

SULIT

1449/1

Matematik

Kertas 1

Ogos

2012

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

Nama : .....

Tingkatan : .....



MAJLIS PENGETUA SEKOLAH-SEKOLAH MALAYSIA (MPSM)  
CAWANGAN KELANTAN

PEPERIKSAAN PERCUBAAN SPM  
TINGKATAN LIMA  
2012

MATEMATIK  
KERTAS 1

Masa : Satu Jam Lima Belas Minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

Arahan

1. Tuliskan **nama** dan **tingkatan** anda 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 dikehendaki membaca maklumat di halaman belakang kertas soalan ini.

Kertas soalan ini mengandungi 15 halaman bercetak dan 1 halaman tidak bercetak.

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**SULIT**  
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MATEMATIK (1) PERCUBAAN SPM 2012

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## MATHEMATICAL FORMULAE

### RUMUS MATEMATIK

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

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

### RELATIONS PERKAITAN

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

**SHAPE AND SPACE**  
**BENTUK DAN RUANG**

1. Area of trapezium =  $\frac{1}{2} \times$  sum of parallel sides  $\times$  height  
*Luas trapezium =  $\frac{1}{2} \times$  hasil tambah sisi selari  $\times$  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. Curve surface area of cylinder =  $2\pi rh$   
*Luas permukaan melengkung silinder =  $2\pi jt$*
  
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  
*Isi padu prisma tegak = luas keratan rentas  $\times$  panjang*
  
7. Volume of cylinder =  $\pi r^2 h$   
*Isi padu silinder =  $\pi j^2 t$*
  
8. Volume of cone =  $\frac{1}{3} \pi r^2 h$   
*Isi padu kon =  $\frac{1}{3} \pi j^2 t$*
  
9. Volume of sphere =  $\frac{4}{3} \pi r^3$   
*Isi padu sfera =  $\frac{4}{3} \pi j^3$*
  
10. Volume of right pyramid =  $\frac{1}{3} \times$  base area  $\times$  height  
*Isi padu piramid tegak =  $\frac{1}{3} \times$  luas tapak  $\times$  tinggi*

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

12. 
$$\frac{\text{arc length}}{\text{circumference of circle}} = \frac{\text{angle subtended at centre}}{360^\circ}$$
  
*$$\frac{\text{panjang lengkok}}{\text{lilitan bulatan}} = \frac{\text{sudut pusat}}{360^\circ}$$*

13. 
$$\frac{\text{area of sector}}{\text{area of circle}} = \frac{\text{angle subtended at centre}}{360^\circ}$$
  
*$$\frac{\text{luas sektor}}{\text{luas bulatan}} = \frac{\text{sudut pusat}}{360^\circ}$$*

14. Scale factor,  $k = \frac{PA'}{PA}$   
*Faktor skala,  $k = \frac{PA'}{PA}$*

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

- 1 Which number is rounded off correctly to **three** significant figures?

*Nombor yang manakah dibundarkan betul kepada tiga angka bererti?*

	Number <i>Nombor</i>	Rounded off correctly to two significant figures <i>Dibundarkan betul kepada dua angka bererti</i>
A	0.01266	0.0126
B	0.0127	0.013
C	0.01638	0.0164
D	8237	824

2  $\frac{4.8 \times 10^{-5}}{0.003} =$

- A  $1.6 \times 10^{-8}$       B  $1.6 \times 10^{-7}$       C  $1.6 \times 10^{-3}$       D  $1.6 \times 10^{-2}$

- 3 0.00036 is written as  $v \times 10^w$  in the standard form. Find the value of  $v$  and of  $w$ .

*0.00036 ditulis sebagai  $v \times 10^w$  dalam bentuk piawai. Cari nilai  $v$  dan  $w$ .*

- A  $v = 3.6, w = 4$       B  $v = 3.6, w = -4$       C  $v = 36, w = 5$       D  $v = 36, w = -5$

- 4 The area of a rectangular nursery plot is  $9.6 \text{ km}^2$ . Its length is 4000 m. The width, in m, of the nursery plot is

*Luas tapak semaian yang berbentuk segi empat tepat ialah  $9.6 \text{ km}^2$ . Panjang tapak semaian itu ialah 4000 m. Lebar, dalam m, tapak semaian itu ialah*

- A  $2.4 \times 10^{-3}$       B  $2.4 \times 10^0$       C  $2.4 \times 10^1$       D  $2.4 \times 10^3$

- 5 What is the value of digit 4, in base ten, in the number  $2431_5$ ?

*Apakah nilai bagi digit 4, dalam asas sepuluh, dalam nombor  $2431_5$ ?*

- A 20      B 100      C 400      D 500

6  $10110_2 + 111_2 =$

- A  $11101_2$       B  $10101_2$       C  $1101_2$       D  $1111_2$

- 7 In Diagram 1,  $PQRSTU$  is a regular hexagon.

$QRM$  is a straight line.

*Rajah 1 ialah sebuah heksagon sekata*

*$PQRSTU$ .*

*$QRM$  ialah garis lurus.*

Find the value of  $x$ .

*Cari nilai  $x$ .*

- A  $40^\circ$       C  $60^\circ$   
B  $55^\circ$       D  $15^\circ$

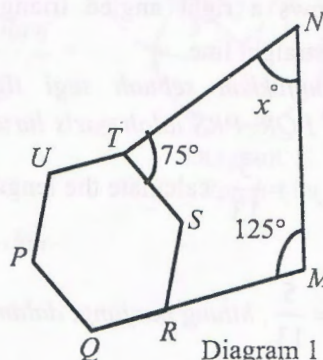


Diagram 1  
Rajah 1

- 8 In Diagram 2,  $PQR$  is a tangent to the circle  $QSTU$  at  $Q$ .

Dalam Rajah 2,  $PQR$  ialah tangen kepada bulatan  $QSTU$  di  $Q$ .

Find the value of  $x^\circ$ .

Cari nilai  $x^\circ$ .

- A  $32^\circ$                       C  $80^\circ$   
 B  $50^\circ$                       D  $100^\circ$

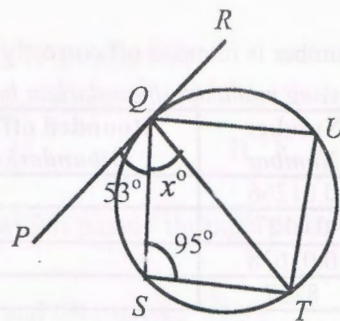


Diagram 2  
Rajah 2

- 9 Under an enlargement, the area of an object is  $5\pi \text{ cm}^2$  and the area of the image is  $45\pi \text{ cm}^2$ . Find the scale factor of the enlargement.

Di bawah suatu pembesaran, luas suatu objek ialah  $5\pi \text{ cm}^2$  dan luas imejnya ialah  $45\pi \text{ cm}^2$ . Cari faktor skala pembesaran itu.

- A 9                      B 3                      C  $\frac{1}{3}$                       D  $\frac{1}{9}$

- 10 Diagram 3 shows seven points on a square grid.  $P'$  is the image of  $P$  under a reflection. Rajah 3 menunjukkan tujuh titik pada grid segi empat sama.  $P'$  ialah imej bagi  $P$  di bawah satu pantulan.

Which of the point, A, B, C or D, is the image of point Q under the same reflection?

Antara titik-titik A, B, C dan D, yang manakah imej bagi titik Q di bawah pantulan yang sama?

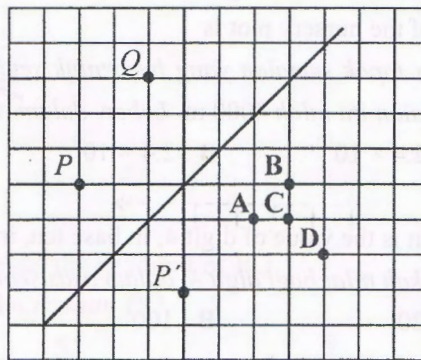


Diagram 3  
Rajah 3

- 11 Diagram 4 shows a right angled triangle  $PQR$ .  $PRS$  is a straight line.

Rajah 4 menunjukkan sebuah segi tiga bersudut tegak  $PQR$ .  $PRS$  ialah garis lurus.

Given that  $\sin y^\circ = \frac{5}{13}$ , calculate the length, in cm, of  $QR$ .

Diberi  $\sin y^\circ = \frac{5}{13}$ , hitung panjang, dalam cm, bagi  $QR$ .

- A 12                      B 24                      C 36                      D 39

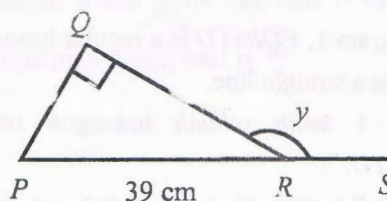


Diagram 4  
Rajah 4

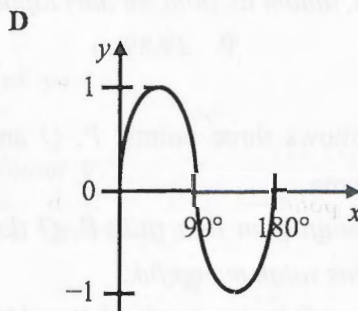
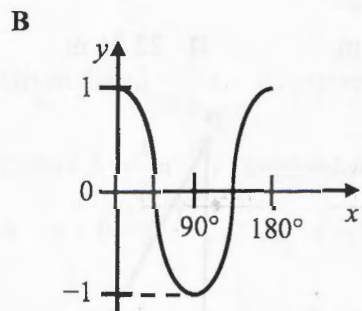
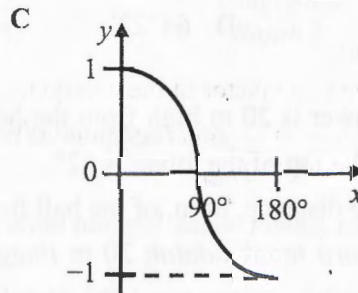
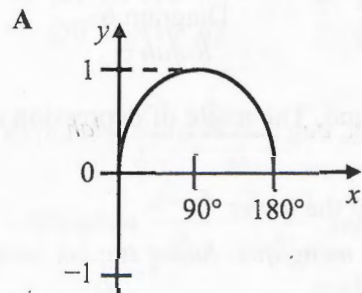
- 12 Given that  $\sin x^\circ = \frac{3}{5}$  where  $90^\circ \leq x^\circ \leq 180^\circ$ , find the value of  $\cos x^\circ$ .

Diberi bahawa  $\sin x^\circ = \frac{3}{5}$  dengan keadaan  $90^\circ \leq x^\circ \leq 180^\circ$ , cari nilai  $\cos x^\circ$ .

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

- 13 Which of the following represents the graph of  $y = \cos x^\circ$  for  $0^\circ \leq x^\circ \leq 180^\circ$ ?

Antara yang berikut, yang manakah mewakili graf  $y = \cos x^\circ$  bagi  $0^\circ \leq x^\circ \leq 180^\circ$ ?



- 14 Diagram 5 shows a right prism  $PQRSTU$  with a rectangular base,  $PQRS$ .

Rajah 5 menunjukkan sebuah prisma tegak  $PQRSTU$  dengan tapak segi empat tepat,  $PQRS$ .

Name the angle between the plane  $TPQ$  and the plane  $PQRS$ .

Namakan sudut antara satah  $TPQ$  dengan satah  $PQRS$ .

- A  $\angle TPS$   
 B  $\angle TQS$   
 C  $\angle TQP$   
 D  $\angle PTS$

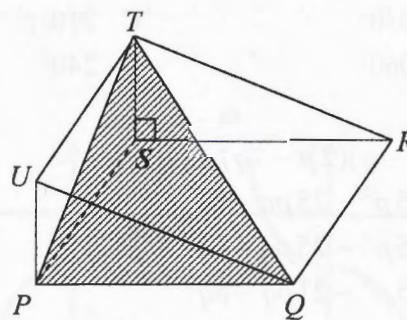


Diagram 5  
Rajah 5

- 15 In Diagram 6,  $R$  and  $Q$  are two points on a horizontal plane.  $P$  is vertically above  $Q$ .  
*Dalam Rajah 6,  $R$  dan  $Q$  adalah dua titik yang terletak di atas satah mengufuk.  $P$  berada tegak di atas  $Q$ .*

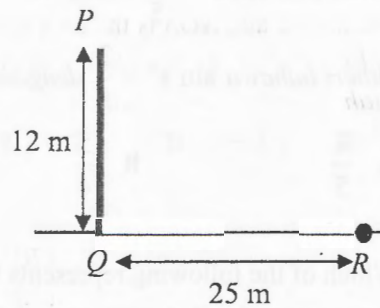


Diagram 6  
 Rajah 6

Calculate the angle of elevation of  $P$  from  $R$ .  
*Hitungkan sudut dongakan  $P$  dari  $R$ .*

- A  $25^\circ 38'$                       C  $28^\circ 41'$   
 B  $61^\circ 19'$                       D  $64^\circ 22'$

- 16 A vertical tower is 20 m high from the horizontal ground. The angle of depression of a ball from the top of the tower is  $42^\circ$ .

