

**NOMBOR DAN OPERASI
NUMBER AND OPERATIONS**

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 $a^{\frac{m}{n}} = \left(a^m\right)^{\frac{1}{n}}$

5 $a^{\frac{m}{n}} = \left(a^m\right)^{\frac{1}{n}} = \left(a^{\frac{1}{n}}\right)^m$

6 $a^{\frac{m}{n}} = \sqrt[n]{a^m} = \left(\sqrt[n]{a}\right)^m$

7 Faedah mudah, / *Simple interest*, $I = Prt$

Nilai Matang, / *Maturity value*,

8 $MV = P\left(1 + \frac{r}{n}\right)^{nt}$

9 Jumlah bayaran balik, / *Total repayment* $A = P + Prt$

$$\text{Premium} = \frac{\text{Nilai muka polisi}}{\text{RM}x} \times (\text{Kadar premium per RM}x)$$

10

$$\text{Premium} = \frac{\text{Face Value of policy}}{\text{RM } x} \times (\text{Premium rate per RM } x)$$

11

$$\text{Jumlah Insurans yang harus dibeli} = \left(\begin{array}{c} \text{Peratus} \\ \text{ko insurans} \end{array} \right) \times \left(\begin{array}{c} \text{Nilai boleh} \\ \text{insurans harta} \end{array} \right)$$

$$\text{Amount of required insurance} = \left(\begin{array}{c} \text{Percentage of} \\ \text{co insurance} \end{array} \right) \times \left(\begin{array}{c} \text{Insurable value} \\ \text{of property} \end{array} \right)$$

**PERKAITAN DAN ALGEBRA
RELATIONSHIP AND ALGEBRA**

1 $\text{Jarak /Distance} = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

Titik tengah, *Midpoint*

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

3 $\text{Laju purata} = \frac{\text{jarak yang dilalui}}{\text{masa yang diambil}}$

4 $m = \frac{y_2 - y_1}{x_2 - x_1}$

$$\text{Average speed} = \frac{\text{Total Distance}}{\text{Total time}}$$

5 $A^{-1} = \frac{1}{ad - bc} \begin{pmatrix} d & -b \\ -c & a \end{pmatrix}$

6 $m = -\frac{\text{pintasan } - y}{\text{pintasan } - x}$
 $m = -\frac{y - \text{intercept}}{x - \text{intercept}}$

SUKATAN DAN GEOMETRI
MEASUREMENT AND GEOMETRY

- 1 Teorem Pythagoras / *Pythagoras Theorem* $c^2 = a^2 + b^2$
- 2 Hasil tambah sudut pedalaman poligon / *Sum of interior angles of polygon* $= (n - 2) \times 180^\circ$
- 3 Lilitan bulatan/ *Circumference* $= \pi d = 2\pi j$
- 4 Luas bulatan/ *Area of circle* $= \pi j^2$
- 5
$$\frac{\text{Panjang lengkok}}{2\pi j} = \frac{\theta}{360^\circ}$$

$$\frac{\text{Arc Length}}{2\pi r} = \frac{\theta}{360^\circ}$$
- 6
$$\frac{\text{Luas sektor}}{\pi j^2} = \frac{\theta}{360^\circ}$$

$$\frac{\text{Area of sector}}{\pi r^2} = \frac{\theta}{360^\circ}$$
- 7 Luas layang = $\frac{1}{2} \times$ hasil darab panjang dua pepenjuru
Area of kite $= \frac{1}{2} \times$ product of the length of two diagonals
- 8 Luas trapezium = $\frac{1}{2} \times$ hasil tambah dua sisi selari \times tinggi
Area of trapezium $= \frac{1}{2} \times$ sum of two parallel side \times height
- 9 Luas permukaan silinder = $2\pi j^2 + 2\pi jt$
Surface area of cylinder $= 2\pi r^2 + 2\pi rt$
- 10 Luas permukaan kon = $\pi j^2 + \pi js$
Surface area of cone $= \pi r^2 + \pi rs$
- 11 Luas permukaan sfera = $4\pi j^2$
Surface area of sphere $= 4\pi r^2$
- 12 Isipadu prisma = luas keratan rentas \times tinggi
Volume of prism $=$ cross sectional area \times height
- 13 Isipadu silinder = $\pi j^2 t$
Volume of cylinder $= \pi r^2 h$
- 14 Isipadu kon = $\frac{1}{3} \pi j^2 t$
Volume of cone $= \frac{1}{3} \pi r^2 h$
- 15 Isipadu sfera = $\frac{4}{3} \pi j^3$
Volume of sphere $= \frac{4}{3} \pi r^3$

- Isipadu piramid = $\frac{1}{3} \times \text{luas tapak} \times \text{tinggi}$
- 16 *Volume of pyramid* = $\frac{1}{3} \times \text{base area} \times \text{height}$
- Faktor skala, $k = \frac{PA'}{PA}$
- 17 *Scale factor*, $k = \frac{PA'}{PA}$
- 18 Luas imej = $k^2 \times \text{luas objek}$
Area of image = $k^2 \times \text{area of object}$

STATISTIK DAN KEBARANGKALIAN
STATISTICS AND PROBABILITY

- 1 Min/ Mean, $\bar{x} = \frac{\sum x}{N}$
- 2 Min/Mean, $\bar{x} = \frac{\sum fx}{\sum f}$
- 3 Varians/ Variance, $\sigma^2 = \frac{\sum(x - \bar{x})^2}{N} = \frac{\sum x^2}{N} - \bar{x}^2$
- 4 Varians/ Variance, $\sigma^2 = \frac{\sum f(x - \bar{x})^2}{\sum f} = \frac{\sum fx^2}{\sum f} - \bar{x}^2$
- 5 Sisihan piawai/ Standard deviation, $\sigma = \sqrt{\frac{\sum(x - \bar{x})^2}{N}} = \sqrt{\frac{\sum x^2}{N} - \bar{x}^2}$
- 6 Sisihan piawai/ Standard deviation, $\sigma = \sqrt{\frac{\sum f(x - \bar{x})^2}{\sum f}} = \sqrt{\frac{\sum fx^2}{\sum f} - \bar{x}^2}$
- 7 $P(A) = \frac{n(A)}{n(S)}$
- 8 $P(A') = 1 - P(A)$

Jawab **semua** soalan
Answer **all** questions

1 Antara berikut, yang manakah mempunyai nilai terkecil?
Which of the following has the smallest value?

- A 1
- B 16
- C -18
- D -23

2 Pilih pernyataan yang betul.
Choose a correct statement.

- A $\frac{6^2}{7}$ ialah hasil darab $\frac{6}{7} \times \frac{6}{7}$
 $\frac{6^2}{7}$ is the product of $\frac{6}{7} \times \frac{6}{7}$
- B Hasil darab 6.3×2 ialah 6.3^2
The product of 6.3×2 is 6.3^2
- C Kuasa dua bagi -84 ialah -84^2
The square of -84 is -84^2
- D Punca kuasa dua bagi 4 ialah -2
The square root of 4 is -2

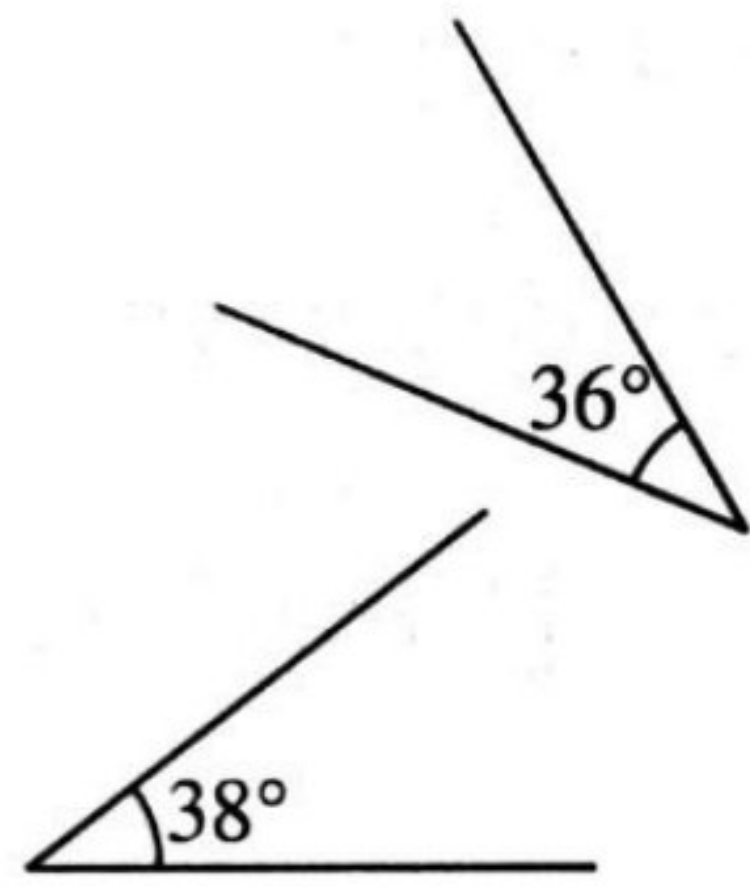
3 Antara berikut, yang manakah nisbah setara?
Which of the following are equivalent ratios?

- A 1 : 0.25 dan/ and $\frac{1}{2}$: 0.4
- B 18 : 6 dan/ and 20 : 8
- C 0.4 : 0.15 dan/ and 7 : 3
- D $\frac{1}{3}$: $\frac{3}{5}$ dan/ and 5 : 9

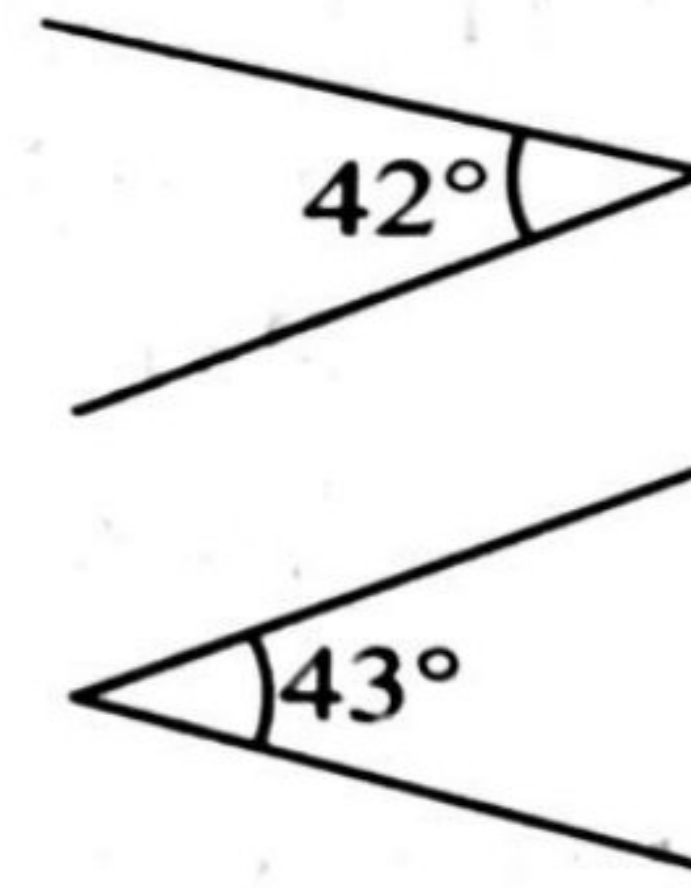
4 Antara berikut, yang manakah pasangan sudut yang kongruen?

Which of the following is a pair of congruent angles?

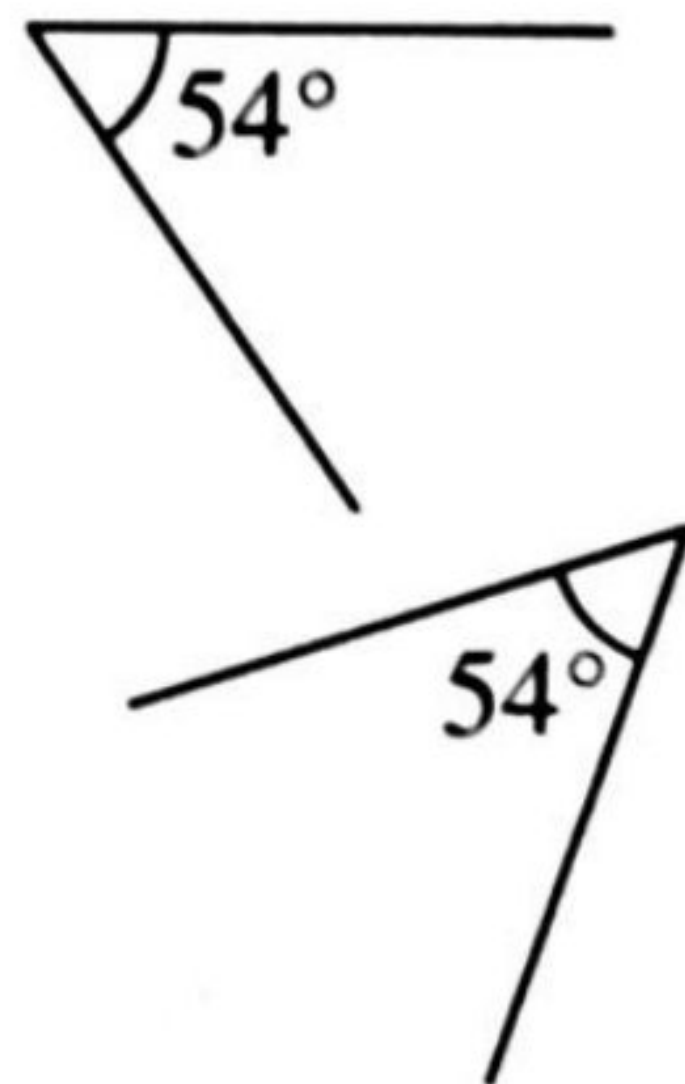
A



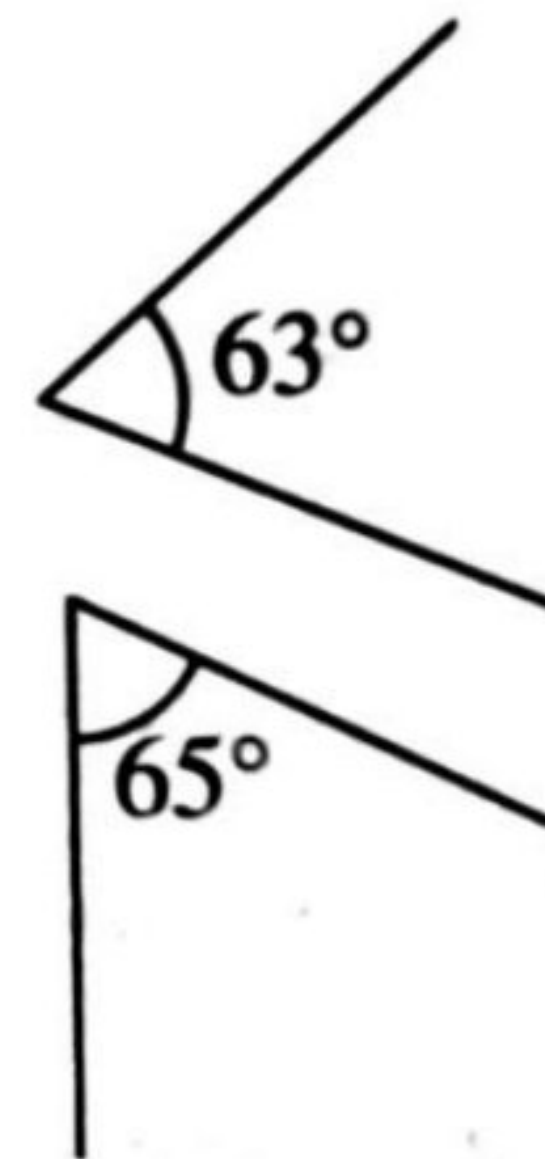
B



C



D



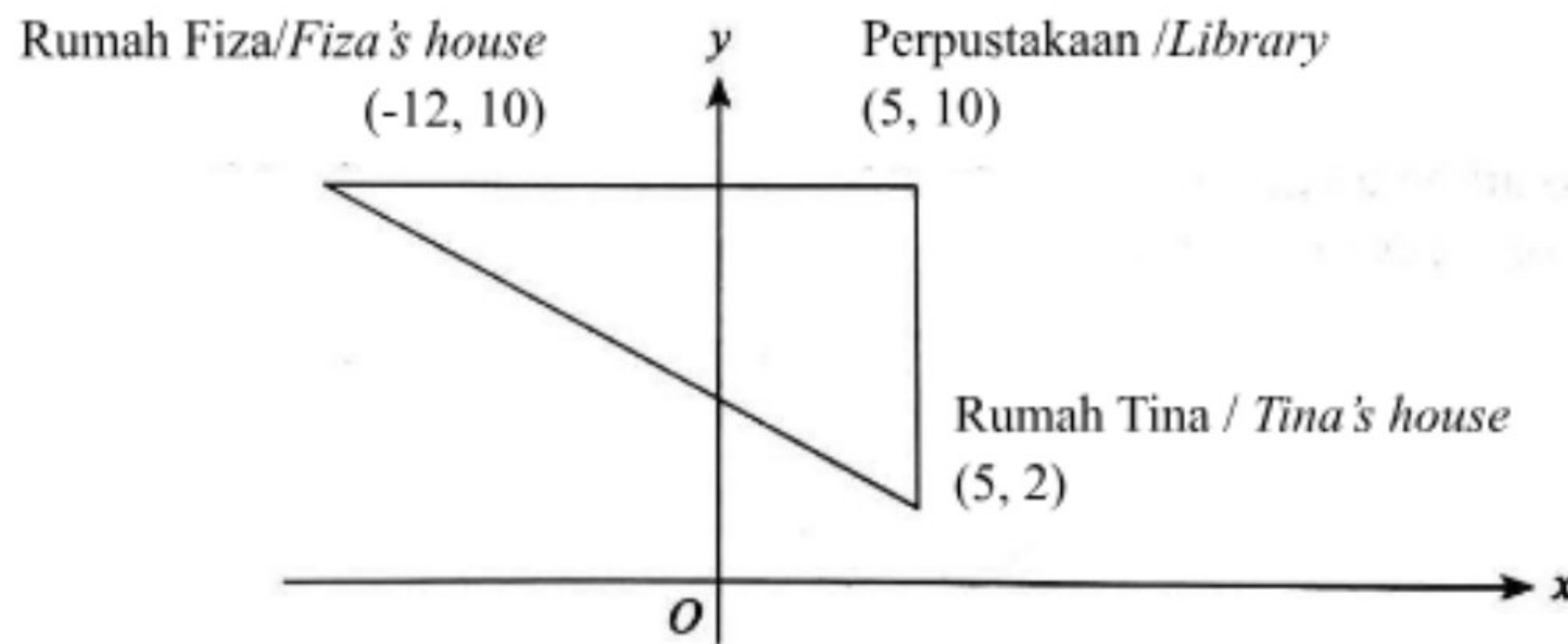
5 Isi padu air dalam sebuah tangki air ialah $1\,728\,000\text{ cm}^3$. Ungkapkan isi padu air itu dalam bentuk piawai.

The volume of water in a water tank is $1\,728\,000\text{ cm}^3$. Express the volume of the water in standard form.

- A 1.728×10^5
- B 1.728×10^6
- C 17.28×10^5
- D 17.28×10^5

6. Rajah 1 menunjukkan kedudukan rumah Fiza, rumah Tina dan perpustakaan yang dilukis pada suatu satah Cartes.

Diagram 1 shows the locations of Fiza's house, Tina's house and the library drawn on a Cartesian plane.

