj}^{-1}$ , bas itu bagi keseluruhan perjalanan.

*Calculate the average speed, in  $\text{kmh}^{-1}$ , of the bus for the whole journey.*

[6 markah/marks]

Jawapan / Answer:

- (a) (i)

(ii)

- (b) (i)

(ii)

- (c)

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- 11 Diberi bahawa matriks  $M = \begin{pmatrix} 2 & -3 \\ 4 & 1 \end{pmatrix}$  dan matriks  $N = \frac{1}{k} \begin{pmatrix} 1 & 3 \\ p & 2 \end{pmatrix}$  dengan keadaan

$$MN = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}.$$

It is given that matrix  $M = \begin{pmatrix} 2 & -3 \\ 4 & 1 \end{pmatrix}$  and matrix  $N = \frac{1}{k} \begin{pmatrix} 1 & 3 \\ p & 2 \end{pmatrix}$  such that

$$MN = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}.$$

- (a) Cari nilai  $k$  dan nilai  $p$ .

*Find the value of  $k$  and of  $p$ .*

- (b) Tulis persamaan linear serentak berikut dalam bentuk persamaan matriks.

*Write the following simultaneous linear equations as matrix equation.*

$$2x - 3y = 4$$

$$4x + y = 1$$

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

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

[6 markah/marks]

Jawapan/Answer:

- (a)

- (b)

**HALAMAN KOSONG**

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

[48 markah / marks]

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

- 12** (a) Lengkapkan Jadual 12 di ruang jawapan pada halaman 22, bagi persamaan  $y = \frac{12}{x}$  dengan menulis nilai  $y$  apabila  $x = -1.5$  dan nilai  $y$  apabila  $x = 3$ .

*Complete Table 12 in the answer space on page 22, for the equation  $y = \frac{12}{x}$  by writing down the value of  $y$  when  $x = -1.5$  and the value of  $y$  when  $x = 3$ .*

[2 markah/marks]

- (b) Untuk ceraian soalan ini, gunakan kertas graf yang disediakan pada halaman 23. Anda boleh menggunakan pembaris fleksibel.

Dengan menggunakan skala 2 cm kepada 1 unit pada paksi-x dan 2 cm kepada 5 unit pada paksi-y, lukiskan graf  $y = \frac{12}{x}$  untuk  $-3 \leq x \leq 4$  dan  $-24 \leq y \leq 24$ .

*For this part of question, use the graph paper provided on page 23. You may use a flexible curve rule.*

*By using a scale of 2 cm to 1 unit on the x-axis and 2 cm to 5 units on the y-axis, draw the graph of  $y = \frac{12}{x}$  for  $-3 \leq x \leq 4$  and  $-24 \leq y \leq 24$ .*

[4 markah/marks]

- (c) Dari graf di ruang jawapan **12(b)**, cari

*From the graph in the answer space **12(b)**, find*

- (i) nilai  $y$  apabila  $x = 1.3$ ,  
*the value of  $y$  when  $x = 1.3$ ,*

- (ii) nilai  $x$  apabila  $y = -15$ .  
*the value of  $x$  when  $y = -15$ .*

[2 markah/marks]

- (d) Lukis satu garis lurus yang sesuai pada graf di ruang jawapan **12(b)** untuk mencari satu nilai  $x$  yang memuaskan persamaan  $2x^2 + 3x - 12 = 0$  bagi  $-3 \leq x \leq 4$  dan  $-24 \leq y \leq 24$ .

Nyatakan nilai  $x$  itu.

*Draw a suitable straight line on your graph in the answer space **12(b)** to find the value of  $x$  which satisfy the equation  $2x^2 + 3x - 12 = 0$  for  $-3 \leq x \leq 4$  and  $-24 \leq y \leq 24$ .*

*State this value of  $x$ .*

[4 markah/marks]

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Use

Jawapan / Answer:

(a)  $y = \frac{12}{x}$

|   |    |      |     |      |     |    |   |   |   |
|---|----|------|-----|------|-----|----|---|---|---|
| x | -3 | -1.5 | -1  | -0.5 | 0.5 | 1  | 2 | 3 | 4 |
| y | -4 |      | -12 | -24  | 24  | 12 | 6 |   | 3 |

Jadual 12  
Table 12

(b) Rujuk graf di halaman 23.

*Refer graph on page 23.*

(c) (i)  $y = \dots\dots\dots$

(ii)  $x = \dots\dots\dots$

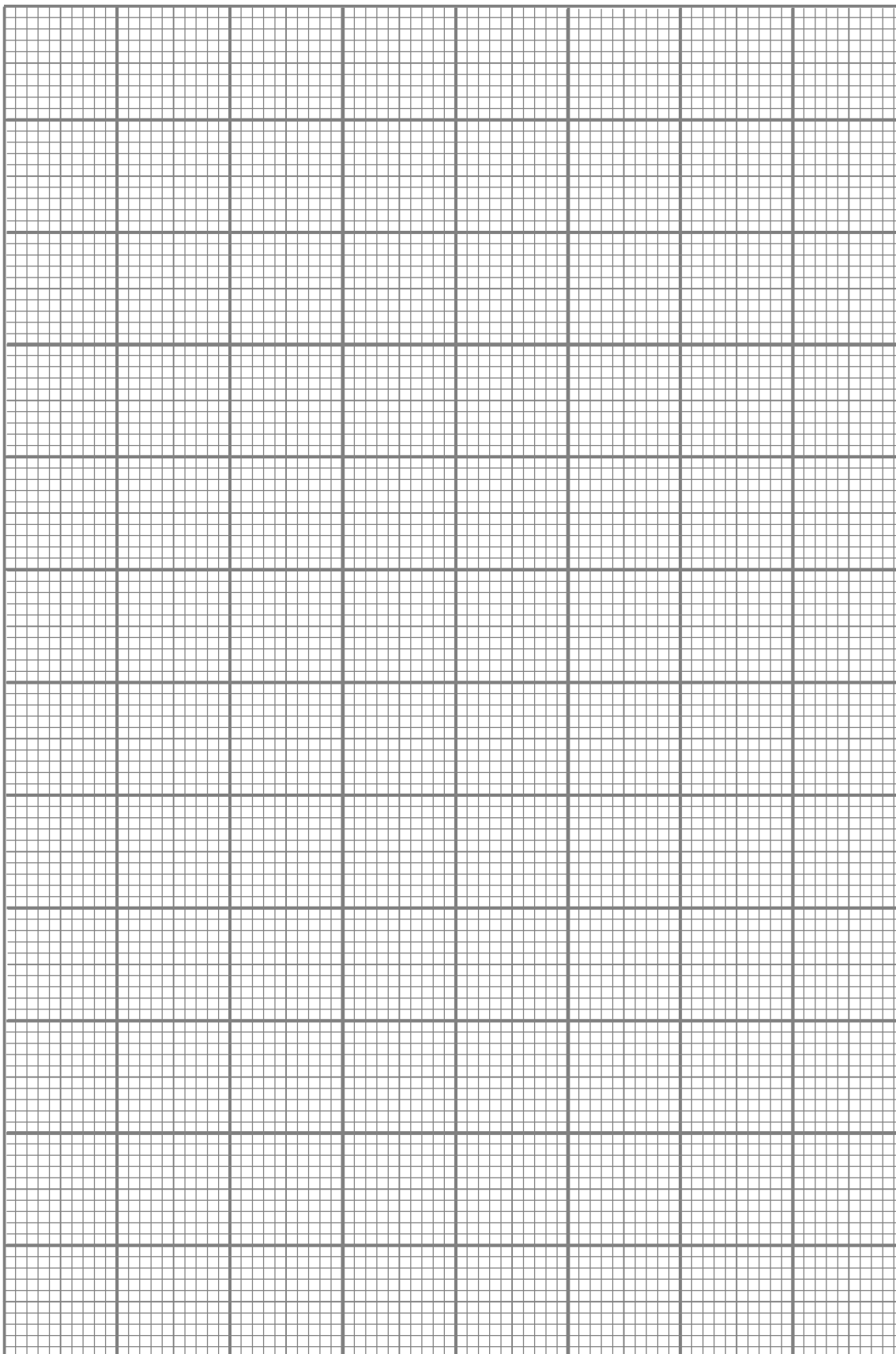
(d)

