

SULIT

1449/2

Matematik

Kertas 2

Ogos 2019

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

1449/2

NAMA : _____ TINGKATAN : _____



MAJLIS PENGETUA SEKOLAH MALAYSIA
NEGERI SEMBILAN

PROGRAM PENINGKATAN AKADEMIK TINGKATAN LIMA
SEKOLAH-SEKOLAH MENENGAH NEGERI SEMBILAN 2019

MATEMATIK

Kertas 2

Dua jam tiga puluh minit

**JANGAN BUKA KERTAS SOALAN INI
SEHINGGA DIBERITAHU**

1. *Tulis 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.*

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

Kertas soalan ini mengandungi 40 halaman bercetak dan 2 halaman tidak bercetak.

MATHEMATICAL FORMULAE
RUMUS MATEMATIK

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

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

RELATIONS
PERKAITAN

1	$a^m \times a^n = a^{m+n}$	10	Pythagoras Theorem <i>Teorem Pithagoras</i> $c^2 = a^2 + b^2$
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 / Jarak $= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$	13	$m = \frac{y_2 - y_1}{x_2 - x_1}$
6	Midpoint / Titik tengah $(x, y) = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$	14	$m = -\frac{y - \text{intercept}}{x - \text{intercept}}$ $m = -\frac{\text{pintasan} - y}{\text{pintasan} - x}$
7	Average speed = $\frac{\text{distance travelled}}{\text{time taken}}$ <i>Purata laju = $\frac{\text{jarak yang dilalui}}{\text{masa yang diambil}}$</i>		
8	Mean = $\frac{\text{sum of data}}{\text{number of data}}$ <i>Min = $\frac{\text{hasil tambah nilai data}}{\text{bilangan data}}$</i>		
9	Mean = $\frac{\text{sum of (midpoint} \times \text{frequency)}}{\text{sum of frequencies}}$ <i>Min = $\frac{\text{hasil tambah (nilai titik tengah kelas} \times \text{kekerapan)}}{\text{hasil tambah kekerapan}}$</i>		

SHAPE AND SPACE
BENTUK DAN RUANG

- 1 Area of trapezium = $\frac{1}{2} \times \text{sum of parallel sides} \times \text{height}$
Luas trapezium = $\frac{1}{2} \times \text{hasil tambah dua sisi selari} \times \text{tinggi}$
- 2 Circumference of circle = $\pi d = 2\pi r$
Lilitan bulatan = $\pi d = 2\pi j$
- 3 Area of circle = πr^2
Luas bulatan = πj^2
- 4 Curved surface area of cylinder = $2\pi r h$
Luas permukaan melengkung silinder = $2\pi j t$
- 5 Surface area of sphere = $4\pi r^2$
Luas permukaan sfera = $4\pi j^2$
- 6 Volume of right prism = cross sectional area \times length
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 = $\frac{1}{3} \times \text{base area} \times \text{height}$
Isi padu piramid tegak = $\frac{1}{3} \times \text{luas tapak} \times \text{tinggi}$
- 11 Sum of interior angles of a polygon
Hasil tambah sudut pedalaman poligon
= $(n - 2) \times 180^\circ$

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

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

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

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

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

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

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

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

SULIT

For
Examiner's
Use

Section A
Bahagian A

[52 marks]
[52 markah]

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

- 1** Based on Diagram 1, given that $y \leq 4$ satisfies the shaded region, state the other two inequalities which also satisfies the shaded region.

Berdasarkan Rajah 1, diberi $y \leq 4$ memuaskan kawasan berlorek, nyatakan dua ketaksamaan lain yang memuaskan kawasan berlorek berikut.

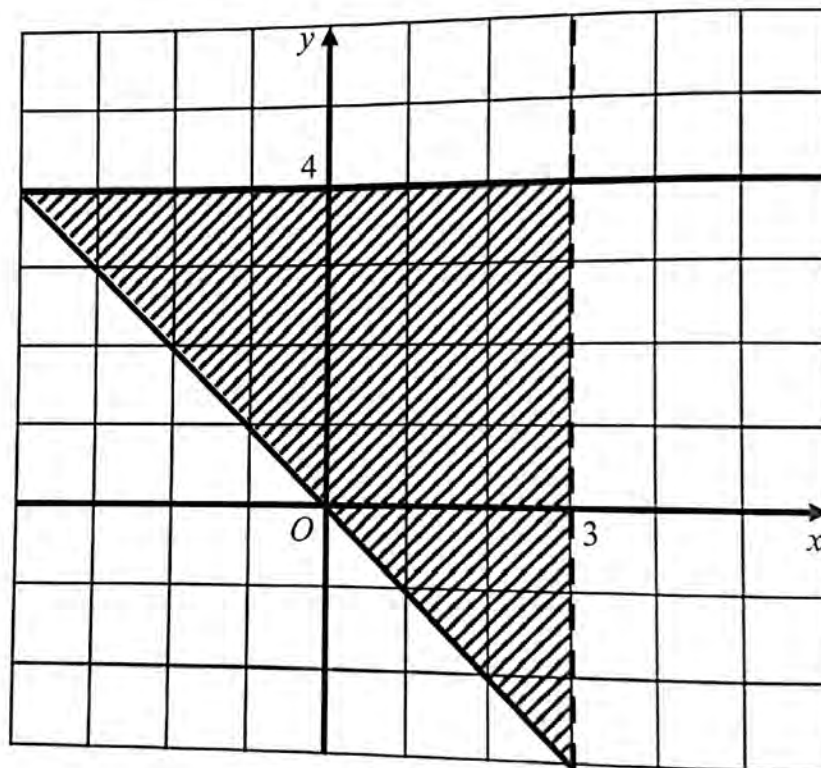


Diagram 1
Rajah 1

[3 marks]
[3 markah]

Answer / Jawapan :

- 2 Diagram 2 shows a right prism. The base $PQRS$ is a horizontal rectangle. Trapezium $PQVU$ is the uniform cross section of the prism.

For
Examiner's
Use

Rajah 2 menunjukkan sebuah prisma tegak. Tapak $PQRS$ ialah segi empat tepat yang mengufuk. Trapezium $PQVU$ ialah keratan rentas seragam prisma itu.

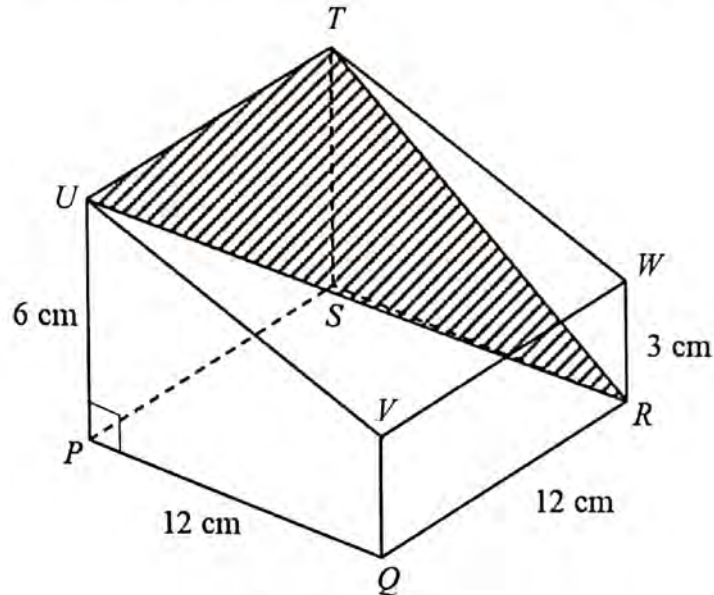


Diagram 2
Rajah 2

- (a) Name the angle between the plane UTR and the plane $PSTU$.
Namakan sudut di antara satah UTR dan satah $PSTU$.
- (b) Calculate the angle between the plane UTR and the plane $PSTU$.
Kira sudut di antara satah UTR dengan satah $PSTU$.

[3 marks]
[3 markah]

Answer / Jawapan :

(a)

(b)

For
Examiner's
Use

3

Mr Khairir want to design a diamond shape logo as shown in Diagram 3. The area of the logo is 23 cm^2 . Find the value of x .

Encik Khairir ingin mereka bentuk satu logo yang berbentuk berlian seperti yang ditunjukkan pada Rajah 3. Luas logo itu ialah 23 cm^2 . Cari nilai x .

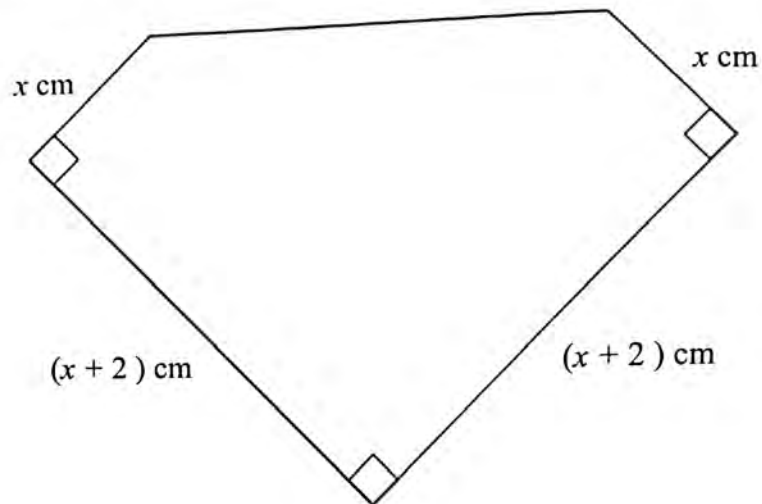


Diagram 3
Rajah 3

[4 marks]
[4 markah]

Answers / Jawapan :

- 4 Diagram 4 shows a composite solid formed by joining a half cylinder and a right prism which lies on the horizontal plane.