Calculate the distance, in m, of the ball from the base of the tower.

*Sebuah menara tegak adalah 20 m tinggi dari tanah mengufuk. Sudut tunduk sebiji bola dari puncak menara tegak itu adalah  $42^\circ$ .*

*Hitung jarak, dalam m, bola itu dari tapak menara tegak.*

- A 18.01 m                      B 29.89 m                      C 13.38 m                      D 22.21 m

- 17 Diagram 7 shows three points,  $P$ ,  $Q$  and  $R$ , on a horizontal plane.

*Rajah 7 menunjukkan tiga titik,  $P$ ,  $Q$  dan  $R$ , yang terletak di atas satah mengufuk.*

It is given that  $Q$  is due south of  $P$  and the bearing of  $R$  from  $P$  is  $150^\circ$ . Find the bearing of  $Q$  from  $R$ .

*Diberi bahawa  $Q$  berada di selatan  $P$  dan bearing  $R$  dari  $P$  ialah  $150^\circ$ . Cari bearing  $Q$  dari  $R$ .*

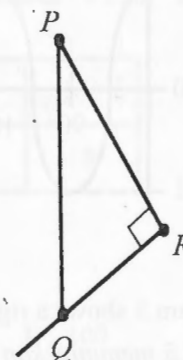


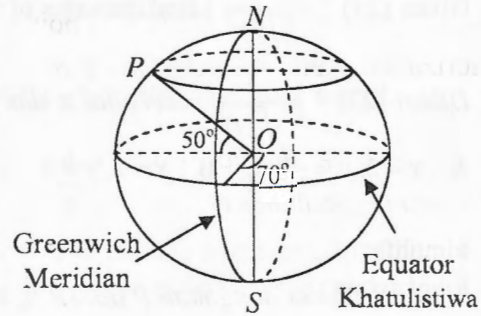
Diagram 7  
 Rajah 7

- A  $030^\circ$                       C  $210^\circ$   
 B  $060^\circ$                       D  $240^\circ$

- 18  $(3p - q)(2p - 7q) - (p + q)^2 =$   
 A  $5p^2 - 25pq + 8q^2$   
 B  $5p^2 - 25pq + 6q^2$   
 C  $5p^2 - 21pq + 8q^2$   
 D  $5p^2 - 21pq + 6q^2$



- 19 In Diagram 8,  $N$  is the North Pole,  $S$  is the South Pole and  $NOS$  is the axis of the earth. Dalam Rajah 8,  $U$  ialah Kutub Utara,  $S$  ialah Kutub Selatan dan  $NOS$  ialah paksi bumi.



Find the position of point  $P$ .  
Cari kedudukan titik  $P$ .

- A.  $(50^\circ N, 70^\circ W)$       C.  $(70^\circ N, 70^\circ E)$   
 $(50^\circ U, 70^\circ B)$        $(70^\circ U, 70^\circ T)$   
 B.  $(50^\circ N, 110^\circ W)$       D.  $(70^\circ N, 110^\circ E)$   
 $(50^\circ U, 110^\circ B)$        $(70^\circ U, 110^\circ T)$

Diagram 8  
Rajah 8

- 20 Express  $\frac{c-3}{2} - \frac{2c+1}{6}$  as a single fraction in its simplest form.

Ungkapkan  $\frac{c-3}{2} - \frac{2c+1}{6}$  sebagai satu pecahan tunggal dalam bentuk termudah.

- A  $\frac{c-10}{6}$       B  $\frac{c-8}{6}$       C  $\frac{c-4}{6}$       D  $\frac{c-2}{6}$

- 21 Given that  $3 = \frac{1}{2}x - y$ , express  $x$  in terms of  $y$ .

Diberi  $3 = \frac{1}{2}x - y$ , ungkapkan  $x$  dalam sebutan  $y$ .

- A  $x = 6 - y$       B  $x = 6 + y$       C  $x = 6 - 2y$       D  $x = 6 + 2y$

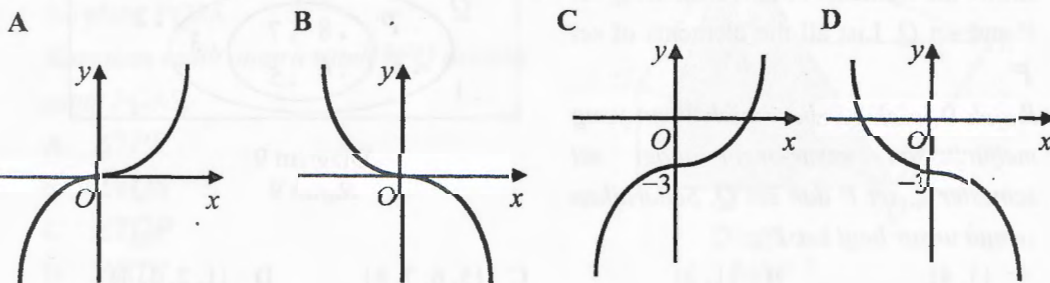
- 22 Given that  $6 + m = 5 - 3(5 - m)$ , find the value of  $m$ .

Diberi bahawa  $6 + m = 5 - 3(5 - m)$ , cari nilai  $m$ .

- A  $-1$       B  $-4$       C  $-8$       D  $8$

- 23 Which one of the following graphs represents  $y = -3x^3$ ?

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



24 Given  $(27)^{\frac{-2}{3}} = \frac{1}{\sqrt[3]{27^x}}$ , find the value of  $x$  and  $y$ .

Diberi  $(27)^{\frac{-2}{3}} = \frac{1}{\sqrt[3]{27^x}}$ , cari nilai  $x$  dan  $y$ .

- A  $x=2, y=-3$     B  $x=2, y=3$     C  $x=3, y=2$     D  $x=3, y=-2$

25 Simplify:

Ringkaskan:

$$\frac{(3e^2 \times 2f^3)^2}{f^5}$$

- A  $6e^2f$     B  $36e^4f$     C  $36e^4$     D  $12e^4f$

26 It is given that  $2 < p \leq 6$  and  $4 - q < 5$ , where  $p$  and  $q$  are integers. Find the maximum value of  $p - q$ .

Diberi bahawa  $2 < p \leq 6$  dan  $4 - q < 5$ , dengan keadaan  $p$  dan  $q$  ialah integer.

Cari nilai terbesar bagi  $p - q$ .

- A 4    B 5    C 6    D 7

27 Table 1 shows the scores of 80 students in a school contest.

Jadual 1 menunjukkan skor yang diperolehi 80 orang murid dalam suatu pertandingan.

Score skor	60	70	80	90	100
Frequency kekerapan	12	21	12	17	18

Table 1 / Jadual 1

Determine the score mode.

Tentukan skor mod.

- A 18    B 21    C 70    D 100

28 Diagram 9 is a Venn diagram which shows the elements of universal set  $\xi$ , set  $P$  and set  $Q$ . List all the elements of set  $P'$ .

Rajah 9 ialah gambar rajah Venn yang menunjukkan unsur-unsur bagi set semester  $\xi$ , set  $P$  dan set  $Q$ . Senaraikan semua unsur bagi set  $P'$ .

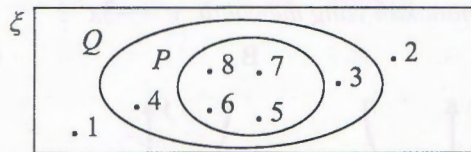


Diagram 9  
Rajah 9

- A  $\{3, 4\}$     B  $\{1, 2\}$     C  $\{5, 6, 7, 8\}$     D  $\{1, 2, 3, 4\}$

- 29 Diagram 10 is an incomplete bar chart representing the number of children in a group of families in a housing area. The bar representing the families that have three children is not shown.

Rajah 10 ialah sebuah carta palang yang tidak lengkap mewakili bilangan anak dalam keluarga di suatu kawasan perumahan. Palang yang mewakili keluarga mempunyai tiga orang anak tidak ditunjukkan.

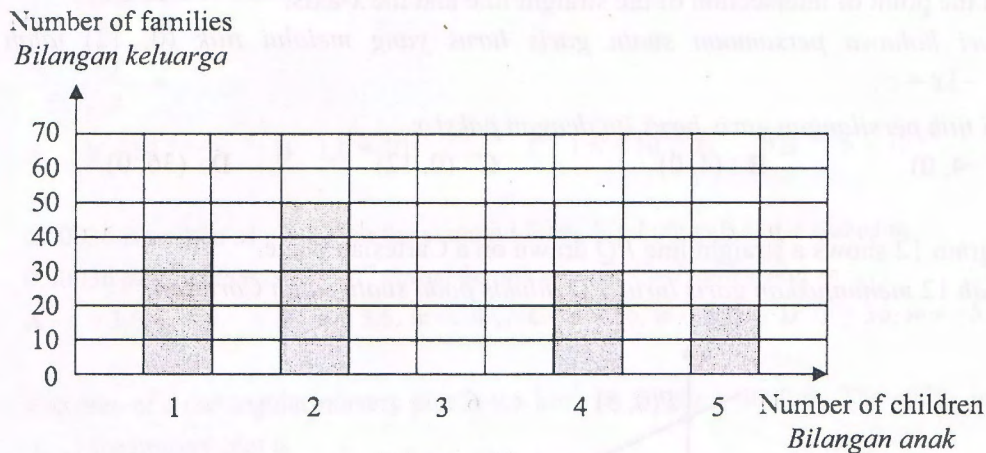


Diagram 10  
Rajah 10

It is given that the total number of families in the housing area is 200.

Find the percentage of families that have three children.

Diberi bahawa jumlah bilangan keluarga di kawasan perumahan itu ialah 200 orang.

Cari peratusan keluarga yang mempunyai tiga orang anak.

- 30 Diagram 11 is an incomplete Venn diagram showing the number of elements in set  $P$ ,  $Q$  and  $R$ .

Rajah 11 ialah gambar rajah Venn yang tidak lengkap yang menunjukkan bilangan unsur dalam set  $P$ ,  $Q$  dan  $R$ .

It is given that the universal set  $\xi = P \cup Q \cup R$  and  $n(P) = 15$ .

Find  $n[(P \cap Q) \cup (Q \cap R) \cup (P \cap R)]$ .

Diberi bahawa set semesta,  $\xi = P \cup Q \cup R$  dan  $n(P) = 15$ .

Cari  $n[(P \cap Q) \cup (Q \cap R) \cup (P \cap R)]$ .

- A 4                      B 10                      C 12                      D 16

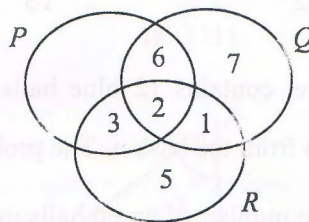


Diagram 11  
Rajah 11

- 31 Given that set  $C = \{0, 1, 2, 3, 4\}$ , find the number of subsets of  $C$ .  
*Diberi bahawa set  $C = \{0, 1, 2, 3, 4\}$ , cari bilangan subset bagi  $C$ .*  
 A 64                      B 32                      C 25                      D 5
- 32 It is given that the equation of a straight line which passes through point  $(0, 12)$  is  $y = -3x + c$ .  
 Find the point of intersection of the straight line and the  $x$ -axis.  
*Diberi bahawa persamaan suatu garis lurus yang melalui titik  $(0, 12)$  ialah  $y = -3x + c$ .*  
*Cari titik persilangan garis lurus itu dengan paksi- $x$ .*  
 A  $(-4, 0)$               B  $(4, 0)$               C  $(0, 12)$               D  $(36, 0)$
- 33 Diagram 12 shows a straight line  $PQ$  drawn on a Cartesian plane.  
*Rajah 12 menunjukkan garis lurus  $PQ$  dilukis pada suatu satah Cartesian.*

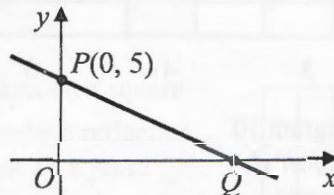


Diagram 12  
 Rajah 12

It is given that the distance of  $PQ$  is 13 unit. Find the gradient of  $PQ$ .  
*Diberi bahawa jarak  $PQ$  ialah 13 unit. Cari kecerunan  $PQ$ .*

- A  $-\frac{5}{12}$               B  $-\frac{5}{13}$               C  $\frac{5}{12}$               D  $\frac{5}{13}$
- 34 A basket contains 12 blue balls and a number of green balls. A ball is chosen at random from the basket. The probability of choosing a green ball is  $\frac{2}{5}$ .  
 Find the number of green balls in the basket.  
*Sebuah bakul mengandungi 12 biji bola biru dan beberapa bola hijau. Sebiji bola dipilih secara rawak daripada bakul itu. Kebarangkalian memilih sebiji bola hijau ialah  $\frac{2}{5}$ . Cari bilangan bola hijau di dalam bakul itu.*  
 A 30              B 20              C 18              D 8

- 35 In a group of 60 students, 20 are girls. Then 8 boys and 4 girls leave the group. If a student is chosen at random from the group, state the probability that the student chosen is a boy.