$x = \dots\dots\dots$

**Graf untuk Soalan12**  
**Graph for Question 12**

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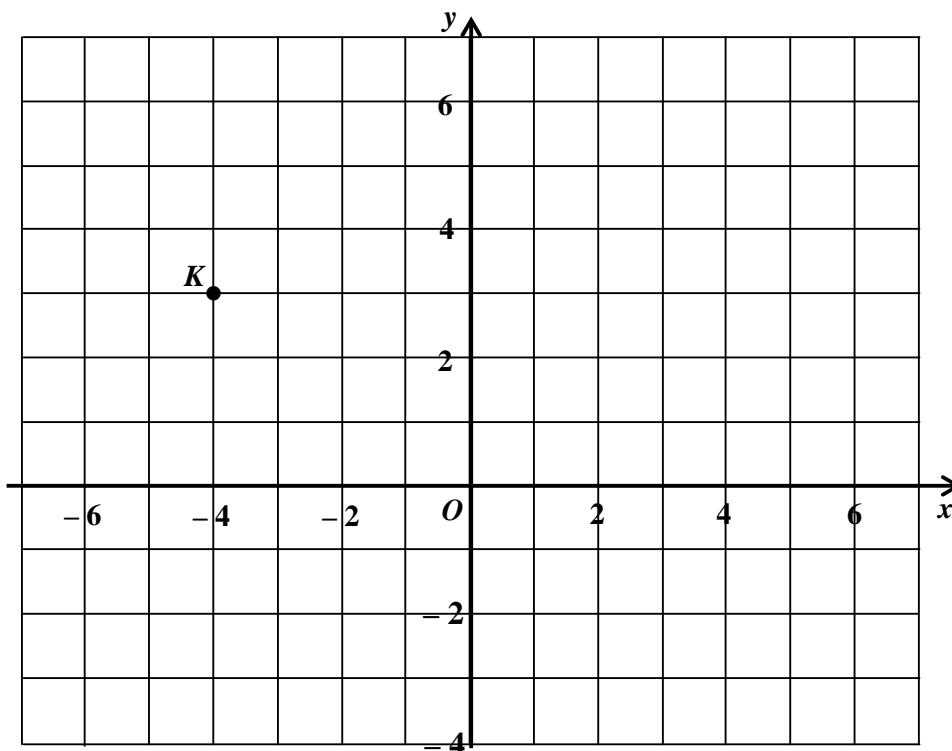
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Use

- 13 Rajah 13.1 menunjukkan titik  $K$  dilukis pada suatu satah Cartesan.

Diagram 13.1 shows point  $K$  drawn on a Cartesian plane.



Rajah 13.1  
Diagram 13.1

- (a) Penjelmaan  $\mathbf{T}$  ialah satu translasi  $\begin{pmatrix} 5 \\ -2 \end{pmatrix}$ .

Penjelmaan  $\mathbf{R}$  ialah satu pantulan pada garis lurus  $y = 1$ .

Nyatakan koordinat imej bagi titik  $K$  di bawah penjelmaan berikut:

Transformation  $\mathbf{T}$  is a translation  $\begin{pmatrix} 5 \\ -2 \end{pmatrix}$ .

Transformation  $\mathbf{R}$  is a reflection in the straight line  $y = 1$ .

State the coordinates of the image of point  $K$  under the following transformations:

- (i)  $\mathbf{T}$ ,  
(ii)  $\mathbf{TR}$ .

[3 markah/marks]

**SULIT**

25

**1449/2**

Jawapan / Answer:

(a) (i)

(ii)

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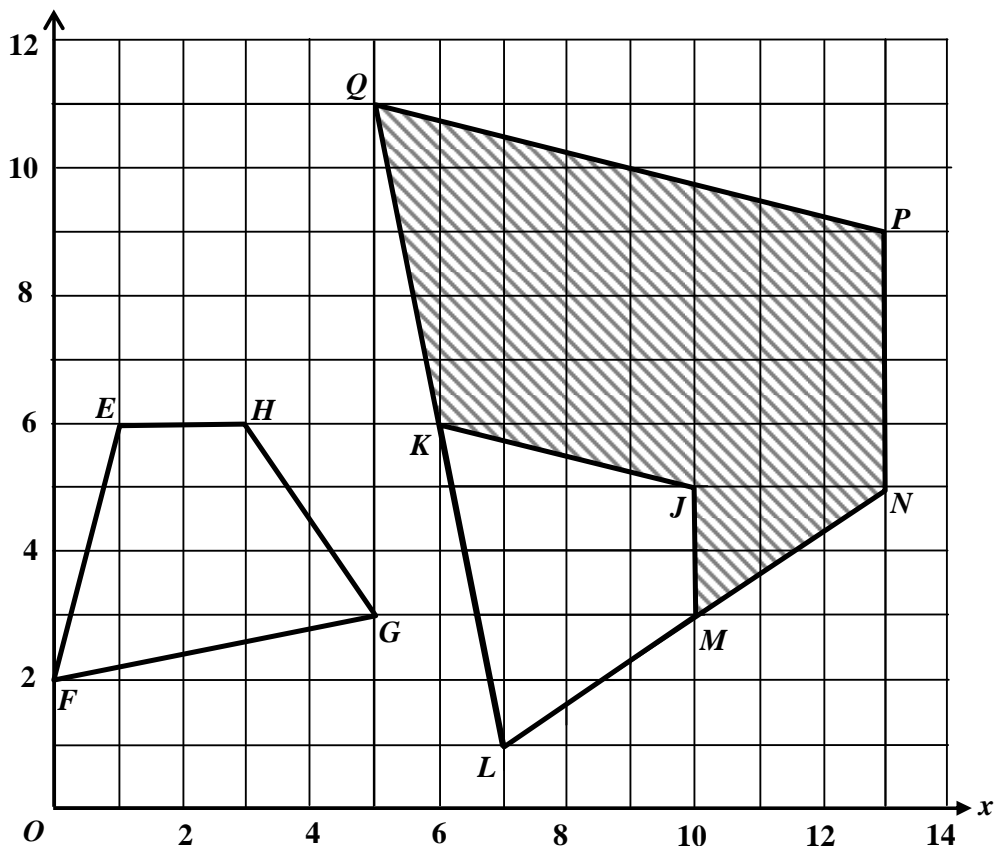
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Use

- (b) Rajah 13.2 menunjukkan sisi empat  $EFGH$ ,  $JKLM$  dan  $PQLN$  dilukis pada satu satah Cartesan.

*Diagram 13.2 shows quadrilaterals  $EFGH$ ,  $JKLM$  and  $PQLN$ , drawn on a Cartesian plane.*



Rajah 13.2  
Diagram 13.2

- (i)  $PQLN$  ialah imej bagi  $EFGH$  di bawah gabungan penjelmaan  $VU$ .

Huraikan selengkapnya penjelmaan:

*$PQLN$  is the image of  $EFGH$  under the combined transformation  $VU$ .*

*Describe in full, the transformation:*

(a)  $U$ .

(b)  $V$ .

**SULIT**

- (ii) Diberi bahawa  $EFGH$  mewakili suatu kawasan yang mempunyai luas  $25.5 \text{ m}^2$ .

Hitung luas, dalam  $\text{m}^2$ , kawasan yang diwakili oleh kawasan berlorek.

*It is given that  $EFGH$  represents a region of area  $25.5 \text{ m}^2$ .*

*Calculate the area, in  $\text{m}^2$ , of the region represented by the shaded region.*

[9 markah/marks]

Jawapan / Answer:

(b) (i) (a) **U:**

(b) **V:**

(ii)

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- 14** Data dalam Rajah 14 menunjukkan berat daging, dalam kg, yang dijual setiap hari dalam tempoh 40 hari.

*The data in Diagram 14 shows the weight of meat, in kg, sold each day over 40 days.*

|    |    |    |    |    |    |    |    |    |    |
|----|----|----|----|----|----|----|----|----|----|
| 35 | 64 | 44 | 46 | 66 | 70 | 69 | 78 | 93 | 48 |
| 42 | 51 | 65 | 77 | 83 | 56 | 76 | 85 | 57 | 93 |
| 60 | 73 | 72 | 61 | 55 | 67 | 45 | 36 | 71 | 67 |
| 80 | 40 | 57 | 59 | 71 | 81 | 92 | 60 | 63 | 53 |

Rajah 14  
Diagram 14

- (a) (i) Berdasarkan data di Rajah 14, lengkapkan Jadual 14 pada ruang jawapan.

*Based on the data in Diagram 14, complete Table 14 in the answer space.*

[4 markah/marks]

- (ii) Berdasarkan Jadual 14, hitung min anggaran berat daging yang dijual dalam tempoh 40 hari.

*Based on Table 14, calculate the estimated mean of the weight of meat sold over 40 days.*

[3 markah/marks]

- (b) Untuk ceraian soalan ini, gunakan kertas graf yang disediakan di halaman 31.

*For this part of the question, use the graph paper provided on page 31.*

Menggunakan skala 2 cm kepada 10 kg pada paksi mengufuk dan 2 cm kepada 1 hari pada paksi mencancang, lukis satu poligon kekerapan bagi data tersebut.

*Using the scale of 2 cm to 10 kg on the horizontal axis and 2 cm to 1 day on the vertical axis, draw a frequency polygon for the data.*

[4 markah/marks]

- (c) Berdasarkan poligon kekerapan di ruang jawapan **14(b)**, nyatakan bilangan hari, berat daging dapat dijual lebih daripada 69 kg.