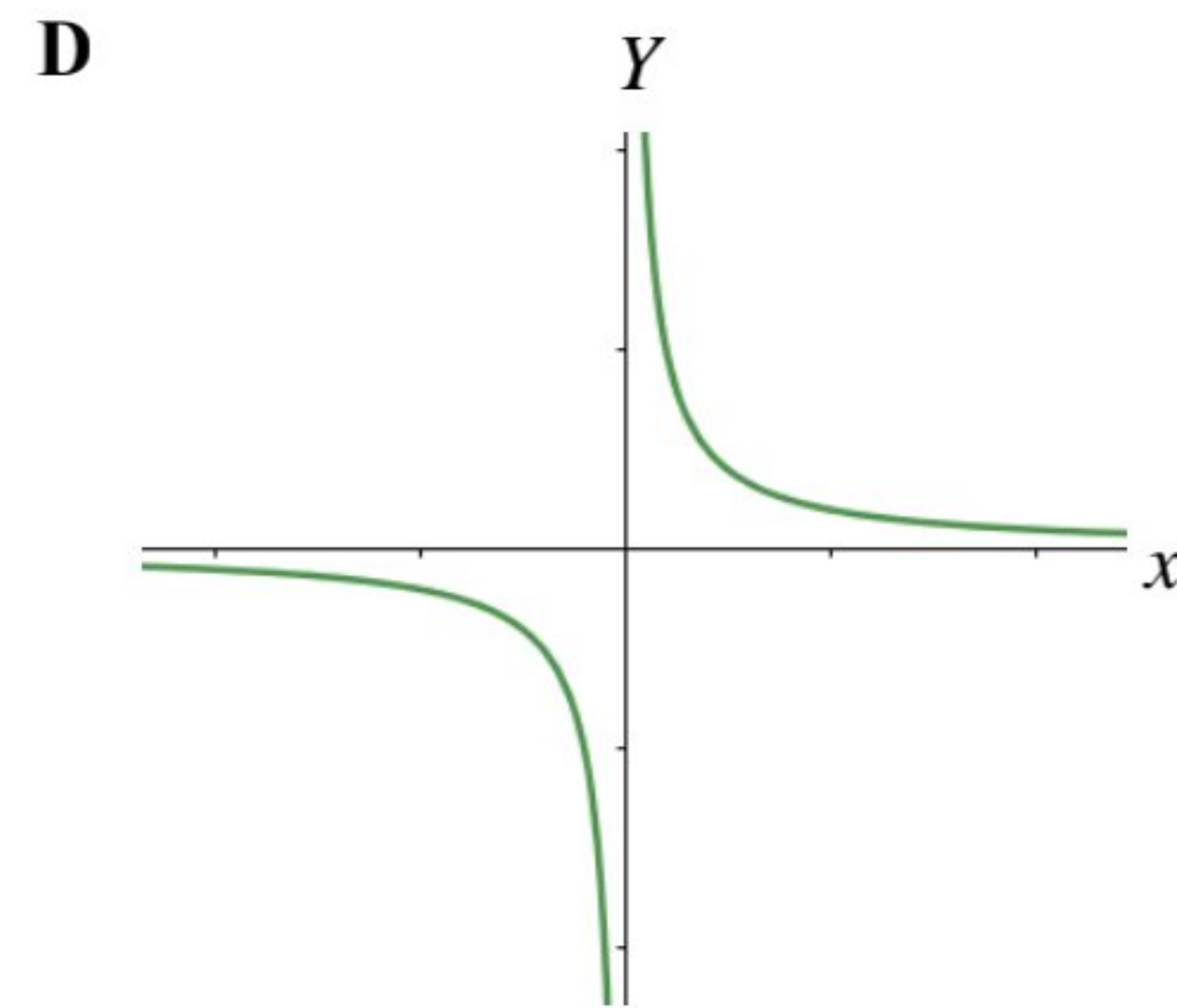
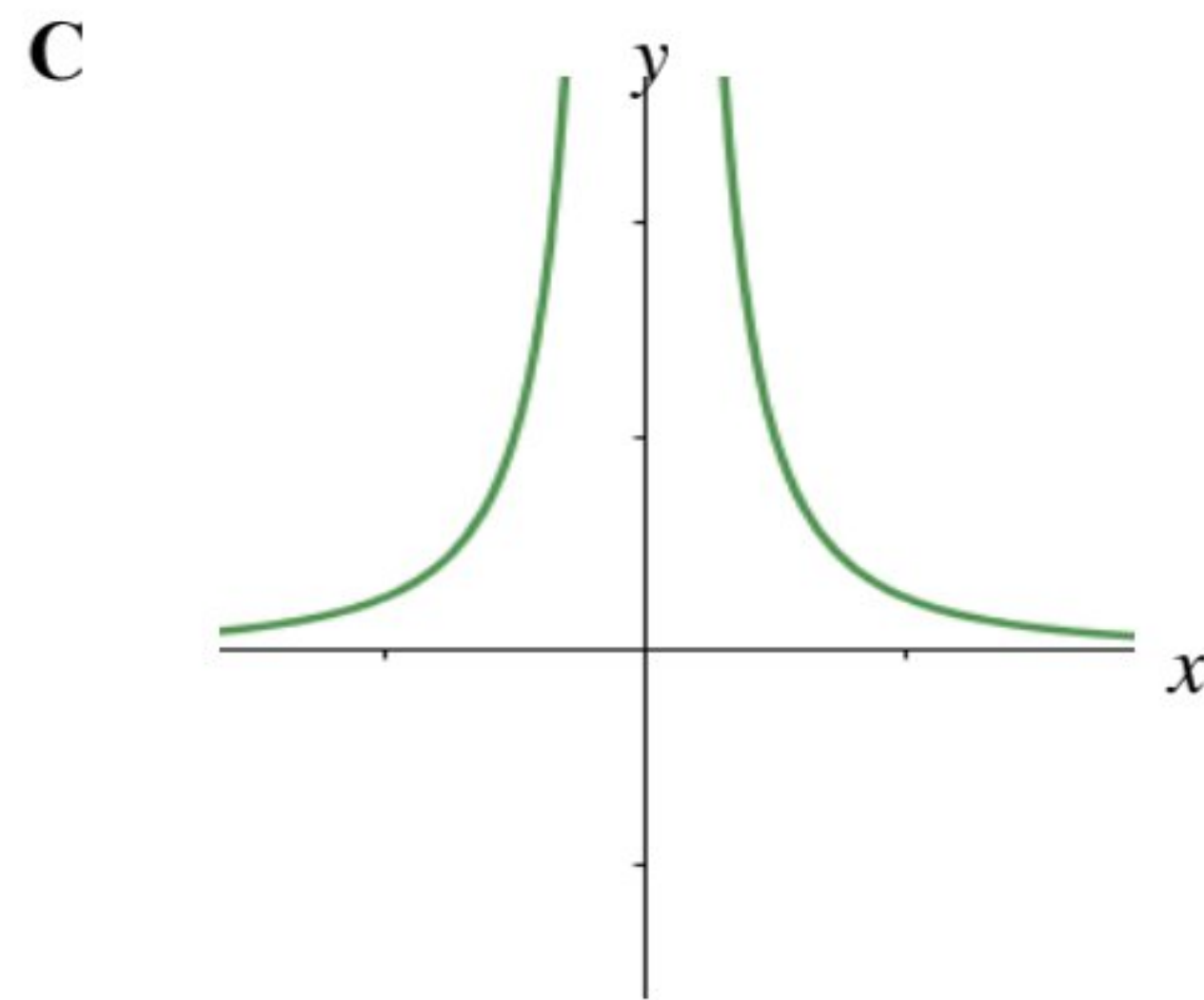
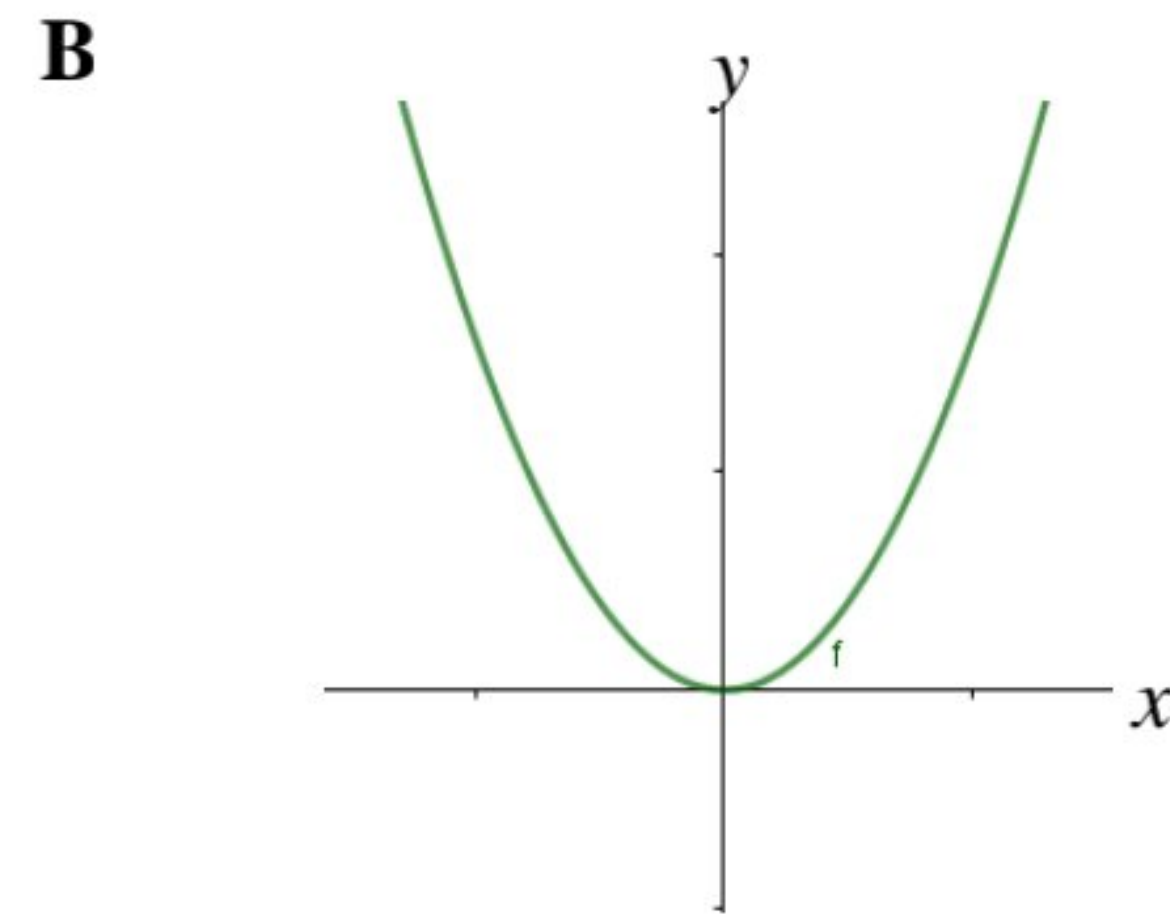
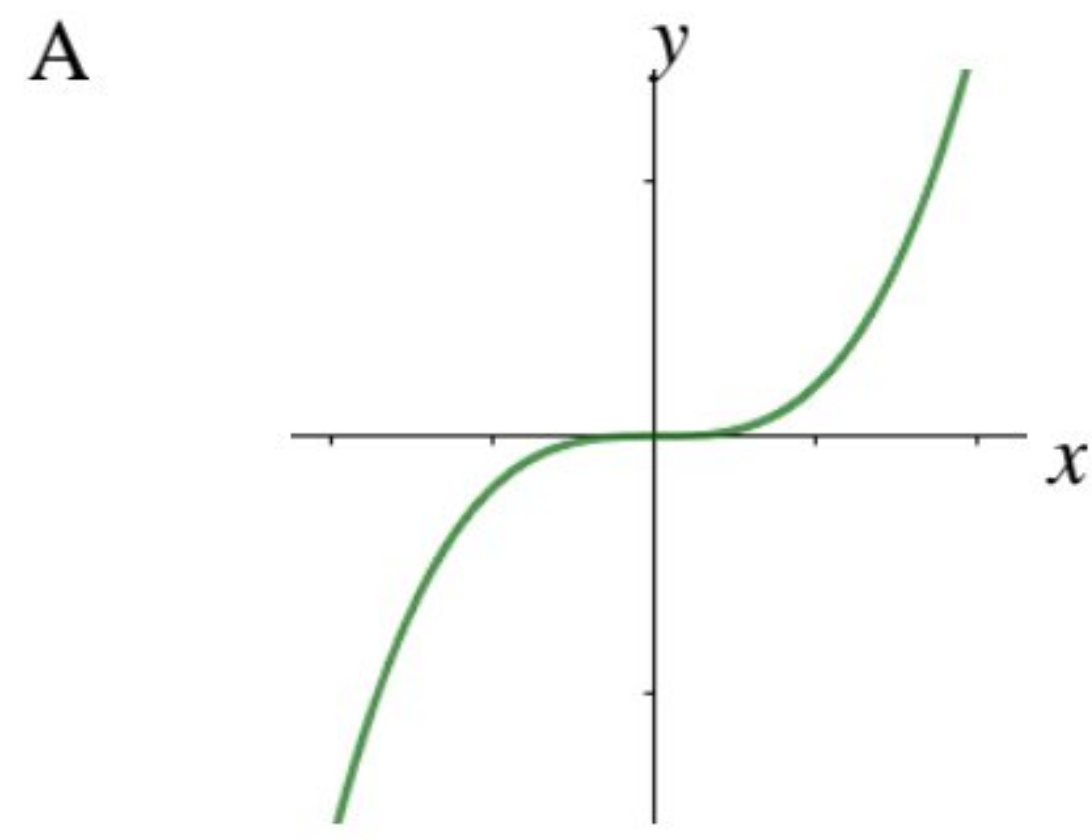


Rajah 1
Diagram 1

Persamaan garis lurus yang menghubungkan rumah Fiza dan perpustakaan ialah
The equation of a straight line that connects Fiza's house and the library is

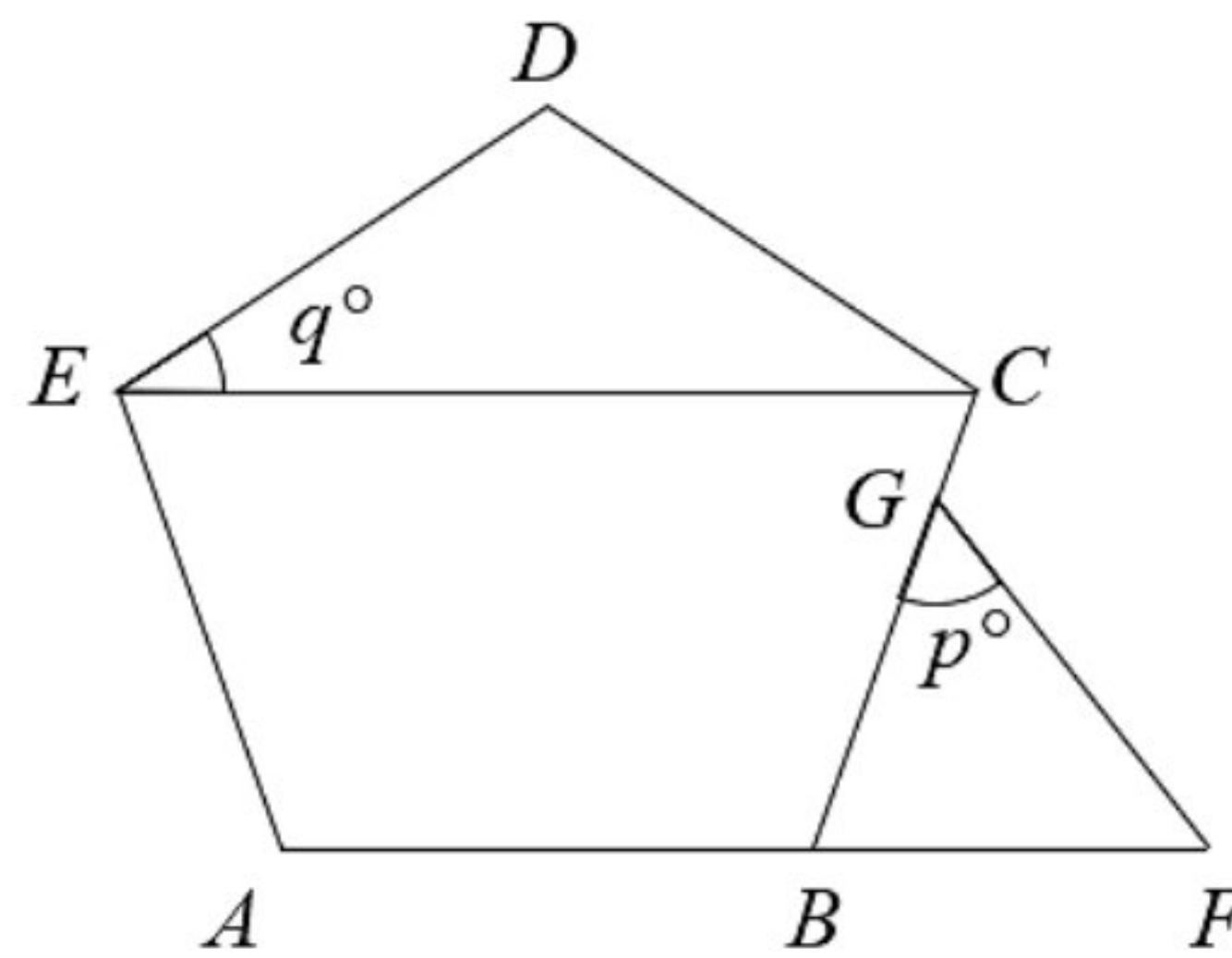
- A** $y = 5$
- B** $y = 10$
- C** $y = 10x$
- D** $y = 5x$

7 Antara berikut, yang manakah mungkin graf bagi $y = 2x^3$
 Which of the following is possibly the graph of $y = 2x^3$



8 Rajah 2 menunjukkan sebuah pentagon sekata ABCDE dan sebuah segi tiga sama kaki BFG. ABF ialah garis lurus.

Diagram 2 shows a regular pentagon ABCDE and an isosceles triangle BFG. ABF is a straight line.



Rajah 2
 Diagram 2

Diberi $BF = BG$, cari nilai $p - q$.

Given $BF = BG$, find the value of $p - q$

- A 18
- B 36
- C 54
- D 90

- 9 Sebiji dadu dilambung. Cari kebarangkalian mendapat faktor bagi 6.
A dice was tossed. Find the probability of getting a factor of 6.

- A $\frac{1}{6}$
 B $\frac{5}{6}$
 C $\frac{1}{3}$
 D $\frac{2}{3}$

- 10 Plot batang-dan-daun menunjukkan masa, dalam minit, yang diambil oleh 11 orang murid untuk melengkapkan tugas.

The stem-and-leaf plot shows the time in minutes, taken by 11 students to complete the assignment.

Batang / Stem	Daun / Leaf
2	1 5 9
3	0 2 4 5
4	3 7 8 9

Kekunci / Key : 2|1 bermaksud 21 minit

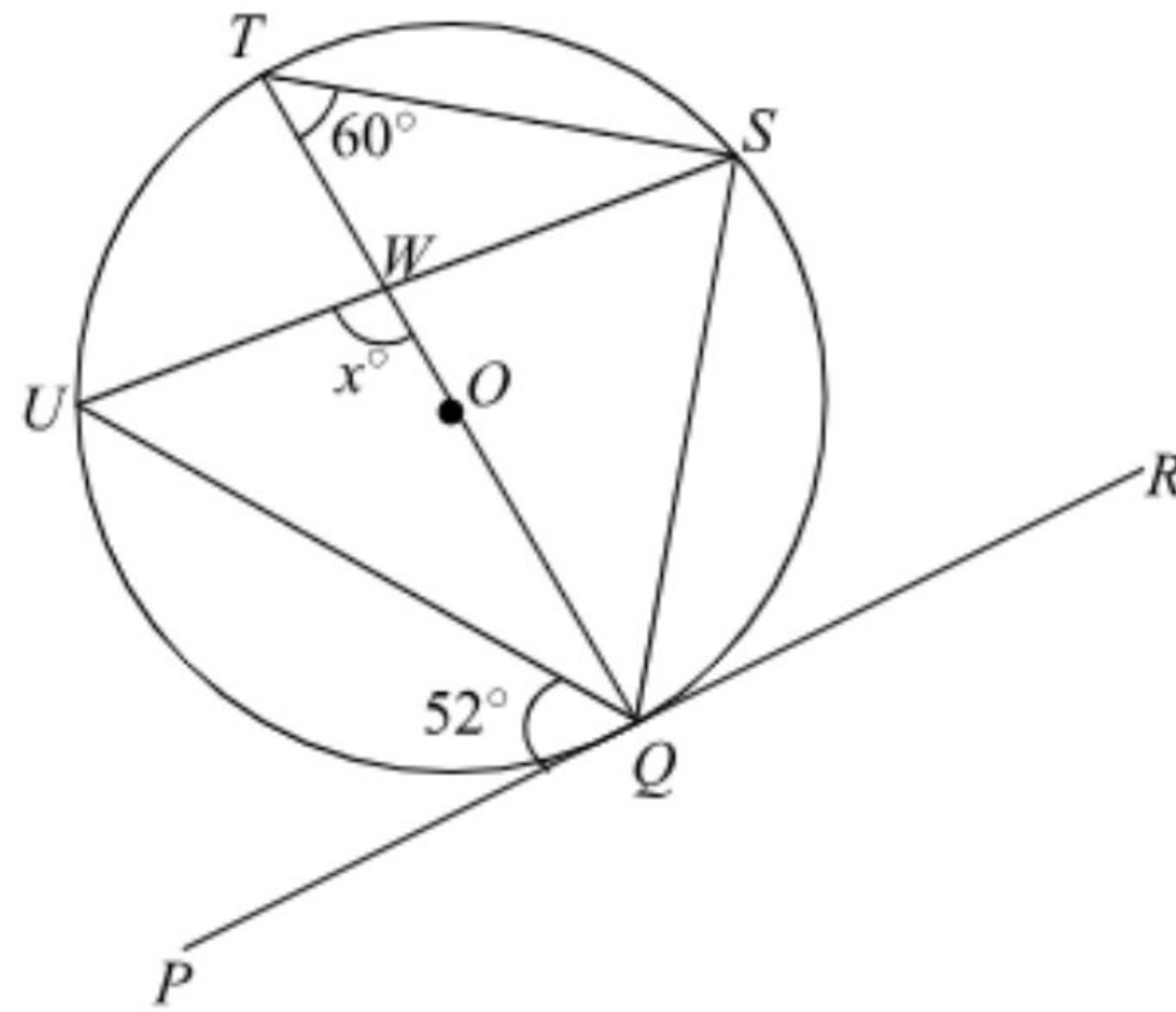
2|1 means 21 minutes

Tentukan median
Determine the median

- A 29
 B 34
 C 35
 D 49

- 11** Rajah 3 menunjukkan PQR ialah tangen kepada bulatan $QSTU$ berpusat O , di Q . TOQ ialah diameter bagi bulatan itu dan UWS ialah garis lurus.

Diagram 3, show PQR is the tangent to the circle $QSTU$ with centre O , at Q . TOQ is a diameter to the circle and UWS is a straight line.



Rajah 3
Diagram 3

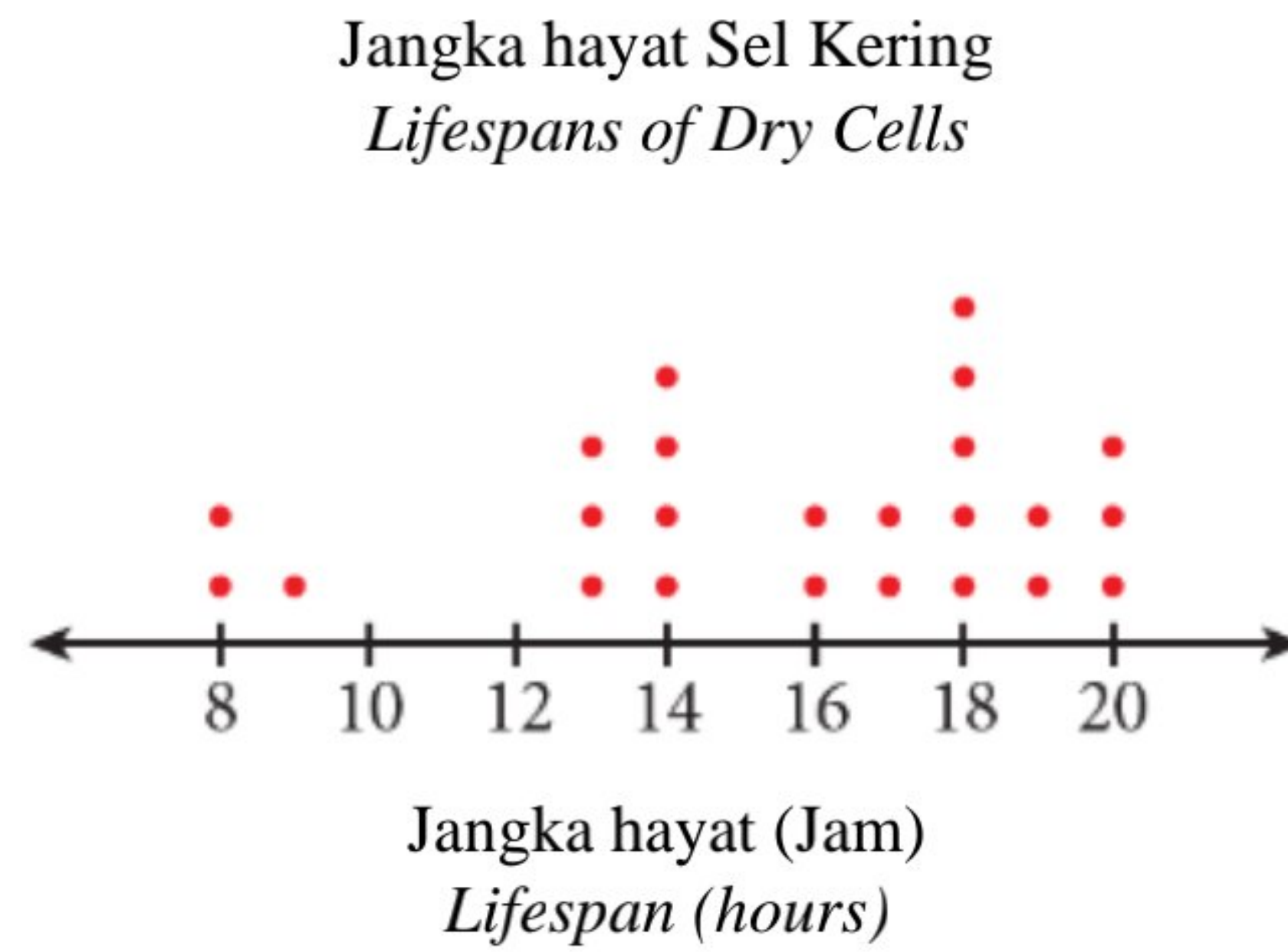
Cari nilai x .

Find the value of x .

- A** 78°
- B** 82°
- C** 92°
- D** 98°

- 12** Rajah 4 menunjukkan data yang diperolehi dalam bentuk plot titik dalam satu ujikaji kualiti jangka hayat (kepada jam yang hampir) bagi 24 biji sel kering yang dijalankan disebuah makmal kawalan kualiti.

Diagram 4 shows the data obtained in dot plot for the lifespan(to the nearest hours) of 24 dry cells in quality control laboratory



Rajah 4
Diagram 4

Diketahui 50% daripada sel kering mempunyai jangka hayat sekurang-kurangnya x jam. Cari nilai x .

It is known that 50% of the dry cells have a lifespan of at least x hours. Find the value of x .

- A** 12
- B** 13
- C** 16
- D** 17
- 13** Diberi $564_8 = (a \times 10^2) + (b \times 10^1) + c$, tentukan nilai a , b , dan c .
- Given, $564_8 = (a \times 10^2) + (b \times 10^1) + c$, determine the values of a , b , c .*
- A** $a = 2$, $b = 6$, $c = 4$
- B** $a = 2$, $b = 9$, $c = 3$
- C** $a = 3$, $b = 5$, $c = 5$
- D** $a = 3$, $b = 7$, $c = 2$

- 14** Pendapatan aktif Encik Halim ialah RM2 050. Perbelanjaan tetap dan perbelanjaan tidak tetapnya masing-masing ialah RM3 100 dan RM1 500. Berapakah pendapatan pasif minimum bagi Encik Halim supaya aliran tunai dalam bulan itu adalah positif?

Mr. Halim's active income is RM2 050. His fixed expenses and irregular expenses are RM3 100 and RM1 500 respectively. What is the minimum passive income for Mr. Halim so that the cash flow in the month is positive?

- A RM 1500
- B RM 2300
- C RM 2700
- D RM 3200

- 15** Nilai boleh insurans rumah Zaleha ialah RM350 000. Polisi insurans yang ingin dibelinya mempunyai peruntukan ko-insurans untuk menginsuranskan 80% daripada nilai boleh insurans dengan deduktibel sebanyak RM10 000. Beliau menginsuranskan rumahnya dengan jumlah RM250 000 sahaja namun rumahnya terbakar dengan kerugian menyeluruh. Hitung kerugian yang ditanggung oleh Zaleha.

The insurable value of Zaleha's house is RM350 000. The insurance policy she wants to buy has a co-insurance provision to insure 80% of the insurable value with a deductible of RM10 000. She insures her house for only RM250 000 but her house burns with total loss. Calculate the loss borne by Zaleha.

- A RM 90 000
- B RM 110 000
- C RM 240 000
- D RM 260 000

- 16** Jadual 1 menunjukkan kadar premium tahunan bagi setiap RM 1 000 nilai muka insuran sementara boleh baharu tahunan yang ditawarkan oleh Syarikat Insuran Takaful.

Table shows the annual premium rate per RM 1 000 face value of yearly renewable term insurance offered by insurance company Takaful.

Umur Age	Lelaki / Male (RM)		Perempuan / Female (RM)	
	Bukan Perokok Non-smoker	Perokok Smoker	Bukan Perokok Non-smoker	Perokok Smoker
37	2.28	2.70	1.81	2.09
38	2.56	2.93	2.14	2.32

Jadual 1
Table 1

Encik Darien berumur 37 tahun dan merupakan seorang perokok. Dia membeli polisi insuran bernilai RM 200 000. Dia berhasrat untuk menambah polisi bagi penyakit kritikal. Syarikat insuran Takaful menawarkan polisi penyakit kritikal dengan memberikan perlindungan sebanyak 30% nilai muka asas dan kadar premium bagi setiap RM 1 000 seperti yang ditunjukkan dalam Jadual 1. Berapakah premium tahunan yang perlu ditambah oleh Encik Darien bagi polisi penyakit kritikal?

Encik Darien is 37 years old and a smoker. He bought an insurance policy worth RM 200 000. He decided to add on a critical illness policy with a coverage of 30% of basic face value and the premium rate per RM 1 000 as shown in table 1. How much is the addition of annual premium for critical illness policy?

- A RM 81
- B RM 162
- C RM 232
- D RM 464

- 17** Encik Wong mempunyai jumlah pendapatan tahunan sebanyak RM52 500 pada tahun 2022. Beliau telah menderma sebanyak RM800 kepada tabung kebajikan yang telah diluluskan oleh kerajaan. Jadual 2 menunjukkan maklumat yang disediakan untuk pelepasan cukai yang dituntutnya.

Encik Wong has total annual income of RM 52500 for year 2022. He donated RM800 to the welfare fund which is approved by the government. Table 2 below shows the information for the tax reliefs claimed by him.

Pelepasan cukai <i>Tax Relief</i>	Amaun <i>Amount(RM)</i>
Individu/ <i>Individual</i>	RM9 000
Insurans perubatan (Terhad RM3 000) <i>Medical insurance</i> (Restricted to RM3 000)	RM2 900
Insurans hayat dan KWSP (Terhad RM4 000) <i>Life insurance and EPF</i> (Restricted to RM4 000)	RM4 500

Jadual 2
Table 2

Hitung pendapatan bercukai bagi Encik Wong.
Calculate the chargeable income of Encik Wong.