*Dalam satu kumpulan 60 orang murid, 20 daripadanya adalah murid perempuan. Kemudian seramai 8 orang murid lelaki dan 4 orang murid perempuan meninggalkan kumpulan itu. Jika seorang murid dipilih secara rawak daripada kumpulan itu, nyatakan kebarangkalian bahawa murid yang dipilih itu adalah lelaki.*

- A  $\frac{8}{15}$       B  $\frac{7}{12}$       C  $\frac{1}{3}$       D  $\frac{2}{3}$

- 36 It is given that  $P$  varies inversely as the cube root of  $Q$ .

Find the relation between  $P$  and  $Q$ .

*Diberi bahawa  $P$  berubah secara songsang dengan punca kuasa tiga  $Q$ .*

*Cari hubungan antara  $P$  dan  $Q$ .*

- A  $P \propto \frac{1}{\sqrt[3]{Q}}$       B  $P \propto \frac{1}{Q^3}$       C  $P \propto \sqrt[3]{Q}$       D  $P \propto Q^3$

- 37 The relation between  $p$ ,  $r$  and  $w$  is  $p \propto \frac{\sqrt[3]{r}}{w}$ . Given that  $p = 3$  when  $r = 8$  and  $w = 4$ .

Calculate the value of  $p$  when  $r = 27$  and  $w = 9$ .

*Hubungan antara  $p$ ,  $r$  dan  $w$  ialah  $p \propto \frac{\sqrt[3]{r}}{w}$ . Diberi bahawa  $p = 3$  apabila  $r = 8$  dan*

*$w = 4$ . Hitungkan nilai  $p$  apabila  $r = 27$  dan  $w = 9$ .*

- A 2      B 4      C 6      D  $\frac{1}{3}$

- 38 It is given that  $E$  varies directly as  $F$  and inversely as the square root of  $G$  and  $E = 2$  when  $F = 5$  and  $G = 4$ .

Express  $E$  in terms of  $F$  and  $G$ .

*Diberi bahawa  $E$  berubah secara langsung dengan  $F$  dan secara songsang dengan punca kuasa dua  $G$  dan  $E = 2$  apabila  $F = 5$  dan  $G = 4$ .*

*Ungkapkan  $E$  dalam sebutan  $F$  dan  $G$ .*

- A  $E = \frac{2F}{\sqrt{5G}}$       B  $E = \frac{4F}{5\sqrt{G}}$       C  $E = \frac{5F}{4\sqrt{G}}$       D  $E = \frac{4}{5}F\sqrt{G}$

- 39 Given matrix  $P = \begin{pmatrix} -1 & 5 \end{pmatrix}$  and matrix  $Q = \begin{pmatrix} 3 \\ 2 \end{pmatrix}$ , find the product of  $PQ$ .

Diberi matriks  $P = \begin{pmatrix} -1 & 5 \end{pmatrix}$  dan matriks  $Q = \begin{pmatrix} 3 \\ 2 \end{pmatrix}$ , cari hasil darab  $PQ$ .

- A (7)                      B  $\begin{pmatrix} -3 \\ 10 \end{pmatrix}$                       C (-3 10)                      D  $\begin{pmatrix} -3 & -2 \\ 15 & 10 \end{pmatrix}$

40  $2 \begin{pmatrix} -1 & 0 \\ 3 & -3 \end{pmatrix} - \begin{pmatrix} 1 & -1 \\ 3 & -2 \end{pmatrix} =$

- A  $\begin{pmatrix} -3 & 1 \\ 3 & -4 \end{pmatrix}$                       B  $\begin{pmatrix} -3 & 1 \\ 3 & -8 \end{pmatrix}$                       C  $\begin{pmatrix} -3 & -1 \\ 3 & -4 \end{pmatrix}$                       D  $\begin{pmatrix} -3 & 3 \\ 3 & -4 \end{pmatrix}$

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

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 objective answer sheet.  
*Jawab setiap soalan dengan menghitamkan ruang yang betul pada kertas jawapan objektif.*
4. Blacken only **one** space for each question.  
*Hitamkan satu ruang sahaja bagi setiap soalan.*
5. If you wish to change your answer, erase the blacken mark that you have done. Then blacken the space for the new answer.  
*Jika anda hendak menukar jawapan, padamkan tanda yang telah dibuat. Kemudian hitamkan jawapan yang baru.*
6. The diagrams in the question provided are not drawn to scale unless stated.  
*Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali yang dinyatakan.*
7. A list of formulae is provided on pages 2 to 4.  
*Satu senarai rumus disediakan di halaman 2 hingga 4.*
8. A booklet of four-figure mathematical tables is provided.  
*Sebuah buku sifir matematik empat angka disediakan.*
9. You may use a scientific calculator.  
*Anda dibenarkan menggunakan kalkulator saintifik.*

PEPERIKSAAN PERCUBAAN SPM  
TAHUN 2012MATEMATIK  
KERTAS 1

Masa: Satu Jam Lima Belas Minit

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



SULIT  
1449/2  
Matematik  
Kertas 2  
Ogos  
2012  
2½ jam

Nama : .....

Tingkatan : .....



MAJLIS PENGETUA SEKOLAH-SEKOLAH MALAYSIA ( MPSM )  
CAWANGAN KELANTAN

PEPERIKSAAN PERCUBAAN SPM  
TINGKATAN LIMA  
2012

MATEMATIK  
KERTAS 2

Masa : Dua Jam Tiga Puluh Minit

JANGAN BUKA KERTAS SOALAN INI  
SEHINGGA DIBERITAHU

Arahan

1. Tuliskan *nama dan tingkatan* anda 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 Inggeris atau bahasa Melayu.
5. Calon dikehendaki membaca maklumat di halaman belakang kertas soalan ini.

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

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## MATHEMATICAL FORMULAE

### RUMUS MATEMATIK

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

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

### RELATIONS PERKAITAN

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

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

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

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

5. Distance / Jarak

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

6. Midpoint / Titik tengah

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

7. Average speed =  $\frac{\text{distance travelled}}{\text{time taken}}$

$$\text{Purata laju} = \frac{\text{jarak yang dilalui}}{\text{masa yang diambil}}$$

8. Mean =  $\frac{\text{sum of data}}{\text{number of data}}$

$$\text{Min} = \frac{\text{hasil tambah nilai data}}{\text{bilangan data}}$$

9. Mean =  $\frac{\text{sum of (midpoint of interval} \times \text{frequency)}}{\text{sum of frequency}}$

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

10. Pythagoras Theorem

*Teorem Pithagoras*

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

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

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

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

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

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

**SHAPE AND SPACE**  
**BENTUK DAN RUANG**

1. Area of trapezium =  $\frac{1}{2} \times$  sum of parallel sides  $\times$  height  
*Luas trapezium* =  $\frac{1}{2} \times$  hasil tambah sisi selari  $\times$  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. Curve surface area of cylinder =  $2\pi rh$   
*Luas permukaan melengkung silinder* =  $2\pi rh$
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  
*Isi padu prisma tegak* = *luas keratan rentas*  $\times$  *panjang*
7. Volume of cylinder =  $\pi r^2 h$   
*Isi padu silinder* =  $\pi r^2 h$
8. Volume of cone =  $\frac{1}{3} \pi r^2 h$   
*Isi padu kon* =  $\frac{1}{3} \pi r^2 h$
9. Volume of sphere =  $\frac{4}{3} \pi r^3$   
*Isi padu sfera* =  $\frac{4}{3} \pi r^3$
10. Volume of right pyramid =  $\frac{1}{3} \times$  base area  $\times$  height  
*Isi padu piramid tegak* =  $\frac{1}{3} \times$  *luas tapak*  $\times$  *tinggi*

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11. Sum of interior angles of a polygon =  $(n - 2) \times 180^\circ$

*Hasil tambah sudut pedalaman* =  $(n - 2) \times 180^\circ$

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

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

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

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

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

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

15. Area of image =  $k^2 \times$  area of object

*Luas imej* =  $k^2 \times$  *luas objek*

**Section A**

**Bahagian A**

[52 marks]

[52 markah]

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

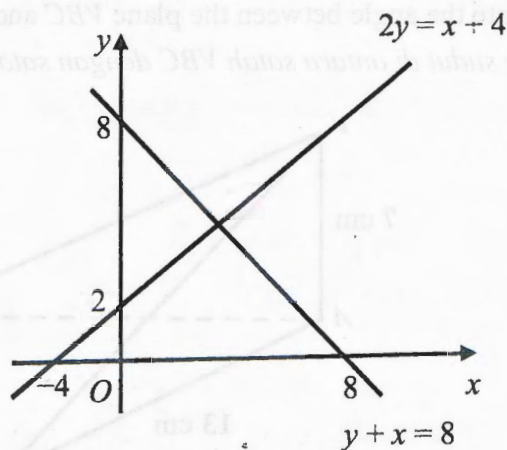
$$y + x \geq 8, 2y \leq x + 4 \text{ and } x < 8.$$

[3 marks]

Pada graf di ruang jawapan, lorek rantau yang memuaskan ketiga-tiga ketaksamaan

$$y + x \geq 8, 2y \leq x + 4 \text{ dan } x < 8.$$

[3 markah]



- 2 Solve the quadratic equation:

Selesaikan persamaan kuadratik berikut:

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

[4 marks]

Answer / Jawapan:

[4 markah]

3 Diagram 3 shows a pyramid  $VABC$ . The vertex  $V$  is vertically above  $A$  and  $E$  is the centre of line  $BC$ .  $ABC$  and  $VBC$  are isosceles triangles.

Rajah 3 menunjukkan sebuah pyramid  $VABC$ . Bucu  $V$  adalah tegak di atas  $A$  dan  $E$  ialah titik tengah garis  $BC$ .  $ABC$  dan  $VBC$  ialah segi tiga kaki sama.

(a) Name the angle between the plane  $VBC$  and the plane  $ABC$ .

Namakan sudut di antara satah  $VBC$  dengan satah  $ABC$ .

(b) Calculate the angle between the plane  $VBC$  and the plane  $ABC$ .

Hitung sudut di antara satah  $VBC$  dengan satah  $ABC$ .

[3 marks]

[3 markah]

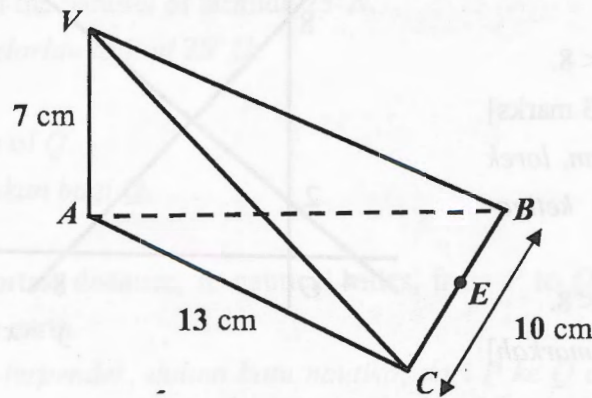


Diagram 3  
Rajah 3

Answer / Jawapan:

(a)

(b)

4 Calculate the value of  $p$  and  $q$  that satisfy the following simultaneous linear equations:

Hitungkan nilai  $p$  dan nilai  $q$  yang memuaskan persamaan linear serentak berikut:

For  
Examiner's  
Use

$$p + 2q = 6$$

$$\frac{3}{2}p - q = -7$$

[4 marks]

[4 markah]

Answer / Jawapan:



For  
Examiner's  
Use

- 5 Diagram 5 shows a solid formed by joining a cuboid and a half cylinder at the rectangular plane  $EFGH$ .