For
Examiner's
Use

Rajah 4 menunjukkan sebuah gabungan pepejal yang terbentuk daripada cantuman sebuah separuh silinder dan sebuah prisma tegak yang terletak pada satah mengufuk.

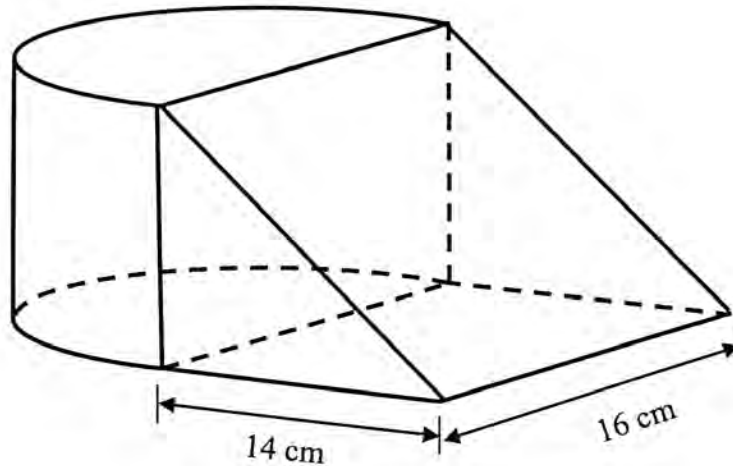


Diagram 4

Rajah 4

It is given the diameter of the half cylinder is 16 cm and the volume of the composite solid is $2763\frac{3}{7}$ cm³.

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

Diberi bahawa diameter separuh silinder ialah 16 cm dan isi padu gabungan pepejal itu ialah $2763\frac{3}{7}$ cm³.

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

[4 marks]

[4 markah]

Answer / Jawapan :

For
Examiner's
Use

- 5 Solving using matrix method is not allowed in this question.
Penyelesaian menggunakan kaedah matriks tidak dibenarkan untuk soalan ini.

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

Hitungkan nilai x dan nilai y yang memuaskan persamaan linear serentak berikut :

$$3x - y = 2$$

$$4y + x = 5$$

[4 marks]

[4 markah]

Answer / Jawapan:

- 6 (a) Complete the compound statement in the answer space by writing the word 'or' or 'and' to form a **true** statement.

For
Examiner's
Use

Lengkapkan pernyataan majmuk di ruang jawapan dengan menulis perkataan 'atau' atau 'dan' untuk membentuk satu pernyataan **benar**.

Statement 1: $\frac{1}{10} > \frac{1}{5}$
Pernyataan 1:

Statement 2: $2^{-2} = \frac{1}{4}$
Pernyataan 2:

- (b) Write down the converse of the following implication.

Tulis akas untuk implikasi berikut.

If $\triangle ABC$ is a right-angled triangle, then $AC^2 = AB^2 + BC^2$.
Jika $\triangle ABC$ ialah segi tiga bersudut tegak, maka $AC^2 = AB^2 + BC^2$.

- (c) The blue, red, yellow and green marbles are arranged in one line. The green marble is on the left side of the yellow marble and on the right side of the blue marble. The red marble is on the left side of the yellow marble and is not beside the blue marble. What is the arrangement the marble color from left to right?

Guli-guli berwarna biru, merah, kuning dan hijau disusun dalam satu barisan. Guli hijau berada di kiri guli kuning dan di kanan guli biru. Guli merah berada di kiri guli kuning dan bukan di sebelah guli biru. Apakah susunan warna guli-guli itu dari kiri ke kanan?

[4 marks]

[4 markah]

Answer / Jawapan:

(a)

.....

(b)

.....

.....

(c)

.....

For
Examiner's
Use

7

In Diagram 5, O is the origin. Straight line KL is parallel to straight line PQ . Straight line QL is parallel to the y -axis.

Dalam Rajah 5, O ialah asalan. Garis lurus KL adalah selari dengan garis lurus PQ . Garis lurus QL adalah selari dengan paksi- y .

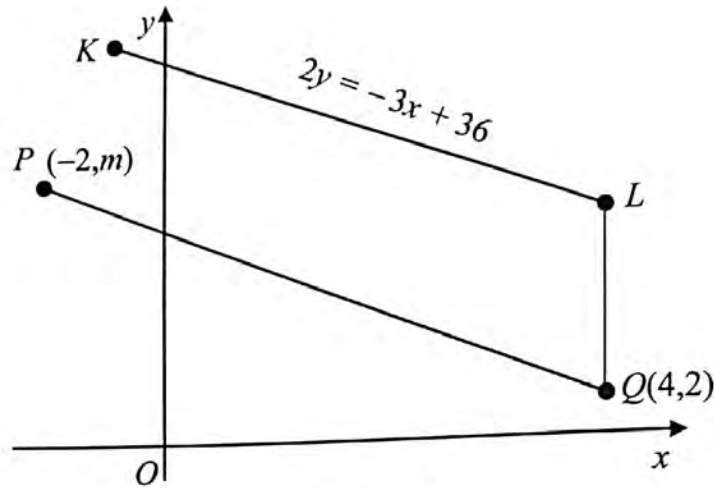


Diagram 5
Rajah 5

Find
Cari

- the equation of the straight line QL ,
persamaan garis lurus QL ,
- the equation of the straight line PQ ,
persamaan garis lurus PQ ,
- the value of m .
nilai bagi m .

[6 marks]
[6 markah]

Answer / Jawapan :

(a)

(b)

(c)

For
Examiner's
Use

For
Examiner's
Use

- 8 Encik Aziz bought rambutans from Encik Azman's orchard to sale in Seremban. Diagram 6 shows rambutans' price rates-mass graph.

Encik Aziz membeli rambutan dari dusun Encik Azman untuk dijual di Seremban. Rajah 6 menunjukkan graf kadar harga-jisim rambutan.

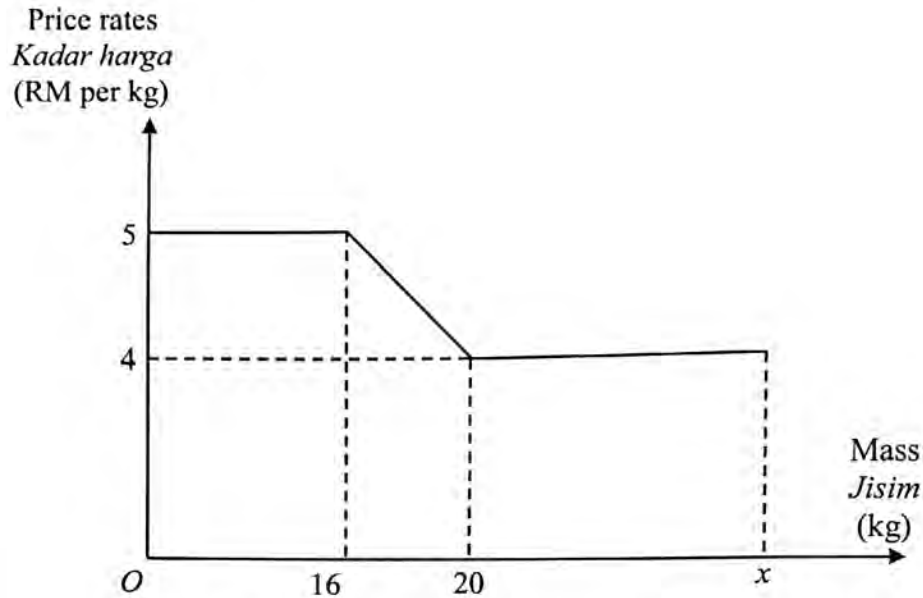


Diagram 6
Rajah 6

- (a) What is meant by the area below the graph for the price rates-mass graph above?

Apakah yang dimaksudkan dengan luas di bawah graf bagi graf kadar harga-jisim di atas?

- (b) Encik Aziz paid a sum of RM146 for the rambutans he bought. Calculate the rambutans's mass purchased by Encik Aziz.

Encik Aziz telah membayar wang sejumlah RM146 untuk rambutan yang dibelinya. Hitung jisim rambutan yang dibeli oleh Encik Aziz.

- (c) Encik Aziz has managed to sell all the rambutans at RM6 per kilogram. How much profit does his get?

Encik Aziz telah berjaya menjual semua rambutan itu dengan harga RM6 sekilogram. Berapakah keuntungan yang diperolehinya?

[6 marks]

[6 markah]

Answer/ Jawapan:

(a)

(b)

(c)

For
Examiner's
Use

For
Examiner's
Use

- 9 Diagram 7 shows two boxes, P and Q , containing with cards labelled numbers and letters.
Rajah 7 menunjukkan dua kotak, P dan Q , yang mengandungi kad berlabel dengan nombor dan abjad.

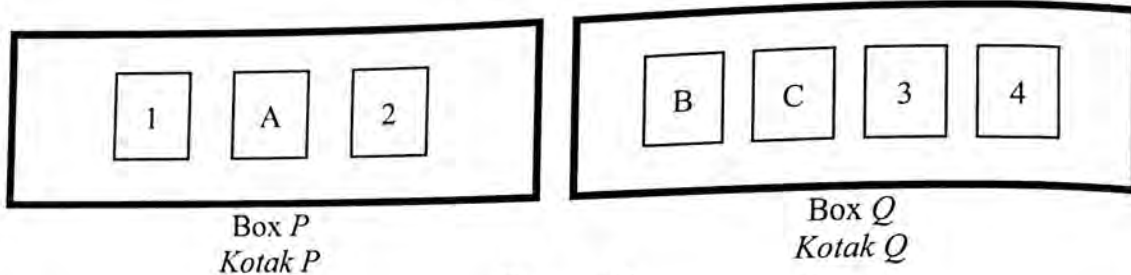


Diagram 7
Rajah 7

Two cards are picked at random, one card from box P and another card from box Q .
Dua kad dipilih secara rawak, satu kad dari kotak P dan satu kad lagi dari kotak Q .