- A RM35 000
- B RM35 800
- C RM36 100
- D RM36 600

- 18** Jisim sebuah motosikal ialah 120 kg dan pecutan motosikal itu ialah 6.5 m s^{-2}

Diberi jisim, j berubah secara songsang dengan pecutan, p .

Ungkapakan j dalam sebutan p .

The mass of a motorcycle is 120 kg and the acceleration of the motorcycle is 6.5 m s^{-2}

Given the mass, j varies inversely with the acceleration, p .

Express j in terms of p .

A $j = \frac{240}{13}p$

B $p = \frac{240}{13}j$

C $j = \frac{780}{p}$

D $p = \frac{780}{j}$

- 19** Jadual 3 menunjukkan beberapa nilai pemboleh ubah a , b dan c dengan keadaan a berubah secara langsung dengan b dan secara songsang dengan punca kuasa dua c ,

Table 3 shows some values of the variables a , b and c , such that a varies directly as b and inversely as the square root of c .

a	b	c
5	1	4
m	2	9

Jadual 3

Table 3

Hitung nilai m ,

Calculate the value of m

A 1

B 3

C $\frac{20}{3}$

D $\frac{160}{3}$

20 Diberi bahawa matriks $B = \begin{bmatrix} 1 & -16 \\ 20 & 8 \end{bmatrix}$, hitung nilai bagi $b_{12} + b_{21}$.

Given that $B = \begin{bmatrix} 1 & -16 \\ 20 & 8 \end{bmatrix}$, find the value of $b_{12} + b_{21}$.

A -4

B 4

C 8

D 12

21 Diberi bahawa $\begin{pmatrix} 22 & 18 \\ -3 & 16 \end{pmatrix} + \frac{1}{3} \begin{pmatrix} 12 & -15 \\ 6 & m \end{pmatrix} = \begin{pmatrix} 26 & 13 \\ -1 & 10 \end{pmatrix}$. Hitung nilai m .

Given that $\begin{pmatrix} 22 & 18 \\ -3 & 16 \end{pmatrix} + \frac{1}{3} \begin{pmatrix} 12 & -15 \\ 6 & m \end{pmatrix} = \begin{pmatrix} 26 & 13 \\ -1 & 10 \end{pmatrix}$. Calculate the value of m .

A 18

B 6

C -6

D -18

22 Dalam kelas 2 Ibnu Sina, bilangan murid lelaki adalah lebih daripada dua kali bilangan murid perempuan. Antara yang berikut, yang manakah merupakan ketaksamaan yang mewakili situasi tersebut? (Katakan bilangan murid lelaki = y dan bilangan murid perempuan = x).

In a class 2 Ibnu Sina, the number of male pupils is more than twice the number of female pupils.

Which of the following inequalities represents the situation? (let the number of male pupils = y and the number of female pupils = x).

A $y > 2x$

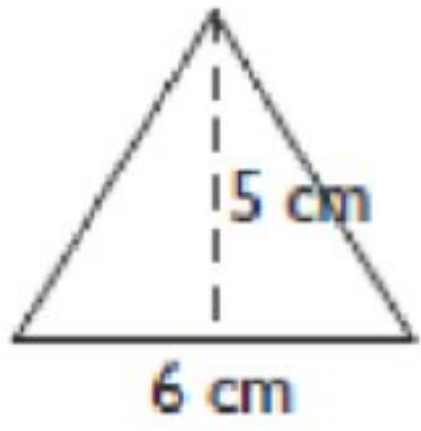
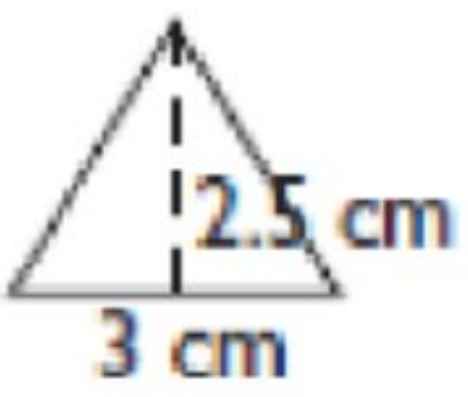
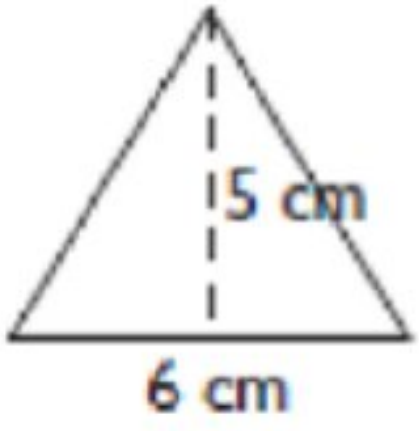
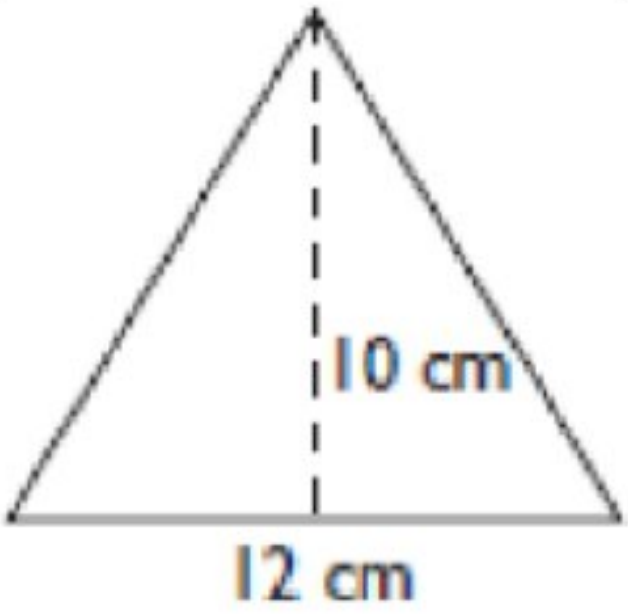
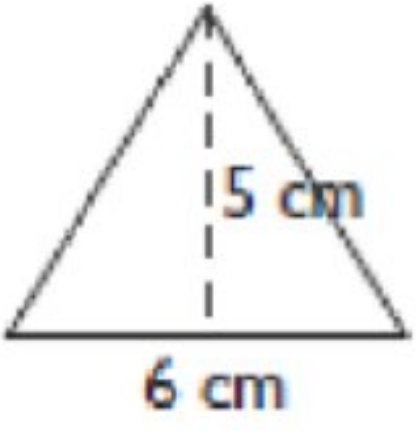
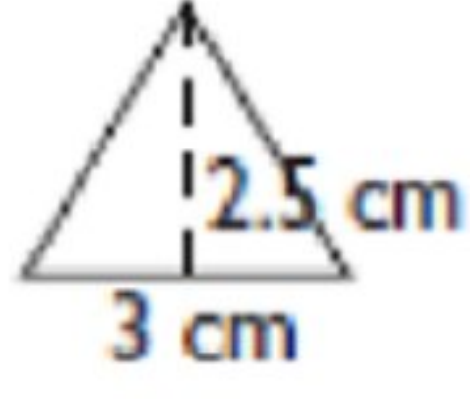
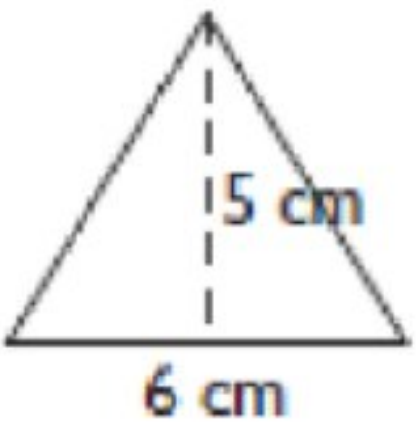
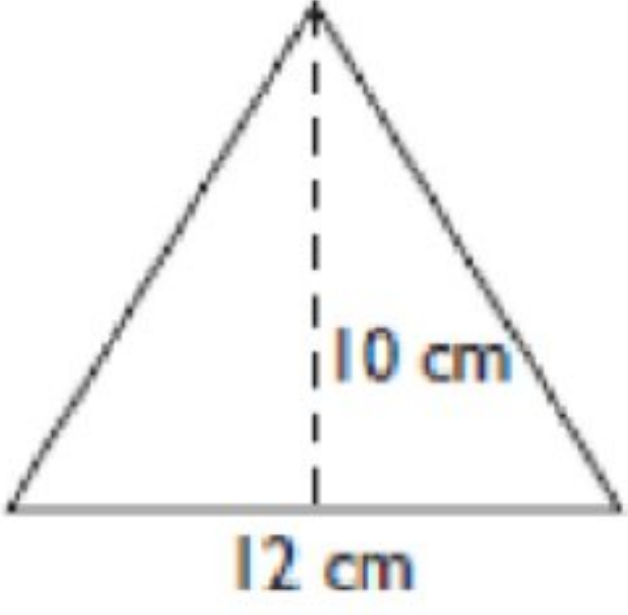
B $y \geq 2x$

C $y < 2x$

D $y \leq 2x$

23 Antara berikut, yang manakah benar?

Which of the following is true?

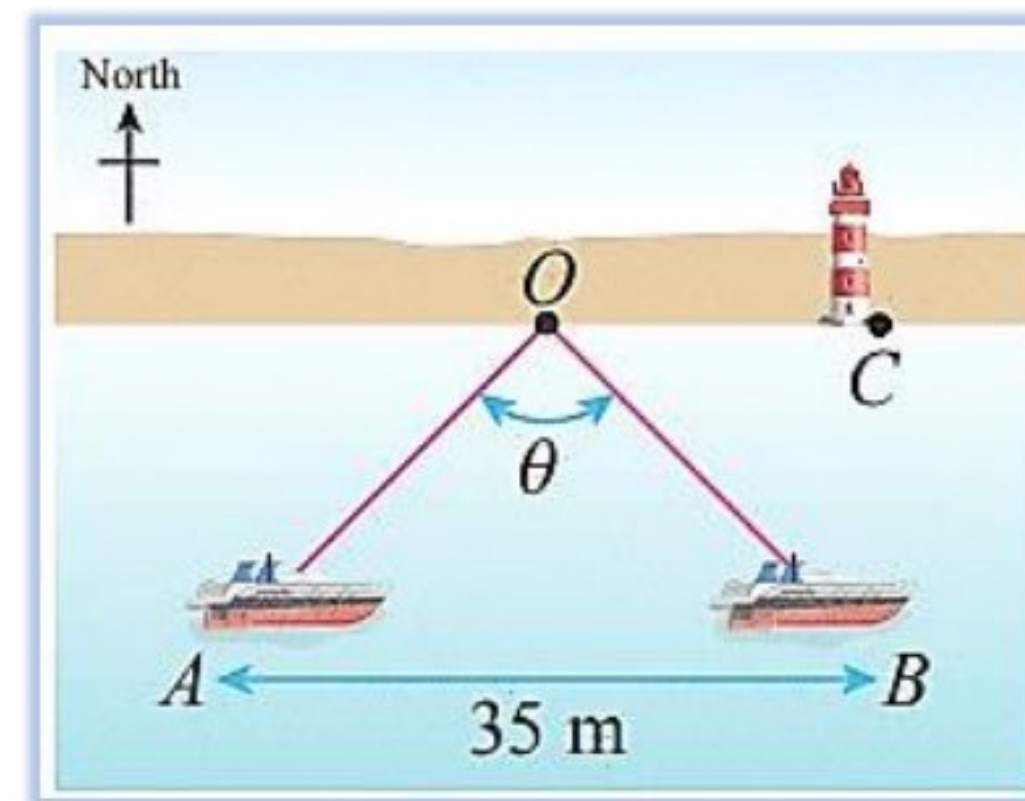
	Objek <i>Object</i>	Faktor skala <i>Scale Factor</i>	Imej <i>Image</i>
A		2	
B		5	
C		$\frac{1}{2}$	
D		$\frac{1}{5}$	

24 Titik F (-7,2) ialah imej bagi titik E(3,-4) di bawah gabungan transformasi P^2 . Perihalkan transformasi P.

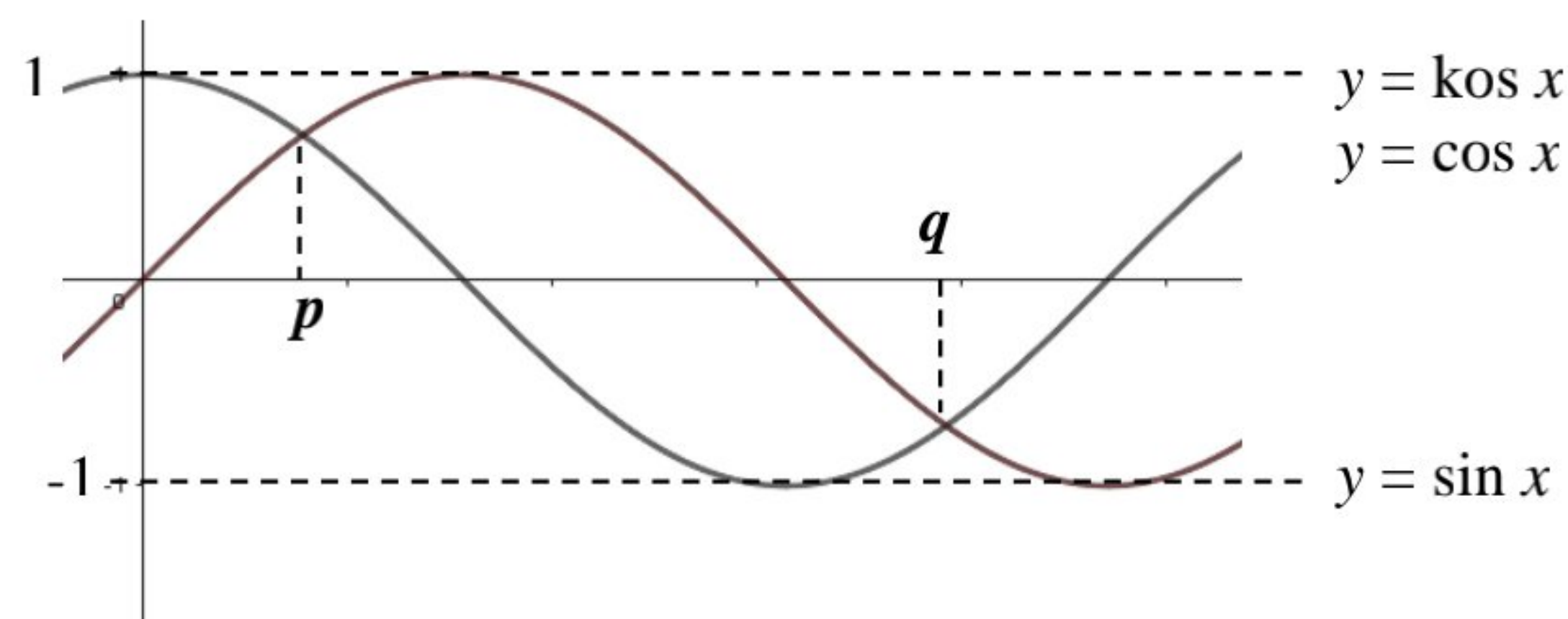
Point F(-7,2) is the image of point E(3,-4) under the combined transformation P^2 . Describe transformation P.

- A Translasi $\begin{pmatrix} -3 \\ 5 \end{pmatrix}$
Translation $\begin{pmatrix} -3 \\ 5 \end{pmatrix}$
- B Translasi $\begin{pmatrix} 5 \\ -3 \end{pmatrix}$
Translation $\begin{pmatrix} 5 \\ -3 \end{pmatrix}$
- C Putaran 90° ikut arah jam pada pusat (-2,-1)
Rotation of 90° clockwise at centre (-2,-1)
- D Putaran 180° pada pusat (-2,-1)
Rotation of 180° clockwise at centre (-2,-1)

- 25 Sebuah kapal belayar dari kedudukan A ke kedudukan B dengan keadaan jarak $OA = OB$. Laluan kapal tersebut adalah selari dengan daratan. Dari kedudukan B , kapal tersebut akan belayar ke arah utara menuju ke rumah api, C . Jika $OA = 20$ m dan $AB = 35$ m hitung sudut θ
- A ship sails from position A to position B such that $OA = OB$. The route of the ship is parallel to the sea bank. From position B , the ship will sail north towards the lighthouse C . If $OA = 20$ m and $AB = 35$ m, calculate the angle θ*



- A 122.1°
 - B 115.8°
 - C 82.4°
 - D 58.0°
- 26 Rajah 5 menunjukkan graf $y = \sin x$ dan $y = \cos x$
- Diagram 5 shows the graphs $y = \sin x$ and $y = \cos x$*

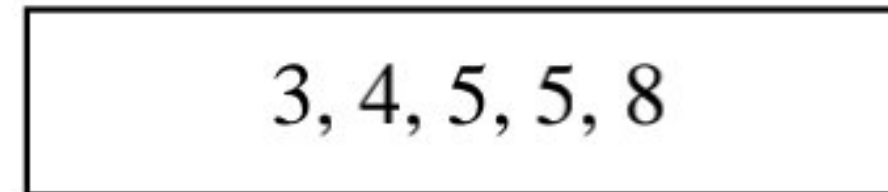


Rajah 5
Diagram 5

Nyatakan nilai p dan q .
State values of p and q .

- A $p = 30^\circ, q = 210^\circ$
- B $p = 40^\circ, q = 220^\circ$
- C $p = 45^\circ, q = 225^\circ$
- D $p = 50^\circ, q = 230^\circ$

- 27 Rajah 6 di bawah menunjukkan satu set data.
The diagram 6 shows a set of data.



Rajah 6
Diagram 6

Cari varians bagi set data itu.
Find the variance of the set of data.

- A 1.8
B 2.0
C 2.8
D 3.2
- 28 Jadual 4 di bawah ialah jadual kekerapan yang menunjukkan skor bagi sekumpulan pelajar dalam suatu kuiz.
Table 4 below is the frequency table showing the scores of a group of students in a quiz.

Skor <i>Score</i>	2	3	4	5	6	7	8
Kekerapan <i>frequency</i>	3	5	6	8	12	7	3

Jadual 4
Table 4

Hitung julat antara kuartil bagi skor kumpulan pelajar tersebut
Calculate the interquartile range for the scores of the student group

- A 2
B 3
C 4
D 5

- 29** Jadual 5 menunjukkan masa, dalam minit yang diambil oleh 20 orang murid untuk menyelesaikan satu latihan matematik

Table 5 shows the time, taken by 20 pupils to answer a mathematics practices

Masa (minit) <i>Time (minutes)</i>	Bilangan murid <i>Number of pupils</i>
10 -14	3
15 – 19	8
20 -24	7
25 - 29	2

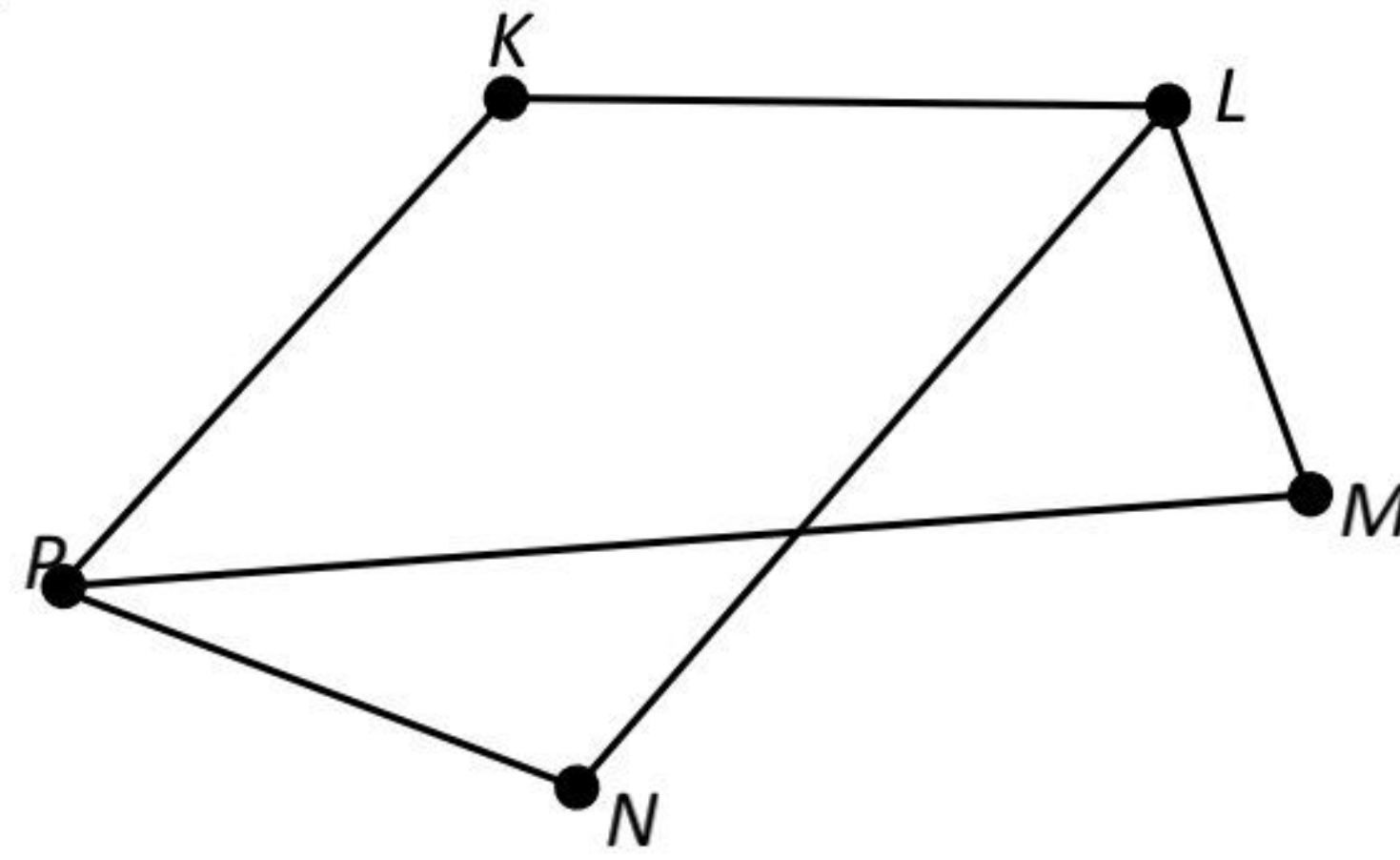
Jadual 5
Table 5

Hitung min dan sisihan piawai

Calculate the mean and standard deviation

- A** $\bar{x} = 18$, $\sigma = 4.301$
- B** $\bar{x} = 18$, $\sigma = 18.5$
- C** $\bar{x} = 19$, $\sigma = 4.301$
- D** $\bar{x} = 19$, $\sigma = 18.5$
- 30** Sebuah kotak yang mengandungi tiga keping kad dengan label huruf G, E dan T. Dua keping kad dipilih secara rawak dari kotak satu demi satu tanpa pemulangan. Antara ruang sampel berikut, yang manakah betul?
A box contains three cards labelled with letter G, E and T. Two cards are chosen at random one by one from the box without replacement. Which of the following sample space is correct?
- A** $S = \{ GE, GT, ET \}$
- B** $S = \{ GG, GE, GT, EE, ET, TT \}$
- C** $S = \{ GE, GT, EG, ET, TG, TE \}$
- D** $S = \{ GG, GE, GT, EE, EG, ET, TT, TG, TE, \}$

- 31 Rajah 7 menunjukkan sebuah graf.
Diagram 7 shows a graph.



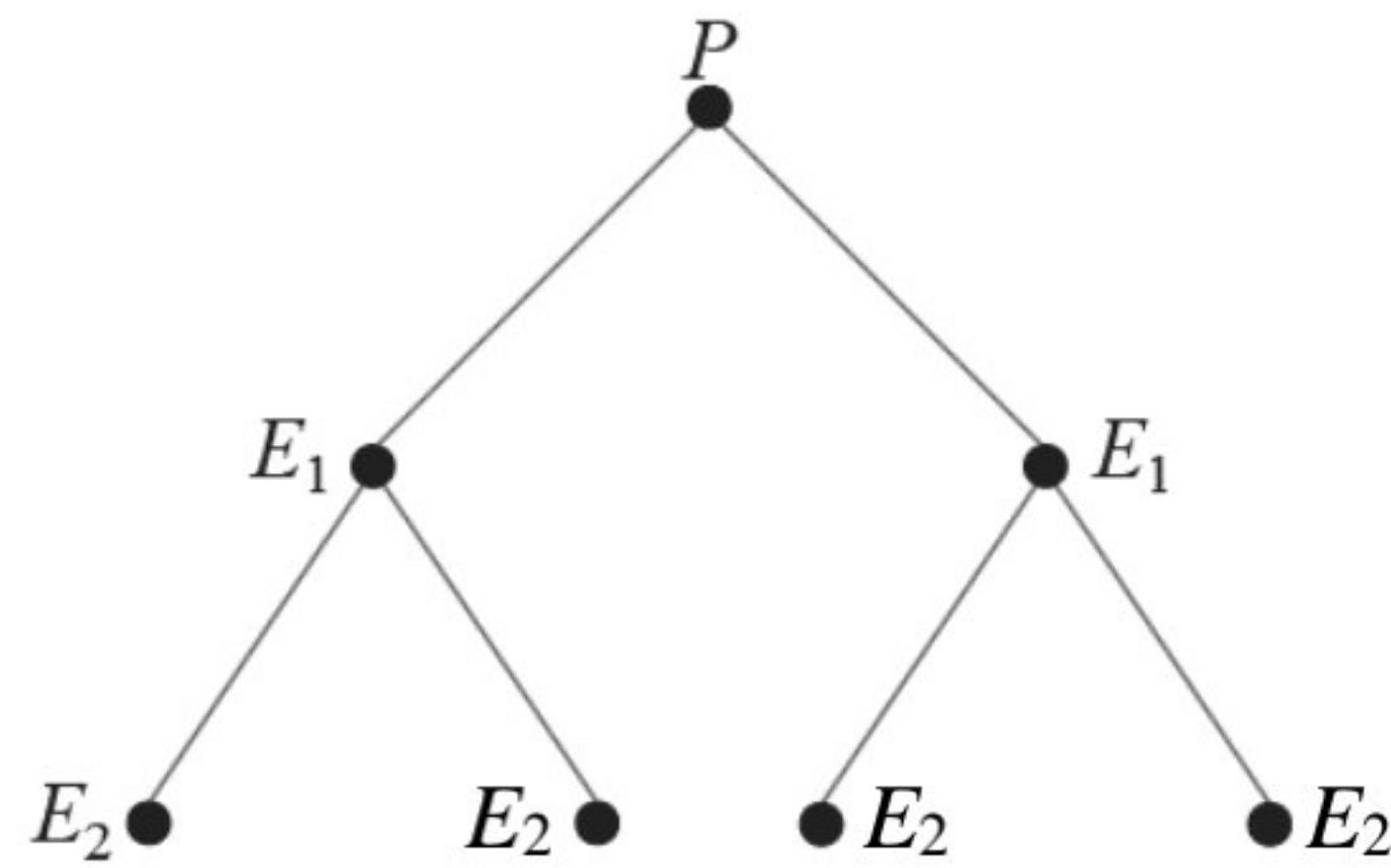
Rajah 7
Diagram 7

Antara pernyataan berikut, yang manakah benar?
Which of following statements is true.