Rajah 5 menunjukkan sebuah pepejal yang terbentuk daripada cantuman sebuah kuboid dan sebuah separuh silinder pada satah segi empat tepat  $EFGH$ .

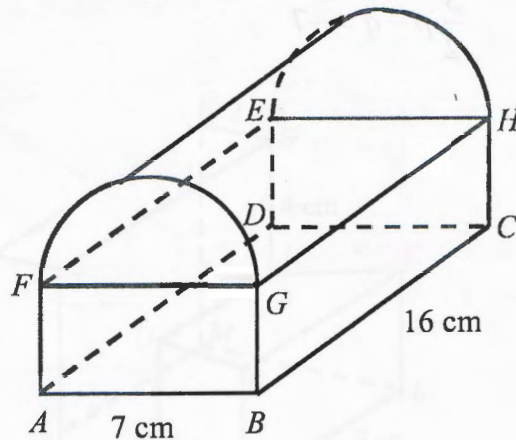


Diagram 5  
Rajah 5

The volume of the solid is  $588 \text{ cm}^3$ .

Using  $\pi = \frac{22}{7}$ , calculate the height, in cm, of the cuboid.

Isi padu pepejal itu ialah  $588 \text{ cm}^3$ .

Menggunakan  $\pi = \frac{22}{7}$ , hitung tinggi, dalam cm, kuboid itu.

[4 marks]

Answer / Jawapan:

[4 markah]



6 (a) Determine whether the following sentence is a statement or not a statement.

Tentukan sama ada ayat berikut ialah pernyataan atau bukan pernyataan.

(i)  $7 - 3$

(ii)  $8 > 6$

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

Tulis *Premis 2* untuk melengkapkan hujah berikut:

*Premise 1* : If  $x$  is a factor of 5, then  $x$  is a factor of 10.

*Premis 1* : Jika  $x$  ialah faktor bagi 5, maka  $x$  ialah faktor bagi 10.

*Premise 2 / Premis 2*: .....

Conclusion : 3 is not a factor of 5.

Kesimpulan : 3 bukan faktor bagi 5.

(c) Make a general conclusion by induction for the sequence of numbers 1, 15, 53, ... which follows the following pattern.

Buat satu kesimpulan umum secara aruhan bagi aruhan nombor 1, 15, 53, ... yang mengikut pola berikut.

$$1 = 2(1) - 1$$

$$15 = 2(8) - 1$$

$$53 = 2(27) - 1$$

$$\dots = \dots$$

[5 marks]

[5 markah]

Answer / Jawapan:

(a) (i) .....

(ii) .....

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

(c) .....

7 In Diagram 7,  $O$  is the origin and  $PQRS$  is a trapezium.  $PS$  is parallel to  $QR$ . The straight line  $RS$  is parallel to the  $y$ -axis. The points  $Q$  and  $S$  lie on the  $x$ -axis.

Dalam Rajah 7,  $O$  ialah asalan dan  $PQRS$  ialah sebuah trapezium.  $PS$  adalah selari dengan  $QR$ . Garis lurus  $RS$  adalah selari dengan paksi- $y$ . Titik  $Q$  dan titik  $S$  terletak pada paksi- $x$ .

Find

Carikan

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

[5 marks] [5 markah]

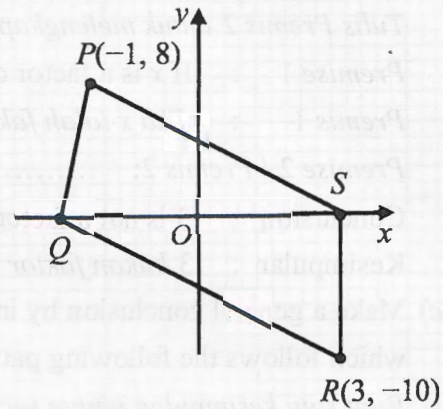


Diagram 7  
Rajah 7

Answer / Jawapan:

(a)

(b)

8 In Diagram 8,  $MN$  and  $PQ$  are arcs of two different circles with common centre  $O$ .  $ONP$  is a straight line.

Dalam Rajah 8,  $MN$  dan  $PQ$  adalah lengkok bagi dua bulatan yang berlainan dengan pusat sepunya  $O$ .  $ONP$  ialah garis lurus.

It is given that  $ON = NP = 7$  cm. Using  $\pi = \frac{22}{7}$ , calculate

Diberi bahawa  $ON = NP = 7$  cm. Gunakan  $\pi = \frac{22}{7}$ ,

hitung

- (a) the perimeter of the whole diagram,  
perimeter seluruh rajah,
- (b) the area of the shaded region,  
luas kawasan yang berlorek.

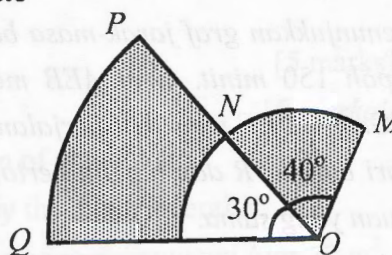


Diagram 8  
Rajah 8

[6 marks]

[6 markah]

Answer / Jawapan:

(a)

(b)

- 9 Diagram 9 shows the distance-time graph of the journeys of a car and a bus during a period of 150 minutes. The graph  $AEB$  represents the journey of the car from town  $R$  to town  $S$ . The graph  $CDEF$  represents the journey of the bus from town  $S$  to town  $R$ . The car leaves town  $R$  and the bus leaves town  $S$  at the same time and they travel along the same route.

Rajah 9 menunjukkan graf jarak-masa bagi perjalanan sebuah kereta dan sebuah bas dalam tempoh 150 minit. Graf  $AEB$  mewakili perjalanan kereta dari Bandar  $R$  ke Bandar  $S$ . Graf  $CDEF$  mewakili perjalanan bas dari bandar  $S$  ke bandar  $R$ . Kereta tu bertolak dari bandar  $R$  dan bas itu bertolak dari bandar  $S$  pada waktu yang sama dan melalui laluan yang sama.

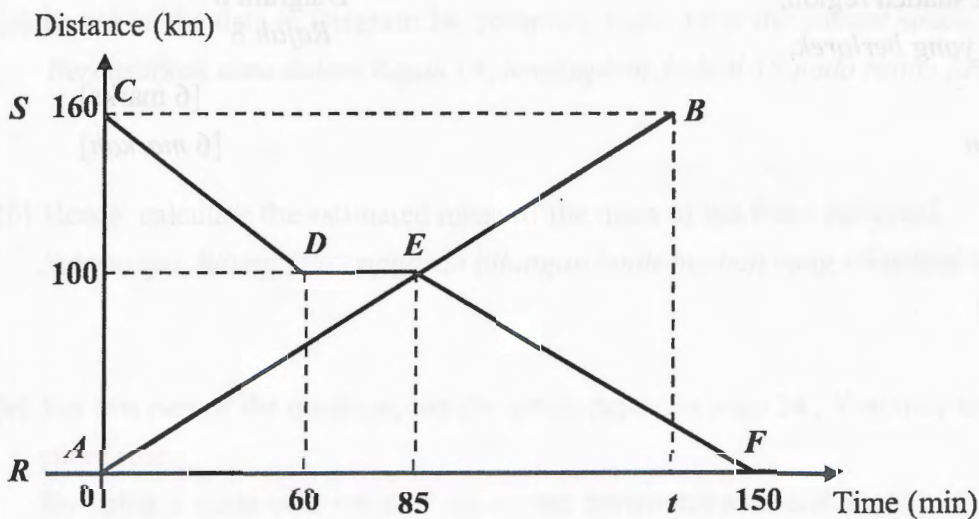


Diagram 9  
Rajah 9

- (a) State the length of the time, in minutes, during which the bus is stationary.  
*Nyatakan tempoh masa, dalam minit, ketika bas itu berhenti.*
- (b) Find the distance, in km, from town  $S$  when both the vehicles met.  
*Cari jarak, dalam km, dari Bandar  $S$  apabila kedua-dua kenderaan bertemu.*
- (c) Calculate the average speed, in  $\text{km h}^{-1}$ , of the bus for the whole journey.  
*Hitung purata laju, dalam  $\text{km j}^{-1}$ , bas itu untuk keseluruhan perjalanan itu.*
- (d) Given that the average speed of the car is  $75 \text{ km h}^{-1}$ , calculate the value of  $t$ .  
*Diberi purata laju kereta itu ialah  $75 \text{ km j}^{-1}$ , hitung nilai bagi  $t$ .*

[6 marks]

[6 markah]

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Answer / Jawapan:

(a)



(b)

(c)

(d)

[6 marks]  
[6 marks]

10 Diagram 10 shows five cards labelled with digits.

*Rajah 10 menunjukkan lima kad yang berlabel dengan digit.*

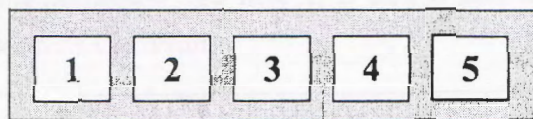


Diagram 10

*Rajah 10*

All these cards are put into a box. A two-digit code is to be formed by using any two of these cards. Two cards are picked at random, one after, without replacement.

*Kesemua kad ini dimasukkan ke dalam sebuah kotak. Suatu kod dua digit hendak dibentuk menggunakan mana-mana dua daripada kad ini. Dua kad dipilih secara rawak, satu persatu tanpa dikembalikan.*

(a) List the sample space.

*Senaraikan ruang sampel.*

(b) List all the outcomes of the events and the probability that

*Senaraikan semua kesudahan peristiwa dan cari kebarangkalian bahawa*

(i) the code begins with the letter 3,

*kod itu bermula dengan 3.*

(ii) the code consists of two even digits or two odd digits.

*kod itu terdiri daripada dua digit genap atau dua digit ganjil.*

[6 marks]

[6 markah]

Answer / Jawapan:

Section B

Bahagian B  
[48 marks]

For  
Examiner's  
Use

(a)

12 (a) Write the following simultaneous linear equations as matrix equations.  
[4 marks]

(b) 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  $y = 3 - x - 2x^2$  for  $-3 \leq x \leq 4$  and  $-33 \leq y \leq 3$ .  
[4 marks]

(b) (i)

(c) From the graph drawn in 13(b), find  
[2 marks]

(i) the value of y when  $x = 1.6$ .  
[2 marks]

(ii) the value of x when  $y = -22$ .  
[2 marks]

(ii)

(d) Draw a suitable straight line on your graph in 13(b) to find all the values of x which satisfy the equation  $2x^2 - 4x - 8 = 0$  for  $-3 \leq x \leq 4$  and  $-33 \leq y \leq 3$ .  
State these values of x.  
[4 marks]

- 11 (a) Find the inverse matrix of  $\begin{pmatrix} 4 & -5 \\ -2 & 3 \end{pmatrix}$ .

Cari matriks songsang bagi  $\begin{pmatrix} 4 & -5 \\ -2 & 3 \end{pmatrix}$ .

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

Tulis persamaan linear serentak berikut dalam bentuk persamaan matriks.

$$4x - 5y = 14$$

$$-2x + 3y = -8$$

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

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

[6 marks]

Answer / Jawapan:

[6 markah]

(a)

(b)



**Section B**  
**Bahagian B**  
[48 marks]  
[48 markah]

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

- 12 (a) Complete Table 12 in the answer space for the equation  $y = 3 - x - 2x^2$  by writing down the value of  $y$  when  $x = -2$  and  $x = 2$  [2 marks]  
*Lengkapkan Jadual 12 di ruang jawapan bagi persamaan  $y = 3 - x - 2x^2$  dengan menulis nilai-nilai  $y$  apabila  $x = -2$  dan  $x = 2$ . [2 markah]*

- (b) For this part of the question, use the graph paper provided. 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  $y = 3 - x - 2x^2$  for  $-3 \leq x \leq 4$  and  $-33 \leq y \leq 3$ . [4 marks]

*Untuk ceriaan soalan ini, gunakan kertas graf yang disediakan. Anda boleh menggunakan pembaris fleksibel.*

*Dengan menggunakan skala 2 cm kepada 1 unit pada paksi- $x$  dan 2 cm kepada 5 units pada paksi- $y$ , lukis graf  $y = 3 - x - 2x^2$  untuk  $-3 \leq x \leq 4$  dan  $-33 \leq y \leq 3$ .*

[4 markah]

- (c) From the graph drawn in 13(b), find

*Dari graf di 13(b), cari*

- (i) the value of  $y$  when  $x = 1.6$ .