*Based on the frequency polygon in the answer space **14(b)**, state the number of days, the weight of meat sold more than 69 kg.*

[1 markah/marks]

Jawapan / Answer:

(a)(i)

| <b>Berat<br/>Weight</b> | <b>Titik Tengah<br/>Midpoint</b> | <b>Frekuensi<br/>Frequency</b> |
|-------------------------|----------------------------------|--------------------------------|
| 30 – 39                 |                                  |                                |
|                         |                                  |                                |
|                         |                                  |                                |
|                         |                                  |                                |
|                         |                                  |                                |
|                         |                                  |                                |
|                         |                                  |                                |

Jadual 14  
Table 14

(ii)

(b) Rujuk graf di halaman 31.

*Refer graph on page 31*

(c)

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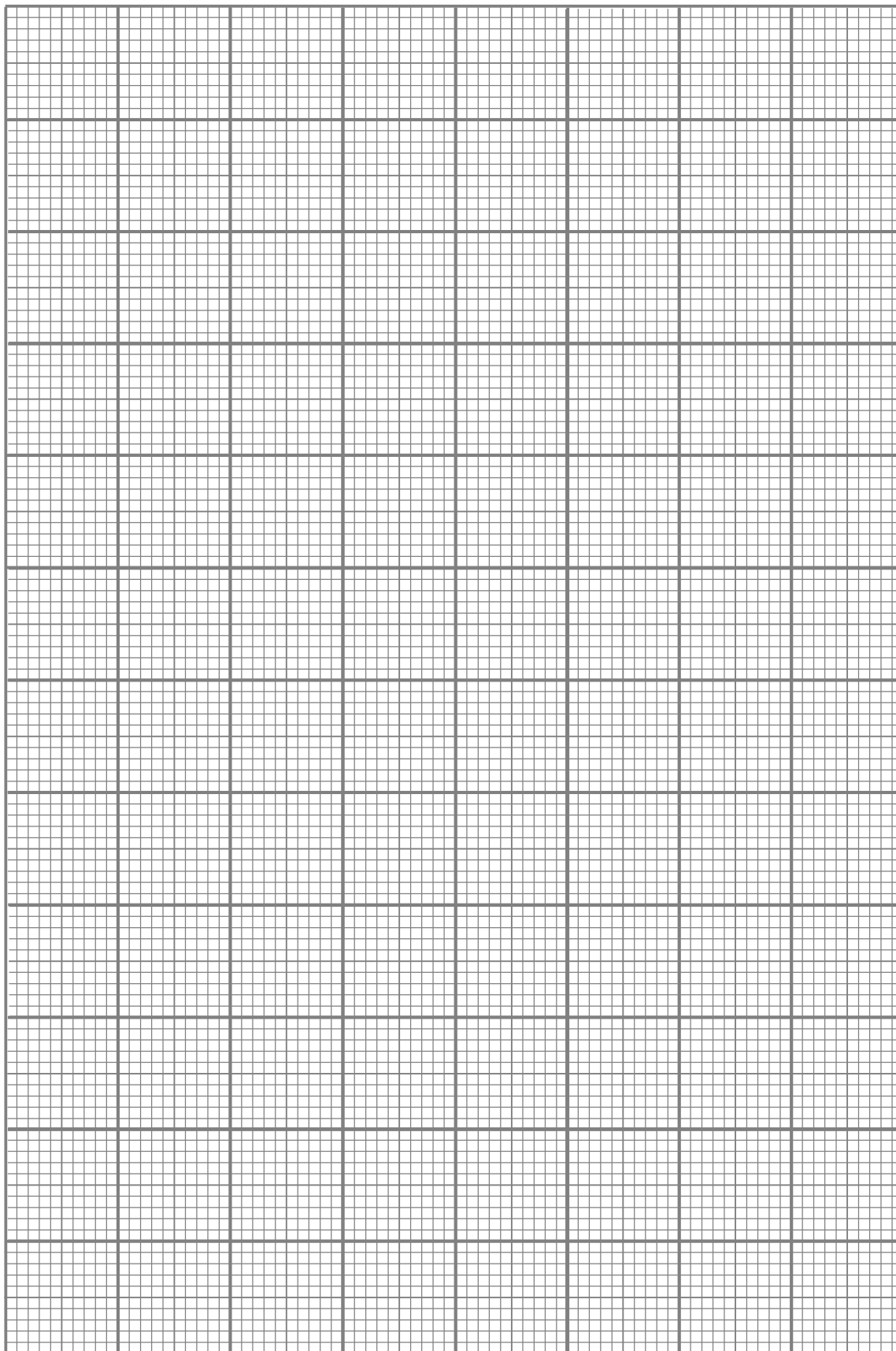
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**Graf untuk Soalan 14**  
**Graph for Question 14**

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- 15 You are **not** allowed to use graph paper to answer this question.

Anda **tidak** dibenarkan menggunakan kertas graf untuk menjawab soalan ini.

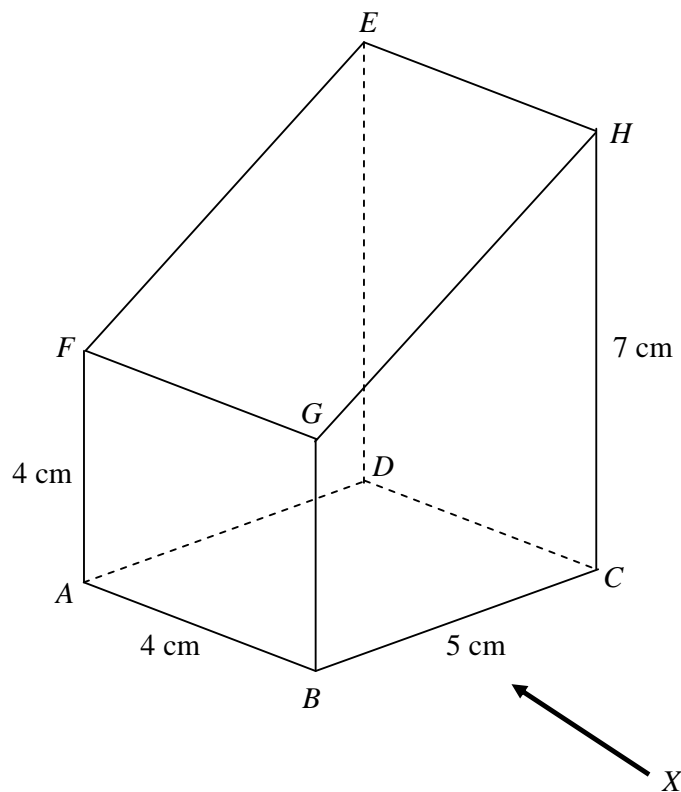
- (a) Rajah 15.1 menunjukkan sebuah pepejal berbentuk prisma tegak dengan tapak segi empat tepat  $ABCD$  terletak di atas satah mengufuk. Permukaan  $BCHG$  ialah keratan rentas seragam prisma itu. Tepi  $BG$  dan  $CH$  adalah tegak. Segi empat tepat  $EFGH$  ialah satah condong.

*Diagram 15.1 shows a solid right prism with rectangular base  $ABCD$  on a horizontal plane.*

*The surface  $BCHG$  is the uniform cross-section of the prism.*

*$BG$  and  $CH$  are vertical edges.*

*Rectangle  $EFGH$  is an inclined plane.*



Rajah 15.1  
Diagram 15.1

Lukis dengan skala penuh, dongakan pepejal itu pada satah mencancang yang selari dengan  $BC$  sebagaimana dilihat dari  $X$ .

*Draw to full scale, the elevation of the solid on a vertical plane parallel to  $BC$  as viewed from  $X$ .*

[3 markah/marks]

**SULIT**

33

**1449/2**Jawapan / *Answer*:**15 (a)***Untuk  
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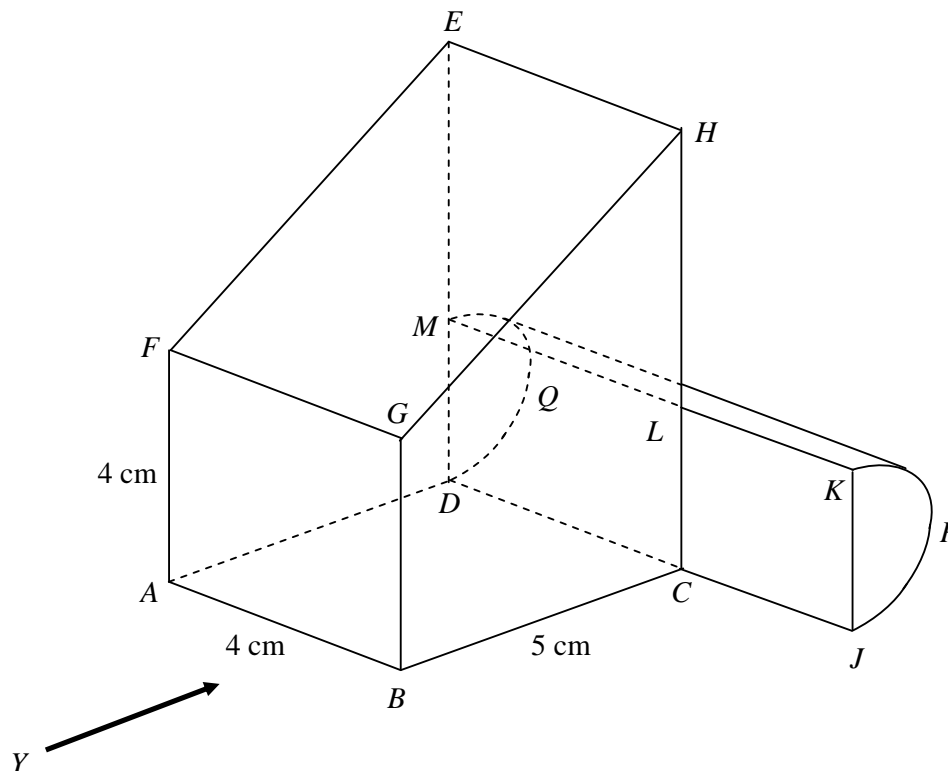
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- (b) Sebuah pepejal berbentuk separuh silinder berdiameter 3 cm dicantumkan kepada prisma dalam Rajah 15.1 pada satah  $CLMD$ . Gabungan pepejal adalah seperti yang ditunjukkan dalam Rajah 15.2. Diberi panjang separuh silinder ialah 7 cm.