- (a) List all possible outcomes in the answer space.
Senaraikan semua kesudahan yang mungkin di ruang jawapan.
- (b) Hence, find the probability of the events that the cards picked are
Seterusnya, cari kebarangkalian bagi peristiwa tersebut bahawa kad-kad yang dipilih itu ialah
- (i) labelled with odd number and labelled with a consonant
berlabel dengan nombor ganjil dan berlabel huruf konsonan
- (ii) labelled with even number or labelled with a vocal.
berlabel dengan nombor genap atau berlabel dengan huruf vokal.

[6 marks]

[6 markah]

Answers / Jawapan :

(a)

*For
Examiner's
Use*

(b)(i)

(ii)

For
Examiner's
Use

- 10 Diagram 8 shows a semicircle $OPQR$ centre O with diameter 28 cm. SOT is a quadrant of a circle centre O . T is a midpoint of OR .

Rajah 8 menunjukkan semibulatan $OPQR$ berpusat di O dengan diameter 28 cm. SOT ialah sukuan bulatan berpusat di O . T ialah titik tengah OR .

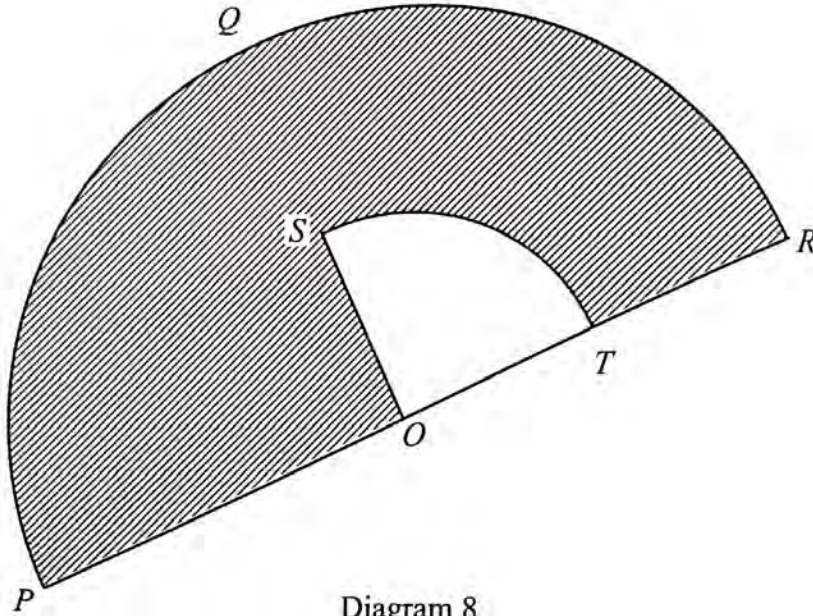


Diagram 8
Rajah 8

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

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

- (a) the perimeter, in cm, the shaded region,
perimeter, dalam cm, kawasan berlerek,

[3 marks]

- (b) the area, in cm^2 , the shaded region.
luas, dalam cm^2 , kawasan berlerek.

[3 markah]

[3 marks]

[3 markah]

For
Examiner's
Use

11

(a) Given that $\frac{1}{e} \begin{pmatrix} 6 & f \\ -4 & -1 \end{pmatrix} \begin{pmatrix} -1 & 2 \\ 4 & 6 \end{pmatrix} = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$, find the value of e and f .

Diberi $\frac{1}{e} \begin{pmatrix} 6 & f \\ -4 & -1 \end{pmatrix} \begin{pmatrix} -1 & 2 \\ 4 & 6 \end{pmatrix} = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$, cari nilai e dan f .

(b) Using matrices, calculate the value of x and y that satisfy the following matrix equation :

Dengan menggunakan kaedah matriks, hitung nilai x dan y yang memuaskan persamaan matriks berikut :

$$2x - y = 7$$

$$6x - 4y = 2$$

[6 marks]
[6 markah]

Answer/ Jawapan:

(a)

(b)

For
Examiner's
Use

Section B
Bahagian B

[48 marks]
[48 markah]

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

- 12 (a) Complete Table 1 in the answer space on page 23, for the equation $y = 2x^2 + 5x - 3$ by writing down the values of y when $x = -3.4$ and $x = 1$.
[2 marks]

Lengkapkan Jadual 1 di ruang jawapan pada halaman 23, bagi persamaan $y = 2x^2 + 5x - 3$ dengan menulis nilai-nilai y apabila $x = -3.4$ dan $x = 1$.
[2 markah]

- (b) For this part of the question, use the graph paper provided on the page 24.
You may use a flexible curve ruler.

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

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 $y = 2x^2 + 5x - 3$ for $-4 \leq x \leq 3$.
[4 marks]

Menggunakan skala 2 cm kepada 1 unit pada paksi- x dan 2 cm kepada 5 unit pada paksi- y , lukis graf $y = 2x^2 + 5x - 3$ untuk $-4 \leq x \leq 3$.
[4markah]

- (c) From the graph in 12(b), find
Daripada graf di 12(b), cari

the value of y when $x = -2.5$,
nilai y apabila $x = -2.5$,

the value of x when $y = 12$.
nilai x apabila $y = 12$.

[2 marks]
[2 markah]

- (d) Draw a suitable straight line on the graph in 12(b) to find the values of x which satisfy the equation $2x^2 + x = 12$ for $-4 \leq x \leq 3$.
State these values of x .

Lukis satu garis lurus yang sesuai pada graf di 12(b) untuk mencari nilai-nilai x yang memuaskan persamaan $2x^2 + x = 12$ untuk $-4 \leq x \leq 3$. Nyatakan nilai-nilai x ini.

[4 marks]
[4 markah]

Answer / Jawapan :

For
Examiner's
Use

(a) $y = 2x^2 + 5x - 3$

x	-4	-3.4	-2	-1	0	1	2.5	3
y	9		-5	-6	-3		22	30

Table 1
Jadual 1

(b) Refer to the graph on page 24.
Rujuk graf di halaman 24.

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

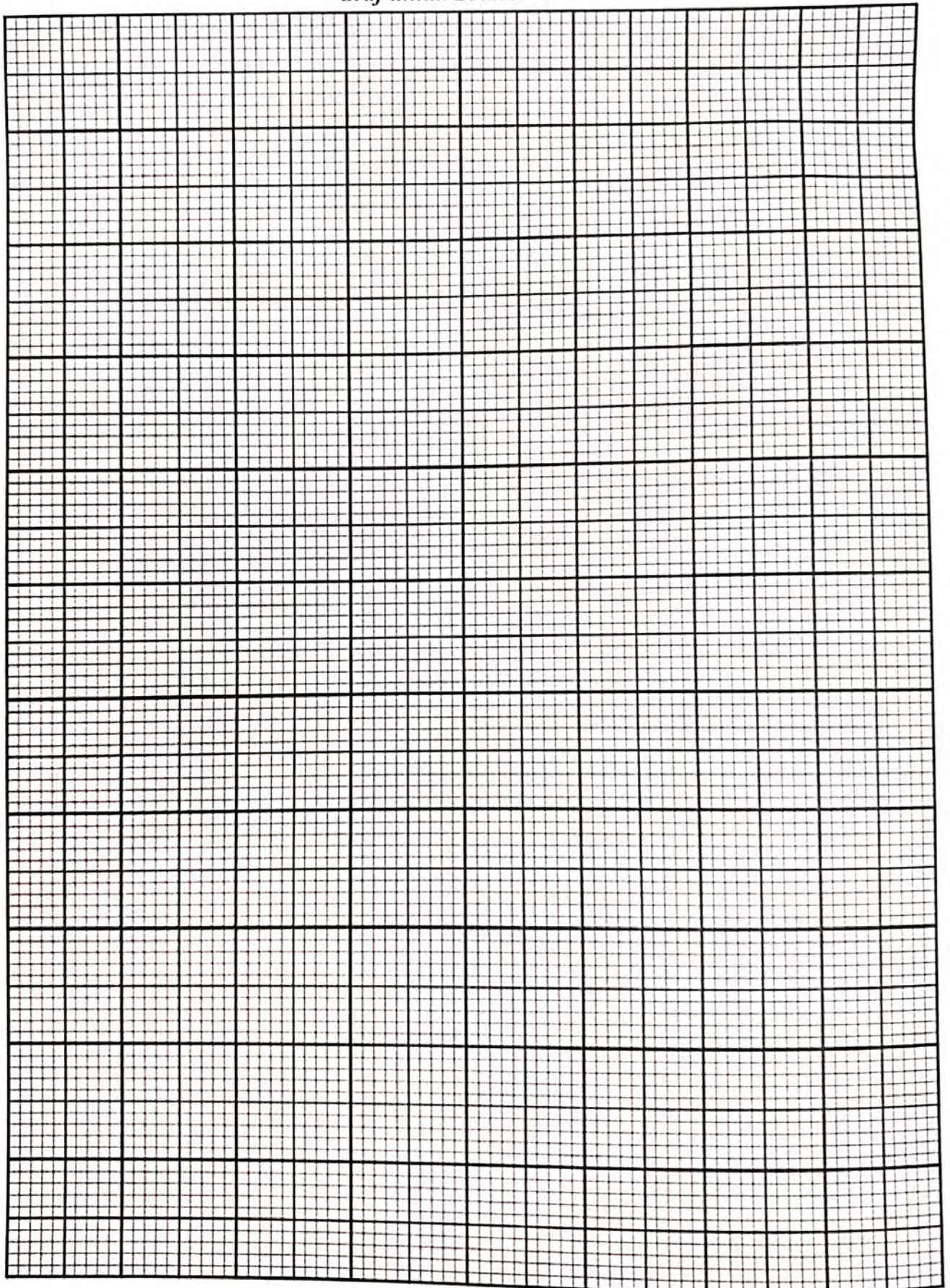
(ii) $x = \dots\dots\dots$

(d)