*nilai  $y$  apabila  $x = 1.6$ .*

- (ii) the value of  $x$  when  $y = -22$ .

*nilai  $x$  apabila  $y = -22$ .*

[2 marks]

[2 markah]

- (d) Draw a suitable straight line on your graph in 13(b) to find all the values of  $x$  which satisfy the equation  $2x^2 - 4x - 8 = 0$  for  $-3 \leq x \leq 4$  and  $-33 \leq y \leq 3$ .

State these values of  $x$ .

[4 marks]

*Lukiskan satu garis lurus yang sesuai pada graf di 13(b) untuk mencari nilai-nilai yang memuaskan persamaan  $2x^2 - 4x - 8 = 0$  untuk  $-3 \leq x \leq 4$  dan  $-33 \leq y \leq 3$ .*

*Nyatakan nilai-nilai  $x$ .*

[4 markah]

For  
Examiner's  
Use

Answer / Jawapan:

(a)  $y = 3 - x - 2x^2$

x	-3	-2	-1	0	1	2	3	3.5	4
y	-12		2	3	0		-18	-25	-33

Table 12

Table 12

(b) Refer graph on page 19.

Rujuk graf di halaman 19.

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

$x = \dots\dots\dots$

(d)

The equation of the straight line:

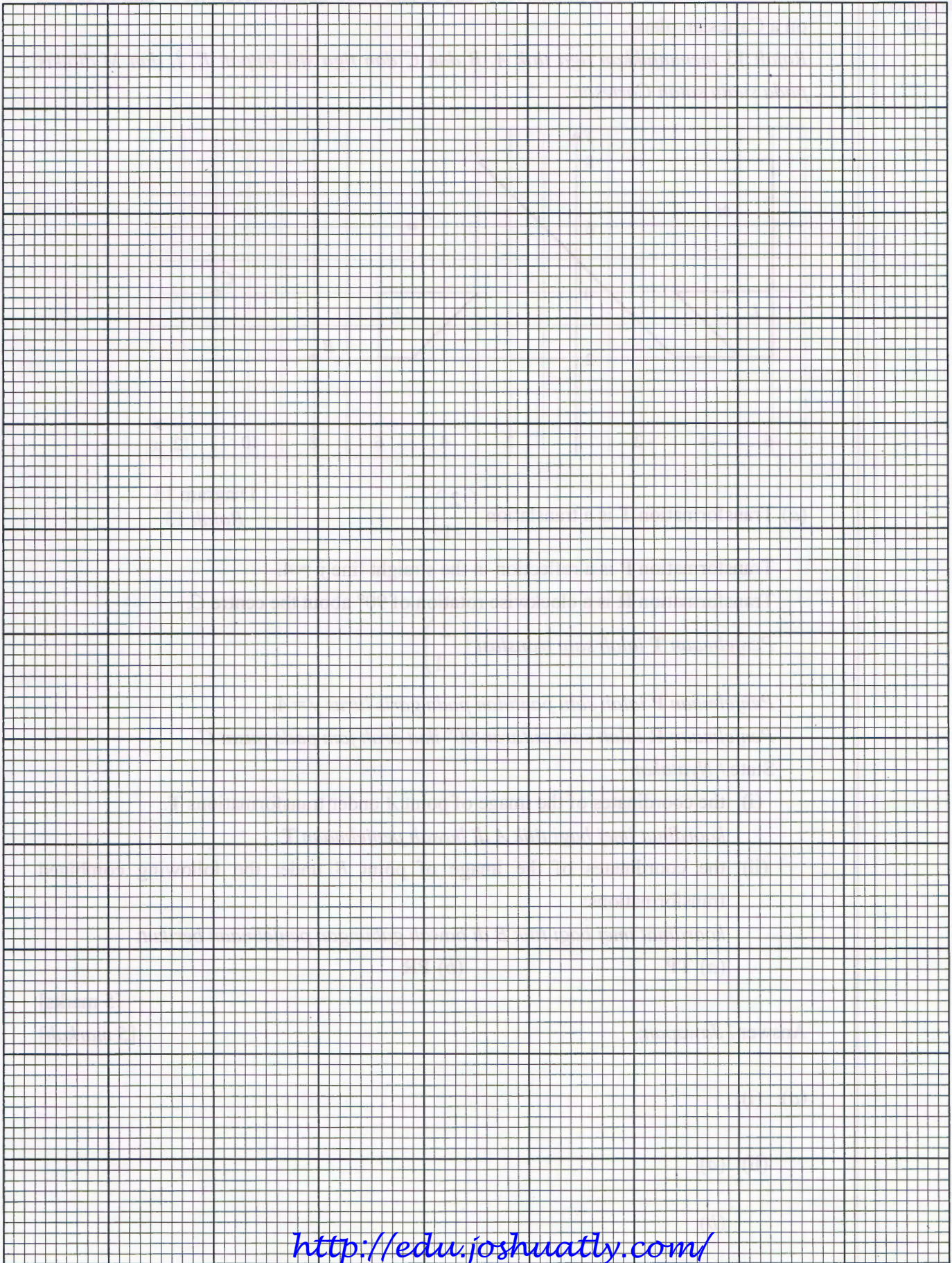
Persamaan garis lurus:

.....

$x = \dots\dots\dots, \dots\dots\dots$

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Graph for Question 12 / Graf untuk Soalan 12



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13 Diagram 13 shows three points,  $A$ ,  $B$  and  $C$  and three quadrilaterals  $K$ ,  $L$ , and  $M$  drawn on a Cartesian plane.

Rajah 13 menunjukkan tiga titik  $A$ ,  $B$  dan  $C$  dan tiga sisi empat,  $K$ ,  $L$  dan  $M$  dilukis pada suatu satah Cartesan.

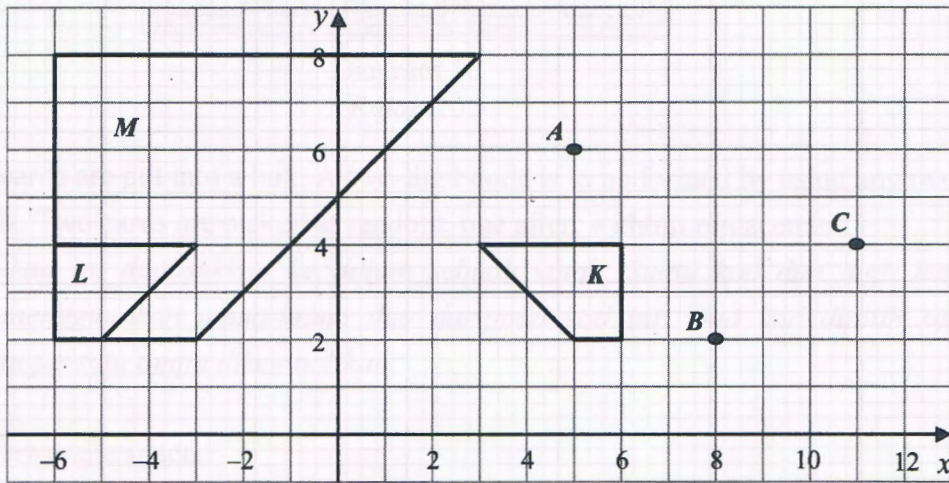


Diagram 13  
Rajah 13

(a) Transformation  $T$  is a translation  $\begin{pmatrix} 2 \\ -1 \end{pmatrix}$ .

Transformation  $P$  is a reflection in the straight line  $y = 4$ .

Transformation  $R$  is a clockwise rotation of  $90^\circ$  about the centre  $C$ .

Penjelmaan  $T$  ialah satu translasi  $\begin{pmatrix} 2 \\ -1 \end{pmatrix}$ .

Penjelmaan  $P$  ialah satu pantulan pada garis lurus  $y = 4$ .

Penjelmaan  $R$  ialah satu putaran  $90^\circ$  ikut arah jam pada pusat  $C$ .

State / Nyatakan

(i) the coordinates of the image of point  $A$  under transformations  $T$ .

koordinat imej bagi titik  $A$  di bawah penjelmaan  $T$ .

(ii) the coordinates of the image of point  $B$  under the following combined transformations:

koordinat imej bagi titik  $B$  di bawah gabungan penjelmaan berikut:

(a)  $TP$

(b)  $PR$

[5 marks]

Answer / Jawapan:

[5 markah]

(a) (i)

(ii) (a)

(b)

(b) Quadrilateral  $M$  is the image of  $K$  under the combined transformation  $VC$ .

Describe in full the transformation:

*Sisi empat  $M$  ialah imej bagi sisi empat  $K$  di bawah gabungan penjelmaan  $VC$ .*

*Huraikan selengkapnya penjelmaan:*

(i)  $U$ ,

(ii)  $V$ .

[5 marks]

[5 markah]

(c) It is given that the quadrilateral  $M$  represents a region of area  $72 \text{ m}^2$ .

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

*Diberi bahawa sisi empat  $M$  mewakili suatu kawasan yang mempunyai luas  $72 \text{ m}^2$ .*

*Hitung luas, dalam  $\text{m}^2$ , kawasan yang diwakili oleh sisi empat  $K$ .*

[2 marks]

[2 markah]

Answer / Jawapan:

(b) (i)

(ii)

(c)

14 Diagram 14 shows the mass, in kg, of fruits collected over the period of 40 days.

Rajah 14 menunjukkan jisim, dalam kg, buah-buahan yang dikumpul dalam tempoh 40 hari.

79	70	75	79	83	74	66	58	65	85
84	76	56	80	64	57	78	67	52	59
72	58	57	75	69	76	55	75	60	73
83	63	74	65	78	58	63	64	75	59

Diagram 14

Rajah 14

(a) Based on the data in Diagram 14, complete Table 15 in the answer space. [4 marks]

Berdasarkan data dalam Rajah 14, lengkapkan Jadual 15 pada ruang jawapan.

[4 markah]

(b) Hence, calculate the estimated mean of the mass of the fruits collected. [3 marks]

Seterusnya, hitung min anggaran bilangan buah-buahan yang dikumpul itu.

[3 markah]

(c) For this part of the question, use the graph paper on page 24. You may use a flexible curve rule.

By using a scale of 2 cm to 5 kg on the horizontal axis and 2 cm to 1 day on the vertical axis, draw a frequency polygon for this data. [4 marks]

Untuk ceraiian soalan ini, guna kertas graf pada halaman 24. Anda boleh menggunakan pembaris fleksibel.

Dengan menggunakan skala 2 cm kepada 5 kg pada paksi mengufuk dan 2 cm kepada satu hari pada paksi mencancang, lukis satu poligon kekerapan bagi data tersebut. [4 markah]

(d) Based on your frequency polygon in 15(c), give one information about the modal class of the data. [1 mark]

Berdasarkan poligon kekerapan di 15(c), nyatakan satu maklumat berkaitan kelas mod data tersebut. [1 markah]

Answer / Jawapan:

(a)

Mass (kg) <i>Jisim (kg)</i>	Midpoint <i>Titik tengah</i>	Frequency <i>Kekerapan</i>
52 – 56		
57 – 61		

Table 15  
*Jadual 15*

(b)