- A Graf mudah dan berpemberat
Directed graph and weighted
- B Jumlah bilangan darjah ialah 12
The sum of degree is 12
- C Bilangan darjah bagi bucu L ialah 2
The degree of vertex L is 2
- D $E = \{ K, L, M, N, P \}$ dan $V = \{ (K, L), (K, P), (L, M), (L, N), (M, P), (N, P) \}$
 $E = \{ K, L, M, N, P \}$ and $V = \{ (K, L), (K, P), (L, M), (L, N), (M, P), (N, P) \}$
- 32 Antara yang berikut, yang manakah bukan suatu rangkaian ?
Which of the following is not a network?
- A Buku cerita di perpustakaan
Story book in librar
- B Kembara Mahkota Johor
Royal Motorcycle Tour Program
- C Sistem telekomunikasi di Malaysia
Malaysia telecommunication systems
- D Sistem pengangkutan darat
Land transportation systems

- 33** Encik Ganesan berjawatan sebagai pengurus sebuah agensi insurans. Beliau berjaya menyediakan dua orang ejen insurans yang aktif di bawah pimpinannya untuk menjual suatu skim insurans terkini, yang bernilai RM 200 sebulan. Selain menjual polisi insurans, ejen-ejen tersebut juga perlu memperkenalkan minimum dua ejen baharu, setiap seorang untuk tujuan kenaikan pangkat. Pada rajah pokok di Rajah 8, bucu P mewakili pengurus, E_1 sebagai ejen peringkat pertama, E_2 sebagai ejen peringkat kedua dan seterusnya.

Mr. Ganesan is the manager of an insurance agency. He recruits two active insurance agents to sell the latest insurance scheme valued at RM 200 per month. Besides selling insurance policies, each agent needs to recommend at least two new insurance agents. In the tree diagram in Diagram 8, P represents the manager, E_1 represents the first level agents and E_2 represents the second level agents.



Rajah 8
Diagram 8

Peratus komisen asas yang diterima oleh seorang ejen apabila satu polisi insurans berjaya dijual ialah 25%. Berapakah minimum polisi yang perlu dijual oleh seorang ejen agar komisen asas yang diterima adalah sekurang-kurangnya RM 1 000?

The percentage of a basic commission received by an agent is 25% after successfully sell an insurance policy. What is the minimum number of policies that an agent needs to sell in order to receive a basic commission of at least RM 1 000?

- A** 10
- B** 20
- C** 30
- D** 40

34 Antara berikut, yang manakah adalah suatu pernyataan?

Which of the following is a statement?

- A** Darabkan 4 dengan 5.
Multiply 4 by 5.
- B** Hasil tambah A dan B ialah nombor genap.
The sum of A and B is an even number.
- C** Adakah 2 nombor perdana?
Is 2 is prime numbers?
- D** Nonagon sekata mempunyai 9 sisi yang sama panjang.
A regular nonagon has 9 sides of equal length.

35 Maklumat berikut menunjukkan satu hujah

The following information shows an argument.

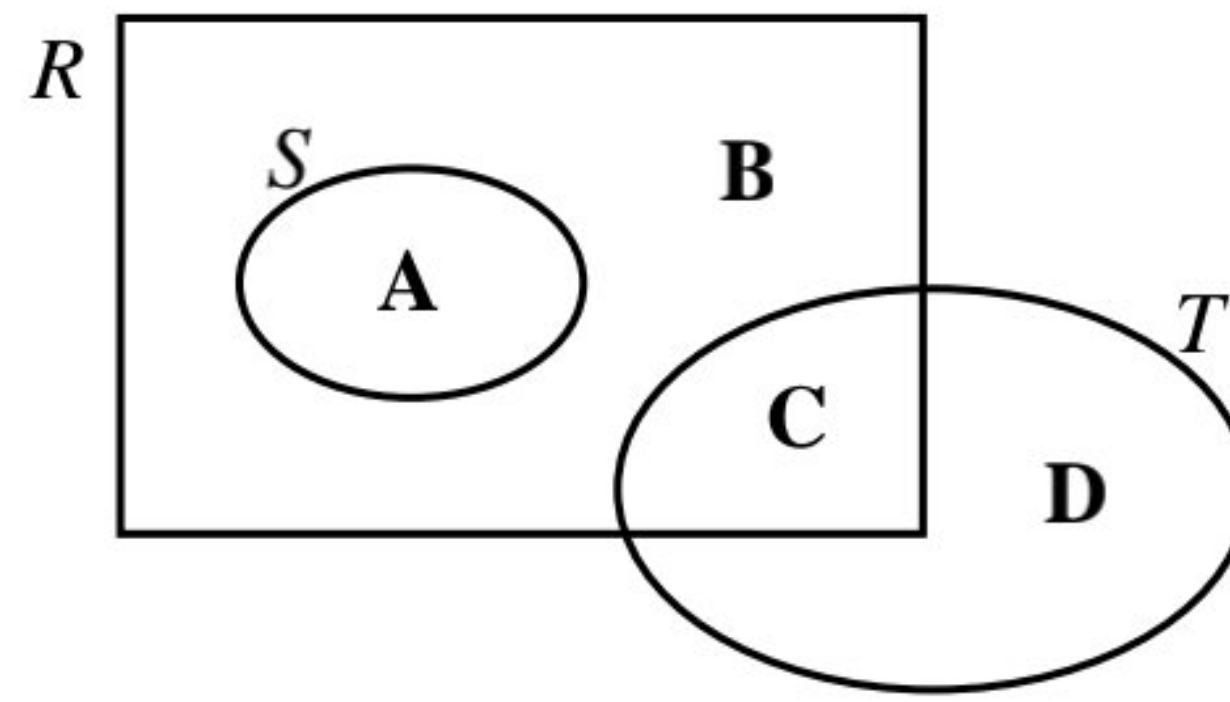
Premis 1	:	Jika $x + 3 = 5$ maka $x = 2$
<i>Premise 1</i>	<i>:</i>	<i>If $x + 3 = 5$ then $x = 2$</i>
Premis 2	:	$x \neq 2$
<i>Premise 2</i>	<i>:</i>	<i>$x \neq 2$</i>
Kesimpulan	:	_____
<i>Conclusion</i>	<i>:</i>	_____

Apakah kesimpulan bagi hujah itu?

What is the conclusion to that argument

- A** $x + 3 = 5$
- B** $x + 3 \neq 5$
- C** $x = 2$
- D** $x > 2$

- 36** Rajah 9 menunjukkan gambar rajah Venn dengan set semesta, $\xi = R \cup S \cup T$.
 Diagram 9 shows a Venn diagram with the universal set, $\xi = R \cup S \cup T$.



Rajah 9
Diagram 9

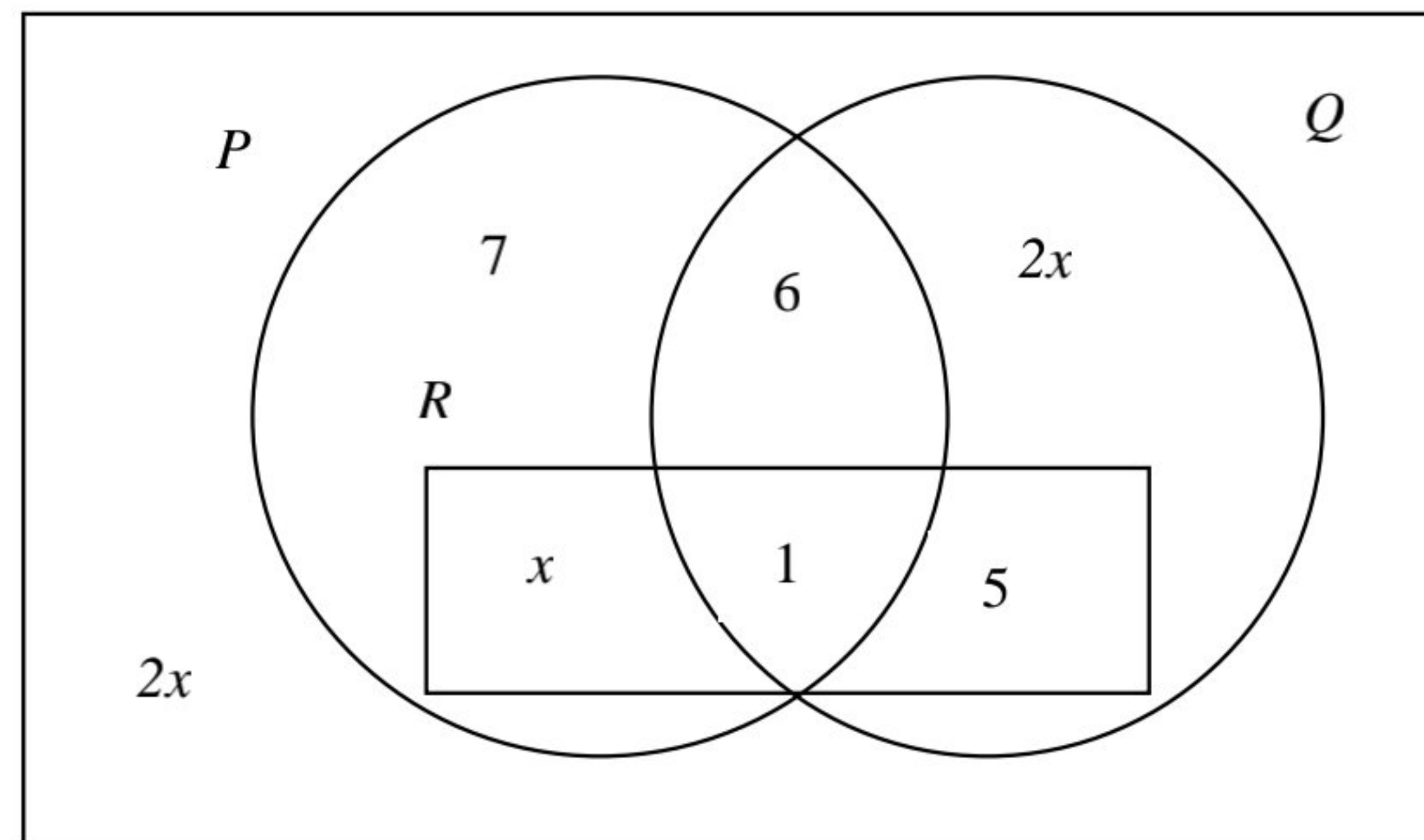
Di antara rantau **A**, **B**, **C** dan **D**, yang manakah memuaskan set $S \cup T \cap R$?
 Between region **A**, **B**, **C** and **D**, which satisfy set $S \cup T \cap R$?

- 37** Diberi set semesta, $\xi = \{ x : x \text{ ialah integer positif dan } x < 12 \}$, set $A = \{ x : x \text{ ialah nombor perdana} \}$ dan $B = \{ x : x \text{ ialah nombor genap} \}$. Tentukan $n(A \cup B)$.

Given universal set $\xi = \{ x : x \text{ is positive integer and } x < 12 \}$, set $A = \{ x : x \text{ is prime number} \}$ dan $B = \{ x : x \text{ is an even number} \}$. Determine $n(A \cup B)$.

- A** 1
B 2
C 3
D 4

- 38 Rajah 10 ialah satu gambar rajah Venn yang mewakili pesanan kek di sebuah kedai kek.
 Diagram 10 is a Venn diagram that represents the orders of cake at a bakery shop.

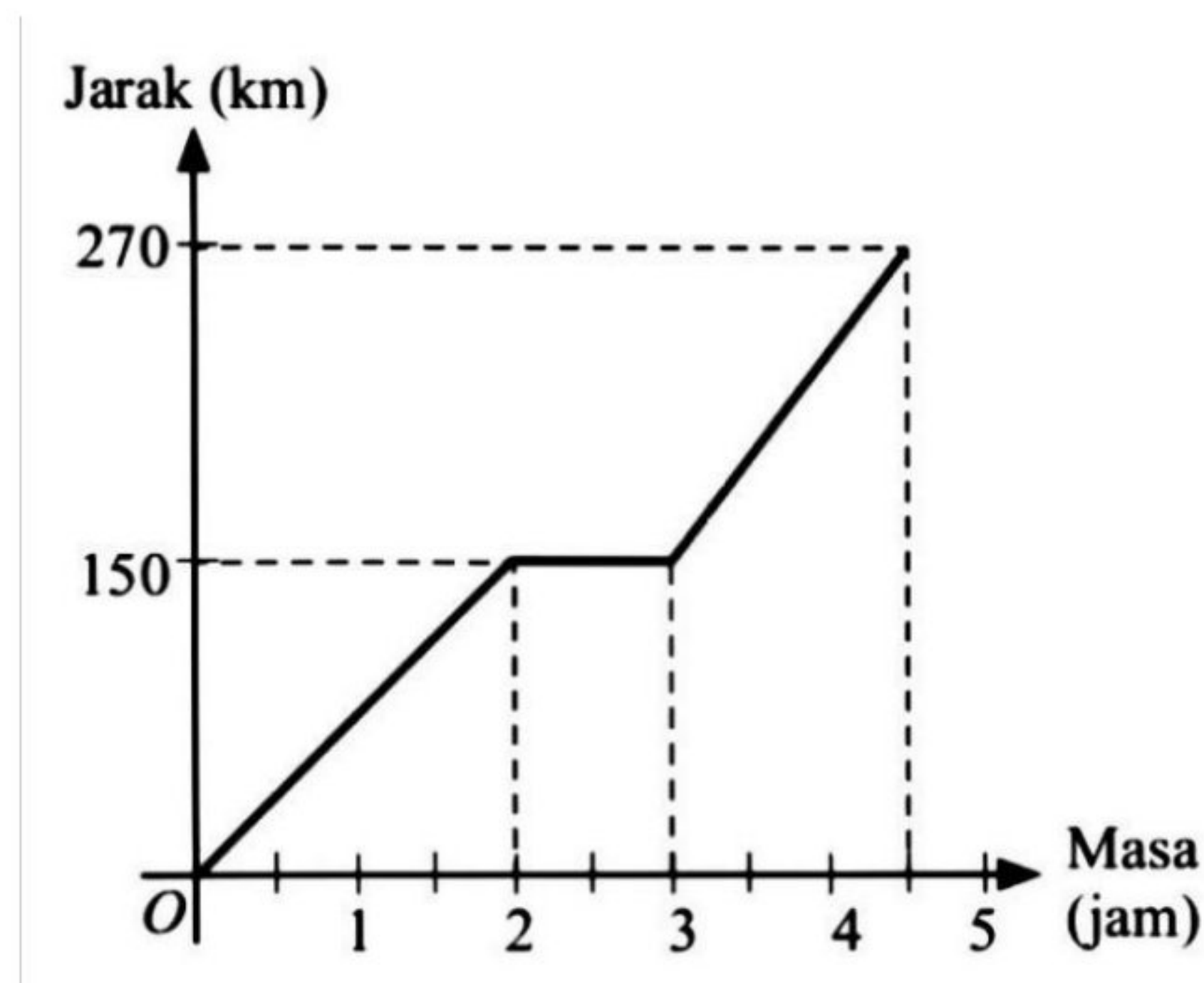


Rajah 10
Diagram 10

Diberi set $P = \{\text{pesanan bagi kek pisang}\}$, set $Q = \{\text{pesanan bagi kek pandan}\}$ dan set $R = \{\text{pesanan bagi kek keju}\}$. Jika $n(\xi) = 144$, hitung bilangan pesanan bagi satu jenis kek sahaja.
 Given set $P = \{\text{order for banana cake}\}$, set $Q = \{\text{order for pandan cake}\}$ and set $R = \{\text{order for cheese cake}\}$. If $n(\xi) = 144$, calculate the number of orders for only one type of cake.

- A 25
 B 50
 C 57
 D 120

- 39 Rajah 11 menunjukkan graf jarak-masa bagi gerakan sebuah kereta untuk tempoh 4.5 jam.
 Diagram 11 shows the distance - time graph for the motion of a car for a period of 4.5 hours.

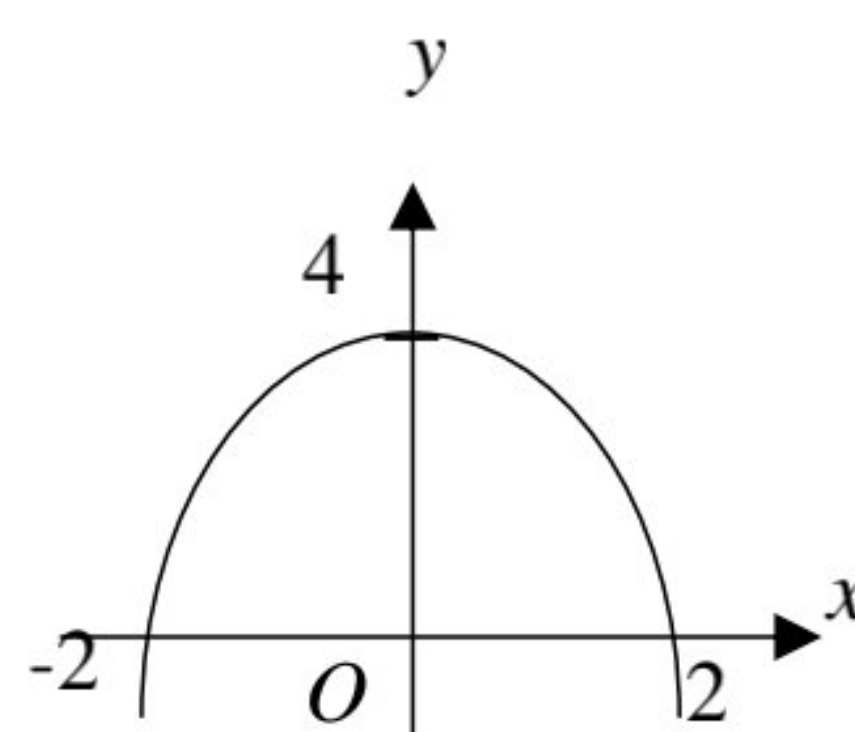


Rajah 11
 Diagram 11

Tentukan tempoh masa kereta berada dalam keadaan pegun.

Determine the duration when the car is stationary.

- A 2 jam / hours
 B 1 jam / hour
 C $1\frac{1}{2}$ jam / hours
 D 3 jam / hours
- 40 Rajah 12 di bawah menunjukkan graf pada suatu satah Cartes.
 Diagram 12 below shows a graph on a Cartesian plan.



Rajah 12
 Diagram 12

Antara berikut, yang manakah persamaan bagi graf itu?

Which of the following is the equation for the graph.

- A $y = x^2 - 4$
 B $y = x^2 + 4$
 C $y = -x^2 - 4$
 D $y = -x^2 + 4$

SKEMA KERTAS 1 PERCUBAAN KULAI SPM 2023**SET A**

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

Selamat mengulangkaji dari telegram@soalanpercubaanspm

NAMA PELAJAR :

KELAS :

NO. KAD PENGENALAN

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SMK
PEPERIKSAAN PERCUBAAN SPM TINGKATAN 5
OKTOBER 2023

MATEMATIK 1449/2

KERTAS 2

Dua jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

- Kertas ini mengandungi tiga bahagian: Bahagian A, Bahagian B dan Bahagian C. Jawab semua soalan daripada Bahagian A, Bahagian B dan satu soalan dalam Bahagian C.*
- Jawapan hendaklah ditulis dengan jelas dalam ruang yang disediakan. Tunjukkan langkah-langkah penting. Ini boleh membantu anda untuk mendapatkan markah.*
- Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.*
- Satu senarai rumus disediakan di halaman 2,3 dan 4*
- Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogramkan*

<i>Untuk Kegunaan Pemeriksa</i>			
Bahagian	Soalan	Markah Penuh	Markah diperoleh
A	1	3	
	2	3	
	3	3	
	4	4	
	5	4	
	6	4	
	7	4	
	8	4	
	9	6	
	10	5	
B	11	8	
	12	10	
	13	9	
	14	9	
	15	9	
C	16	15	
	17	15	
Jumlah			

Kertas soalan ini mengandungi 32 halaman bercetak.

**NOMBOR DAN OPERASI
NUMBER AND OPERATIONS**

- | | |
|--|--|
| <p>1 $a^m \times a^n = a^{m+n}$</p> <p>3 $(a^m)^n = a^{mn}$</p> <p>5 $a^{\frac{m}{n}} = (a^m)^{\frac{1}{n}} = (a^{\frac{1}{n}})^m$</p> <p>7 Faedah mudah / <i>Simple interest</i>, $I = Prt$</p> <p>9 Jumlah bayaran balik / <i>Total repayment</i>, $A = P + Prt$</p> <p>10 Premium = $\frac{\text{Nilai muka polisi}}{\text{RMx}} \times (\text{Kadar premium per RMx})$</p> <p>Premium = $\frac{\text{Face value of policy}}{\text{RMx}} \times (\text{Premium rate per RMx})$</p> <p>11 Jumlah insurans yang harus dibeli = $\left(\begin{array}{l} \text{Peratusan} \\ \text{ko-insurans} \end{array} \right) \times \left(\begin{array}{l} \text{Nilai boleh} \\ \text{insurans harta} \end{array} \right)$</p> <p>Amount of required insurance = $\left(\begin{array}{l} \text{Percentage of} \\ \text{co-insurance} \end{array} \right) \times \left(\begin{array}{l} \text{Insurable value} \\ \text{of property} \end{array} \right)$</p> | <p>2 $a^m \div a^n = a^{m-n}$</p> <p>4 $a^{\frac{1}{n}} = \sqrt[n]{a}$</p> <p>6 $a^{\frac{m}{n}} = \sqrt[n]{a^m} = (\sqrt[n]{a})^m$</p> <p>8 Nilai matang / <i>Maturity value</i>, $M = P \left(1 + \frac{r}{n} \right)^{nt}$</p> |
|--|--|

**PERKAITAN DAN ALGEBRA
RELATIONSHIP AND ALGEBRA**

- | | |
|---|--|
| <p>1 Jarak / <i>Distance</i> = $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$</p> <p>3 Laju Purata = $\frac{\text{Jumlah jarak}}{\text{Jumlah masa}}$</p> <p>Average speed = $\frac{\text{Total distance}}{\text{Total time}}$</p> <p>4 $A^{-1} = \frac{1}{ad - bc} \begin{pmatrix} d & -b \\ -c & a \end{pmatrix}$</p> | <p>Titik Tengah / <i>midpoint</i></p> <p>2 $(x, y) = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$</p> <p>4 $m = \frac{y_2 - y_1}{x_2 - x_1}$</p> <p>5 $m = -\frac{\text{pintasan-y}}{\text{pintasan-x}}$</p> <p>$m = -\frac{\text{y-intercept}}{\text{x-intercept}}$</p> |
|---|--|

SUKATAN DAN GEOMETRI
MEASUREMENT AND GEOMETRY

- 1 Teorem Pythagoras / *Pythagoras Theorem* $c^2 = a^2 + b^2$
- 2 Hasil tambah sudut pedalaman poligon / *Sum of interior angles of a polygon*
 $= (n - 2) \times 180^\circ$
- 3 Lilitan bulatan = $\pi d = 2\pi j$
Circumference of circle = $\pi d = 2\pi r$
- 4 Luas bulatan = πj^2
Area of circle = πr^2
- 5 Panjang lengkok = $\frac{\theta}{360^\circ} \times 2\pi j$
Arc length = $\frac{\theta}{360^\circ} \times 2\pi r$
- 6 Luas sektor = $\frac{\theta}{360^\circ} \times \pi j^2$
Area of sector = $\frac{\theta}{360^\circ} \times \pi r^2$
- 7 Luas layang = $\frac{1}{2} \times$ hasil darab panjang dua pepenjuru
Area of kite = $\frac{1}{2} \times$ product of two diagonals
- 8 Luas trapezium = $\frac{1}{2} \times$ hasil tambah dua sisi selari \times tinggi
Area of trapezium = $\frac{1}{2} \times$ sum of parallel sides \times height
- 9 Luas permukaan silinder = $2\pi j^2 + 2\pi jt$
Surface area of cylinder = $2\pi r^2 + 2\pi rh$
- 10 Luas permukaan kon = $\pi j^2 + \pi js$
Surface area of cone = $\pi r^2 + \pi rs$
- 11 Luas permukaan sfera = $4\pi j^2$
Surface area of sphere = $4\pi r^2$
- 12 Isi padu prisma = luas keratan rentas \times tinggi
Volume of prism = cross sectional area \times height
- 13 Isi padu silinder = $\pi j^2 t$
Volume of cylinder = $\pi r^2 h$