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

For
Examiner's
Use

Graph for Question 12
Graf untuk Soalan 12



13

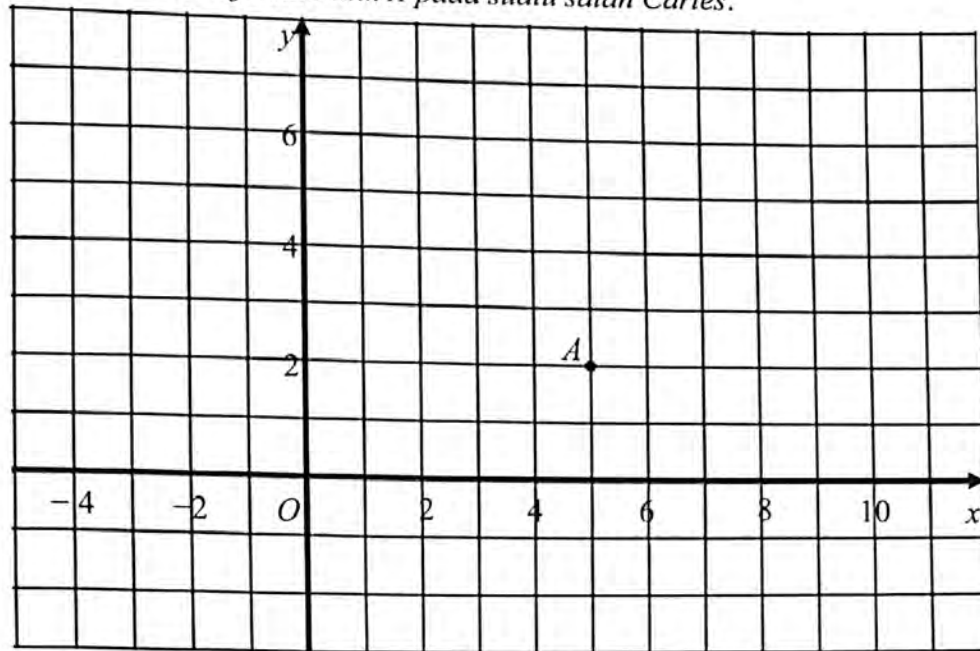
(a) Diagram 9.1 shows point A on a Cartesian plane.*Rajah 9.1 menunjukkan titik A pada suatu satah Cartes.*

Diagram 9.1

*Rajah 9.1*Transformation **G** represents a reflection at the line $x = 2$.Transformation **H** represents a translation $\begin{pmatrix} 1 \\ -4 \end{pmatrix}$.Transformation **K** represents a rotation of 90° in the anticlockwise direction about the point $(2, 0)$.*Penjelmaan **G** mewakili satu pantulan pada garis $x = 2$.**Penjelmaan **H** mewakili translasi $\begin{pmatrix} 1 \\ -4 \end{pmatrix}$.**Penjelmaan **K** mewakili putaran 90° mengikut arah lawan jam pada titik $(2, 0)$.*State the coordinates of the image of point $A(5, 2)$ under the following transformation :*Nyatakan koordinat imej bagi titik $A(5, 2)$ di bawah penjelmaan :*(i) **K**,(ii) **HG**.

[3 marks]

[3 markah]

For
Examiner's
Use

- (b) Diagram 9.2 shows the geometrical shape $KLGMN$ and $EFGHJ$. Given that $LG : GF = 2 : 1$, where line LGF is perpendicular to the line HGM .
Rajah 9.2 menunjukkan bentuk geometri $KLGMN$ dan $EFGHJ$. Diberi $LG : GF = 2 : 1$, di mana garis LGF berserenjang dengan garis HGM .

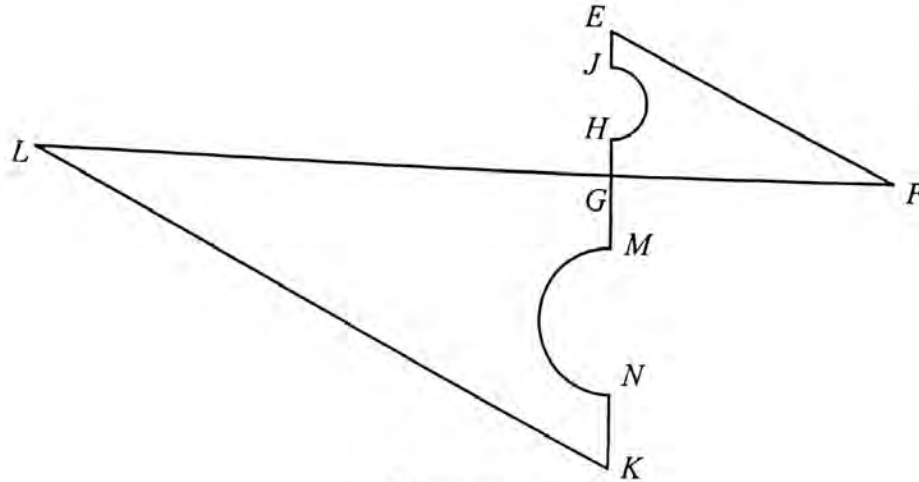


Diagram 9.2
Rajah 9.2

- (i) $KLGMN$ is the image of $EFGHJ$ under transformation V followed by transformation W , where both transformation centred at G .
 Describe in full the transformation :

*$KLGMN$ ialah imej bagi $EFGHJ$ di bawah penjelmaan V dan W , di mana kedua-dua penjelmaan itu berpusat di G .
 Huraikan selengkapnya penjelmaan :*

- (a) V ,
 (b) W .

- (ii) Describe in full a single transformation which is equivalent to transformation WV .

Huraikan dengan penuh satu penjelmaan tunggal yang sama dengan penjelmaan WV .

[7 marks]

[7 markah]

- (c) Given that the area of $EFGHJ$ is 9.425 unit^2 , calculate the area of $KLGMN$.

Diberi luas $EFGHJ$ ialah 9.425 unit^2 , kirakan luas imej bagi $KLGMN$.

[2 marks]

[2 markah]

- 14 Diagram 10 shows the distribution of water bill payments, in RM, of 35 houses in April.
Rajah 10 menunjukkan taburan bayaran bil air, dalam RM, bagi 35 buah rumah pada bulan April.

For
Examiner's
Use

31	45	42	23	39	34	39
42	36	22	32	27	42	37
28	34	31	44	48	35	27
33	23	47	29	26	40	40
33	48	29	37	34	36	28

Diagram 10

Rajah 10

- (a) Based on the data in Diagram 10, complete Table 2 in the answer space on page 30.

[4 marks]

Berdasarkan data dalam Rajah 10, lengkapkan Jadual 2 di ruang jawapan di halaman 30.

[4 markah]

- (b) Based on Table 2, calculate the mean for water bill payments in April.

[3 marks]

Berdasarkan Jadual 2, hitungkan min bayaran bil air pada bulan April.

[3 markah]

- (c) For this part of the question, use the graph paper provided on page 31.

Untuk ceraian soalan ini, gunakan kertas graf yang disediakan di halaman 31.

By using the scale of 2 cm to RM5 on the horizontal axis and 2 cm to 1 house on the vertical axis, draw a frequency polygon for the data.

[4 marks]

Dengan menggunakan skala 2 cm kepada RM5 pada paksi mengufuk dan 2 cm kepada 1 rumah pada paksi mencancang, lukis satu poligon kekerapan bagi data tersebut.

[4 markah]

- (d) Based on the frequency polygon drawn in 14(c), state the number of houses with the water bill payment of more than RM37.

[1 marks]

Berdasarkan kepada poligon kekerapan yang dilukis di 14(c), nyatakan bilangan rumah yang bayaran bil airnya lebih dari RM37.