*A half-cylinder solid of diameter 3 cm is joined to the prism in Diagram 15.1 at the plane  $CLMD$ . The composite solid is as shown in Diagram 15.2. Given the length of the half cylinder is 7 cm.*



Rajah 15.2  
Diagram 15.2

Lukis dengan skala penuh,

*Draw to full scale,*

- (i) pelan gabungan pepejal itu.

*the plan of the composite solid.*

[4 markah/marks]

- (ii) dongakan gabungan pepejal itu pada satah mencancang yang selari dengan  $AB$  sebagaimana dilihat dari  $Y$ .

*the elevation of the composite solid on a vertical plane parallel to  $AB$  as viewed from  $Y$ .*

[5 markah/marks]

**SULIT**

35

**1449/2**

Jawapan / Answer:

(b) (i), (ii)

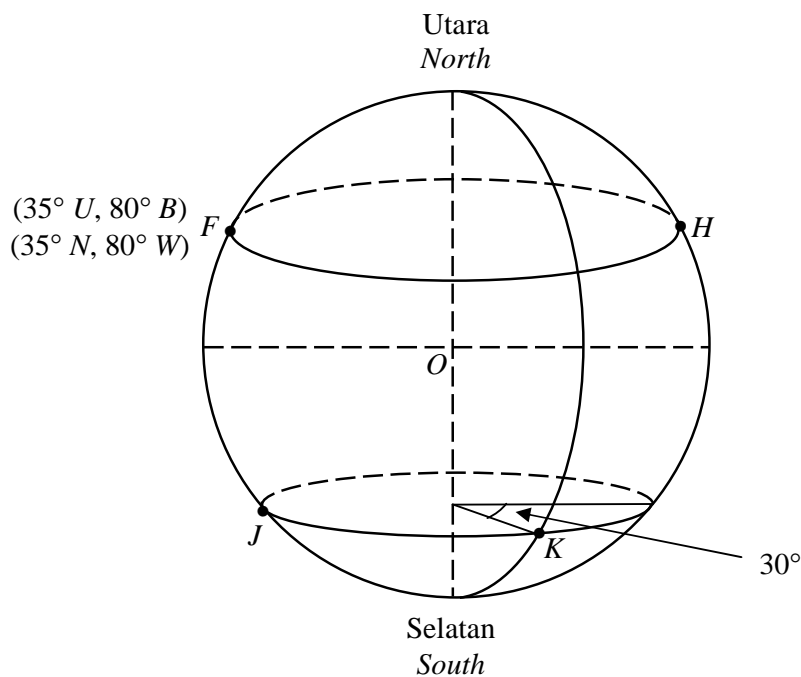
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- 16 Rajah 16 menunjukkan empat titik,  $F$ ,  $H$ ,  $J$  dan  $K$ , di permukaan bumi.  $FH$  ialah diameter selarian latitud  $35^\circ U$ .  $J$  dan  $K$  terletak pada selarian latitud  $40^\circ S$ .

Diagram 16 shows four points  $F$ ,  $H$ ,  $J$  and  $K$ , on the surface of the earth.  $FH$  is the diameter of the parallel of latitude of  $35^\circ N$ .  $J$  and  $K$  lie on the common parallel of latitude of  $40^\circ S$ .



Rajah 16  
Diagram 16

- (a) Cari kedudukan bagi  $K$ .

Find the position of  $K$ .

[3 markah/marks]

- (b) Hitung,

Calculate,

- (i) jarak, dalam batu nautika, dari  $J$  arah ke utara ke  $F$  diukur sepanjang permukaan bumi.

the distance, in nautical miles from  $J$  due north to  $F$  measured along the surface of the earth.

- (ii) jarak, dalam batu nautika, dari  $J$  arah ke timur ke  $K$  diukur sepanjang selarian latitud sepunya.

the shortest distance, in nautical miles from  $J$  due east to  $K$  measured along the common parallel of latitude.

[5 markah/marks]

SULIT

- (c) Sebuah kapal terbang berlepas dari  $F$  arah ke timur ke  $H$  mengikut selarian latitud dengan purata laju 600 knot.

Hitung jumlah masa keseluruhan penerbangan itu.

*An aeroplane took off from  $F$  and flew due east to  $H$  along the parallel of latitude with an average speed of 600 knots.*

*Calculate the total time taken for the whole flight.*

[4 markah/marks]

Jawapan / Answer:

(a)

(b) (i)

(ii)

(c)

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Examiner's  
Use*

**KERTAS SOALAN TAMAT  
END OF QUESTION PAPER**

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SULIT**

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**MAKLUMAT UNTUK CALON  
INFORMATION FOR CANDIDATES**

1. Kertas soalan ini mengandungi dua bahagian: **Bahagian A** dan **Bahagian B**.  
*This question paper consists of two sections: **Section A** and **Section B**.*
2. Jawab **semua** soalan dalam **Bahagian A** dan mana-mana **empat** soalan daripada **Bahagian B**.  
*Answer **all** questions in **Section A** and any **four** questions from **Section B**.*
3. Tulis jawapan anda pada ruang yang disediakan dalam kertas soalan ini.  
*Write your answer in the spaces provided in the question paper.*
4. Tunjukkan kerja mengira anda. Ini boleh membantu anda untuk mendapatkan markah.  
*Show your working. It may help you to get marks.*
5. Jika anda hendak menukar jawapan, batalkan jawapan yang telah dibuat. Kemudian tulis jawapan yang baru.  
*If you wish to change your answer, cross out the answer that you have done. Then write down the new answer.*
6. Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.  
*The diagrams in the questions provided are not drawn to scale unless stated.*
7. Markah yang diperuntukkan bagi setiap soalan dan ceraian soalan ditunjukkan dalam kurungan.  
*The marks allocated for each question and sub-part of a question are shown in brackets.*
8. Satu senarai rumus disediakan di halaman 2 hingga 3.  
*A list of formulae is provided on pages 2 to 3.*
9. Sebuah buku sifir matematik empat angka boleh digunakan.  
*A booklet of four-figure mathematical tables can be used.*
10. Anda dibenarkan menggunakan kalkulator saintifik.  
*You may use a scientific calculator.*
11. Serahkan kertas soalan ini kepada pengawas peperiksaan pada akhir peperiksaan.  
*Hand this question paper to the invigilator at the end of the examination.*

**SULIT**

1449/2(PP)

1449/2 (PP)  
Matematik  
Kertas 2  
Peraturan  
Pemarkahan  
Ogos  
2011

MAJLIS PENGETUA SEKOLAH MENENGAH  
NEGERI KEDAH DARUL AMAN

## PROGRAM PENINGKATAN PRESTASI SPM 2011

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MATEMATIK

Kertas 2

PERATURAN PEMARKAHAN

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UNTUK KEGUNAAN PEMERIKSA SAHAJA

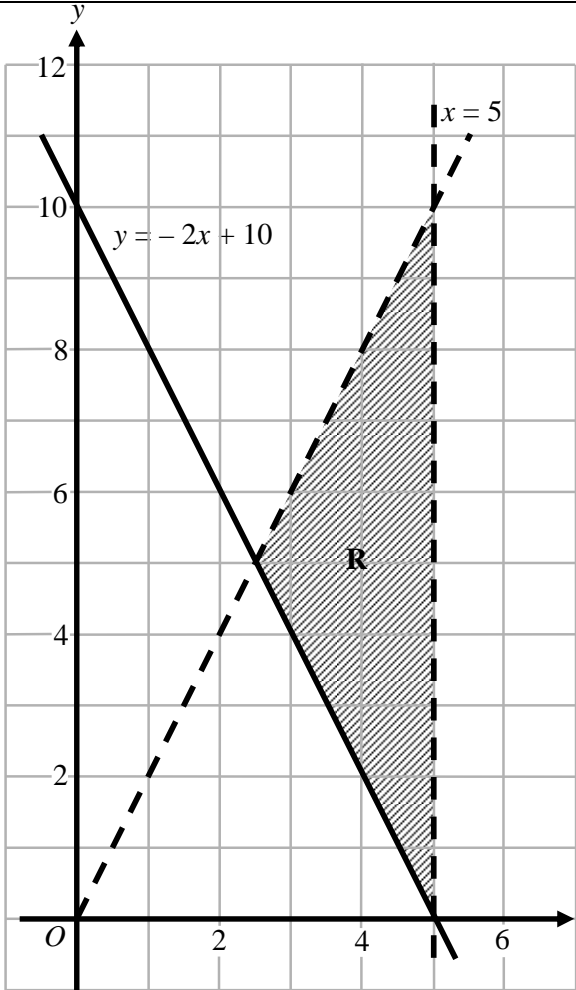
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Peraturan pemarkahan ini mengandungi 18 halaman bercetak