- 14 Isi padu kon = $\frac{1}{3}\pi j^2 t$
Volume of cone = $\frac{1}{3}\pi r^2 h$
- 15 Isi padu sfera = $\frac{4}{3}\pi j^3$
Volume of sphere = $\frac{4}{3}\pi r^3$
- 16 Isi padu piramid = $\frac{1}{3} \times$ luas tapak \times tinggi
Volume of pyramid = $\frac{1}{3} \times$ base area \times height
- 17 Faktor skala, $k = \frac{PA'}{PA}$
 Scale factor, $k = \frac{PA'}{PA}$
- 18 Luas imej = $k^2 \times$ luas objek
Area of image = $k^2 \times$ area of object

STATISTIK DAN KEBARANGKALIAN
STATISTICS AND PROBABILITY

- 1 Min / Mean, $\bar{x} = \frac{\sum x}{N}$
- 2 Min / Mean, $\bar{x} = \frac{\sum fx}{\sum f}$
- 3 Varians / Variance, $\sigma^2 = \frac{\sum x^2}{N} - \bar{x}^2 = \frac{\sum (x - \bar{x})^2}{N}$
- 4 Varians / Variance, $\sigma^2 = \frac{\sum fx^2}{\sum f} - \bar{x}^2 = \frac{\sum f(x - \bar{x})^2}{\sum f}$
- 5 Sisihan piawai / Standard deviation, $\sigma = \sqrt{\frac{\sum x^2}{N} - \bar{x}^2} = \sqrt{\frac{\sum (x - \bar{x})^2}{N}}$
- 6 Sisihan piawai / Standard deviation, $\sigma = \sqrt{\frac{\sum fx^2}{\sum f} - \bar{x}^2} = \sqrt{\frac{\sum f(x - \bar{x})^2}{\sum f}}$
- 7 $P(A) = \frac{n(A)}{n(S)}$
- 8 $P(A') = 1 - P(A)$

Bahagian A
Section A

[40 markah]

[40 marks]

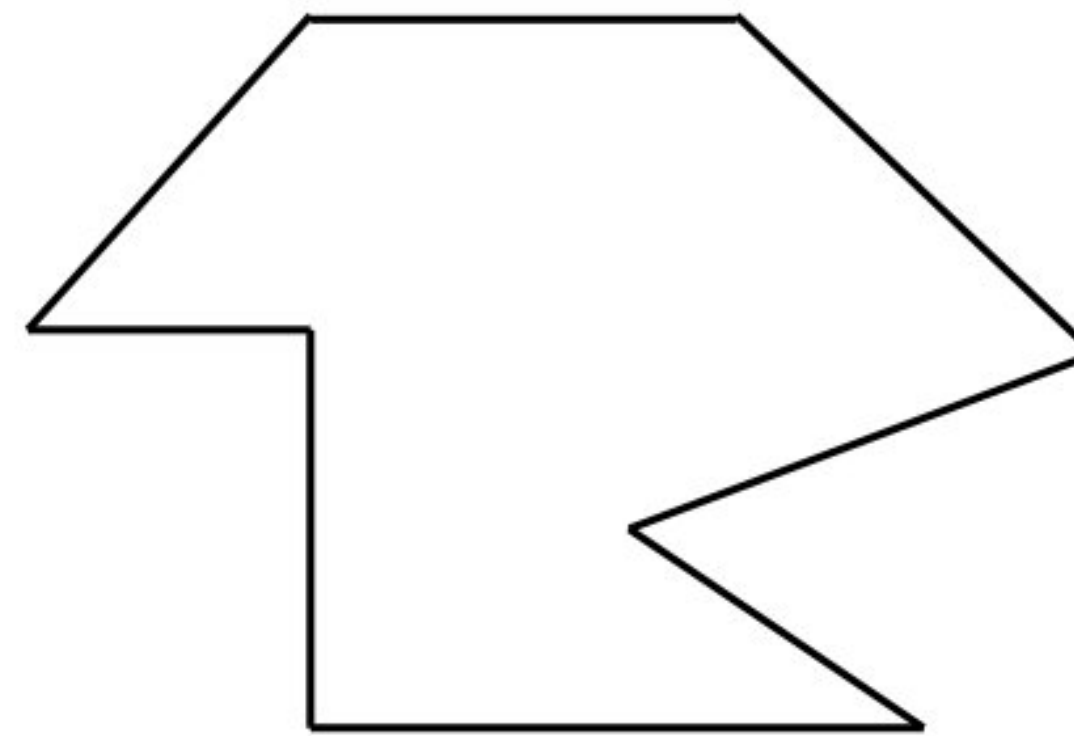
Jawab **semua** soalan dalam bahagian ini.

*Answer **all** questions in this section.*

- 1 (a) Rajah 1 menunjukkan sebuah poligon tidak sekata. Namakan poligon tersebut.
Diagram 1 shows an irregular polygon. Name the polygon

[1 markah]

[1 mark]

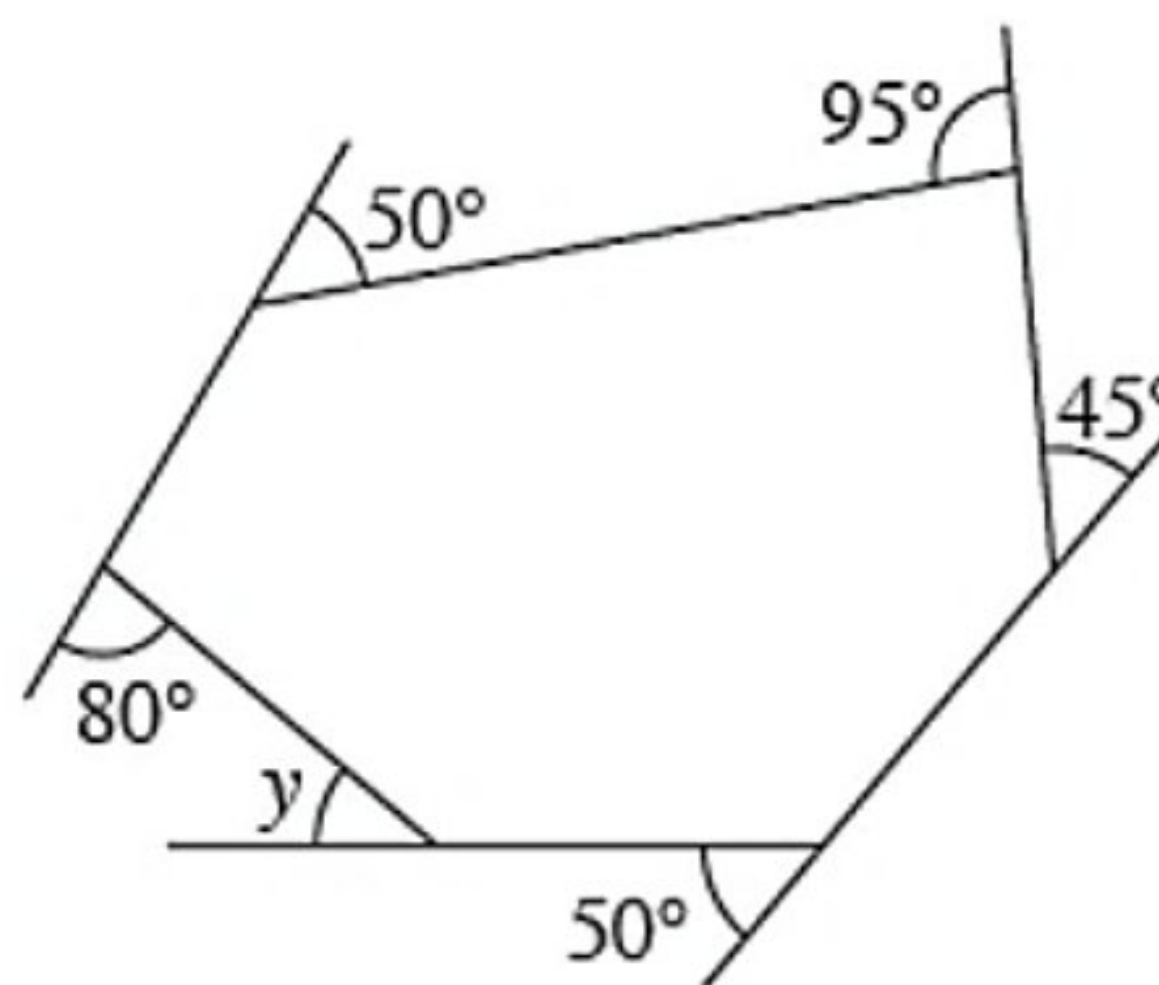


Rajah 1
Diagram 1

- (b) Rajah 2 menunjukkan sudut peluaran bagi sebuah poligon.
Diagram 2 shows the exterior angle of a polygon.
Hitung nilai y bagi poligon tersebut.
Calculate the value of y of the polygon.

[2 markah]

[2 marks]



Rajah 2
Diagram 2

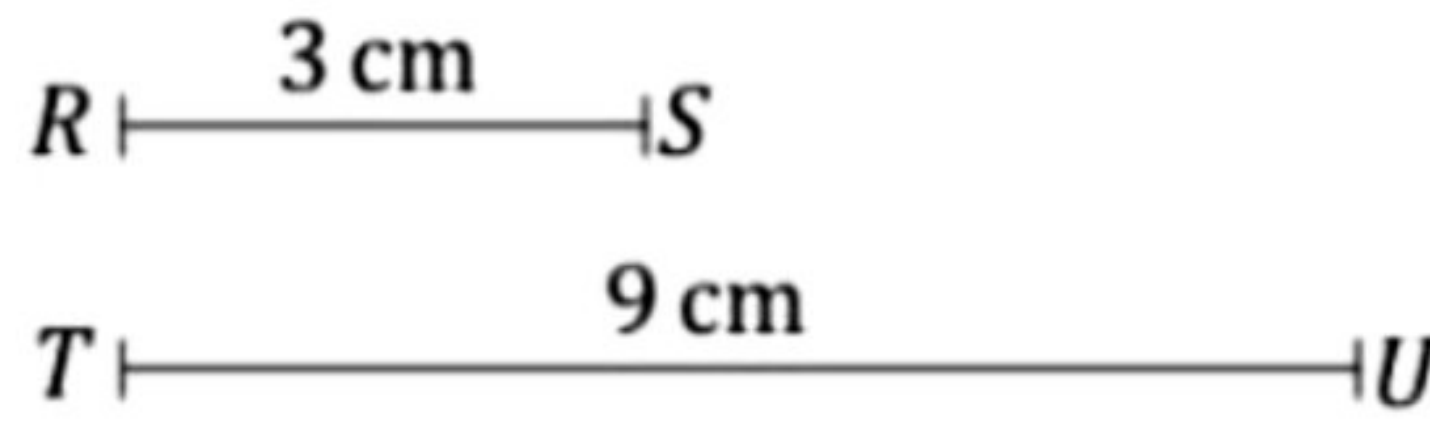
Jawapan / Answer :

(a)

(b)

- 2 (a) Dalam Rajah 3 di bawah, TU ialah lukisan berskala bagi RS.
In the diagram 3 below, TU is the scale drawing of RS.

[1 markah]
 [1mark]

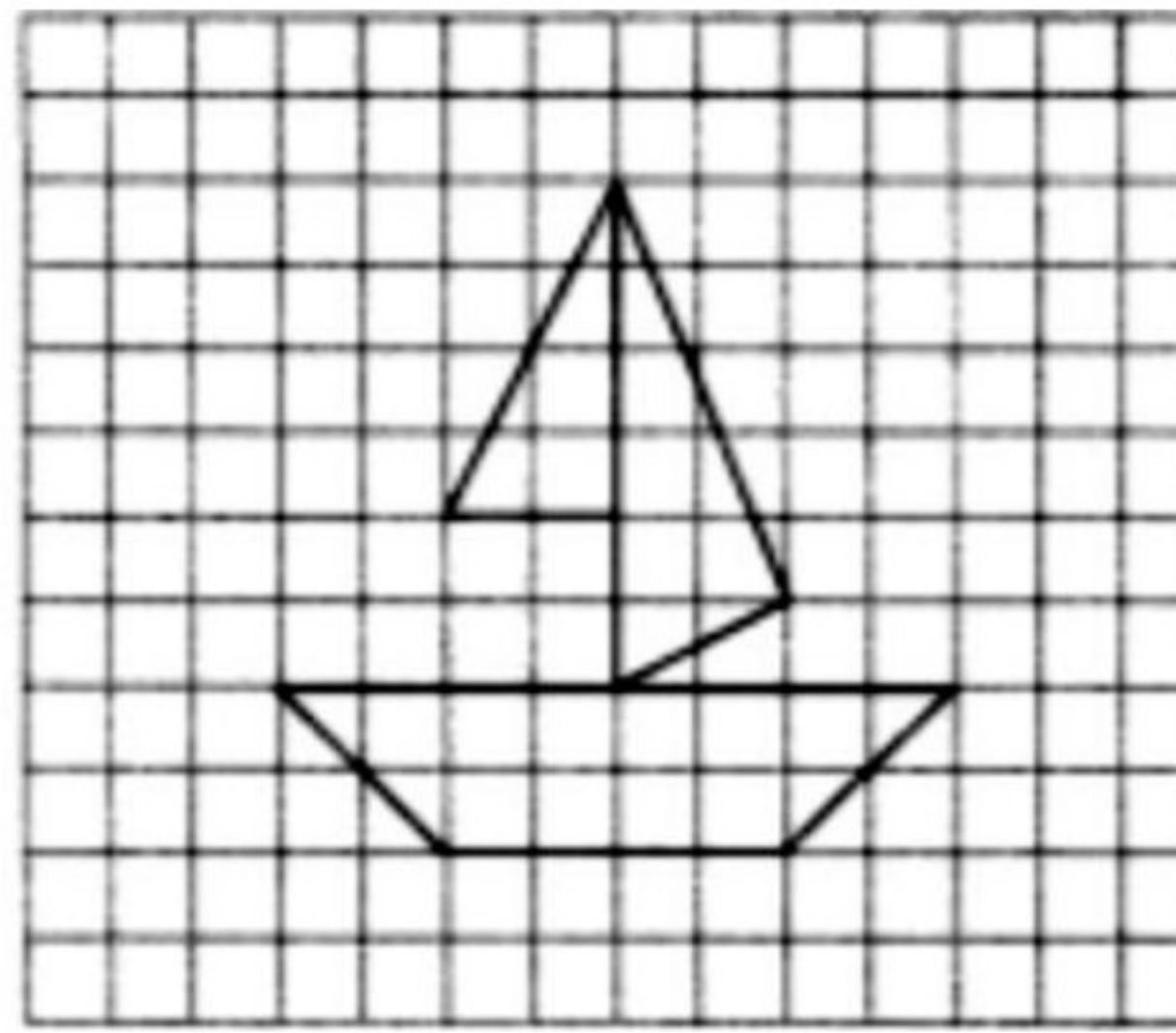


Rajah 3
Diagram 3

Tentukan skala yang digunakan.
State the scale used

- (b) Rajah 4 menunjukkan lukisan berskala yang dilukis pada grid segi empat sama pada skala 1 : 2. Lukis objek sebenarnya.
Diagram 4 shows a scaled drawing drawn on a square grid at a scale 1 : 2. Draw the real object.

[2 markah]
 [2 marks]

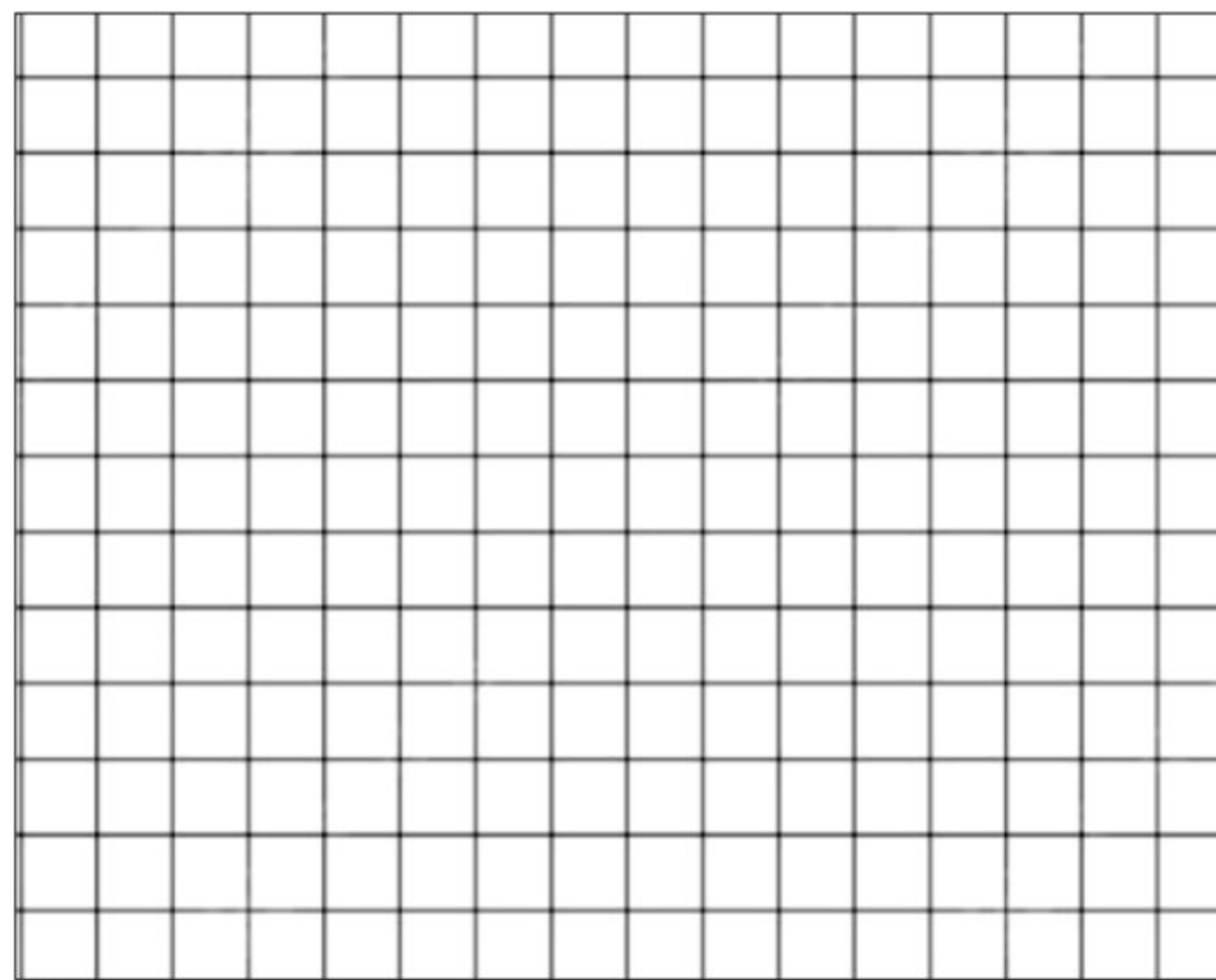


Rajah 4
Diagram 4

Jawapan / Answer :

(a)

(b)



- 3 (a) Lakar graf fungsi kuadratik berikut di ruang jawapan.
Sketch the graph of the following quadratic functions in the answer space.
 $f(x) = (x - 2)(x - 6)$

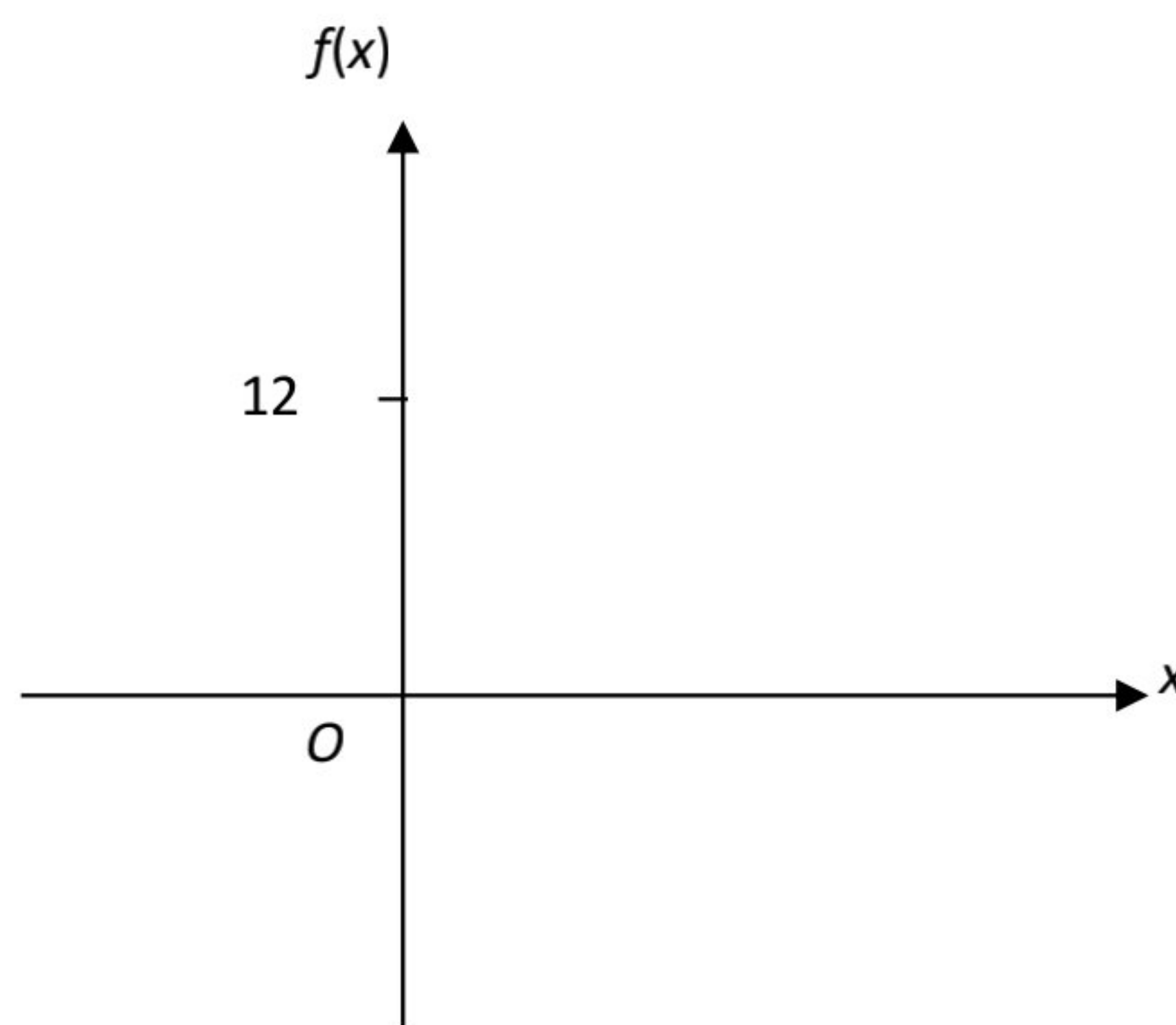
[2 markah]
[2 marks]

- (b) Seterusnya, tentukan persamaan paksi simetri.
Hence, state the equation of the axis of symmetry for the function above.

[1 markah]
[1mark]

Jawapan / Answer :

(a)



(b)

- 4 (a) Puan Syarifah memiliki dua keping kad kredit. Apakah jenis cukai yang perlu dibayar oleh Puan Syarifah?

Puan Syarifah has two credit cards. What type of tax does Puan Syarifah has to pay?

[1 markah]

[1 mark]

- (b) Jadual 1 di bawah menunjukkan harga makanan dan kuantiti yang dipesan oleh Cik Leong.

The table 1 shows the food prices and quantities ordered by Miss Leong.

Makanan dan minimum <i>Food and drink</i>	Harga <i>Price</i>	Kuantiti <i>Quantity</i>
Sandwic/ <i>Sandwich</i>	RM5.80	1
Kek/ <i>Cake</i>	RM7.20	1
Kopi/ <i>Coffee</i>	RM4.50	1

Jadual 1

Table 1

Cukai perkhidmatan 6% adalah termasuk dalam bil. Hitung bil Cik Leong.

6% service tax is included in the bill. Calculate Miss Leong's bill.

[3 markah]

[3 marks]

Jawapan / Answer :

(a)

(b)

- 5 Rajah 5 di bawah menunjukkan sebuah heksagon sekata PQRSTU.
The diagram 5 shows a regular hexagon PQRSTU.

- (a) Dengan menggunakan huruf dalam rajah di bawah, nyatakan lokus bagi titik X yang bergerak dengan keadaan jaraknya sentiasa sama dari garis PQ dan garis TS.
By using the letters in the diagram, state the locus of point X which moves such that it is always equidistant from lines PQ and TS.

[1 markah]

[1 mark]

- (b) (i) Lukis lokus bagi titik Y dengan keadaan $UT=TY$.
Draw the locus of point Y such that $UT=TY$.
- (ii) Lukis lokus bagi titik Z dengan keadaan jaraknya sentiasa sama dari garis PU dan garis RS.
Draw the locus of point Z such that it is always equidistant from lines PU and RS.
- (iii) Tandakan dengan simbol \otimes persilangan lokus Y dan lokus Z.
Mark with symbol \otimes the intersection between the locus Y and the locus Z.