[1 markah]

For
Examiner's
Use

Answer / Jawapan:

(a)

Bill payment <i>Bayaran bil</i> (RM)	Frequency <i>Kekerapan</i>	Midpoint <i>Titik tengah</i>
20 – 24		
25 – 29		

Table 2
Jadual 2

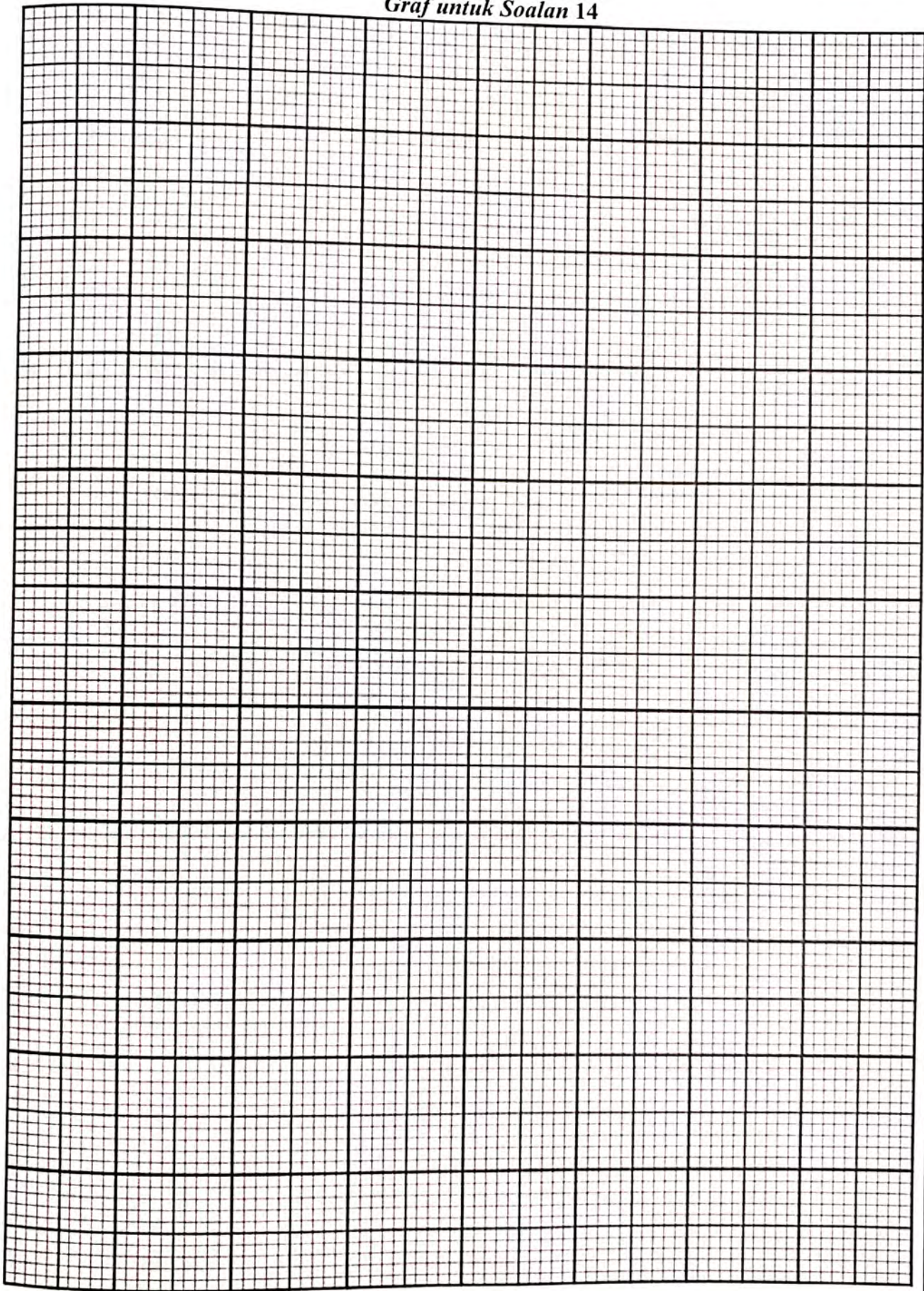
(b)

(c) Refer graph on page 31.
Rujuk graf di halaman 31.

(d)

Graph for Question 14
Graf untuk Soalan 14

For
Examiner's
Use



For
Examiner's
Use

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

- (a) Diagram 11.1 shows a solid prism with a rectangular base $ABCD$ on a horizontal plane. The surface $BCQPLKGF$ is the uniform cross section of the prism. Edges BF , GK , LP and CQ are vertical. $BF = FG = GK = KL = LP = 2$ cm.

Rajah 11.1 menunjukkan sebuah pepejal berbentuk prisma dengan tapak segi empat tepat $ABCD$ terletak di atas satah mengufuk. Permukaan $BCQPLKGF$ ialah keratan rentas seragam prisma itu. Tepi BF , GK , LP dan CQ adalah tegak.

$BF = FG = GK = KL = LP = 2$ cm.

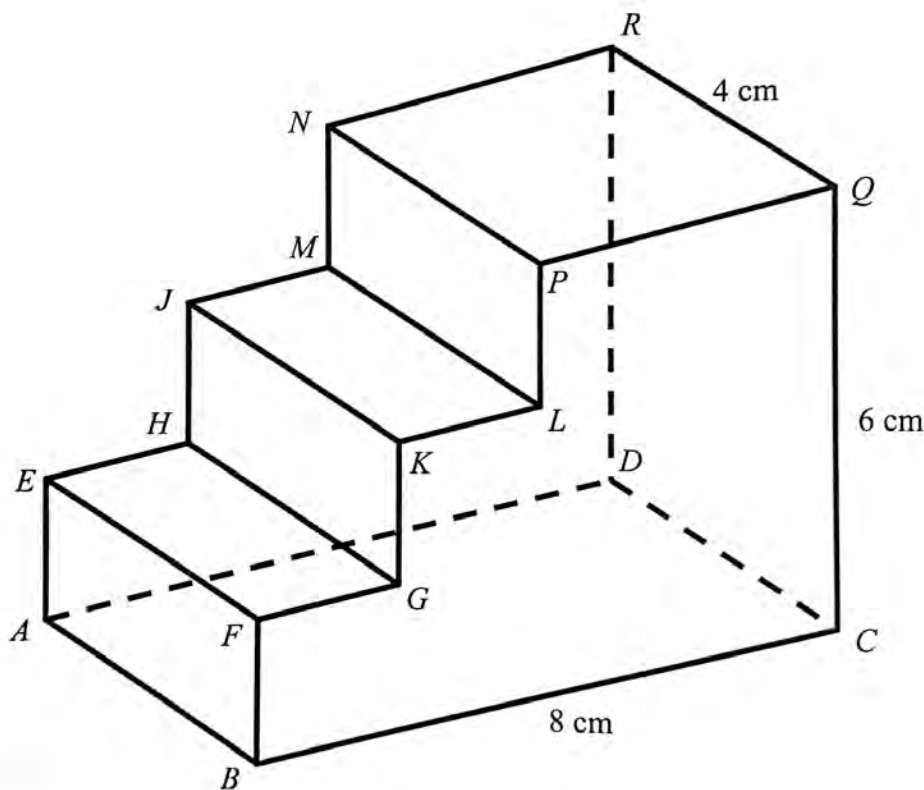


Diagram 11.1
Rajah 11.1

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

Answer / Jawapan:

(a)

For
Examiner's
Use

For
Examiner's
Use

- (b) Another solid prism with a square base $USTC$ is combined to the prism in Diagram 11.1 at the vertical plane $PQCU$. The composite solid as shown in Diagram 11.2. The base $ABUSTCD$ lies on a horizontal plane.

Sebuah pepejal lain berbentuk prisma dengan tapak segi empat sama $USTC$ dicantumkan kepada prisma dalam Rajah 11.1 pada satah mencancang $PQCU$. Gabungan pepejal adalah seperti yang ditunjukkan dalam Rajah 11.2. Tapak $ABUSTCD$ terletak pada satah mengufuk.

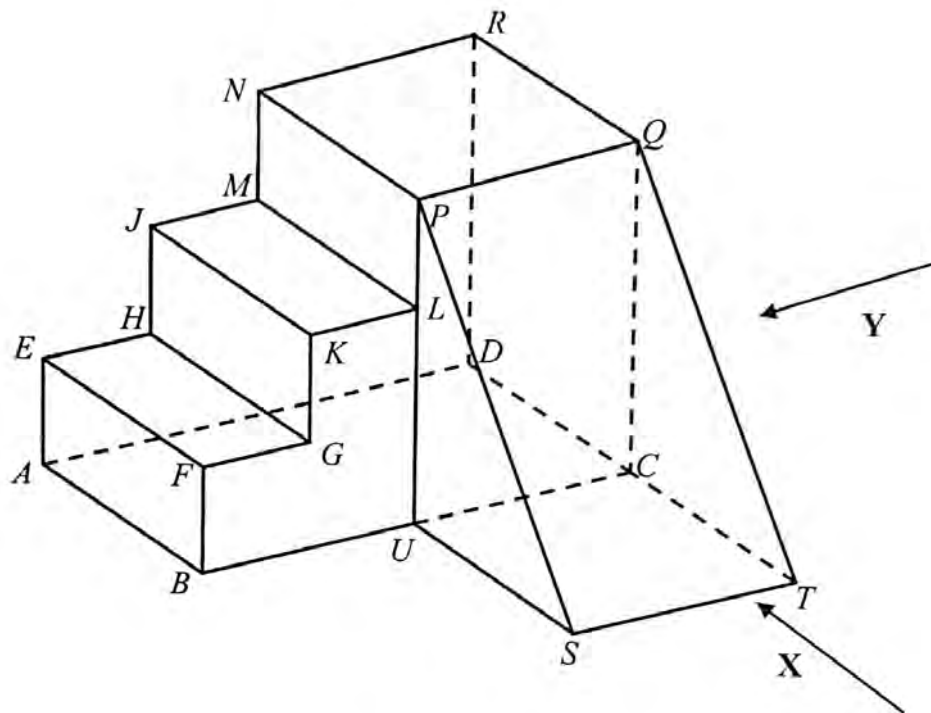


Diagram 11.2
Rajah 11.2

Draw to full scale,
Lukis dengan skala penuh,

- (i) the elevation of the composite solid on a vertical plane parallel to ST as viewed from X .
[4 marks]
dongakan gabungan pepejal itu pada satah mencancang yang selari dengan ST sebagaimana dilihat dari X .
[4 markah]
- (ii) the elevation of the composite solid on a vertical plane parallel to DCT as viewed from Y .
[5 marks]
dongakan gabungan pepejal itu pada satah mencancang yang selari dengan DCT sebagaimana dilihat dari Y .
[5 markah]

Answer / Jawapan:

(b) (i), (ii)

For
Examiner's
Use

For
Examiner's
Use

- 16 $F(40^\circ \text{ S}, 70^\circ \text{ W})$, $G(60^\circ \text{ S}, 110^\circ \text{ E})$, H and J are four points on the surface on the earth. FH is a diameter of the earth. J is due west of H .