1449/2(PP)

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**SULIT**]

**Section A**  
[ 52 marks]

| Question        | Solution and Mark Scheme   | Marks   |
|-----------------|--|---|
| <p><b>1</b></p> | <div style="text-align: center;">  </div> <p>Straight dotted line <math>y = 2x</math> correctly drawn.</p> <p>Region correctly shaded</p> <p><u>Note:</u></p> <ol style="list-style-type: none"> <li>1 Accept solid line <math>y = 2x</math> for K1</li> <li>2 Award P1 to shaded region bounded by two correct lines, including part of <b>R</b>.<br/>(Check one vertex from any two correct lines)</li> </ol> | <p>K1</p> <p>P2</p> <p style="text-align: center;"><b>3</b></p> |

| Question                | Solution and Mark Scheme  | Marks                                   |                                 |
|-------------------------|---|---|---------------------------------|
| <p>2 (a)</p> <p>(b)</p> | <p><math>\angle AMB</math> or <math>\angle BMA</math></p> <p><math>\sin \angle AMB = \frac{5}{13}</math></p> <p><math>22.6^\circ</math> or <math>22^\circ 37'</math></p>  | <p>P1</p> <p>K1</p> <p>N1</p>           | <p></p> <p></p> <p><b>3</b></p> |
| <p>3</p>                | <p><math>3x^2 - 10x - 8 = 0</math> <u>or</u> equivalent</p> <p><math>(3x + 2)(x - 4) = 0</math> <u>or</u> equivalent</p> <p><b>OR</b></p> <p><math>x = \frac{-(-10) \pm \sqrt{(-10)^2 - 4(3)(-8)}}{2(3)}</math> (K1)</p> <p><math>x = -\frac{2}{3}</math> <u>or</u> <math>-0.67</math></p> <p><math>x = 4</math></p> <p><u>Note</u> : 1. Accept without '= 0'.</p> <p>2. Accept three terms on the same side, in any order.</p> <p>3. Accept <math>\left(x + \frac{2}{3}\right)(x - 4)</math> with <math>x = -\frac{2}{3}</math>, 4 for Kk2.</p> <p>4. Accept correct answer from the correct term without factorisation for Kk2.</p> | <p>K1</p> <p>K1</p> <p>N1</p> <p>N1</p> | <p></p> <p></p> <p><b>4</b></p> |

| Question | Solution and Mark Scheme   | Marks |   |
|----------|--|-------|---|
| 4        | <p> <math>4x - 6y = -24</math> <u>or</u> <math>\frac{10}{3}x - 5y = -20</math> <u>or</u> <math>\frac{6}{5}x + \frac{3}{2}y = -\frac{3}{5}</math> <u>or</u><br/> <math>x + \frac{5}{4}y = -\frac{1}{2}</math> <u>or</u> equivalent<br/> <u>Note :</u><br/>           Attempt to equate one of the coefficients the unknowns, award K1<br/> <math>-11y = -22</math> <u>or</u> <math>\frac{22}{3}x = -22</math> <u>or</u> equivalent<br/> <u>OR</u><br/> <math>x = \frac{3}{2}y - 6</math> <u>or</u> <math>x = -\frac{1}{2} - \frac{5}{4}y</math> <u>or</u> <math>y = \frac{-12 - 2x}{-3}</math> <u>or</u><br/> <math>y = \frac{-2 - 4x}{5}</math> <u>or</u> equivalent (K1)<br/> <u>Note :</u><br/>           Attempt to make one of the unknowns as the subject award K1.<br/> <math>11y = 22</math> <u>or</u> equivalent (K1)<br/> <u>OR</u><br/> <math display="block">\begin{pmatrix} x \\ y \end{pmatrix} = \frac{1}{(1)(5) - (-\frac{3}{2})(4)} \begin{pmatrix} 5 &amp; \frac{3}{2} \\ -4 &amp; 1 \end{pmatrix} \begin{pmatrix} -6 \\ -2 \end{pmatrix}</math> (K2)<br/> <u>Note :</u><br/>           Attempt to write without equation, award (K1)<br/> <math>x = -3</math><br/> <math>y = 2</math><br/> <u>Note :</u><br/> <math>\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} -3 \\ 2 \end{pmatrix}</math> as final answer, award N1         </p> | K1    |   |
|          |  | K1    |   |
|          |  | N1    |   |
|          |  | N1    | 4 |

| Question | Solution and Mark Scheme   | Marks |          |
|----------|--|-------|----------|
| 5        | (a) $10 \times 6 \times 5 = 300$   | K1    |          |
|          | (b) $\frac{1}{2} \times \frac{4}{3} \times \frac{22}{7} \times r^3$  | K1    |          |
|          | $\frac{1}{2} \times \frac{4}{3} \times \frac{22}{7} \times r^3 + 10 \times 6 \times 5 = 356\frac{4}{7}$                                  | K1    |          |
|          | 3<br><br><u>Note :</u><br>1. Accept $\pi$ for K mark.<br>2. Accept correct value from incomplete substitution for K mark.                | N1    | <b>4</b> |
| 6 (a)    | Some /Sebilangan   | P1    |          |
|          | (b) <i>PQRS</i> is a trapezium /<br><i>PQRS adalah trapezium /</i>   | K1    |          |
|          | (c) $2n^2 + 3,$<br><br>$n = 1, 2, 3, \dots$  | K1    |          |
|          | (d) If $m^3 = -27$ then $m = -3$ // Jika $m^3 = -27$ maka $m = -3$<br><br>If $m = -3$ then $m^3 = -27$ // Jika $m = -3$ maka $m^3 = -27$ | K1    |          |
|          |  | K1    | <b>6</b> |

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| Question  | Solution and Mark Scheme | Marks |          |
|---|--------------------------|-------|----------|
| <p>7(a)</p> <p><math>0 = -2x + 15</math> <u>or</u> equivalent</p> <p><math>x = \frac{15}{2}</math> <u>or</u> <math>7\frac{1}{2}</math> <u>or</u> <math>7.5</math></p> <p>Note:</p> <p>1. Accept correct answer without working for K1N1.</p> <p>(b)</p> <p><math>m_{PQ} = -2</math></p> <p><math>\frac{y-6}{x-1} = m_{PQ}</math> <u>or</u> <math>6 = m_{QR}(1) + c</math> <u>or</u> equivalent</p> <p><math>y = -2x + 8</math> <u>or</u> equivalent</p> |                          | K1    |          |
|   |                          | N1    |          |
|   |                          | P1    |          |
|   |                          | K1    |          |
|   |                          | N1    | <b>5</b> |
| <p>8 (a)</p> <p>(2, Q) , (4, R)</p> <p>(b)(i)</p> <p>(2, R) , (4, R)</p> <p><math>\frac{2}{9}</math></p> <p>(ii)</p> <p>(2, Q) , (4, Q) , (7, P) , (7, Q) , (7, R)</p> <p><math>\frac{5}{9}</math></p>  |                          | P1    |          |
|   |                          | K1    |          |
|   |                          | N1    |          |
|   |                          | K1    |          |
|   |                          | N1    | <b>5</b> |

| Question   | Solution and Mark Scheme | Marks   |   |
|--|--------------------------|---|---|
| <p><b>9 (a)</b></p> <p><math>\frac{180}{360} \times 2 \times \frac{22}{7} \times 14</math> <i>or</i> <math>\frac{45}{360} \times 2 \times \frac{22}{7} \times 14</math></p> <p><math>\frac{180}{360} \times 2 \times \frac{22}{7} \times 14 + \frac{45}{360} \times 2 \times \frac{22}{7} \times 14 + 7 + 14 + 7</math></p> <p>83</p> <p><b>(b)</b></p> <p><math>\frac{180}{360} \times \frac{22}{7} \times 14^2</math> <i>or</i> <math>\frac{45}{360} \times \frac{22}{7} \times 14^2</math></p> <p><math>\frac{180}{360} \times \frac{22}{7} \times 14^2 - \frac{45}{360} \times \frac{22}{7} \times 14^2</math> <i>or</i> <math>\frac{135}{360} \times \frac{22}{7} \times 14^2</math></p> <p>231</p> <p><u>NOTE</u></p> <p>1. Accept <math>\pi</math> for K mark.<br/> 2. Accept correct value from incomplete substitution for K mark.<br/> 3. Correct answer from incomplete working, award Kk2.</p> |                          | <p>K1</p> <p>K1</p> <p>N1</p> <p>K1</p> <p>K1</p> <p>N1</p> | <p></p> <p></p> <p></p> <p></p> <p></p> <p></p> |
|  |                          | <b>6</b>  |   |
|  |                          |   |   |
| <p><b>10(a)(i)</b></p> <p>30</p> <p><b>(ii)</b></p> <p>9.30 a.m. / pagi <i>or</i> 0930</p> <p><b>(b)(i)</b></p> <p>38</p> <p><b>(ii)</b></p> <p><math>\frac{76}{1} = 76</math></p> <p><b>(c)(i)</b></p> <p><math>\frac{150}{2 \cdot 5}</math></p> <p><b>(ii)</b></p> <p>60</p>   |                          | <p>P1</p> <p>P1</p> <p>P1</p> <p>P1</p> <p>K1</p> <p>N1</p> | <p></p> <p></p> <p></p> <p></p> <p></p> <p></p> |
|  |                          | <b>6</b>  |   |
|  |                          |   |   |