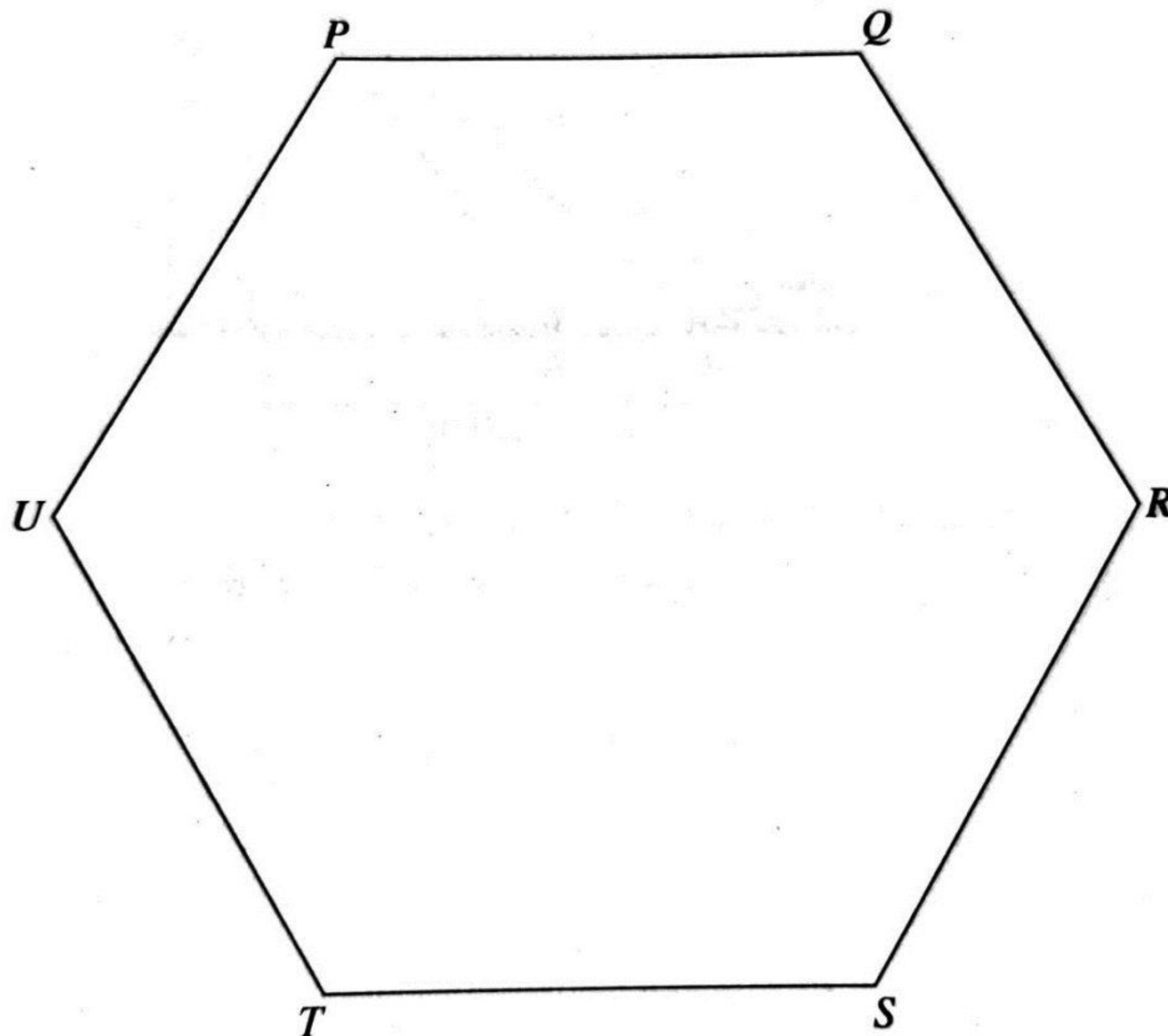
[3 markah]

[3 marks]

Jawapan / Answer :

(a)

(b)



Rajah 5
Diagram 5

- 6 Jadual 2 menunjukkan pengkadaran premium bawah Tarif Motor bagi polisi motor yang dikeluarkan di Semenanjung Malaysia, Sabah dan Sarawak.

Table 2 show the premium rates under the Motor Tariff for motor policies issued in Peninsular Malaysia, Sabah and Sarawak.

Kapasiti enjin tidak melebihi <i>Engine capacity not exceeding (cc)</i>	Semenanjung Malaysia <i>Peninsular Malaysia</i>		Sabah dan Sarawak	
	Polisi komprehensif <i>Comprehensive policy (RM)</i>	Polisi pihak ketiga <i>Third party policy (RM)</i>	Polisi komprehensif <i>Comprehensive policy (RM)</i>	Polisi pihak ketiga <i>Third party policy (RM)</i>
1 400	273.80	120.60	196.20	67.50
1 650	305.50	135.00	220.00	75.60
2 200	339.10	151.20	243.90	85.20
3 050	372.60	167.40	266.50	93.60

*Bagi polisi komprehensif, kadar yang dikenakan adalah bagi RM1 000 pertama daripada jumlah yang diinsuranskan

* *For comprehensive policy, the rate charged is for the first RM1 000 of the sum insured*

Sumber : Jadual Tarif Motor 2015

Jadual 2
Table 2

- (a) Ismail Izzani menetap di Sabah. Dia ingin membeli satu polisi insurans motor dan berikut ialah maklumat kenderaan yang ingin diinsuranskannya. Nyatakan satu faktor mempengaruhi pembayaran kasar insurans motor Ismail Izzani.

Ismail Izzani stays in Sabah. He wants to buy a motor insurance policy. The following is the information regarding the vehicle he wants to insure.

[1 markah]

[1 mark]

- (b)

Jumlah yang ingin diinsuranskan / <i>Sum insured</i> :	RM80 000
Umur kenderaan / <i>Age of vehicle</i>	: 6 tahun
Kapasiti enjin / <i>Engine capacity</i>	: 2000 cc
NCD	: 30%

Hitung premium kasar bagi polisi komprehensif, berdasarkan Jadual 2

Calculate the gross premium for the following vehicle under the comprehensive policy, based on Table 2

[3 markah]

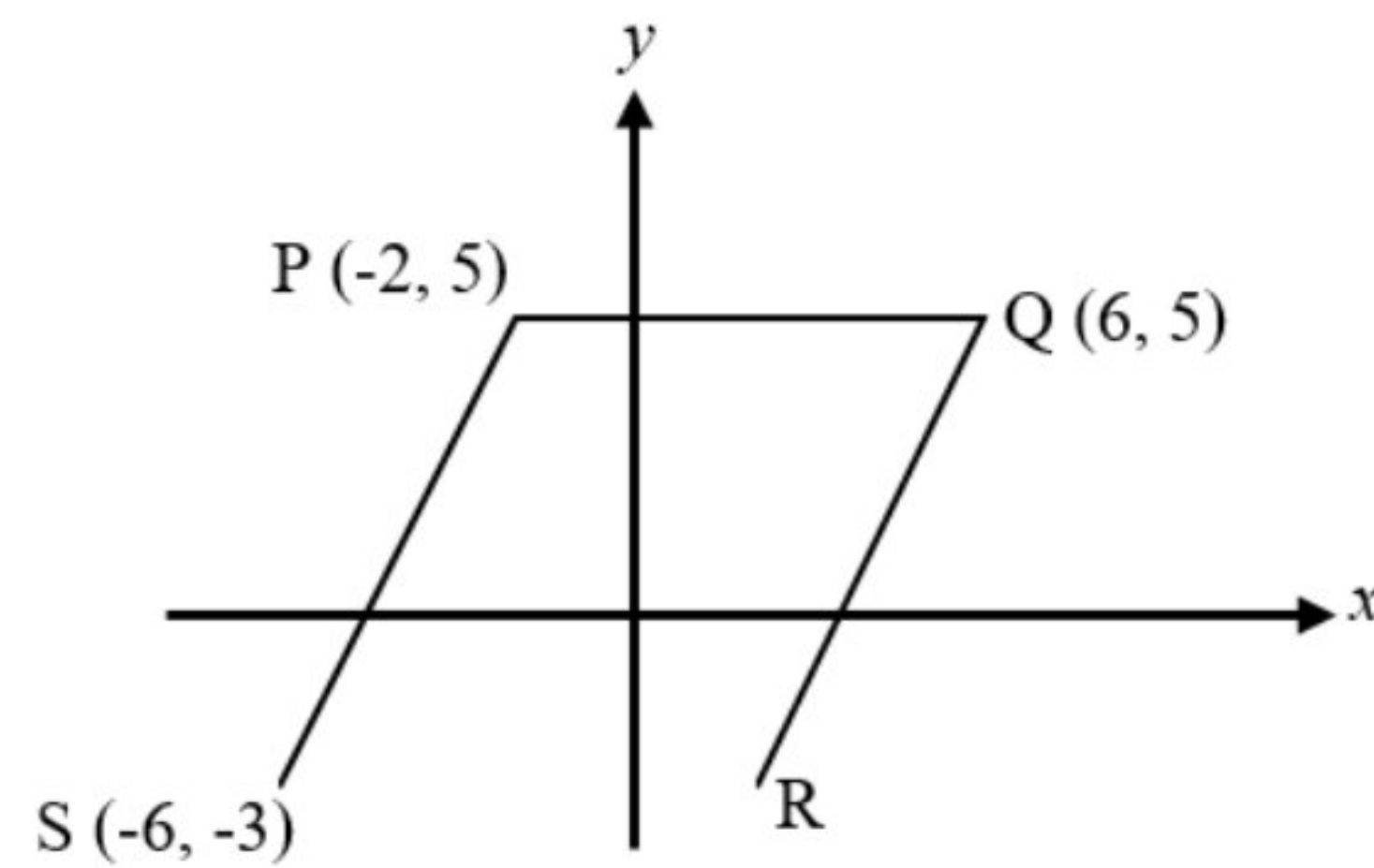
[3 marks]

Jawapan / *Answer* :

- (a)

- (b)

- 7 Dalam Rajah 6, garis lurus PS adalah selari dengan garis lurus QR. Persamaan garis lurus QR ialah $y = 2x - 7$.
In the diagram 6, straight line PS is parallel to straight line QR. The equation of straight line QR is $y = 2x - 7$.



Rajah 6
Diagram 6

- (a) Nyatakan persamaan garis lurus PQ.
State the equation of the straight line PQ.
- (b) Cari persamaan garis lurus PS.
Find the equation of the straight line PS

[1 markah]
 [1 mark]

[3 markah]
 [3 marks]

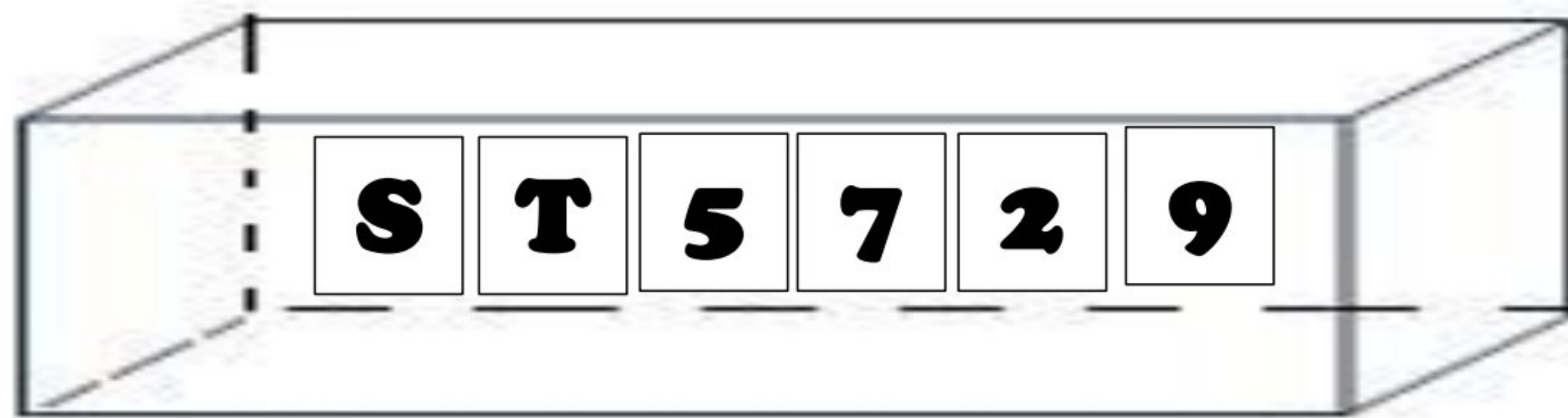
Jawapan / Answer :

(a)

(b)

- 8 Rajah 7 menunjukkan dua keping kad berlabel dengan huruf “Q, R” dan empat keping kad bernombor 5, 3, 2, 9 dimasukkan ke dalam sebuah kotak yang sama. Dua keping kad dikeluarkan dari kotak tersebut satu demi satu tanpa pemulangan.

Diagram 7 shows two cards labelled with letters “S, T” and 4 cards labelled with numbers “5, 7, 2, 9” are put into a box. Two cards are drawn randomly from the box one after another without replacement.



Rajah 7
Diagram 7

- (a) Senaraikan ruang sampel bagi peristiwa bergabung itu.
List the sample space for the combined events
- [2 markah]
[2 marks]
- (b) Dengan menyenaraikan semua kesudahan yang mungkin, hitung kebarangkalian kad pertama mendapat nombor perdana atau huruf T.
By listing all the possible outcomes, calculate the probability of getting the first card with a prime number or letter T.
- [2 markah]
[2 marks]

Jawapan / Answer :

(a)

(b)

- 9 Encik Anuar akan pergi bercuti bersama keluarga di Melaka dalam tempoh 5 bulan lagi. Percutian ini akan menelan perbelanjaan sebanyak RM 1 000. Encik Anuar perlu menyimpan RM 200 sebulan daripada pendapatannya sebanyak RM 5 000 sebulan untuk mencapai matlamat kewangan beliau. Jadual 3 menunjukkan Pelan Kewangan Encik Anuar.

Mr. Anuar will go on vacation with his family in Malacca in 5 months. This holiday will cost RM 1 000. Mr Anuar needs to save RM 200 per month from his income of RM 5000 per month to achieve his financial goals. Table 3 shows Mr Anuar's Financial Plan.

Pelan Kewangan Financial Plan	Ringgit Malaysia (RM)
Gaji / <i>Salary</i>	RM 5 000
Perbelanjaan rumah / <i>Home expenses</i>	RM 1 500
Kereta	RM 800
Sewa Rumah / <i>Residential rental</i>	RM 1 000
Bil elektrik dan air / <i>Electric and water bills</i>	RM 250
Petrol	RM 400
Lain-lain / <i>Others</i>	RM 800
Simpanan / <i>Savings</i>	RM 200
Pendapatan lebihan/ kurangan <i>Surplus of income/ Deficit</i>	X

Jadual 3
Table 3

- (a) Nyatakan dua pendekatan SMART dalam pengurusan kewangan dalam situasi di atas.
State two SMART approaches in the financial management in the above situation
- [2 markah]
[2 marks]
- (b) (i) Nyatakan nilai X. Seterusnya tentukan sama ada aliran tunai Encik Anuar positif atau negatif.
Calculate the value of X. Next determine Mr Anuar cash flow whether it is positive cash flow or negative cash flow
- (ii) Bolehkah Encik Anuar mencapai matlamat pelan kewangan itu? Sila jelaskan
Can Mr Anuar achieve the financial goal? Please explain.
- [4 markah]
[4 marks]

Jawapan / *Answer* :

- (a)

(b) (i)

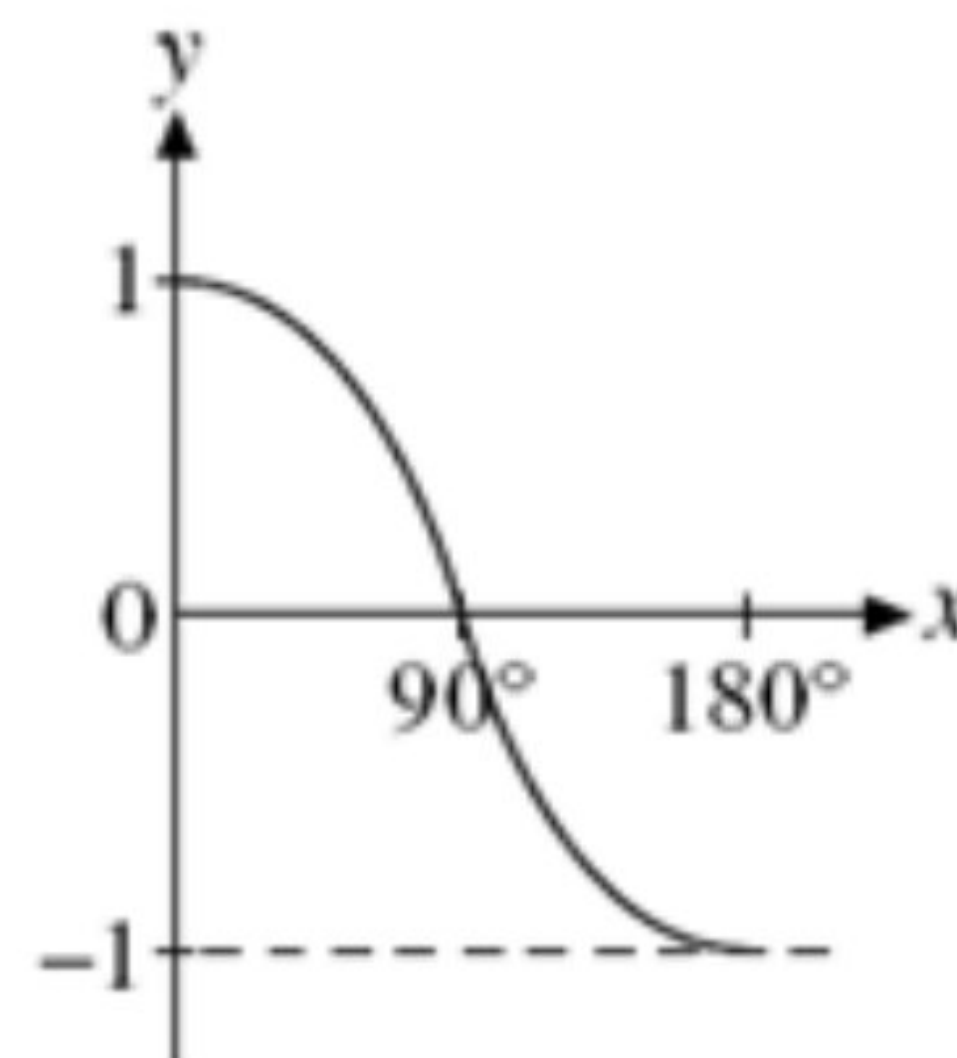
(ii)

- 10 (a) Jika $\cos x = -\cos 58^\circ$ dan $180^\circ \leq x \leq 360^\circ$, cari nilai x
 If $\cos x = -\cos 58^\circ$ and $180^\circ \leq x \leq 360^\circ$, find the value of x

[2 markah]

[2 marks]

- (b) (i) Rajah 8 menunjukkan graf bagi suatu fungsi trigonometri untuk $0^\circ \leq x \leq 180^\circ$.
 Nyatakan persamaan fungsi trigonometri itu.
 Diagram 8 shows the graph of a trigonometric function for values of $0^\circ \leq x \leq 180^\circ$.
 Write the equation of the trigonometric function.



Rajah 8
Diagram 8

- (ii) Pada grid segi empat sama yang disediakan, lakarkan graf $y = 2 \cos x$ untuk $0^\circ \leq x \leq 360^\circ$.

On the square grids provided, sketch the graph of $y = 2 \cos x$ for $0^\circ \leq x \leq 360^\circ$

[3 markah]

[3 marks]

Jawapan / Answer :

(a)

(b) (i)

(ii)

Bahagian B
Section B

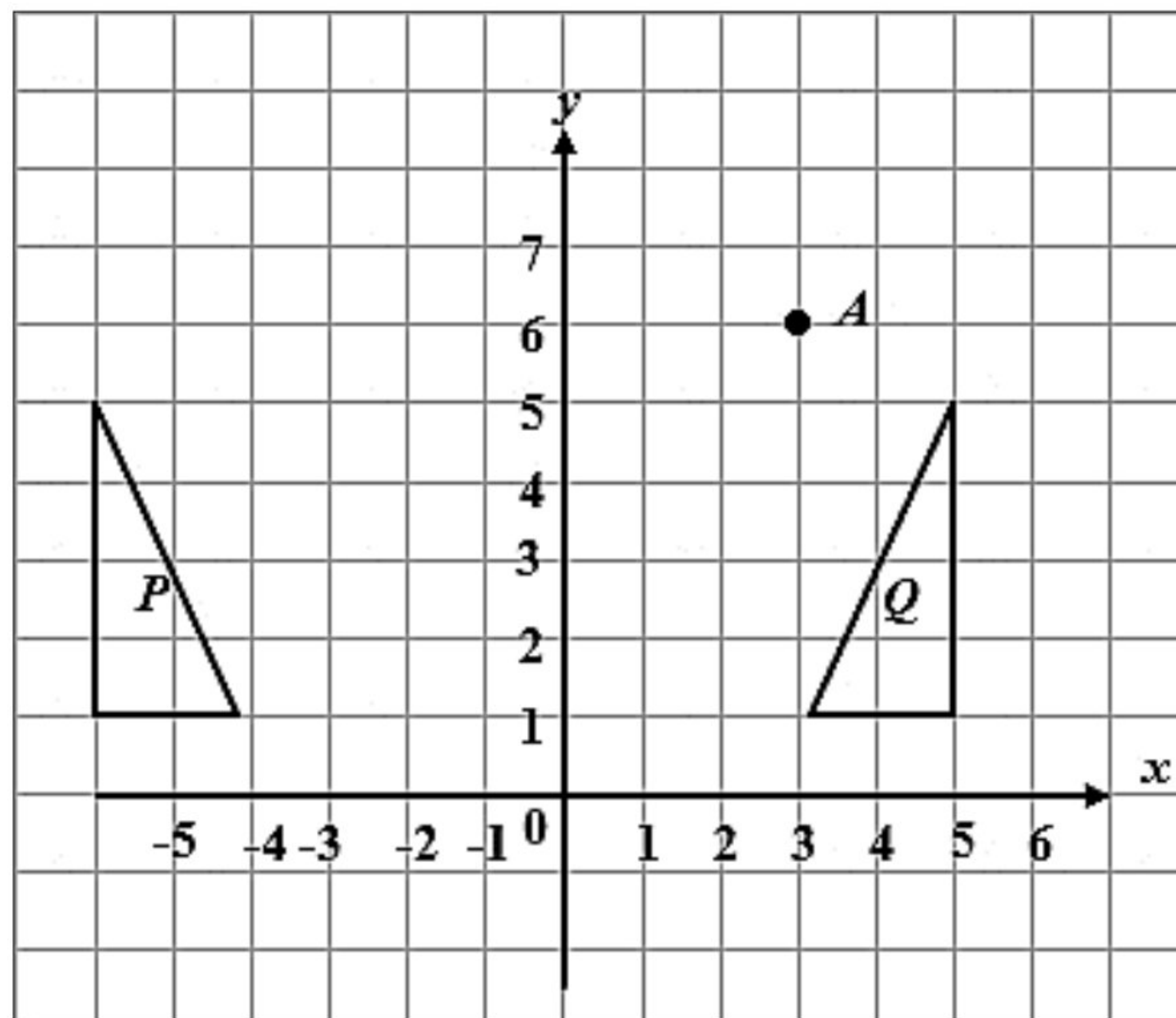
[45 markah]

[45 marks]

Jawab **semua** soalan dalam bahagian ini.

Answer all questions in this section.

- 11 (a) Rajah 9(a) menunjukkan satu titik diplot pada satah Cartes.
Diagram 9(a) shows a point is plotted on the cartes plane.



Rajah 9(a)
Diagram 9(a)

- (i) Tentukan koordinat bagi imej titik A di bawah translasi $\begin{pmatrix} -4 \\ -3 \end{pmatrix}$

Determine the coordinate for the image of A under translation $\begin{pmatrix} -4 \\ -3 \end{pmatrix}$

[1 markah]

[1 marks]

- (ii) Tentukan sama ada pasangan segi tiga P dan Q adalah kongruen, Berikan justifikasi anda.

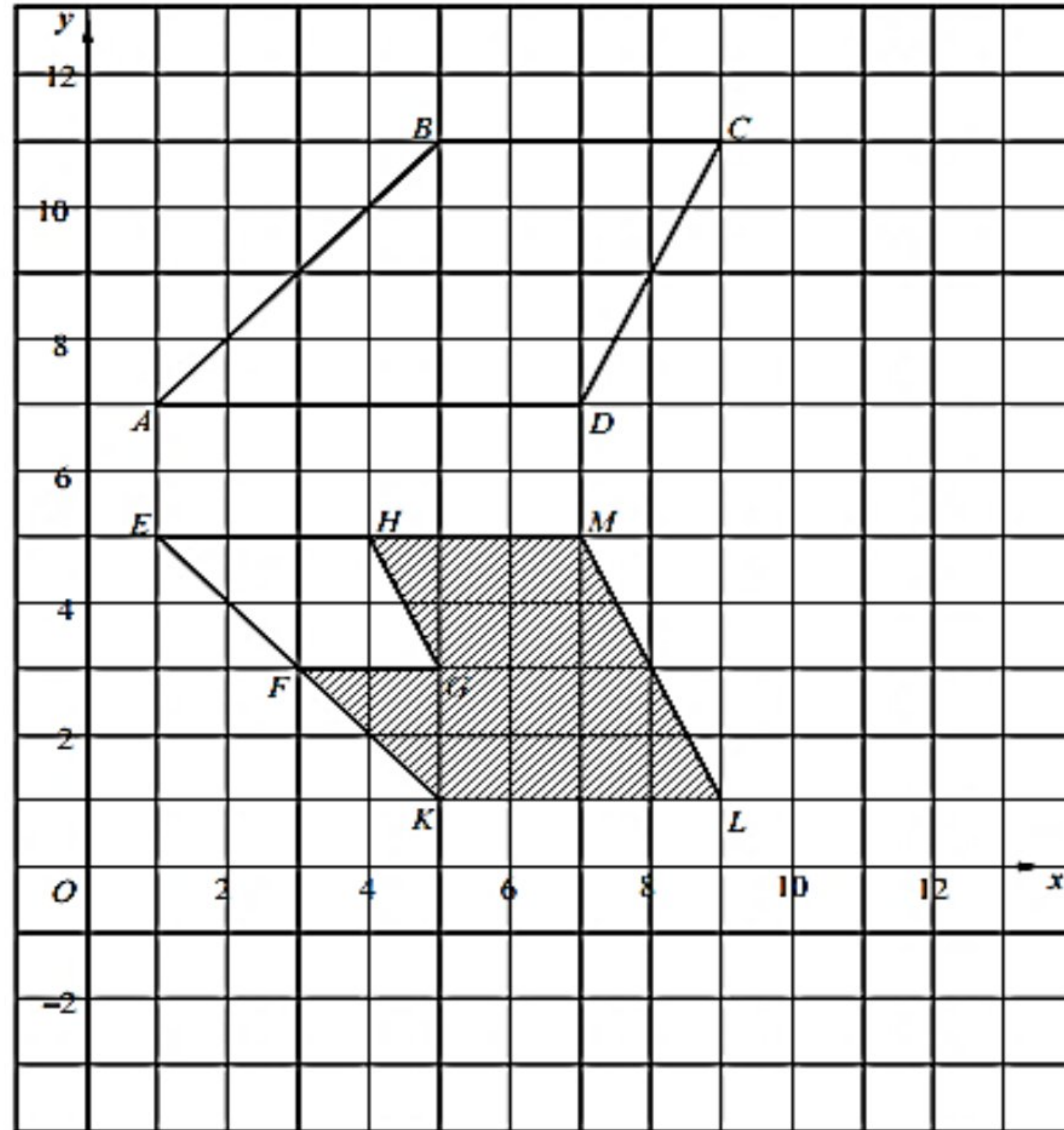
Determine whether the pair of triangles P and Q are congruent, Give your justification.