$F(40^\circ \text{ S}, 70^\circ \text{ B})$, $G(60^\circ \text{ S}, 110^\circ \text{ T})$, H dan J adalah empat titik di atas permukaan bumi. FH ialah diameter bumi. J terletak ke sebelah barat H .

- (a) State the longitude of H . [2 marks]

Nyatakan longitud bagi H . [2 markah]

- (b) The distance from J to H is 2 482 nautical miles measured along the common parallel of latitude. Calculate the longitude of J . [4 marks]

Jarak J ke H ialah 2 482 batu nautika diukur sepanjang selarian latitud sepunya. Hitung longitud bagi J . [4 markah]

- (c) Calculate the shortest distance, in nautical mile, from F to G measured along the surface of the earth. [2 marks]

Hitung jarak terpendek, dalam batu nautika, dari F ke G diukur sepanjang permukaan bumi. [2 markah]

- (d) An aeroplane took off from J and flew due east to H along the common parallel of latitude. Then, it flew due south to G along the same meridian. The average speed for the whole flight was 700 knots.

Sebuah kapal terbang berlepas dari J dan terbang arah timur ke H di sepanjang selarian latitud sepunya. Kemudian, kapal terbang itu terbang arah selatan ke G di sepanjang meridian yang sama. Laju purata bagi keseluruhan penerbangan itu ialah 700 knot.

- (i) Calculate the distance, in nautical mile, from H to G measured along the same meridian.

Hitung jarak, dalam batu nautika, dari H ke G diukur sepanjang meridian yang sama.

- (ii) Calculate the total time, in hour, taken for the whole flight.

Hitung jumlah masa, dalam jam, bagi keseluruhan penerbangan itu.

[4 marks]

[4 markah]

Answer / Jawapan:

(a)

(b)

(c)

(d) (i)

(ii)

*For
Examiner's
Use*

NIZAM TAHIR

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1449/1
Matematik
Kertas 1
Ogos 2019



MAJLIS PENGETUA SEKOLAH MALAYSIA

NEGERI SEMBILAN

PROGRAM PENINGKATAN AKADEMIK TINGKATAN LIMA
SEKOLAH-SEKOLAH MENENGAH NEGERI SEMBILAN 2019

MATEMATIK

Kertas 1

PERATURAN PEMARKAHAN

PROGRAM PENINGKATAN AKADEMIK TINGKATAN LIMA
SEKOLAH-SEKOLAH MENENGAH NEGERI SEMBILAN 2019

MATEMATIK
Kertas 1

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

1449/2
Matematik
Kertas 2
Ogos 2019



**MAJLIS PENGETUA SEKOLAH MALAYSIA
NEGERI SEMBILAN**

**PROGRAM PENINGKATAN AKADEMIK TINGKATAN LIMA
SEKOLAH-SEKOLAH MENENGAH NEGERI SEMBILAN 2019**

MATEMATIK

Kertas 2

PERATURAN PEMARKAHAN

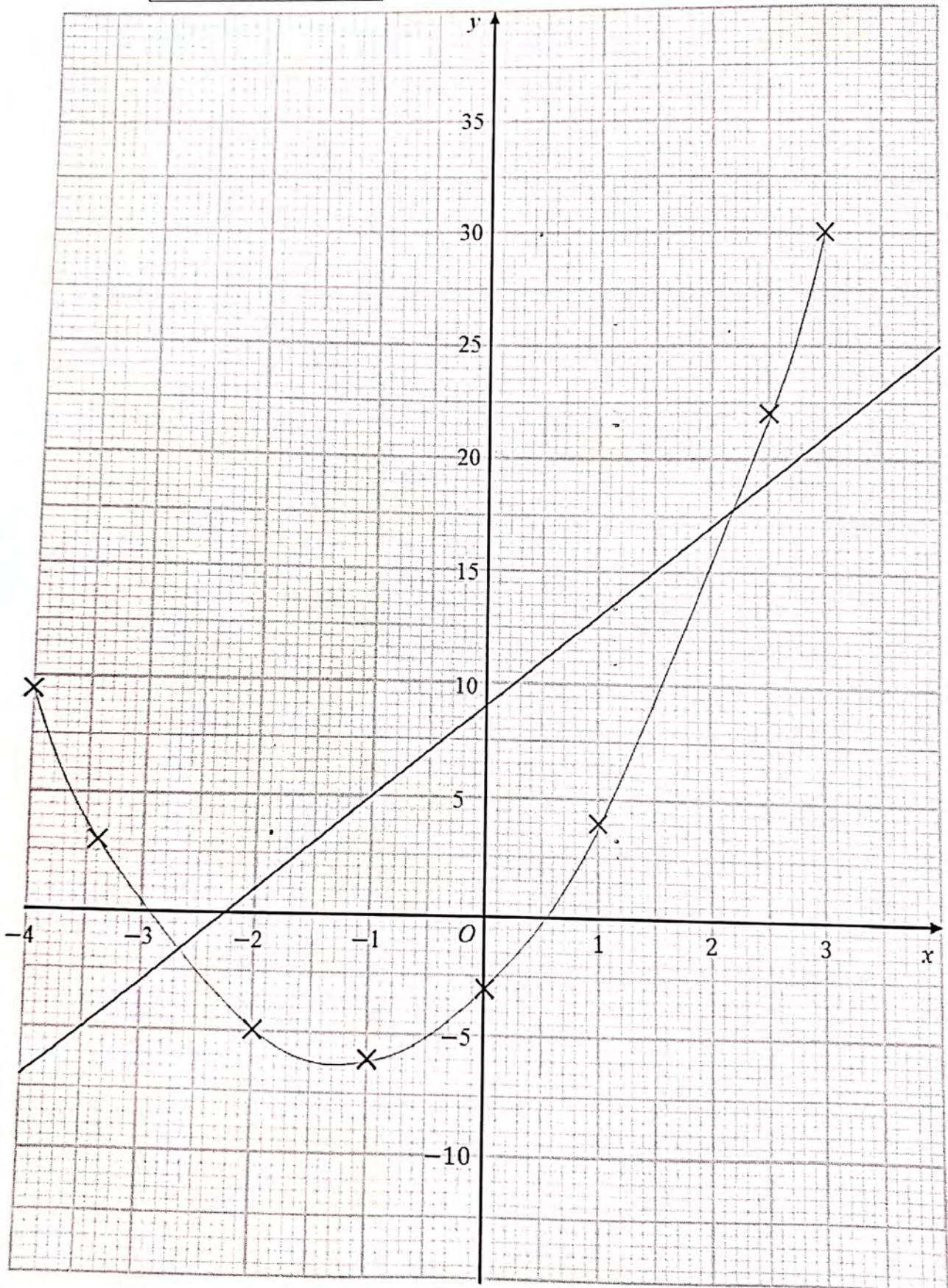
Number	Marking Scheme	Marks
1	$x < 3$	K1
	$y \geq -x$	K2
	<u>Note:</u> Award K1 for $y > -x$	3
2	(a) $\angle STR$ or $\angle RTS$	P1
	(b) $\tan \theta = \frac{12}{6}$ $\theta = 63^\circ 26'$ or 63.43°	K1 N1
		3
3	$x(x+2) + \frac{1}{2}(x+x+2)(2) = 23$ or equivalent	K1
	$x^2 + 4x - 21 = 0$	K1
	$(x+7)(x-3) = 0$	K1
	$x = 3$	N1
		4
4	$\frac{1}{2} \times 14 \times t \times 16$	K1
	$\frac{1}{2} \times \frac{22}{7} \times 8^2 \times t$	K1
	$\left[\frac{1}{2} \times 14 \times t \times 16 \right] + \left[\frac{1}{2} \times \frac{22}{7} \times 8^2 \times t \right] = 2763 \frac{3}{7}$ or equivalent	K1
	13	N1
		4
5	$x = \frac{2+y}{3}$ or $y = 3x - 2$ OR $x = -4y + 5$ or $y = \frac{-x+5}{4}$	K1
	$4y + \left(\frac{2+y}{3} \right) = 5$ or equivalent	K1
	$13y = 13$ or equivalent	K1
	$x = 1$	N1
		N1
		4

Number	Marking Scheme	Marks
6	(a) Or	P1
	(b) If $AC^2 = AB^2 + BC^2$, then $\triangle ABC$ is a right-angled triangle.	K1
	(c) Blue, Green, Red, Yellow <i>Biru, Hijau, Merah, Kuning</i>	K2
	<u>Note:</u> Biru, Hijau, Kuning seen award K1	
		4
7	(a) $x = 4$	K1
	(b) $m = -\frac{3}{2}$	K1
	$(2) = -\frac{3}{2}(4) + c$	K1
	$y = -\frac{3}{2}x + 8$	N1
	(c) $(m) = -\frac{3}{2}(-2) + 8$	K1
	$m = 11$	N1
		6
8	(a) Prices of rambutan <i>Harga rambutan</i>	P1
	(b) 5×16 or $\frac{1}{2} \times (4 + 5) \times 4$ or $4(x - 20)$	K1
	$146 = 5 \times 16 + \frac{1}{2} \times (4 + 5) \times 4 + 4(x - 20)$	K1
	32	N1
	(c) $32 \times 6 - 146$	K1
	46	N1
		6