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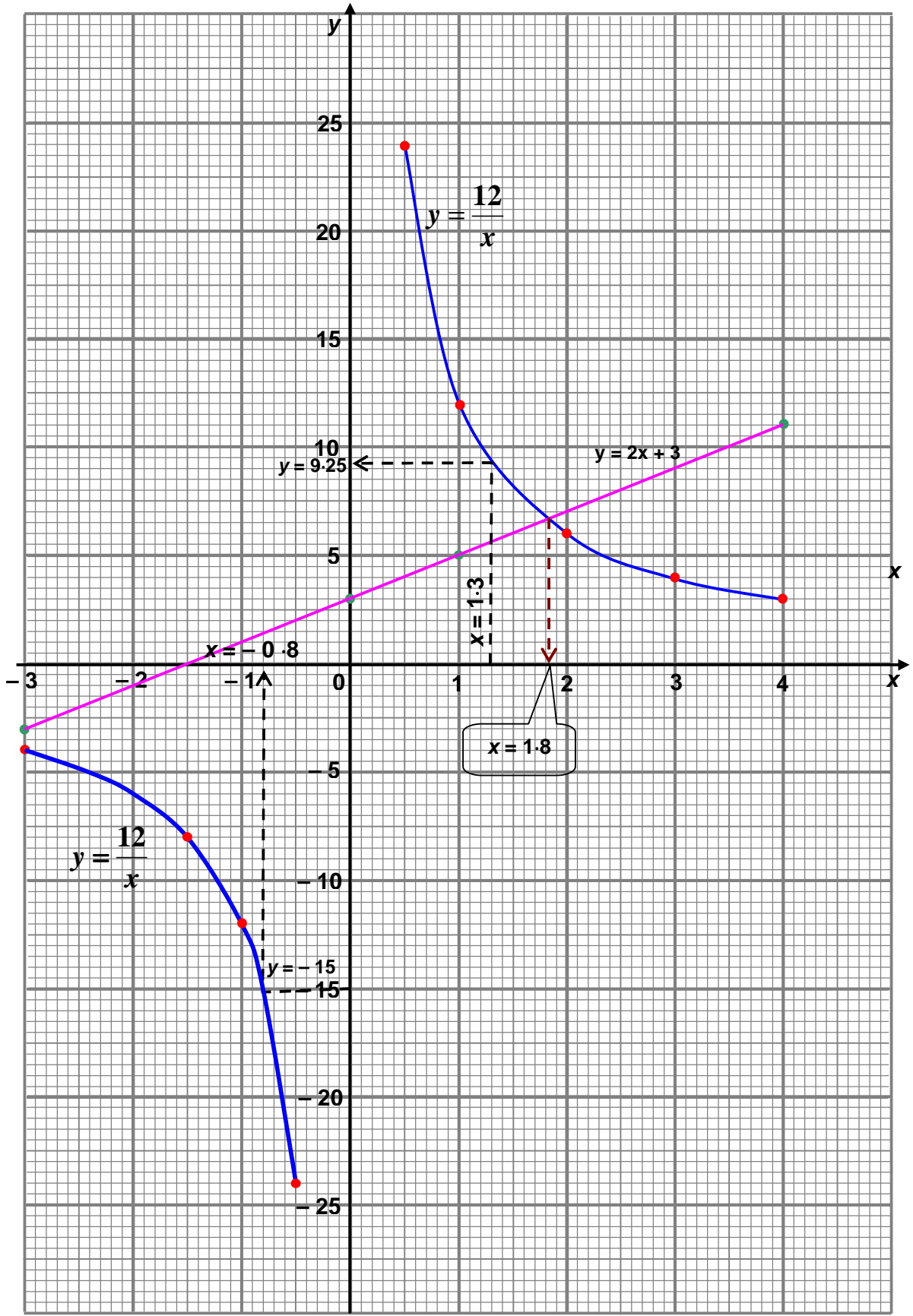
| Question                | Solution and Mark Scheme   | Marks   |   |
|-------------------------|--|---|---|
| <p>11(a)</p> <p>(b)</p> | <p><math>k = 14</math></p> <p><math>p = -4</math></p> $\begin{pmatrix} 2 & -3 \\ 4 & 1 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 4 \\ 1 \end{pmatrix}$ $\begin{pmatrix} x \\ y \end{pmatrix} = \frac{1}{2(1) - (-3)(4)} \begin{pmatrix} 1 & 3 \\ -4 & 2 \end{pmatrix} \begin{pmatrix} 4 \\ 1 \end{pmatrix} \text{ or } \begin{pmatrix} \text{inverse} \\ \text{matrix} \end{pmatrix} \begin{pmatrix} 4 \\ 1 \end{pmatrix}$ <p><math>x = \frac{1}{2}</math> <u>or</u> 0.5</p> <p><math>y = -1</math></p> <p><u>Note:</u></p> <p>1. Do not accept <math>\begin{pmatrix} \text{inverse} \\ \text{matrix} \end{pmatrix} = \begin{pmatrix} 2 &amp; -3 \\ 4 &amp; 1 \end{pmatrix}</math> <u>or</u> <math>\begin{pmatrix} \text{inverse} \\ \text{matrix} \end{pmatrix} = \begin{pmatrix} 1 &amp; 0 \\ 0 &amp; 1 \end{pmatrix}</math></p> <p>2. <math>\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} \frac{1}{2} \\ -1 \end{pmatrix}</math> as final answer, award N1</p> <p>3. Do not accept any solutions solved not using matrix method</p> | <p>P1</p> <p>P1</p> <p>P1</p> <p>K1</p> <p>N1</p> <p>N1</p> | <p></p> <p></p> <p></p> <p></p> <p></p> <p></p> |
|                         |  |   | <b>6</b>  |

## Section B

[ 48 marks]

| Question | Solution and Mark Scheme   | Marks                              |    |
|----------|--|------------------------------------|----|
| 12(a)    | <p>– 8</p> <p>4</p> <p><u>Note</u> : <b>K</b> only meant for table value.</p>  | K1                                 |    |
| (b)      | <p><u>Graph</u></p> <p>Axes drawn in correct direction, uniform scales in <math>-3 \leq x \leq 4</math> and <math>-24 \leq y \leq 24</math>.</p> <p>All 3 points and *1 point (3<sup>rd</sup> quadrant) and 4 Points and * 1 point (1<sup>st</sup> quadrant) correctly plotted <u>or</u> curve passes through these points for <math>-3 \leq x \leq 4</math> and <math>-24 \leq y \leq 24</math>.</p> <p>A smooth and continuous curve without any straight line and passes through all 9 correct points using the given scale for <math>-3 \leq x \leq 4</math> and <math>-24 \leq y \leq 24</math>.</p> <p><u>Note</u> : 1. 7 or 8 points correctly plotted, award K1.<br/>2. Ignore curve out of range.</p> | P1                                 | 2  |
|          |  | K1<br>K1<br>(does not depend on P) |    |
|          |  | N1N1<br>(depends on P and K)       | 5  |
| (c)(i)   | <p><math>8.5 \leq y \leq 9.5</math></p>  | P1                                 |    |
| (ii)     | <p><math>-0.90 \leq x \leq -0.70</math></p>  | P1                                 | 2  |
| (d)      | <p>Straight line <math>y = 2x + 3</math> correctly drawn</p> <p><u>Value of x</u> : <math>1.70 \leq x \leq 1.90</math></p>   | K2                                 |    |
|          |  | N1<br>(dep K2)                     | 3  |
|          | <p><u>Note</u> : 1. Identify equation <math>2x + 3 = \frac{12}{x}</math> <u>or</u> <math>y = 2x + 3</math> award K1<br/>2. Allow N marks if values of <math>x</math> shown on the graph.<br/>3. Values <math>x</math> obtained by calculation, award <b>N0</b>.</p>  |                                    | 12 |