[2 markah]

[2 marks]

- (b) Rajah 9(b) di bawah menunjukkan sisi empat $ABCD$, $EKLM$ dan $EFGH$ dilukis pada satu satah Cartes.

Diagram 9(b) below shows quadrilaterals $ABCD$, $EKLM$ and $EFGH$ drawn on a Cartesian plane.



Rajah 9(b)
Diagram 9(b)

Sisi empat $EFGH$ ialah imej bagi sisi empat $ABCD$ di bawah gabungan penjelmaan VU .
Quadrilaterals $EFGH$ is the image of quadrilateral $ABCD$ under a combined transformation VU .

Huraikan selengkapnya penjelmaan
Describe in full, the transformations

- (i) **U**
- (ii) **V**

[5 markah]
[5 marks]

Jawapan / Answer :

- (a) (i)

- (ii)

- (b) (i)

- (ii)

- 12 (a) (i) Diberi bahawa,
Given that,

$$\begin{pmatrix} 4 & x \\ 1 & -2 \end{pmatrix} \begin{pmatrix} 7 \\ -3 \end{pmatrix} = \begin{pmatrix} 22 \\ 13 \end{pmatrix}$$

Cari nilai x .
Find the value of x .

- (ii) Diberi bahawa,
Given that,

$$\frac{1}{m} \begin{pmatrix} -3 & 2 \\ -5 & 0 \end{pmatrix} \begin{pmatrix} n & -2 \\ 5 & -3 \end{pmatrix} = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$$

Cari nilai m dan n .
Find the value of m and n .

[4 markah]
[4 marks]

- (b) Sebuah pawagam mengenakan cas RM12 untuk orang dewasa dan RM9 untuk kanak-kanak bagi harga satu tiket. Sekumpulan penonton seramai 210 orang telah membayar sebanyak RM2 415.
A cinema charge RM12 for an adult and RM9 for a child as a ticket price. A group of 210 people paid a total of RM2 415.

- (i) Dengan menggunakan pemboleh ubah x bagi mewakili orang dewasa dan pemboleh ubah y bagi mewakili kanak-kanak, bina dua persamaan linear berdasarkan situasi yang diberi.
By using variable x for adult and variable y for children, construct two linear equations based on the given situation.

[2 markah]
[2 marks]

- (ii) Dengan menggunakan kaedah matriks, cari bilangan penonton dewasa dan bilangan penonton kanak-kanak.
By using matrix method, find the number of adults and the number of children.

[4 markah]
[4 marks]

Jawapan / Answer :

- (a) (i)

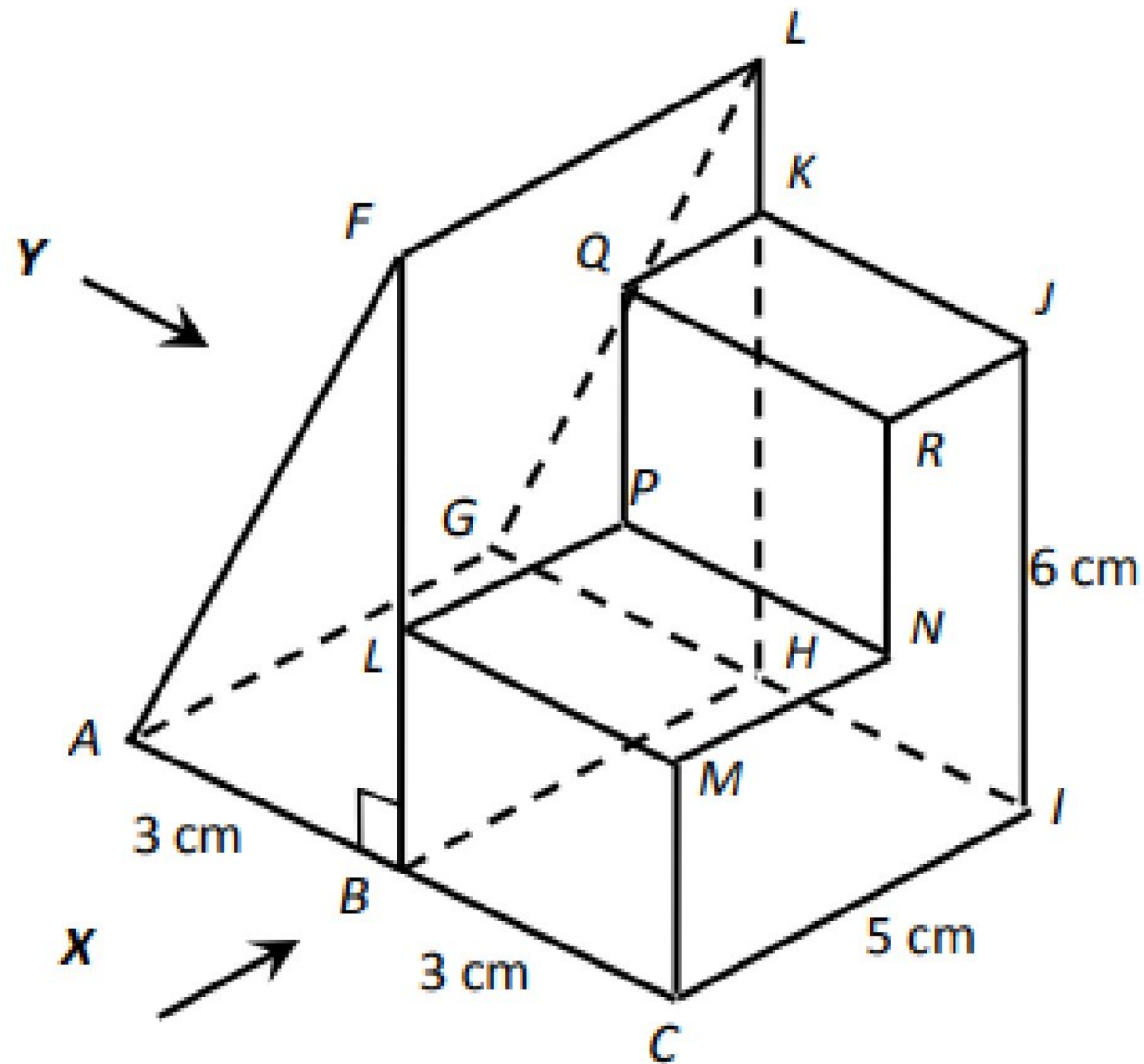
- (ii)

- (b) (i)

- (ii)

- 13 (a) Encik Tan membeli selebih – lebihnya 30 batang pen berwarna hitam (x) dan biru (y) untuk pelajar kelas 5 Bestari. Dua kali bilangan pen hitam tidak lebih daripada bilangan pen biru.
En Tan bought at least 30 black (x) and blue (y) pens for students of class 5 Bestari. 2 times the number of black pens, not more than the number of blue pens.
- (i) Tulis dua ketaksamaan linear selain $x \geq 0$ dan $y \geq 0$ yang mewakili situasi itu.
Write two linear inequalities other than $x \geq 0$ and $y \geq 0$ which represents the situation.
[2 markah]
[2 marks]
- (ii) Lukis dan lorek rantau yang memuaskan ketaksamaan linear di atas.
Draw and shade the region that satisfies the above system of linear inequalities.
[4 markah]
[4 marks]
- (b) Daripada graf,
From the graph,
- (i) Tentukan bilangan minimum dan maksimum pen biru apabila bilangan pen hitam ialah 5 batang.
Determine the minimum and maximum numbers of the blue pen when the number of the black pen is 5.
[2 markah]
[2 marks]
- (ii) Encik Tan ingin membeli 25 batang pen hitam dan 25 batang pen biru. Adakah pembelian Encik Tan memuaskan sistem ketaksamaan linear yang dibina.
Mr Tan wants to buy 25 black pens and 25 blue pens. Does Mr Tan's purchase satisfy the inequality system that was built.
[1 markah]
[1 marks]

- 14 Rajah 10 menunjukkan dua buah pepejal berbentuk prisma tegak dengan tapak segi empat tepat BCIH dan segi empat tepat ABGH. Permukaan CIJRMN dan segi tiga bersudut tegak ABF ialah keratan rentas bagi kedua-dua prisma itu. Tepi BLF, CM, IJ dan HLK adalah tegak. Garis MN=PQ=3cm dan KL=2cm
 Diagram 10 shows a combined two solid right prisms with a rectangular base BCIH and rectangular base ABGH. The surface CIJRMN and right-angle triangle ABF are the uniform cross section of both prisms. The edges BLF, CM, IJ and HLK are vertical. Line MN=PQ=3cm and KL=2cm.

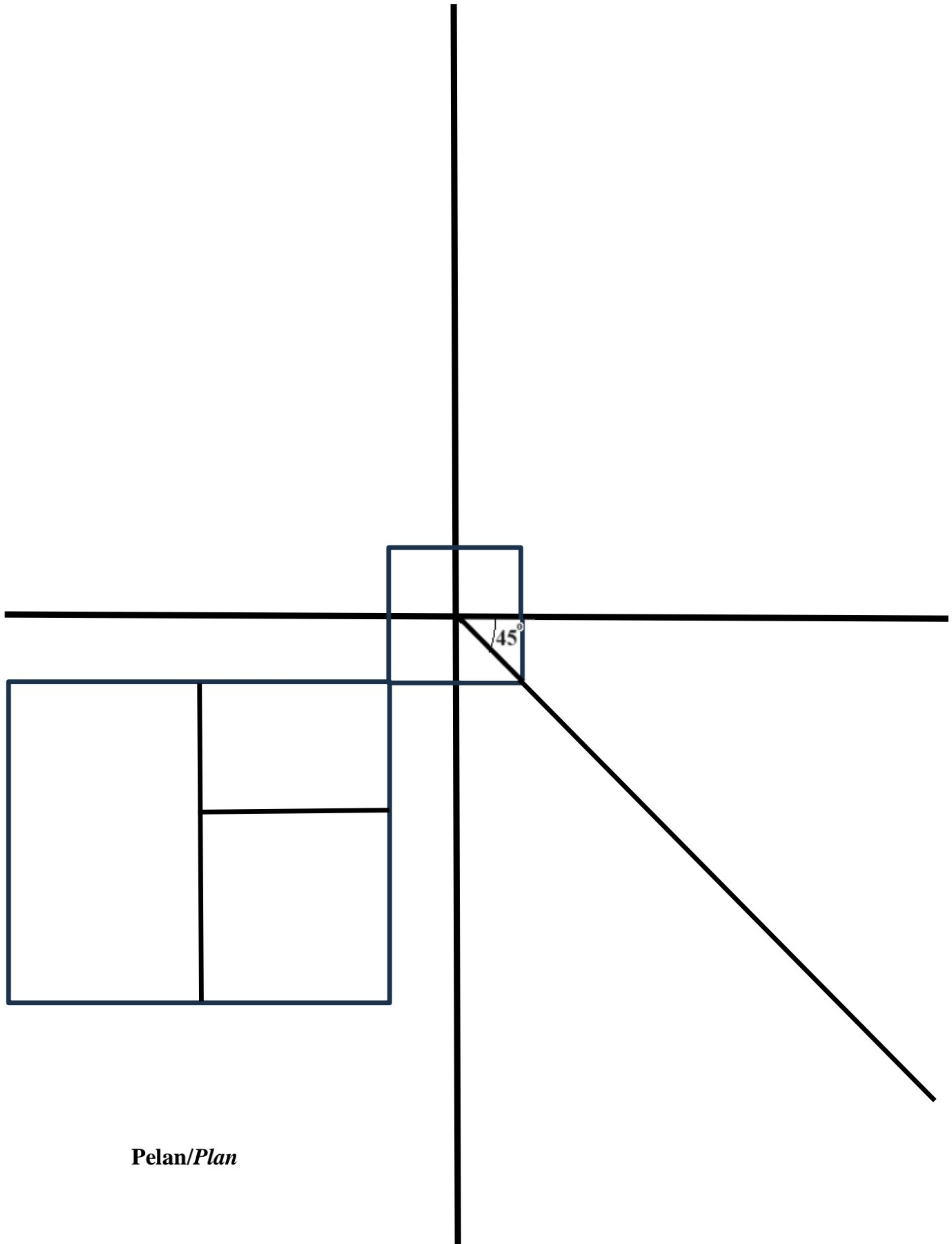


Rajah 10
Diagram 10

Lukis dengan skala penuh,
 Draw the full scale,

- (a) Dongakan gabungan pepejal itu pada satah mencancang yang selari dengan ABC sebagaimana dilihat dari arah X.
 The elevation of the composite solid on a vertical plane parallel to ABC as viewed from X
 [4 markah]
 [4 marks]
- (b) Dongakan gabungan pepejal itu pada satah mencancang yang selari dengan AG sebagaimana dilihat dari arah Y.
 The elevation of the composite solid on a vertical plane parallel to AG as viewed from Y
 [5 markah]
 [5 marks]

Jawapan / Answer :



Pelan/Plan

- 15 (a) Rajah 11 menunjukkan plot batang-dan-daun bagi hasil tinjauan tentang kadar denyutan nadi per minit bagi pesakit yang dirawat di sebuah poliklinik komuniti. Hitung julat bagi kadar denyutan nadi.

Diagram 11 shows the stem-and-leaf plot of the results of a survey on the pulse rates per minutes of patients treated at a community polyclinic. Calculate the range of the pulse rates.

Batang	Daun
4	2 4 7
5	5 5 6 8 9 9
6	1 4 5
7	3 3 4 5 6 6 7 9
8	0 8
9	1 2 4

Kekunci: 4 | 2 bermakna 42 denyutan per minit

Key: 4 | 2 means 42 beats per minute

Rajah 11
Diagram 11

[2 markah]

[2 marks]

- (b) Jadual 4 di ruang jawapan menunjukkan elaun telefon bimbit yang ditawarkan oleh 80 buah Syarikat.

Table 4 in the answer space shows the telephone allowance offered by 80 companies.

- (i) Lengkapkan jadual itu.

Complete the table.

[3 markah]

[3 marks]

- (ii) Untuk ceraian soalan ini, gunakan kertas graf yang disediakan di halaman 23. Menggunakan 2 cm kepada RM10 pada paksi mengufuk dan 2 cm kepada 10 syarikat pada paksi mencancang, lukis satu ogif bagi data tersebut.

For this part of question, use the graph paper provided in page 23. Using a scale of 2 cm to RM10 on the horizontal axis and 2 cm to 10 companies on vertical axis, draw an ogive for the data

[4 markah]

[4 marks]

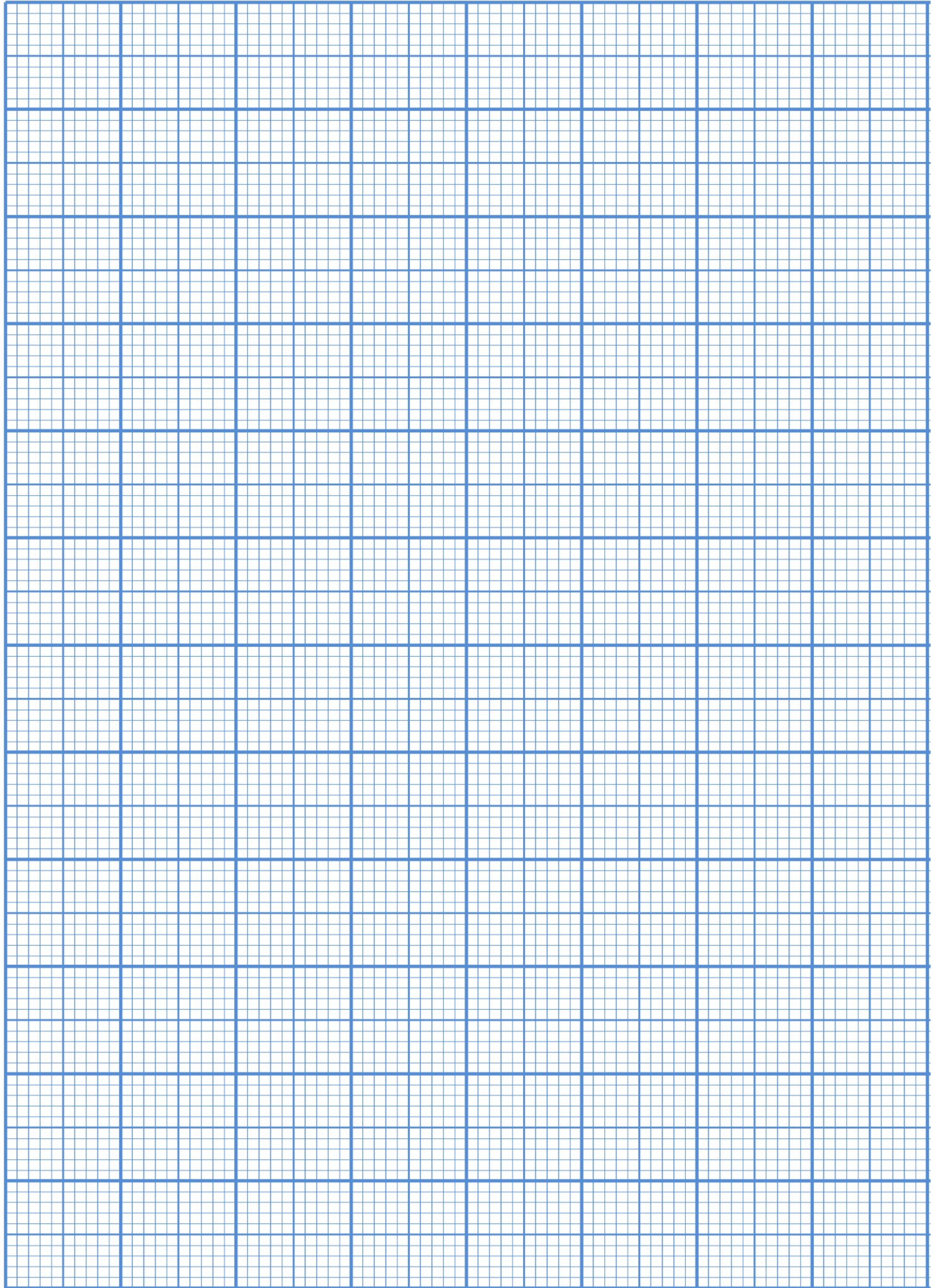
Jawapan / Answer :

- (a)

(i)

Elaun (RM) <i>Allowance (RM)</i>	Kekerapan <i>Frequency</i>	Kekerapan longgokan <i>Cumulative frequency</i>	Sempadan atas <i>Upper boundary</i>
1 – 10	0	0	10.5
11 – 20	5		
21 – 30	7		
31 – 40	18		
41 – 50	27		
51 – 60	18		
61 – 70	5		

Jadual 4
Table 4



Bahagian C
Section C
[15 markah]
[15 marks]

Jawab mana-mana **satu** soalan dalam bahagian ini.
*Answer any **one** question in this section.*

- 16 Sempena sambutan Hari Malaysia, Kementerian Belia dan Sukan bercadang menganjurkan larian Malaysiaku Sejahtera.
In conjunction of Malaysia Day, the Ministry of Youth and Sports is planning to organize the Malaysiaku Sejahtera run.

- (a) Keluarga Zaini dan Keluarga Ali menyertai larian tersebut dan bayaran seperti di dalam jadual 5(a) di bawah.
Zaini's and Ali's families are participating in the run. Their fees are shown in the table 5(a) below.

Peserta <i>Participant</i>	Keluarga Zaini <i>Zaini's family</i>	Keluarga Ali <i>Ali's family</i>
Dewasa <i>Adult</i>	2	3
Kanak-kanak <i>Child</i>	3	1
Jumlah <i>Total</i>	RM150	RM130

Jadual 5(a)
Table 5(a)

- (i) Berdasarkan jadual 5(a) bentukkan dua persamaan linear.
Based on the table 5(a) form two linear equations
- [2 markah]
[2 marks]
- (ii) Sofia merupakan salah seorang peserta larian tersebut. Dia berjaya menamatkan larian dalam tempoh 45 minit dengan jarak 10 km. Dia berhenti berehat selama 5 minit di check point 3. Pada ruang jawapan, lengkapkan graf jarak – masa larian Sofia pada rajah 13.
Sofia was one of the participants of the race. She managed to finish the race in 45 minutes with a distance of 10 km. She stopped and rested for five minutes at Checkpoint 3. In the answer space, complete the time-distance chart in the diagram 13.
- [2 markah]
[2 marks]
- (b) (i) Terdapat seramai 700 ratus orang peserta terdiri daripada 300 peserta perempuan. Hitung kebarangkalian peserta lelaki yang menyertai larian tersebut.
There were a total of 700 hundred participants consisting of 300 female participants. Calculate the probability of male participants participating in the run.
- [1 markah]
[1 marks]

- (ii) Seramai 50 peserta berjaya menghabiskan larian dalam tempoh masa yang ditetapkan seperti dalam jadual 5(b) dibawah.
A total of 50 participants successfully completed the run within the specified time period, as shown in table 5(b) below.

Masa /Time Minit / minute Kategori (Category)	21-25	26-30	31-35	36-40	41-45
Lelaki Boy	10	8	3	2	2
Perempuan Girl	3	5	8	4	5

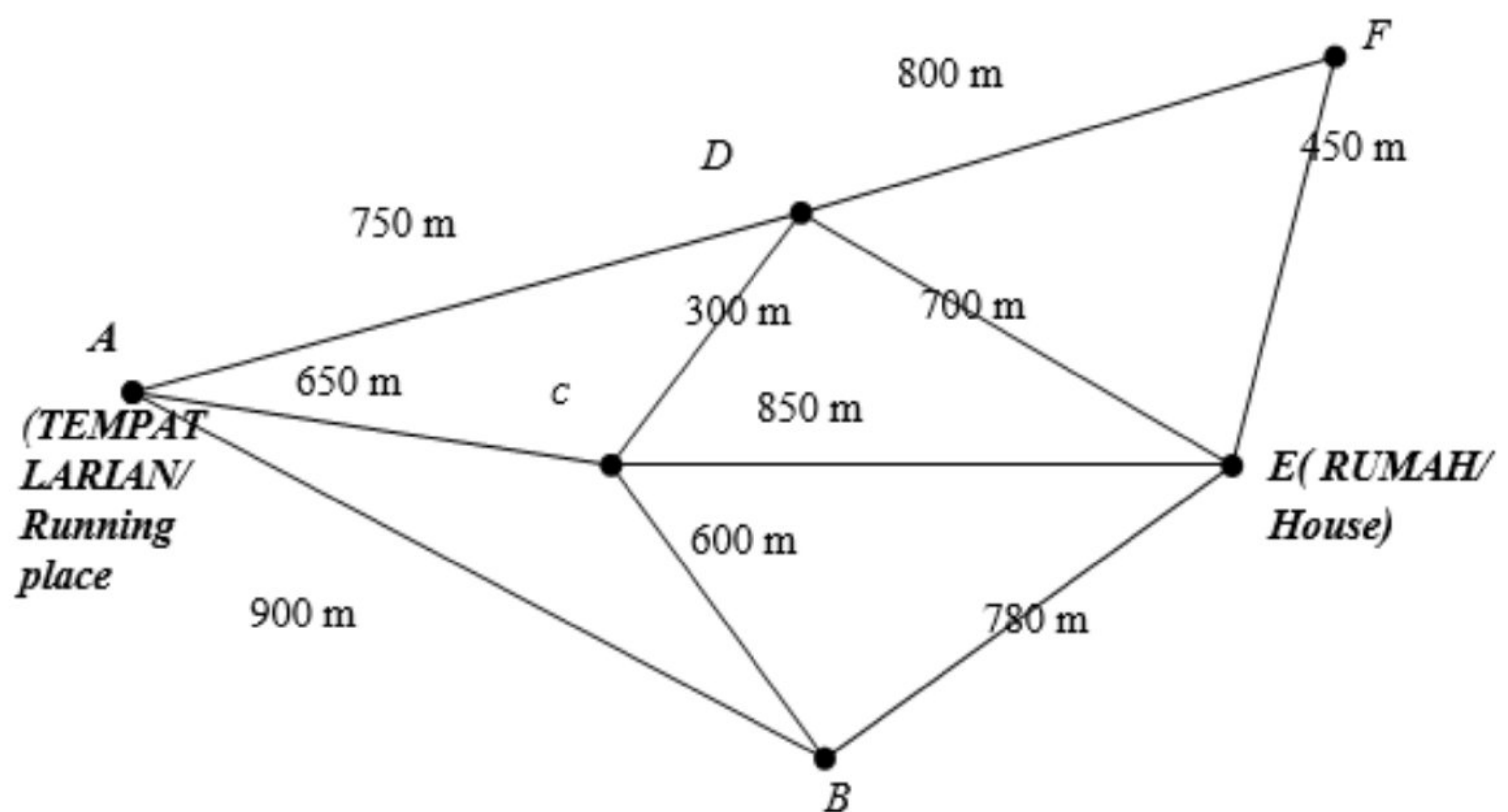
Jadual 5(b)
Table 5(b)

Min bagi kategori lelaki ialah 28.6 dan min bagi kategori perempuan ialah 33.6.
The min for the male category is 28.6 and min for female category is 33.6.