Number	Marking Scheme	Marks
9	<p>(a) $S = \{ (1, B), (1, C), (1, 3), (1, 4), (A, B), (A, C), (A, 3), (A, 4), (2, B), (2, C), (2, 3), (2, 4) \}$</p> <p><u>Note</u>: Allow one mistake for P1.</p> <p>(b)(i) $\{ (1, B), (1, C) \}$</p> $\frac{2}{12}$ <p>(b)(ii) $\{ (1, 4), (A, B), (A, C), (A, 3), (A, 4), (2, B), (2, C), (2, 3), (2, 4) \}$</p> $\frac{9}{12}$	<p>P2</p> <p>K1</p> <p>N1</p> <p>K1</p> <p>N1</p>
10	<p>(a) $\frac{180}{360} \times 2 \times \frac{22}{7} \times 14$ or $\frac{90}{360} \times 2 \times \frac{22}{7} \times 7$</p> $\frac{180}{360} \times 2 \times \frac{22}{7} \times 14 + \frac{90}{360} \times 2 \times \frac{22}{7} \times 7 + 14 + 7 + 7$ <p>or equivalent</p> <p>83</p> <p>(b) $\frac{180}{360} \times \frac{22}{7} \times 14^2$ or $\frac{90}{360} \times \frac{22}{7} \times 7^2$</p> $\frac{180}{360} \times \frac{22}{7} \times 14^2 - \frac{90}{360} \times \frac{22}{7} \times 7^2$ or equivalent <p>269.5 or $\frac{539}{2}$ or $269\frac{1}{2}$</p>	<p>6</p> <p>K1</p> <p>K1</p> <p>N1</p> <p>K1</p> <p>K1</p> <p>N1</p>
		6

Number	Marking Scheme	Marks						
11	<p>(a) $e = -14$</p> <p>$f = -2$</p> <p>(b) $\begin{pmatrix} 2 & -1 \\ 6 & -4 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 7 \\ 2 \end{pmatrix}$</p> <p>$\begin{pmatrix} x \\ y \end{pmatrix} = \frac{1}{(2)(-4) - (-1)(6)} \begin{pmatrix} -4 & 1 \\ -6 & 2 \end{pmatrix} \begin{pmatrix} 7 \\ 2 \end{pmatrix}$</p> <p>$x = 13$</p> <p>$y = 19$</p> <p><u>Note:</u> $\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 13 \\ 19 \end{pmatrix}$ award N1</p>	<p>P1</p> <p>P1</p> <p>P1</p> <p>K1</p> <p>N1</p> <p>N1</p>						
6								
12	<p>(a)</p> <table border="1" data-bbox="683 837 995 967" style="margin-left: auto; margin-right: auto;"> <tr> <td style="padding: 5px;">x</td> <td style="padding: 5px;">-3.4</td> <td style="padding: 5px;">1</td> </tr> <tr> <td style="padding: 5px;">y</td> <td style="padding: 5px;">3.12</td> <td style="padding: 5px;">4</td> </tr> </table> <p>(b) Axes drawn in the correct directions with uniform scales for $-4 \leq x \leq 3$ and $-6 \leq y \leq 30$</p> <p>All 6 points and *2 points correctly plotted or curve passes through all points for $-4 \leq x \leq 3$ and $-6 \leq y \leq 30$</p> <p>A smooth and continuous curve without any straight line and passes through all 8 correct 8 points using the given scale $-4 \leq x \leq 3$ and $-6 \leq y \leq 30$</p> <p><u>Notes:</u></p> <ol style="list-style-type: none"> 1. 6 or 7 points correctly plotted, award K1. 2. Ignore curve out of range. <p>(c) -3 ± 0.5</p> <p>1.8 ± 0.1</p> <p><u>Note:</u> Do not accept 1.76</p> <p>(d) Straight line $y = 4x + 9$ correctly drawn</p> <p>The straight line $y = 4x + 9$ passes through any two of these points $(-2, 1)$, $(0, 9)$ and $(2, 17)$</p> <p><u>Note:</u></p> <p>Identify equation $y = 4x + 9$ seen, award K1</p> <p>-2.7 ± 0.1</p> <p>2.2 ± 0.1</p>	x	-3.4	1	y	3.12	4	<p>P1P1</p> <p>P1</p> <p>K2</p> <p>N1</p> <p>N1</p> <p>N1</p> <p>N1</p> <p>N1</p> <p>N1</p> <p>N1</p> <p>12</p>
x	-3.4	1						
y	3.12	4						