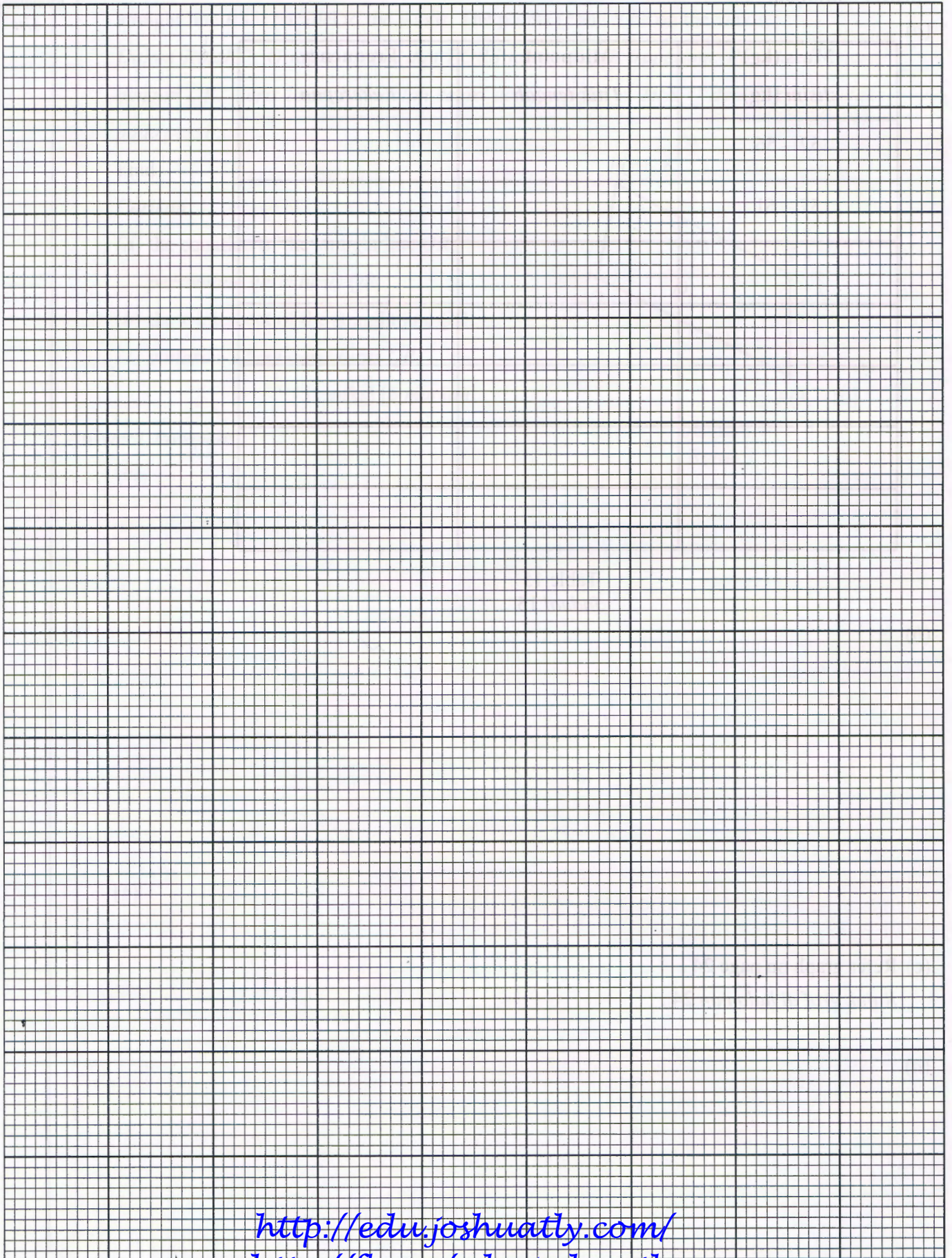
(c) Refer graph on page 24 .

*Rujuk graf di halaman 24 .*

(d)

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Graph for Question 14 / Graf untuk Soalan 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) Diagram 15.1 shows a solid right prism with a rectangular base  $PQLM$  on a horizontal plane. The surface  $PQRSTU$  is the uniform cross-section of the prism. Rectangle  $TUVW$  is an horizontal plane and rectangle  $RSJK$  is an inclined plane. Edges  $UP$ ,  $TS$  and  $RQ$  are vertical.

*Gambar rajah menunjukkan sebuah pepejal berbentuk prisma tegak dengan tapak segi empat tepat  $PQLM$  terletak di atas satah mengufuk. Permukaan  $PQRSTU$  ialah keratin rentas seragam prisma itu. Segi empat tepat  $TUVW$  ialah satah mengufuk dan segi empat tepat  $RSJK$  ialah satah condong. Tepi  $UP$ ,  $TS$  dan  $RQ$  adalah tegak.*

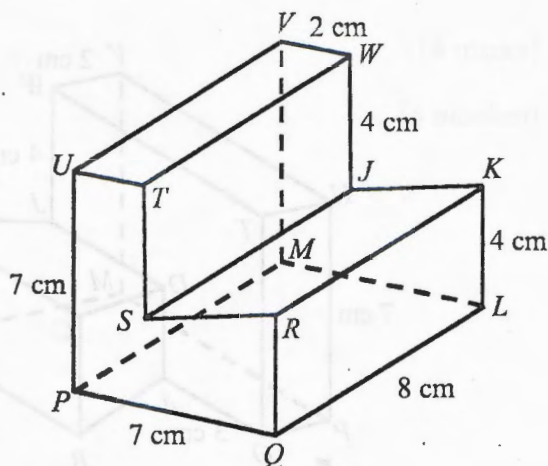


Diagram 15.1 [3 marks]

Rajah 15.1 [3 markah]

Draw to full scale, the plan of solid,

*Lukis dengan skala penuh, pelan pepejal itu,*

Answer / Jawapan:

(a)

- (b) A solid right prism is cut and removed from the solid in Diagram 15.1. The remaining solid is as shown in Diagram 15.2.

*Sebuah pepejal berbentuk prisma tegak dipotong dan dikeluarkan daripada pepejal dalam Rajah 15.1. Pepejal yang tinggal adalah seperti yang ditunjukkan dalam Rajah 15.2.*

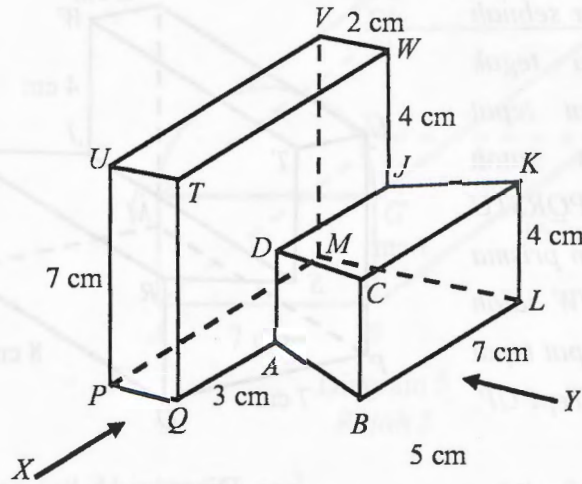


Diagram 15.2  
Rajah 15.2

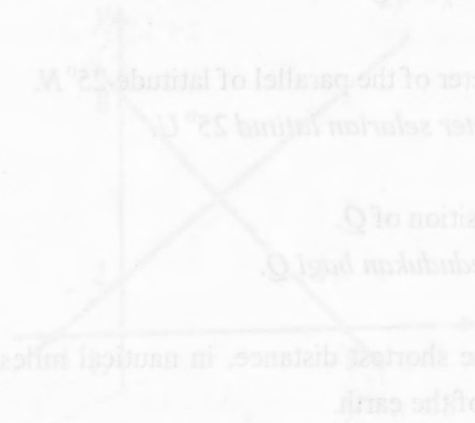
Draw full scale,  
*Lukis dengan skala penuh,*

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

Answer / Jawapan:

(b) (i), (ii)

For  
Examiner's  
Use



16  $P(25^\circ N, 60^\circ E)$ ,  $Q$  and  $R$  are three points on the surface of the earth.  $PR$  is the diameter of the earth.

$P(25^\circ U, 60^\circ T)$ ,  $Q$  dan  $R$  adalah tiga titik pada permukaan bumi.  $PR$  ialah diameter bumi.

(a) State the longitude of  $R$ . [2 marks]

Nyatakan longitude bagi  $R$ . [2 markah]

(b)  $PQ$  is the diameter of the parallel of latitude  $25^\circ N$ .

$PQ$  ialah diameter selarian latitud  $25^\circ U$ .

(i) State the position of  $Q$ .

Nyatakan kedudukan bagi  $Q$ .

(ii) Calculate the shortest distance, in nautical miles, from  $P$  to  $Q$  measured along the surface of the earth. [4 marks]

Hitungkan jarak terpendek, dalam batu nautika, dari  $P$  ke  $Q$  diukur sepanjang permukaan bumi. [4 markah]

(c) An aeroplane took off from  $P$  and flew due west to  $Q$  along the common parallel of latitude and then flew due south to  $R$ .

Sebuah kapal terbang berlepas dari  $P$  dan terbang arah ke barat ke  $Q$  mengikut selarian latitude sepunya dan kemudian terbang arah ke selatan ke  $R$ .

Calculate

Hitung

(i) the distance, in nautical mile, from  $P$  to  $Q$  measured along the common parallel of latitude.

jarak, dalam batu nautika, dari  $P$  ke  $Q$  diukur sepanjang selarian latitude sepunya.

(ii) the time taken, in hours, for the whole flight if the average speed of whole flight is 650 knots.

masa, dalam jam, yang diambil bagi seluruh penerbangan itu jika purata laju seluruh penerbangan itu ialah 650 knot.

[6 marks]

[6 markah]

Answer / Jawapan:

INFORMATION FOR CANDIDATES  
MAKLUMAT UNTUK CALON

For  
Examiner's  
Use

(a)

(b) (i)

(ii)

(c) (i)

(ii)

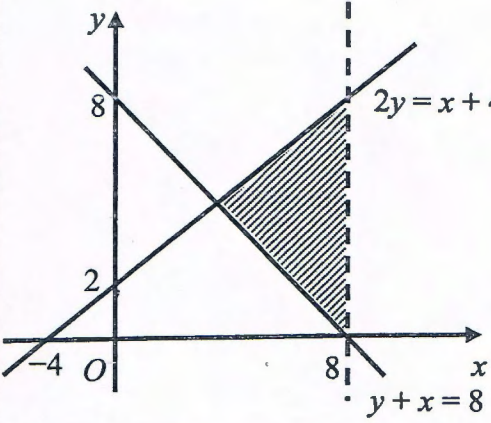
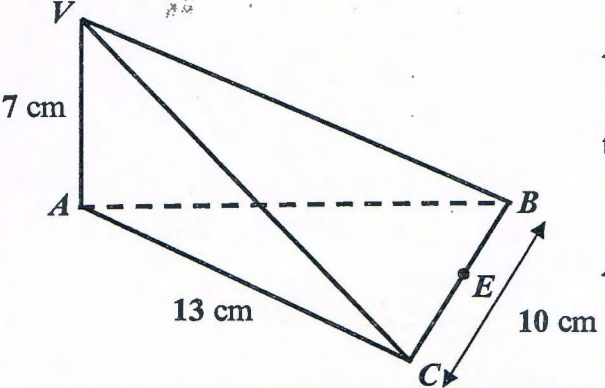
END OF QUESTION PAPER

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**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 from **Section B**.  
*Jawab semua soalan dalam **Bahagian A** dan mana-mana empat soalan daripada **Bahagian B**.*
3. Write your answers in spaces provided in the question paper.  
*Tulis jawapan anda pada ruang yang disediakan dalam kertas soalan ini.*
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.  
*Jika anda hendak menukar jawapan, batalkan jawapan yang telah dibuat. Kemudian tulis jawapan yang baru.*
6. The diagrams in the question provided are not drawn to scale unless stated.  
*Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali yang dinyatakan.*
7. The marks allocated for each question and sub-part of a question are shown in brackets.  
*Markah yang diperuntukkan bagi setiap soalan dan ceraihan soalan ditunjukkan dalam kurungan.*
8. A list of formulae is provided on pages 2 to 4.  
*Satu senarai rumus disediakan di halaman 2 hingga 4.*
9. A booklet of four-figure mathematical tables is provided.  
*Sebuah buku sifir matematik empat angka disediakan.*
10. You may use a scientific calculator.  
*Anda dibenarkan menggunakan kalkulator saintifik.*
11. Hand in this question paper to the invigilator at the end of the examination.  
*Serahkan kertas soalan ini kepada pengawas peperiksaan pada akhir peperiksaan.*

PEPERIKSAAN PEPERIKSAAN PERCUBAAN SPM TAHUN 2012  
 MATHEMATICS 1449/2 TINGKATAN 5, MPSM KELANTAN

No	Marking Scheme	Marks
1.	 <p data-bbox="776 388 1252 646">           Garis bintik (berputus-putus), <math>x &gt; 8</math>            Kawasan berlorek bagi  <math>2y \leq x + 4</math> atau <math>y + x \geq 8</math>            SEMUA BETUL         </p>	B1 B1 B1 3
2.	$3x^2 + x - 10 = 0$ $(3x - 5)(x + 2) = 0$ $x = \frac{5}{3}, \quad x = -2$	K1 K1 N1 N1 4
3.	 <p data-bbox="860 1092 1218 1344"> <math>\angle VEA</math> or <math>\angle AEV</math>  <math>\tan \angle VEA = \frac{7}{12}</math>  <math>\angle VEA = 30^\circ 15'</math> or <math>30.26^\circ</math> </p>	P1 K1 N1 3
4.	$3p - 2q = -14 \quad \text{atau} \quad \begin{pmatrix} 1 & 2 \\ 3 & -1 \end{pmatrix} \begin{pmatrix} p \\ q \end{pmatrix} = \begin{pmatrix} 6 \\ -7 \end{pmatrix} \quad \text{K1}$ $4p = -8$ $p = -2$ $q = 4$ $\begin{pmatrix} p \\ q \end{pmatrix} = \frac{1}{1(-1) - 2(\frac{3}{2})} \begin{pmatrix} -1 & -2 \\ -\frac{3}{2} & 1 \end{pmatrix} \begin{pmatrix} 6 \\ -7 \end{pmatrix} \quad \text{K1}$ $p = -2, \quad q = 4 \quad \text{N1, N1}$	K1 K1 N1 N1 4