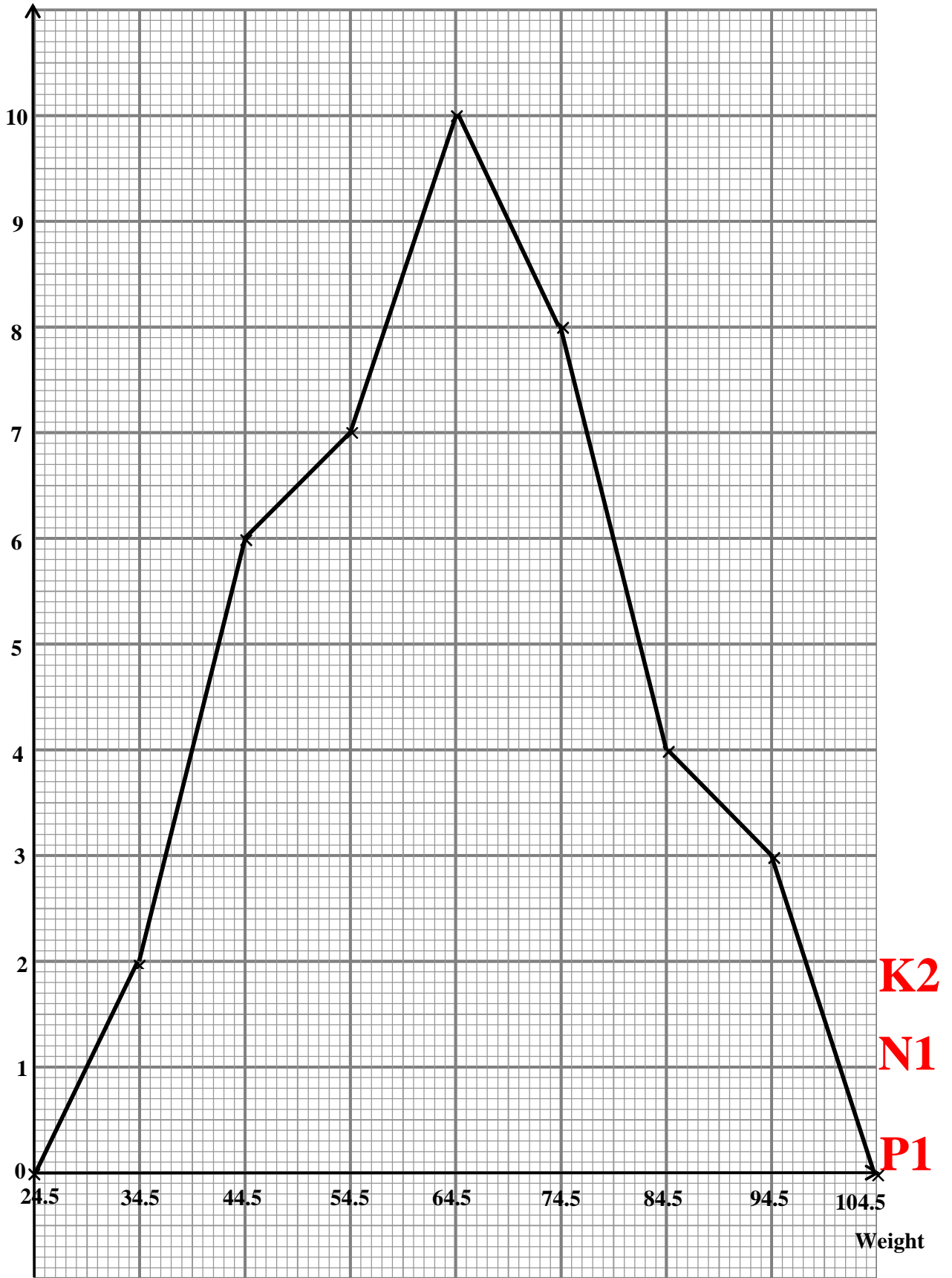
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| Question  | Solution and Mark Scheme  | Marks                 |                       |                     |  |         |      |   |   |         |      |   |    |         |      |   |     |         |      |    |    |         |      |   |   |         |      |   |    |         |      |   |     |  |
|---|---|-----------------------|-----------------------|---------------------|--|---------|------|---|---|---------|------|---|----|---------|------|---|-----|---------|------|----|----|---------|------|---|---|---------|------|---|----|---------|------|---|-----|--|
| 14(a)   | (i) <table border="1" data-bbox="430 275 1144 730"> <thead> <tr> <th>Weight Berat</th> <th>Midpoint Titik Tengah</th> <th>Frequency Frekuensi</th> <th></th> </tr> </thead> <tbody> <tr> <td>30 – 39</td> <td>34.5</td> <td>2</td> <td>I</td> </tr> <tr> <td>40 – 49</td> <td>44.5</td> <td>6</td> <td>II</td> </tr> <tr> <td>50 – 59</td> <td>54.5</td> <td>7</td> <td>III</td> </tr> <tr> <td>60 – 69</td> <td>64.5</td> <td>10</td> <td>IV</td> </tr> <tr> <td>70 – 79</td> <td>74.5</td> <td>8</td> <td>V</td> </tr> <tr> <td>80 – 89</td> <td>84.5</td> <td>4</td> <td>VI</td> </tr> <tr> <td>90 – 99</td> <td>94.5</td> <td>3</td> <td>VII</td> </tr> </tbody> </table> | Weight Berat          | Midpoint Titik Tengah | Frequency Frekuensi |  | 30 – 39 | 34.5 | 2 | I | 40 – 49 | 44.5 | 6 | II | 50 – 59 | 54.5 | 7 | III | 60 – 69 | 64.5 | 10 | IV | 70 – 79 | 74.5 | 8 | V | 80 – 89 | 84.5 | 4 | VI | 90 – 99 | 94.5 | 3 | VII |  |
|   | Weight Berat  | Midpoint Titik Tengah | Frequency Frekuensi   |                     |  |         |      |   |   |         |      |   |    |         |      |   |     |         |      |    |    |         |      |   |   |         |      |   |    |         |      |   |     |  |
|   | 30 – 39   | 34.5                  | 2                     | I                   |  |         |      |   |   |         |      |   |    |         |      |   |     |         |      |    |    |         |      |   |   |         |      |   |    |         |      |   |     |  |
|   | 40 – 49   | 44.5                  | 6                     | II                  |  |         |      |   |   |         |      |   |    |         |      |   |     |         |      |    |    |         |      |   |   |         |      |   |    |         |      |   |     |  |
|   | 50 – 59   | 54.5                  | 7                     | III                 |  |         |      |   |   |         |      |   |    |         |      |   |     |         |      |    |    |         |      |   |   |         |      |   |    |         |      |   |     |  |
|   | 60 – 69   | 64.5                  | 10                    | IV                  |  |         |      |   |   |         |      |   |    |         |      |   |     |         |      |    |    |         |      |   |   |         |      |   |    |         |      |   |     |  |
|   | 70 – 79   | 74.5                  | 8                     | V                   |  |         |      |   |   |         |      |   |    |         |      |   |     |         |      |    |    |         |      |   |   |         |      |   |    |         |      |   |     |  |
|   | 80 – 89   | 84.5                  | 4                     | VI                  |  |         |      |   |   |         |      |   |    |         |      |   |     |         |      |    |    |         |      |   |   |         |      |   |    |         |      |   |     |  |
|   | 90 – 99   | 94.5                  | 3                     | VII                 |  |         |      |   |   |         |      |   |    |         |      |   |     |         |      |    |    |         |      |   |   |         |      |   |    |         |      |   |     |  |
|   | Frequency : (I to VII)  | P2                    |                       |                     |  |         |      |   |   |         |      |   |    |         |      |   |     |         |      |    |    |         |      |   |   |         |      |   |    |         |      |   |     |  |
| Class interval : (II to VII)  | P1  |                       |                       |                     |  |         |      |   |   |         |      |   |    |         |      |   |     |         |      |    |    |         |      |   |   |         |      |   |    |         |      |   |     |  |
| Midpoint : (I to VII)   | P1  |                       |                       |                     |  |         |      |   |   |         |      |   |    |         |      |   |     |         |      |    |    |         |      |   |   |         |      |   |    |         |      |   |     |  |
| <u>Note :</u>   |   |                       |                       |                     |  |         |      |   |   |         |      |   |    |         |      |   |     |         |      |    |    |         |      |   |   |         |      |   |    |         |      |   |     |  |
| Allow one mistake in frequency for P1   |   | 4                     |                       |                     |  |         |      |   |   |         |      |   |    |         |      |   |     |         |      |    |    |         |      |   |   |         |      |   |    |         |      |   |     |  |
| (ii)  |   |                       |                       |                     |  |         |      |   |   |         |      |   |    |         |      |   |     |         |      |    |    |         |      |   |   |         |      |   |    |         |      |   |     |  |
| $\frac{34.5 \times 2 + 44.5 \times 6 + 54.5 \times 7 + 64.5 \times 10 + 74.5 \times 8 + 84.5 \times 4 + 94.5 \times 3}{2 + 6 + 7 + 10 + 8 + 4 + 3}$ | K2  |                       |                       |                     |  |         |      |   |   |         |      |   |    |         |      |   |     |         |      |    |    |         |      |   |   |         |      |   |    |         |      |   |     |  |
| $\frac{2580}{40}$   | N1  |                       |                       |                     |  |         |      |   |   |         |      |   |    |         |      |   |     |         |      |    |    |         |      |   |   |         |      |   |    |         |      |   |     |  |
| = 64.5  |   | 3                     |                       |                     |  |         |      |   |   |         |      |   |    |         |      |   |     |         |      |    |    |         |      |   |   |         |      |   |    |         |      |   |     |  |
| (b)   |   |                       |                       |                     |  |         |      |   |   |         |      |   |    |         |      |   |     |         |      |    |    |         |      |   |   |         |      |   |    |         |      |   |     |  |
| Axes drawn in the correct direction with uniform scale for  |   | P1                    |                       |                     |  |         |      |   |   |         |      |   |    |         |      |   |     |         |      |    |    |         |      |   |   |         |      |   |    |         |      |   |     |  |
| $34.5 \leq x \leq 94.5$ and $0 \leq y \leq 10^*$  |   |                       |                       |                     |  |         |      |   |   |         |      |   |    |         |      |   |     |         |      |    |    |         |      |   |   |         |      |   |    |         |      |   |     |  |
| Horizontal axes labeled with values of midpoint / upper boundry / Class interval  |   |                       |                       |                     |  |         |      |   |   |         |      |   |    |         |      |   |     |         |      |    |    |         |      |   |   |         |      |   |    |         |      |   |     |  |
| *7 points correctly plotted   |   | K2                    |                       |                     |  |         |      |   |   |         |      |   |    |         |      |   |     |         |      |    |    |         |      |   |   |         |      |   |    |         |      |   |     |  |
| <u>Note :</u>   |   |                       |                       |                     |  |         |      |   |   |         |      |   |    |         |      |   |     |         |      |    |    |         |      |   |   |         |      |   |    |         |      |   |     |  |
| *5 or *6 points correctly plotted, award K1   |   |                       |                       |                     |  |         |      |   |   |         |      |   |    |         |      |   |     |         |      |    |    |         |      |   |   |         |      |   |    |         |      |   |     |  |
| Frequency polygon passes all 9 correct points.  |   | N1                    |                       |                     |  |         |      |   |   |         |      |   |    |         |      |   |     |         |      |    |    |         |      |   |   |         |      |   |    |         |      |   |     |  |
|   |   | 4                     |                       |                     |  |         |      |   |   |         |      |   |    |         |      |   |     |         |      |    |    |         |      |   |   |         |      |   |    |         |      |   |     |  |
| (c)   |   |                       |                       |                     |  |         |      |   |   |         |      |   |    |         |      |   |     |         |      |    |    |         |      |   |   |         |      |   |    |         |      |   |     |  |
| 15  |   | P1                    |                       |                     |  |         |      |   |   |         |      |   |    |         |      |   |     |         |      |    |    |         |      |   |   |         |      |   |    |         |      |   |     |  |
|   |   | 1                     |                       |                     |  |         |      |   |   |         |      |   |    |         |      |   |     |         |      |    |    |         |      |   |   |         |      |   |    |         |      |   |     |  |
|   |   | 12                    |                       |                     |  |         |      |   |   |         |      |   |    |         |      |   |     |         |      |    |    |         |      |   |   |         |      |   |    |         |      |   |     |  |