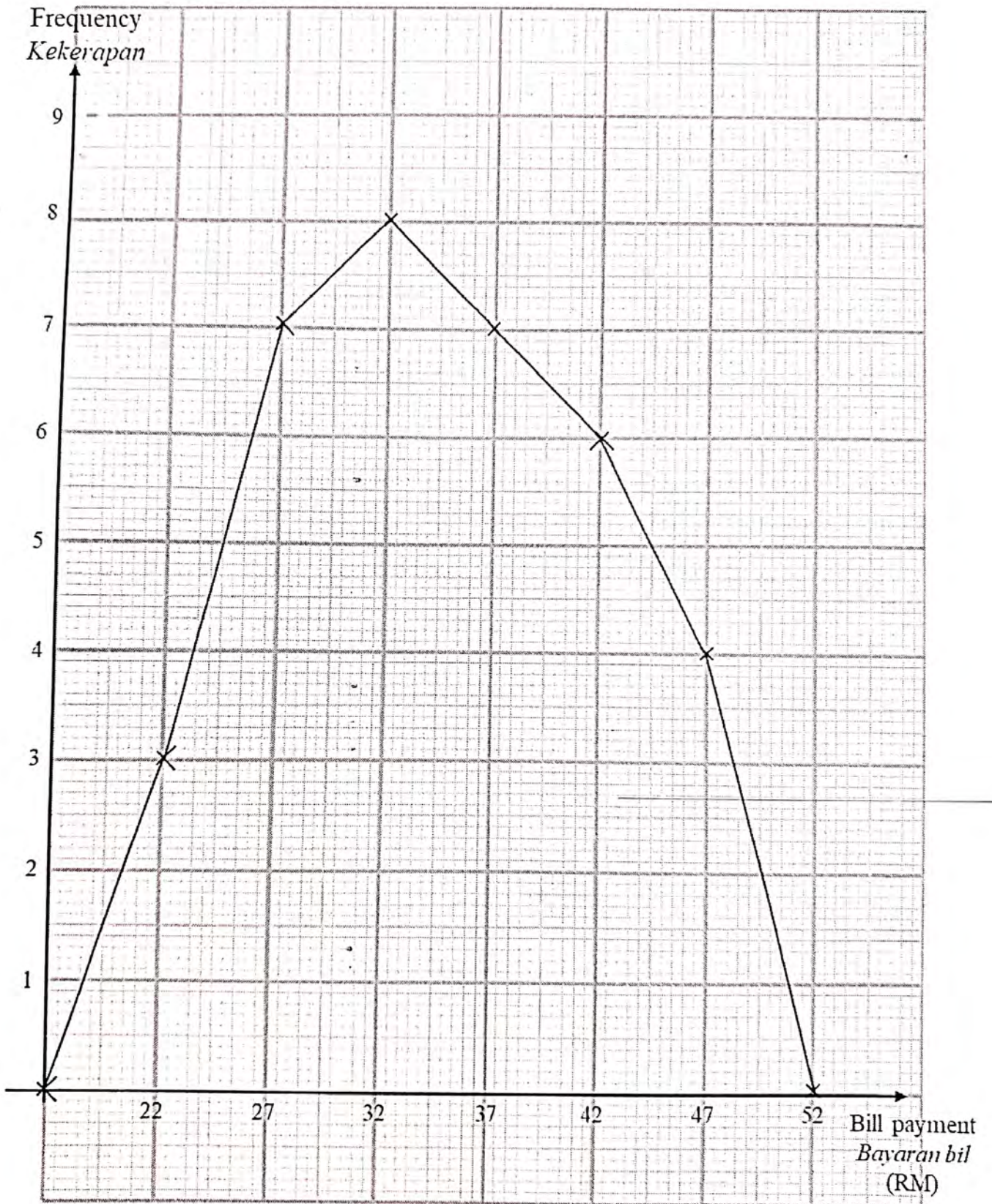
Graph for Question 12

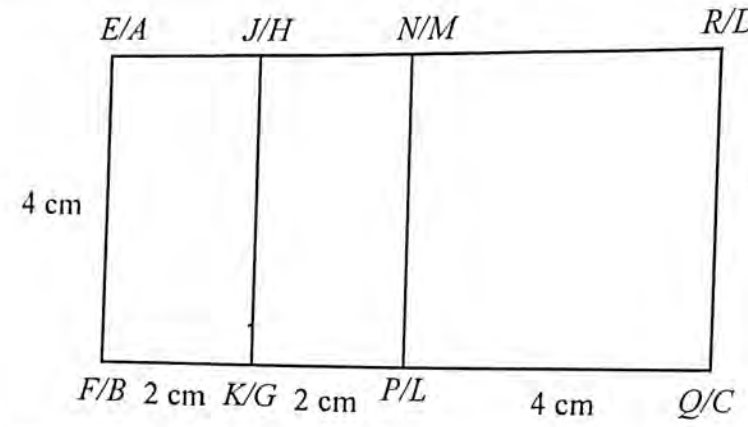
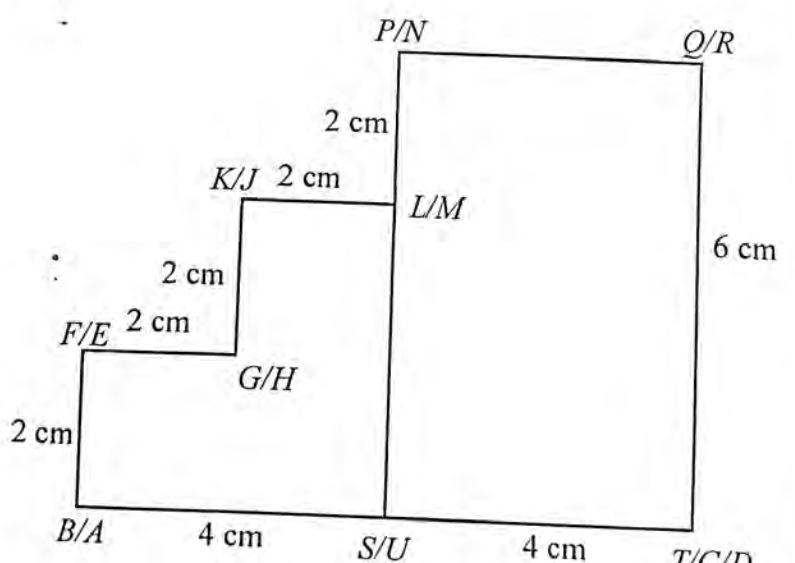


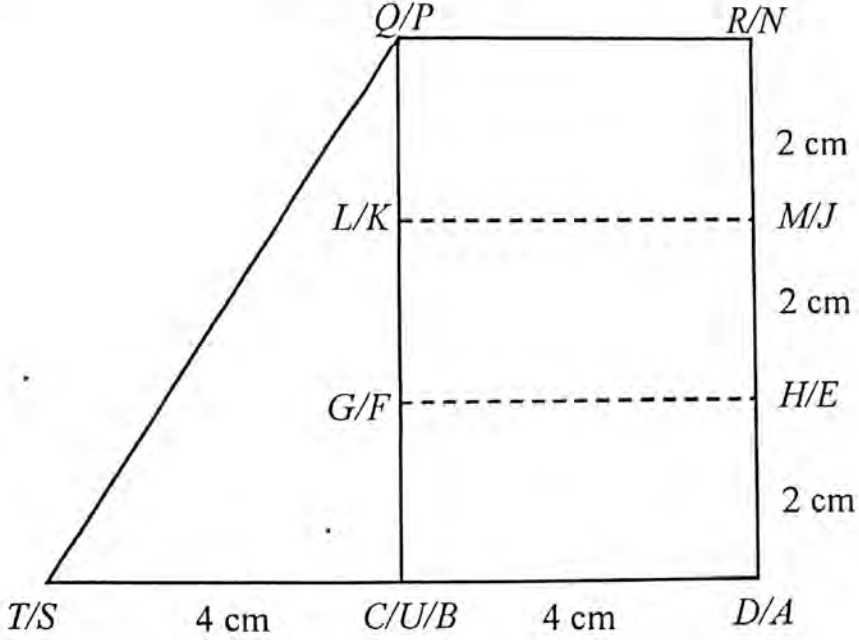
Number	Marking Scheme	Marks
13	(a)(i) (0, 3)	P1
	(ii) (0, -2)	P2
	<u>Note:</u> (0, -2), (-1, 2) seen or marked, award P1	
	(b)(i) Rotation, 180° .	P2
	<u>Note:</u> 1. Rotation, award P1	
	Enlargement, scale factor 2	P2
	<u>Note:</u> 1. Enlargement, award P1	
	(ii) Enlargement, scale factor -2, centre G	P3
	<u>Note:</u> 1. Enlargement, scale factor -2 or Enlargement, centre G, award P2	
	2. Enlargement, award P1	
(c) $2^2 \times 9.425$	K1	
37.7	N1	
	12	

Number	Marking Scheme			Marks																						
14	(a)	<table border="1"> <thead> <tr> <th data-bbox="384 293 746 416">Bill payment <i>Bayaran bil</i> (RM)</th> <th data-bbox="751 293 986 416">Frequency <i>Kekerapan</i></th> <th data-bbox="991 293 1289 416">Midpoint <i>Titik tengah</i></th> </tr> </thead> <tbody> <tr> <td data-bbox="384 423 746 479">20 – 24</td> <td data-bbox="751 423 986 479">3</td> <td data-bbox="991 423 1289 479">22</td> </tr> <tr> <td data-bbox="384 486 746 542">25 – 29</td> <td data-bbox="751 486 986 542">7</td> <td data-bbox="991 486 1289 542">27</td> </tr> <tr> <td data-bbox="384 548 746 604">30 – 34</td> <td data-bbox="751 548 986 604">8</td> <td data-bbox="991 548 1289 604">32</td> </tr> <tr> <td data-bbox="384 611 746 667">35 – 39</td> <td data-bbox="751 611 986 667">7</td> <td data-bbox="991 611 1289 667">37</td> </tr> <tr> <td data-bbox="384 674 746 730">40 – 44</td> <td data-bbox="751 674 986 730">6</td> <td data-bbox="991 674 1289 730">42</td> </tr> <tr> <td data-bbox="384 736 746 792">45 – 49</td> <td data-bbox="751 736 986 792">4</td> <td data-bbox="991 736 1289 792">47</td> </tr> </tbody> </table>			Bill payment <i>Bayaran bil</i> (RM)	Frequency <i>Kekerapan</i>	Midpoint <i>Titik tengah</i>	20 – 24	3	22	25 – 29	7	27	30 – 34	8	32	35 – 39	7	37	40 – 44	6	42	45 – 49	4	47	P1 P2 P1
		Bill payment <i>Bayaran bil</i> (RM)	Frequency <i>Kekerapan</i>	Midpoint <i>Titik tengah</i>																						
		20 – 24	3	22																						
		25 – 29	7	27																						
		30 – 34	8	32																						
		35 – 39	7	37																						
		40 – 44	6	42																						
	45 – 49	4	47																							
	<u>Note:</u> Allow two mistakes in frequency for P1																									
	(b) $\frac{*3 \times 22 + *7 \times 27 + *8 \times 32 + *7 \times 37 + *6 \times 42 + *4 \times 47}{*3 + *7 + *8 + *7 + *6 + *4}$	K2																								
34.57	N1																									
<u>Note:</u> Accept $\frac{1210}{35} = 34.57$, award K2N1																										
(c) Frequency polygon Axes are drawn in the correct direction, uniform scale for $17 \leq x \leq 52$ and $0 \leq y \leq 8$	P1																									
Horizontal axis is labelled using midpoint/ lower and upper boundary and 6 point drawn correctly using midpoint/lower and upper boundary. <u>Note</u> : *4 or *5 line drawn correctly, award K1	K2																									
Points (17, 0) and (52, 0) are plotted correctly. The frequency polygon pass through (17, 0) and (52, 0). The frequency polygon completes and pass through 8 points correctly.	N1																									
(d) 10	P1																									
12																										

Graph for Question 14



Number	Marking Scheme	Marks
15	<p>(a)</p>  <p>Correct shape with three rectangles. All solid lines.</p> <p>$FQ \rightarrow EF = RQ > FK = KL$</p> <p>The measurement is accurate to ± 0.2 cm (one way) and the angles at all vertices of the rectangles are $90^\circ \pm 1^\circ$.</p>	<p>K1</p> <p>K1</p> <p>N1</p>
	<p>(b)(i)</p>  <p>Correct shape with one rectangle and one irregular hexagon All solid lines</p> <p>$CQ > BR = ST > BF = FG = GK = KL = LP$</p> <p>Measurements correct to ± 0.2 cm (one way) and angles at all vertices of the rectangles are $90^\circ \pm 1^\circ$.</p>	<p>K1</p> <p>K1</p> <p>N2</p>

Number	Marking Scheme	Marks
(b)(ii)	 <p data-bbox="368 1126 1129 1205">Correct shape with one rectangle and one triangle All solid lines</p> <p data-bbox="368 1294 922 1339"><i>ML and HG joined with dotted line.</i></p> <p data-bbox="368 1440 1034 1485">$DCT > RD > CD = CT > NM = MH = HA$</p> <p data-bbox="368 1574 1295 1664">Measurements correct to ± 0.2 cm (one way) and angles at all vertices of the rectangles are $90^\circ \pm 1^\circ$.</p>	<p data-bbox="1393 1149 1449 1193">K1</p> <p data-bbox="1393 1294 1449 1339">K1</p> <p data-bbox="1393 1440 1449 1485">K1</p> <p data-bbox="1393 1585 1449 1630">N2</p> <p data-bbox="1393 1731 1449 1776">12</p>

Number	Marking Scheme	Marks
16	(a) $110^\circ T$	P2
	<p><u>Note:</u> 110° or θT, award P1</p>	
	(b) $60 \times \theta \times \cos 40 = 2\,482$	K2
	<p><u>Note:</u> Use $\cos 40^\circ$ correctly, award K1</p>	
	$110 - 54$	K1
	$56^\circ T$	N1
	(c) $60 \times [180 - (60 + 40)]$	K1
	$4\,800$	N1
	(d) (i) $60 \times (40 + 60)$	K1
	$6\,000$	N1
(ii) $\frac{2482 + 6000}{700}$	K1	
12.12 hours	N1	
		12