**PEPERIKSAAN PEPERIKSAAN PERCUBAAN SPM TAHUN 2012**  
**MATHEMATICS 1449/2 TINGKATAN 5, MPSM KELANTAN**

No	Marking Scheme	Marks
5.	$\left(\frac{1}{2} \times \frac{22}{7} \times 3.5 \times 3.5 \times 16\right) + (7 \times 16 \times h) = 588$ $h = 2.5$	K1K1K1
		N1
		4
6.	(a) (i) Not a statement (ii) A statement (b) Premise 2: 3 is not a factor of 10 (c) $2n^3 - 1, n = 1, 2, 3, \dots$	B1
		B1
		B1
		B1B1
		5
7.	(a) $m_{QR} = m_{PS} = -2$ $-10 = -2(3) + c$ atau $y - (-10) = -2(x - 3)$ (b) $y = -2x - 4$ $0 = -2x - 4$ $x = -2$	P1
		K1
		N1
		K1
		N1
		5
8.	(a) $\frac{30}{360} \times 2 \times \frac{22}{7} \times 14$ or $\frac{40}{360} \times 2 \times \frac{22}{7} \times 7$ $\frac{30}{360} \times 2 \times \frac{22}{7} \times 14 + \frac{40}{360} \times 2 \times \frac{22}{7} \times 7 + 7 + 7 + 7 + 14$ $= 40.22 \text{ or } \frac{362}{9} \text{ or } 40\frac{2}{9}$ (b) $\frac{30}{360} \times \frac{22}{7} \times 14 \times 14$ or $\frac{40}{360} \times \frac{22}{7} \times 7 \times 7$ or $\frac{30}{360} \times \frac{22}{7} \times 7 \times 7$ $\left(\frac{30}{360} \times \frac{22}{7} \times 14 \times 14\right) + \left(\frac{40}{360} \times \frac{22}{7} \times 7 \times 7\right) - \left(\frac{30}{360} \times \frac{22}{7} \times 7 \times 7\right)$ $= 51.61 \text{ or } 55\frac{11}{18} \text{ or } \frac{1001}{18}$	K1
		K1
		N1
		K1
		K1
		N1
		6



**PEPERIKSAAN PEPERIKSAAN PERCUBAAN SPM TAHUN 2012**  
**MATHEMATICS 1449/2 TINGKATAN 5, MPSPM KELANTAN**

No	Marking Scheme	Marks
9.	(a) 25 minutes	P1
	(b) 60 km	P1
	(c) $\frac{160}{150/60} = 64$	K1N1
	(d) $\frac{160}{t/60} = 75$ $t = 128$	K1 N1
6		
10.	(a) $\{(1, 2), (1, 3), (1, 4), (1, 5), (2, 1), (2, 3), (2, 4), (2, 5), (3, 1), (3, 2), (3, 4), (3, 5), (4, 1), (4, 2), (4, 3), (4, 5), (5, 1), (5, 2), (5, 3), (5, 4)\}$ * allow 2 mistakes for P1.	P2*
	(b) $\{(3, 1), (3, 2), (3, 4), (3, 5)\}$	K1
	$\frac{4}{20}$ or $\frac{1}{5}$	N1
	(c) $\{(1, 3), (1, 5), (2, 4), (3, 1), (3, 5), (4, 2), (5, 1), (5, 3)\}$	K1
$\frac{8}{20}$ or $\frac{2}{5}$	N1	
6		
11.	(a) $\frac{1}{(4)(3) - (-5)(-2)} \begin{pmatrix} 3 & 5 \\ 2 & 4 \end{pmatrix} = \frac{1}{2} \begin{pmatrix} 3 & 5 \\ 2 & 4 \end{pmatrix}$	K1, N1
	(b) $\begin{pmatrix} 4 & -5 \\ -2 & 3 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 14 \\ -8 \end{pmatrix}$	P1
	$\begin{pmatrix} x \\ y \end{pmatrix} = \frac{1}{(4)(3) - (-5)(-2)} \begin{pmatrix} 3 & 5 \\ 2 & 4 \end{pmatrix} \begin{pmatrix} 14 \\ -8 \end{pmatrix}$	K1
	$x = 1, \quad y = -2$	N1, N1
6		

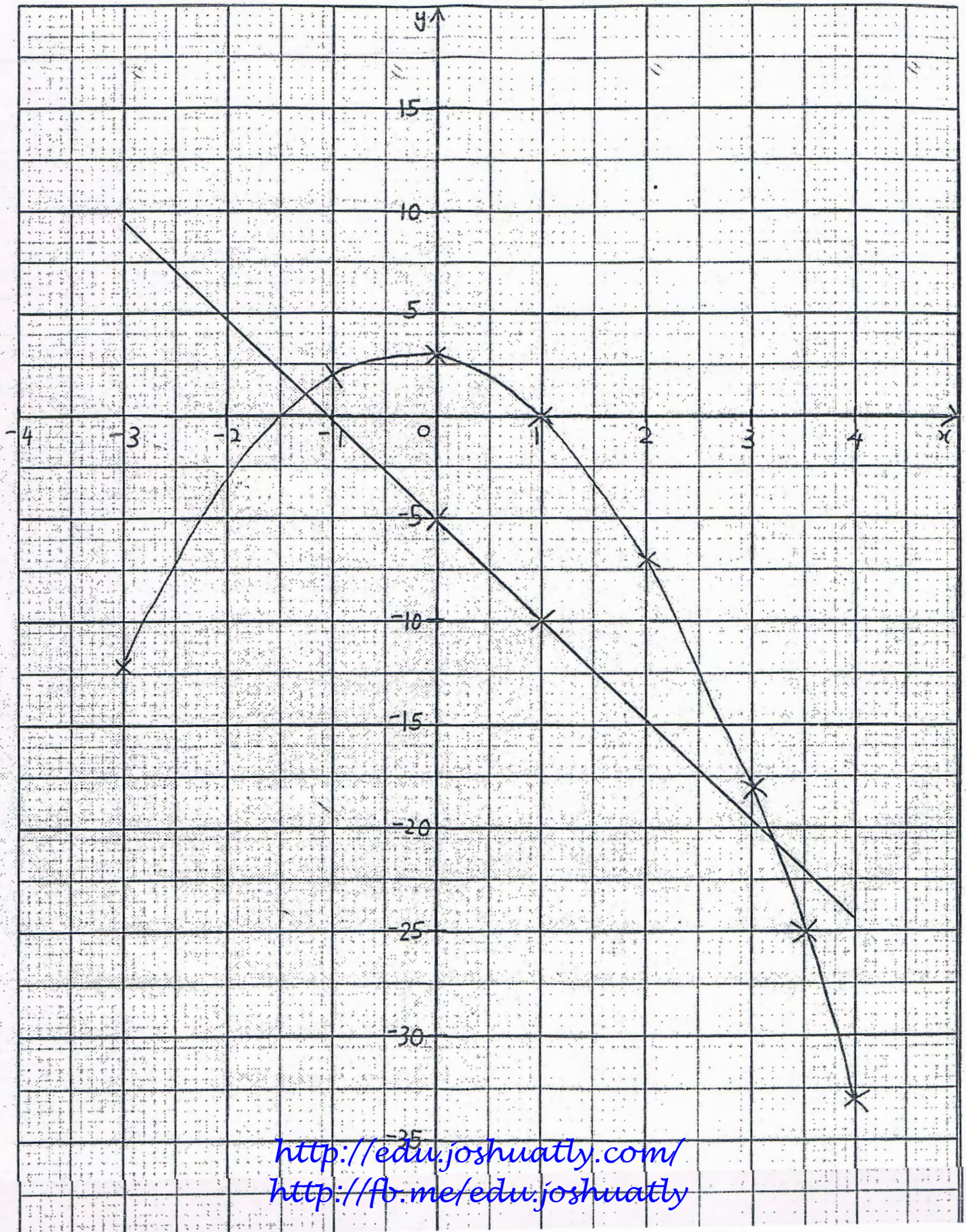
**PEPERIKSAAN PEPERIKSAAN PERCUBAAN SPM TAHUN 2012**  
**MATHEMATICS 1449/2 TINGKATAN 5, MPSM KELANTAN**

No	Marking Scheme	Marks						
12	<p>(a) <table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td style="padding: 5px;"><math>x</math></td> <td style="padding: 5px;"><math>-2</math></td> <td style="padding: 5px;"><math>2</math></td> </tr> <tr> <td style="padding: 5px;"><math>y</math></td> <td style="padding: 5px;"><math>-3</math></td> <td style="padding: 5px;"><math>-7</math></td> </tr> </table></p> <p>(b) Graph (Refer to LAMPIRAN 1)            Axes drawn in correct direction, uniform scales in <math>-3 \leq x \leq 4</math>            and <math>-33 \leq y \leq 3</math>.            7 points and *2 points correctly plotted or curve passes through these            points for <math>-3 \leq x \leq 4</math> and <math>-33 \leq y \leq 3</math>.            A smooth and continuous curve without any straight line and passes            through all 9 correct Points using the given scales.            Note: 7 or 8 points correctly plotted. Award K1</p> <p>(c) (i) <math>-3.0 \leq y \leq -4.0</math>            (ii) <math>-3.25 \leq x \leq -3.35</math></p> <p>(d) Straight line <math>y = -5x - 5</math> correctly drawn.            Note : Identify equation <math>y = -5x - 5</math>, award K1  <math>-1.3 \leq x \leq -1.2</math>  <math>3.3 \leq x \leq 3.2</math></p> <p><u>Note:</u>            1. Allow P marks if value of <math>x</math> and <math>y</math> are shown on the graph.            2. Values of <math>x</math> and <math>y</math> obtained by calculation or from wrong graph            award P0.</p>	$x$	$-2$	$2$	$y$	$-3$	$-7$	<p>K1 K1</p> <p>P1</p> <p>K2</p> <p>N1</p> <p>P1</p> <p>P1</p> <p>K2</p> <p>N1</p> <p>N1</p> <p><b>12</b></p>
$x$	$-2$	$2$						
$y$	$-3$	$-7$						
13.	<p>(a) (i) (7, 5)            (ii) (a) (10, 5)            Note: (8, 6) or (10, 5) marked, award P1            (b) (9, 1)            Note: (9, 7) or (9, 1) marked, award P1</p> <p>(b) (i) U = reflection in <math>y</math>-axis.            (ii) V = enlargement, scale factor 3, centre <math>(-6, 2)</math>.</p> <p>OR (i) U = enlargement, scale factor 3, centre <math>(6, 2)</math>            (ii) V = reflection in <math>y</math>-axis.</p> <p>(c) <math>72 = 3^2 \times A</math>  <math>A = 8</math></p>	<p>P1</p> <p>P2</p> <p>P2</p> <p>P2</p> <p>P3</p> <p>K1</p> <p>N1</p> <p><b>12</b></p>						

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Graph for Question 12 / Graf untuk Soalan 12