**SULIT**  
Frequency

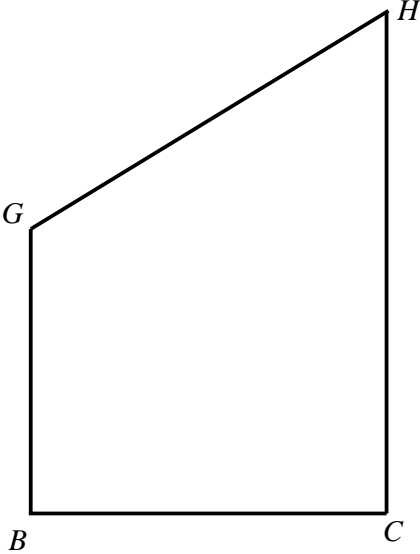


**K2**

**N1**

**P1**

| Question | Solution and Mark Scheme  | Marks |  |
|----------|---|-------|--|
| 15       | <p><u>Note :</u></p> <p>(1) Accept drawing only (not sketch).</p> <p>(2) Accept diagrams with wrong labels and ignore wrong labels.</p> <p>(3) Accept correct rotation of diagrams.</p> <p>(4) Lateral inversions are not accepted.</p> <p>(5) If more than 3 diagrams are drawn, award mark to the correct ones only.</p> <p>(6) For extra lines (dotted or solid) except construction lines, no mark is awarded.</p> <p>(7) If other scales are used with accuracy of <math>\pm 0.2</math> cm one way, deduct 1 mark from the N mark obtained, for each part attempted.</p> <p>(8) Accept small gaps extensions at the corners.<br/>For each part attempted :</p> <p>(i) If <math>\leq 0.4</math> cm, deduct 1 mark from the N mark obtained.</p> <p>(ii) If <math>&gt; 0.4</math> cm, no N mark is awarded.</p> <p>(9) If the construction lines cannot be differentiated from the actual lines:</p> <p>(i) <u>Dotted line</u> :<br/>If outside the diagram, award the N mark.<br/>If inside the diagram, award N0.</p> <p>(ii) <u>Solid line</u> :<br/>If outside the diagram, award N0.<br/>If inside the diagram, no mark is awarded.</p> <p>(10) For double lines or non-collinear or bold lines, deduct 1 mark from the N mark obtained, for each part attempted.</p> |       |  |

| Question | Solution and Mark Scheme  | Marks          |          |
|----------|---|----------------|----------|
| 15(a)    | <div style="text-align: center;">  </div> <p>Correct shape with trapezium <math>BCHG</math><br/>All solid lines</p> <p><math>HC &gt; GH &gt; BC &gt; GB</math></p> <p>Measurement correct to <math>\pm 0.2</math> cm (one way) and all angles<br/><math>\angle B, \angle C = 90^\circ \pm 1^\circ</math></p> | K1             |          |
|          |   | K1<br>dep K1   |          |
|          |   | N1 dep<br>K1K1 | <b>3</b> |



| Question | Solution and Mark Scheme   | Marks          |          |
|----------|--|----------------|----------|
| 15(b)(i) | <div style="text-align: center;"> </div> <p>Correct shape with rectangle <math>EFGH</math> and <math>PQEK</math><br/>All solid lines</p> <p><math>PQ &gt; KQ &gt; GH &gt; FG &gt; HK &gt; KP</math></p> <p>Measurement correct to <math>\pm 0.2</math> cm (one way) and<br/>all angles at the vertices of rectangles = <math>90^\circ \pm 1^\circ</math></p> | K1             |          |
|          |  | K1<br>dep K1   |          |
|          |  | N2 dep<br>K1K1 | <b>4</b> |

| Question         | Solution and Mark Scheme   | Marks  |                    |
|------------------|--|--|--------------------|
| <p>15(b)(ii)</p> | <div style="text-align: center;"> </div> <p>Correct shape with rectangle <math>ABHE</math> and <math>FGHE</math>, square <math>ABGF</math> and <math>BJKL</math><br/>                     All solid lines</p> <p><u>Note</u> : Ignore straight line <math>ML</math></p> <p>Dashed line <math>ML</math></p> <p><math>AJ = AE &gt; AF = AB &gt; HG = BJ = JK</math></p> <p>Measurement correct to <math>\pm 0.2</math> cm (one way) and all angles at the vertices of rectangles = <math>90^\circ \pm 1^\circ</math></p> | <p>K1</p> <p>K1<br/>dep K1</p> <p>K1 dep<br/>K1K1</p> <p>N2 dep<br/>K1K1K1</p> | <p>5</p> <p>12</p> |

| Question | Solution and Mark Scheme  | Marks                |                    |
|----------|---|----------------------|--------------------|
| 16(a)    | $(40^\circ S, 70^\circ E)$<br><br><u>Note :</u><br><br>1. $70^\circ E$ <u>or</u> $70^\circ T$ award P2<br>2. $70^\circ$ <u>or</u> $E$ <u>or</u> $70^\circ$ <u>or</u> $T$ award P1 | P3                   | 3                  |
| (b)(i)   | $(35 + 40) \times 60$<br><br>4500   | K1<br><br>N1         | 2                  |
| (ii)     | $(80 + 70) \times 60 \times \cos 40$<br><br>6894.40 <u>or</u> 6894<br><br><u>Note:</u> $80 + 70$ <u>or</u> $\cos 40$ correctly used, award K1                                     | K2<br><br>N1         | 3                  |
| (c)      | $180 \times 60 \times \cos 35$<br><br><u>Note :</u> Usage of $\cos 35$ , award K1<br><br>$\frac{180 \times 60 \times \cos 35}{600}$ 14.74   | K2<br><br><br><br>K1 | 4<br><br><br><br>4 |
|          |   |                      | <b>12</b>          |

**END OF MARK SCHEME**