**PEPERIKSAAN PEPERIKSAAN PERCUBAAN SPM TAHUN 2012  
MATHEMATICS 1449/2 TINGKATAN 5, MPSM KELANTAN**

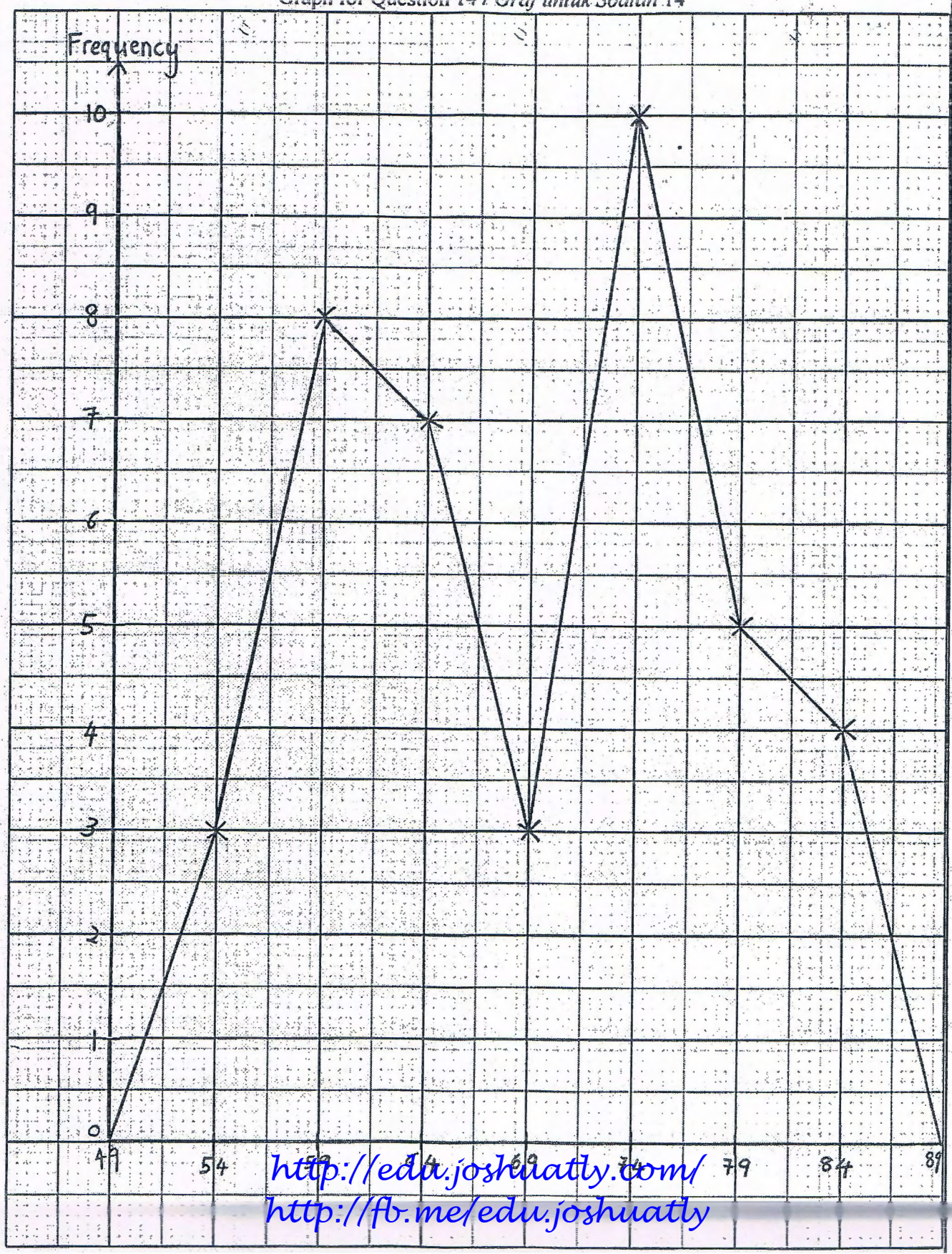
No	Marking Scheme	Marks																								
14.	(a)																									
	<table border="1"> <thead> <tr> <th>Class Interval <i>Selang Kelas</i></th> <th>Midpoint <i>Titik Tengah</i></th> <th>Frequency <i>Kekerapan</i></th> </tr> </thead> <tbody> <tr> <td>52 – 56</td> <td>54</td> <td>3</td> </tr> <tr> <td>57 – 61</td> <td>59</td> <td>8</td> </tr> <tr> <td>62 – 66</td> <td>64</td> <td>7</td> </tr> <tr> <td>67 – 71</td> <td>69</td> <td>3</td> </tr> <tr> <td>72 – 76</td> <td>74</td> <td>10</td> </tr> <tr> <td>77 – 81</td> <td>79</td> <td>5</td> </tr> <tr> <td>82 – 86</td> <td>84</td> <td>4</td> </tr> </tbody> </table>	Class Interval <i>Selang Kelas</i>	Midpoint <i>Titik Tengah</i>	Frequency <i>Kekerapan</i>	52 – 56	54	3	57 – 61	59	8	62 – 66	64	7	67 – 71	69	3	72 – 76	74	10	77 – 81	79	5	82 – 86	84	4	Class Interval P1 Midpoint P1 Frequency* P2 *allow 2 mistakes for P1.
Class Interval <i>Selang Kelas</i>	Midpoint <i>Titik Tengah</i>	Frequency <i>Kekerapan</i>																								
52 – 56	54	3																								
57 – 61	59	8																								
62 – 66	64	7																								
67 – 71	69	3																								
72 – 76	74	10																								
77 – 81	79	5																								
82 – 86	84	4																								
	$\frac{54(3) + 59(8) + 64(7) + 69(3) + 74(10) + 79(5) + 84(4)}{40}$	K2*																								
	(b) = 69	N1																								
	* allow 2 mistakes (frequency or midpoint) for K1																									
	(c) Frequency Polygon (Refer to LAMPIRAN 2)																									
	Axes drawn in correct direction with uniform scales for $49 \leq x \leq 89$ and $0 \leq y \leq 10$ .	P1																								
	Horizontal axes is labeled with 7 values of mid-point																									
	7 points correctly plotted or frequency polygon passes through.	K1																								
	Points (49, 0) and (89, 0) are marked or Graph passes through.	K1																								
	Complete Frequency Polygon which passes through 9 correct points.	N1																								
	Note: If used different scales, N0																									
	(d) 1. Do not accept answer without a frequency polygon. 2. Answer must be obtained from frequency polygon	K1																								
		12																								

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Graph for Question 14 / Graf untuk Soalan 14

For  
Examin.  
Use

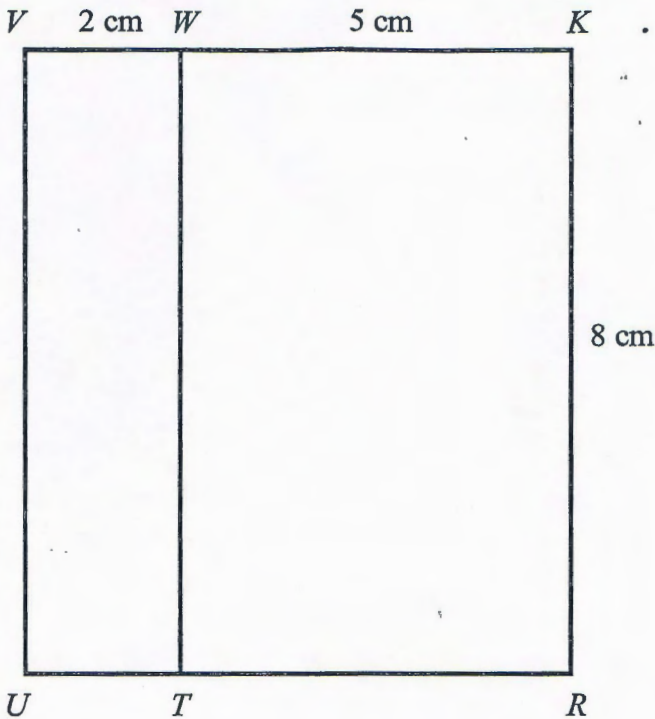


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**MATHEMATICS 1449/2 TINGKATAN 5, MPSM KELANTAN**

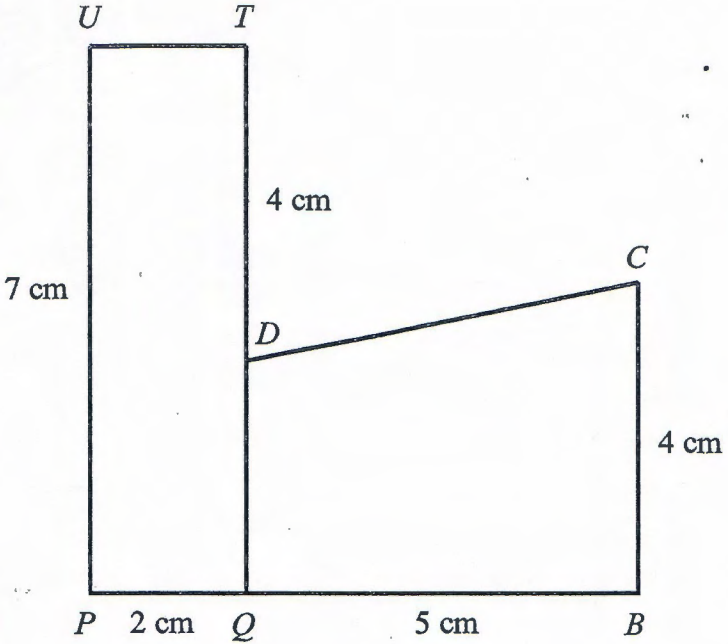
No	Marking Scheme
15	<p>Note:</p> <ol style="list-style-type: none"> <li>(1) Accept drawing only (not sketch).</li> <li>(2) Accept diagrams without labels and ignore wrong labels.</li> <li>(3) Accept correct rotation of diagrams.</li> <li>(4) Lateral inversions are not accepted.</li> <li>(5) If more than 1 diagram are drawn, award mark to the correct one only.</li> <li>(6) For extra lines (dotted / dashed or solid) except construction lines, no KN mark is awarded.</li> <li>(7) If other scales are used with accuracy of <math>\pm 0.20\text{cm}</math> one way, deduct 1 mark from the N mark obtained, for each part attempted.</li> <li>(8) Accept small gaps or extension at the corners. For each part attempted:               <ol style="list-style-type: none"> <li>(i) If <math>\leq 0.4</math> cm, deduct 1 mark from the N mark obtained;</li> <li>(ii) If <math>\geq 0.4</math> cm, no N mark is obtained.</li> </ol> </li> <li>(9) If the construction lines cannot be differentiated from the actual lines:               <ol style="list-style-type: none"> <li>(i) <u>Dotted Line</u> If outside the diagram, award the K mark. If inside the diagram, award N0.</li> <li>(ii) <u>Solid Line</u> If outside the diagram, award the N0. If inside the diagram, no KN mark is awarded.</li> </ol> </li> <li>(10) For double lines or non-collinear or bold lines of crooked lines, deduct 1 mark from the N mark obtained, for each part attempted.</li> <li>(11) If graph paper is used, award K mark only (award N0).</li> </ol>

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 MATHEMATICS 1449/2 TINGKATAN 5, MPSM KELANTAN

No	Marking Scheme	Sub Mark	Mark
15 (a)	<div style="text-align: center;">  <p>Correct shape with rectangles <math>UVKR</math> and <math>UVWT</math>.                      All solid lines.</p> <p><math>UV &gt; UR &gt; WK &gt; VW</math></p> <p>Measurements correct to <math>\pm 0.2</math> cm (one way) and                      all angles at vertices = <math>90^\circ \pm 1^\circ</math></p> </div>	K1  K1  N1	3

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 MATHEMATICS 1449/2 TINGKATAN 5, MPSM KELANTAN

No	Marking Scheme	Sub Mark	Mark
15 (b) (i)	 <p>Correct shape with rectangle <math>UTPQ</math> and trapezium <math>BCDQ</math>.        All solid lines.</p> <p><math>PU &gt; QB &gt; TD &gt; DQ &gt; PQ</math></p> <p>Measurements correct to <math>\pm 0.2</math> cm (one way) and        all angles at vertices = <math>90^\circ \pm 1^\circ</math></p>	K1  K1  N2	   4





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**MATHEMATICS 1449/2 TINGKATAN 5, MPSM KELANTAN**

No	Marking Scheme	Sub Mark	Mark
16(a)	$120^\circ W$ Note: $120^\circ$ or $\theta^\circ W$ , award P1	P1P1	2
(b)(i)	$(25^\circ N, 120^\circ W)$ Note: $25^\circ N$ or $120^\circ W$ , award P1	P2	
(b)(ii)	$130 \times 60$ $7800$	K1 N1	4
(c)(i)	$180 \times 60 \times \cos 25^\circ$ Note: $180^\circ$ or $\cos 25^\circ$ , award K1	K2	
	9788.12	N1	
(c)(ii)	$\frac{9788.12 + (50 \times 60)}{t} = 650$ Note: $(50 \times 60)$ or $(25+25) \times 60$ , award K1	K1K1	
	19.67 jam	N1	6
			12
	<b>PERATURAN PEMARKAHAN TAMAT</b>		

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