Hitung sisihan piawai catatan masa bagi setiap kategori.
 Kategori manakah yang lebih konsisten dalam lariannya? Terangkan jawapan anda.
*Calculate the standard deviation of the time record for every category.
 Which category is the most consistent in running? Explain your answer.*

[3 markah]
 [3 marks]

- (c) Rajah 12 menunjukkan graf berpemberat bagi laluan pulang Zaini ke rumah.
Diagram 12 shows a weighted graph of Zaini's return home route



Rajah 12
Diagram 12

Lukis satu graf dengan jarak terpendek dari tempat larian ke rumah.
 Seterusnya, hitung jarak terpendek itu dalam km.
*Draw a graph with the shortest distance from running place to home.
 Then, calculate the shortest distance in km*

[3 markah]
 [3 marks]

- (d) Encik Ali telah memenangi cabutan bertuah RM 6000 semasa penutupan majlis Larian Hari Malaysia tersebut. Dia bercadang menyimpan selama 2 tahun. Berikut adalah tawaran dari pihak bank.
Mr. Ali has won a lucky draw of RM 6,000 during the closing ceremony of the Malaysian Running Day. He plans to keep it for two years. Here's an offer from the bank:

Pakej A <i>Package A</i>	Kadar faedah 6% setahun <i>Interest rate: 6% per year</i>
Pakej B <i>Package B</i>	Kadar faedah 6% setahun dan dikompaun 4 kali setahun <i>Interest rate of 6% a year compounded four times a year</i>

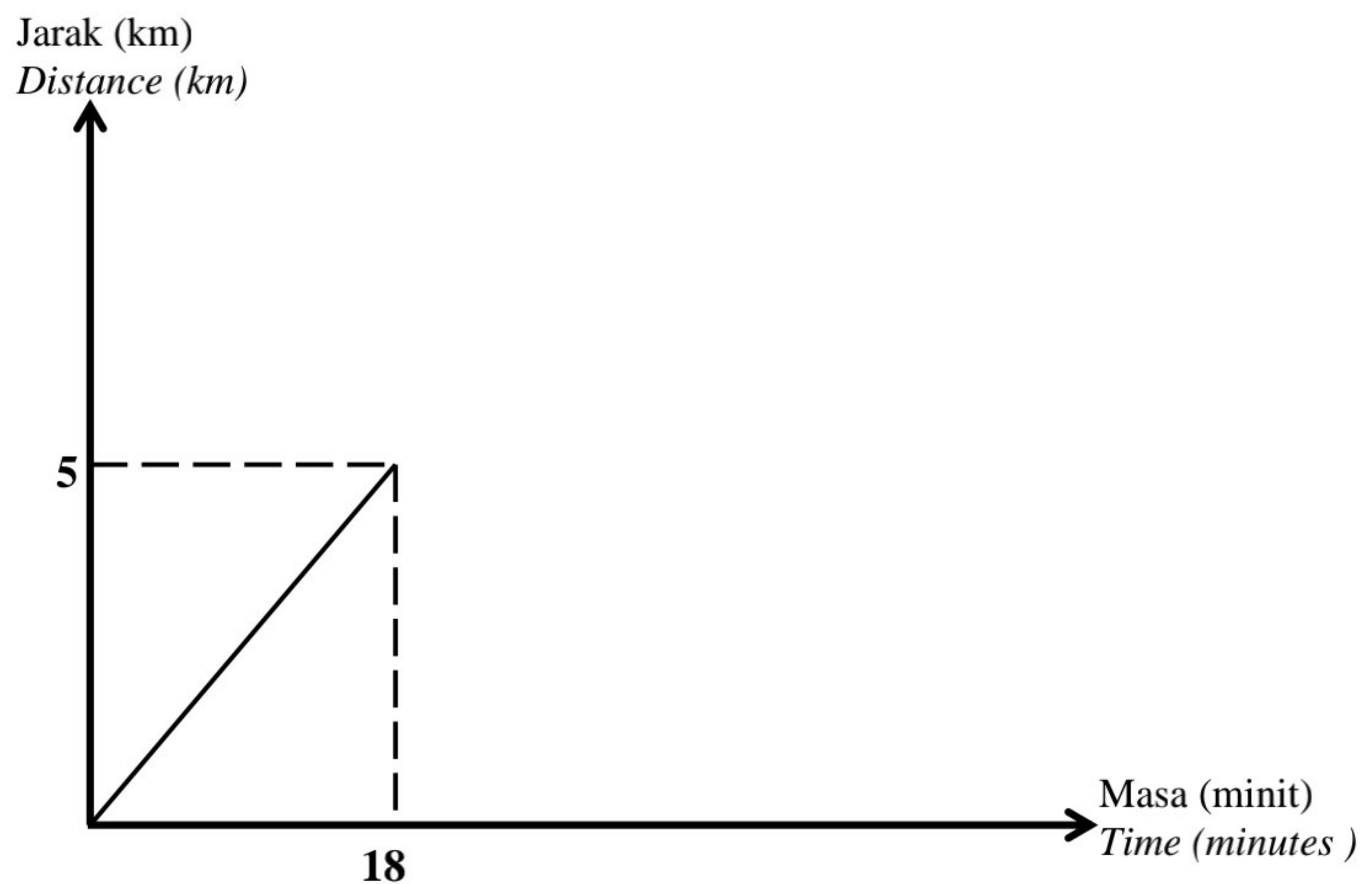
Pakej yang mana lebih menguntungkan? Berikan justifikasi anda.
Which package is more profitable? Give your justification

[4 markah]
 [4 marks]

Jawapan / Answer :

(a) (i)

(ii)



Rajah 13
 Diagram 13

(b) (i)

(ii)

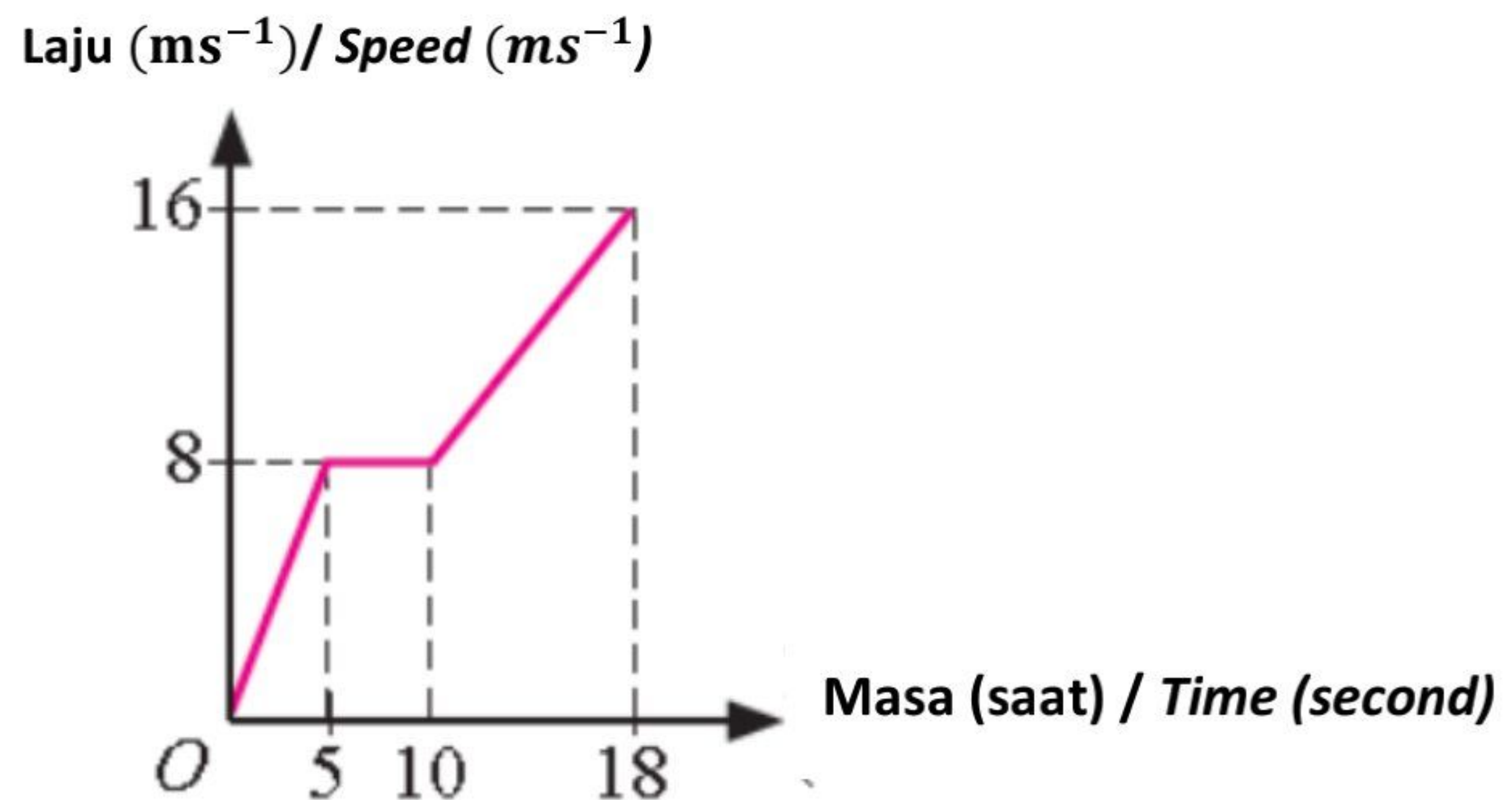
(c)

(d)

- 17 SMK Taman Perling telah mengadakan Hari Sukan Tahunan 2023. Terdapat beberapa acara balapan yang dipertandingkan.

SMK Taman Perling has held the Annual Sports Day 2023. There were several race events that has been contested.

- (a) Ahmad menyertai pertandingan larian 100 m. Graf laju-masa pada Rajah 14 menunjukkan kelajuan larian Ahmad sehingga garisan penamat.
Ahmad participated in 100 m running competition. The speed-time graph in Diagram 14 showed Ahmad's running speed until the finish line.



Rajah 14
Diagram 14

- (i) (a) Nyatakan tempoh laju seragam.
State the uniform speed period, in ms^{-1}
- (b) Hitung kadar perubahan laju, dalam ms^{-2} , bagi 8 saat yang terakhir.
Calculate the rate of change of speeds, in ms^{-2} for the last 8 seconds.
- (ii) Pengawas sekolah diamanahkan untuk menyusun kerusi di khemah. Diberi bahawa masa yang digunakan, t minit, untuk menyusun kerusi di khemah berubah secara langsung dengan bilangan kerusi, c buah, dan secara songsang dengan bilangan pengawas yang terlibat, p orang. Hubungan ini diwakili $t \propto \frac{c}{p}$. Diberi bahawa 5 orang pengawas menggunakan masa 30 minit untuk menyusun 50 buah kerusi. Ungkapkan t dalam sebutan c dan p .

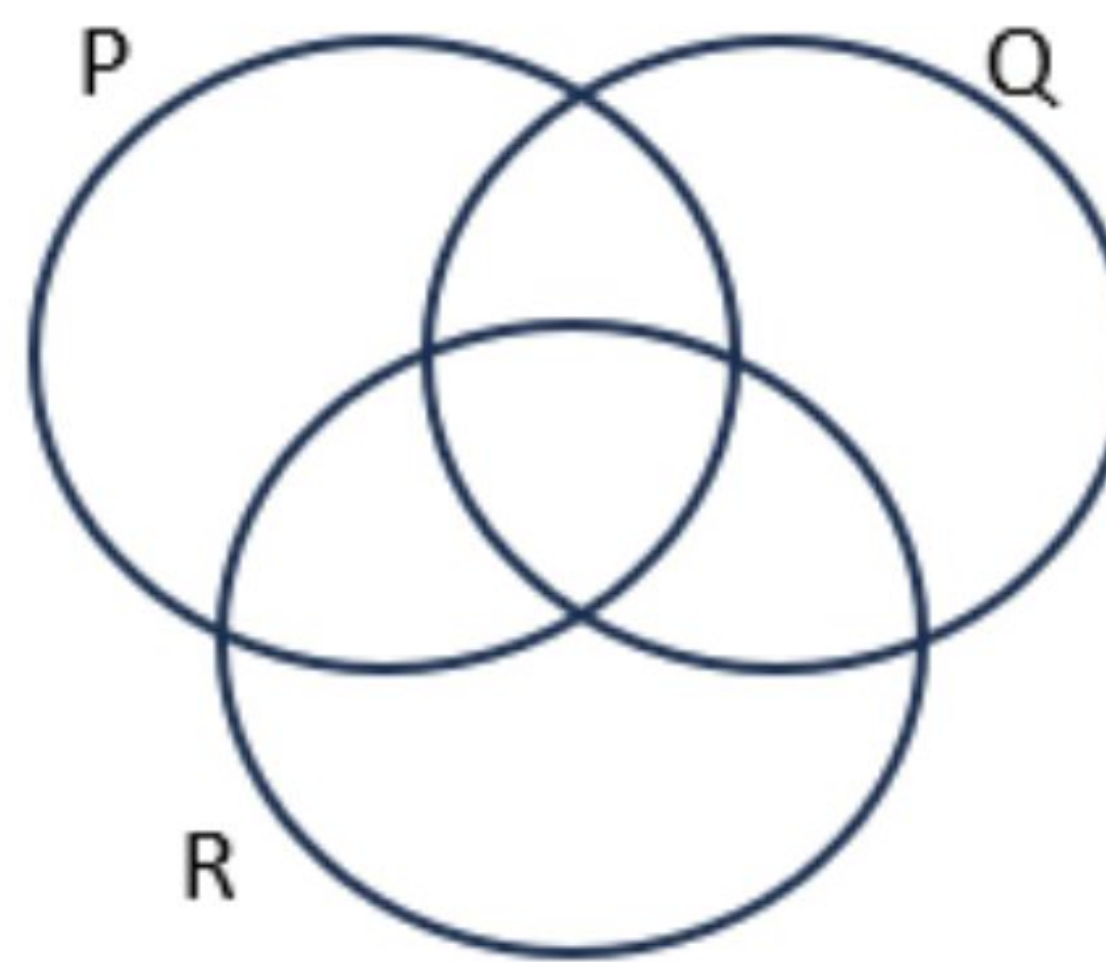
The school prefects have entrusted to arrange the chairs in the tent. Given that the time taken, t minutes, to arrange the chairs in the tent varies directly with the number of chairs, c pieces, and inversely with the number of prefects involved, p people. This relation is represented by $t \propto \frac{c}{p}$. Given that 5 prefects took 30 minutes to arrange 50 chairs. Express t in terms of c and p .

[5 markah]
[5 marks]

- (b) Diberi tiga acara yang disertai oleh beberapa peserta Rumah Merah seperti dalam Set P , Set Q dan Set R dengan keadaan set semesta, $\xi = P \cup Q \cup R$.
Given three events participated by several Rumah Merah participant such as in Set P , Set Q and Set R with the state of the universal set, $\xi = P \cup Q \cup R$.

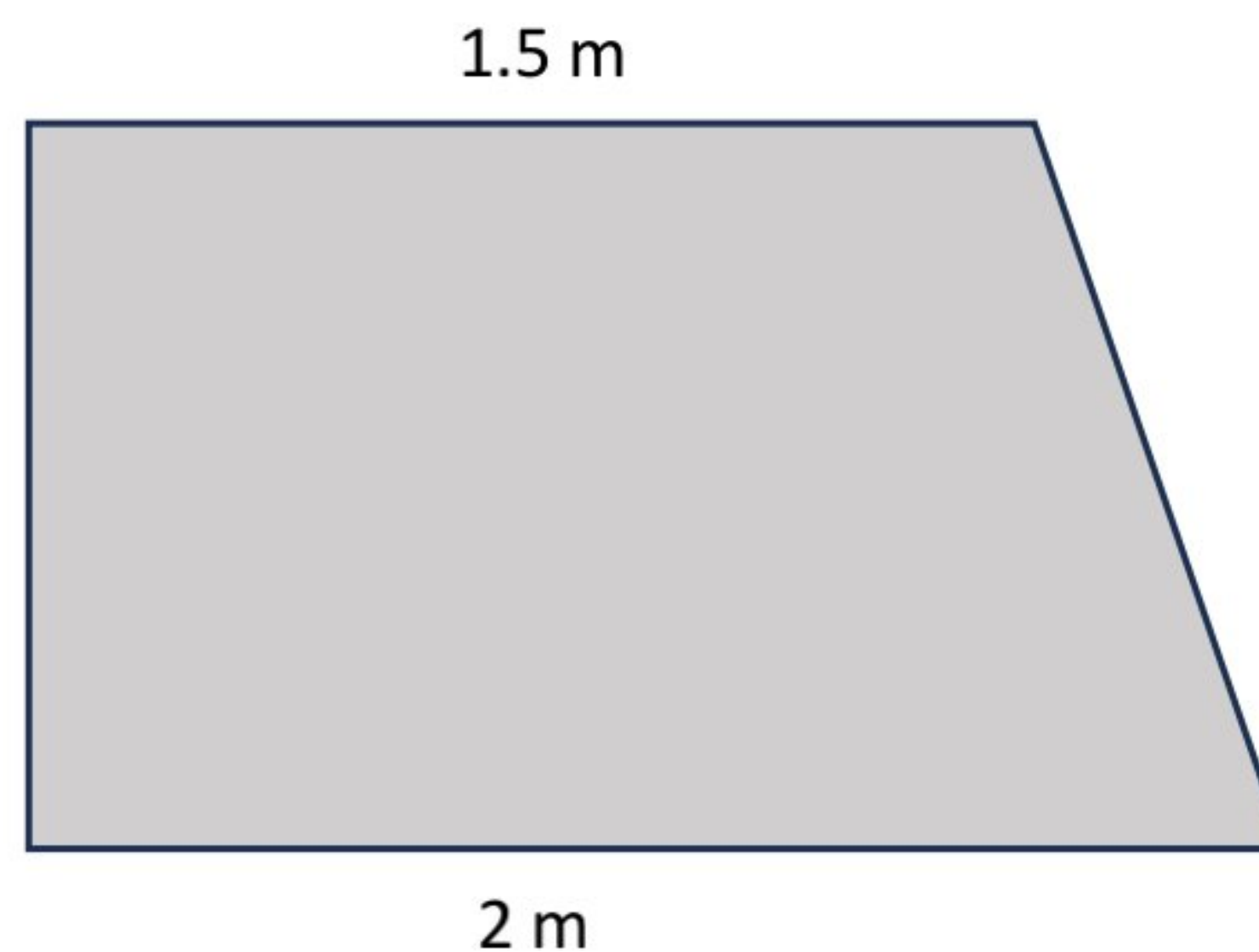
$P = \{\text{Ali, Ahmad, Ah Seng, Laila}\}$
 $Q = \{\text{Raju, Syafik, Ali, Ahmad, Syahirah}\}$
 $R = \{\text{Ali, Raju, Syahirah, Kamal, Laila}\}$

- (i) Senaraikan peserta Rumah Merah yang terlibat dalam **satu** acara sahaja.
*List the participant of the Rumah Merah who are involved in **one** event only.*
- (ii) Lengkapkan gambar rajah Venn bagi mewakili hubungan antara Set P , Set Q dan Set R . Seterusnya, nyatakan unsur-unsur bagi set $P \cup Q \cap R$.
Complete the Venn diagram to represent relationship between Set P , Set Q and Set R . Then, state the elements of set $P \cup Q \cap R$.



[4 markah]
 [4 marks]

- (c) Sempena Hari Sukan, pihak sekolah telah menganjurkan pertandingan mereka bentuk bendera kejohanan. Rajah 15 menunjukkan bentuk bendera.
In conjunction with Sports Day, the school has organized a tournament flag design competition. Diagram 15 shows the shape of the flag.



Rajah 15
Diagram 15

Keluasan bendera adalah 2.1 m^2 . Hitung tinggi bendera, dalam meter.
The area of the flag is 2.1 m^2 . Calculate the height of the flag, in meters.

[2 markah]
 [2 marks]

- (d) Pengusaha kantin sekolah ingin membuat jualan makanan dan minuman semasa hari sukan sekolah. Namun, peti sejuk beku sedia ada telah rosak. Harga sebuah peti sejuk beku yang baru di Shopee adalah RM 5 000 secara sewa beli dengan pendahuluan sebanyak 10%. Bakinya dibayar secara ansuran untuk 6 bulan dan Shopee mengenakan faedah sama rata 6%.

The school canteen wants to sell some foods and drinks during the sports day. However, their freezer has broken. The price of a new freezer in Shopee is RM 5 000, through hire purchase, with down payment of 10%. The balance is to be paid by installments for 6 months and Shopee will charge a flat rate of 6%.

- (i) Tentukan bayaran pendahuluan, dalam RM, yang perlu dibayar oleh pengusaha kantin.
Determine the amount of down payment, in RM, needed to be pay by the school canteen
- (ii) Hitung jumlah bayaran balik pinjaman, dalam RM, pengusaha kantin kepada Shopee.
Calculate the total repayment, in RM, by the school canteen to Shopee
- (iii) Nyatakan bayaran ansuran bulanan, dalam RM, yang perlu dibayar oleh pengusaha kantin.
State the monthly installments, in RM, needed to be pay by the school canteen.

[4 markah]

[4 marks]

Jawapan / Answer :

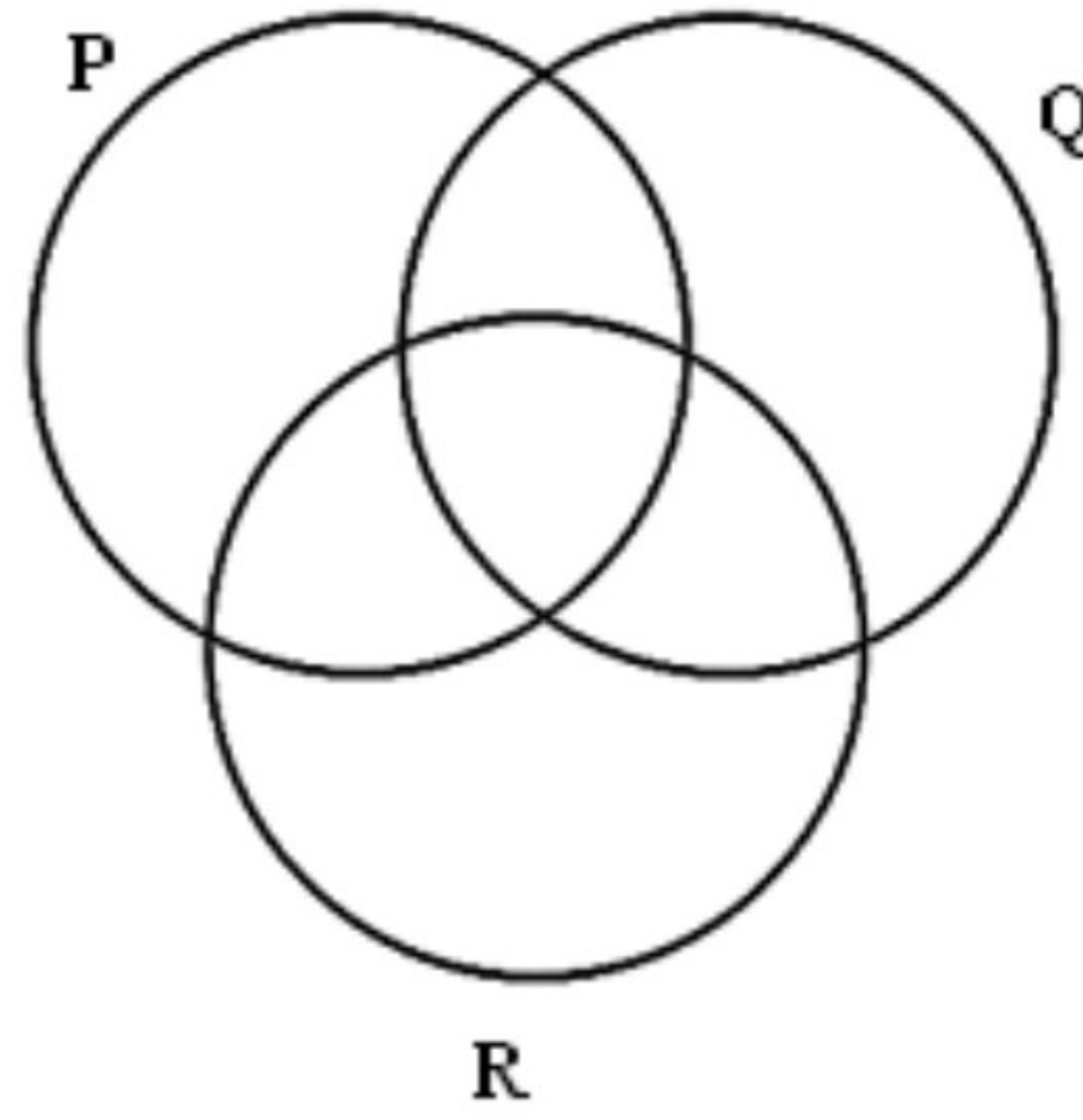
(a) (i) (a)

(b)

(ii)

(b) (i)

(ii)



(c)

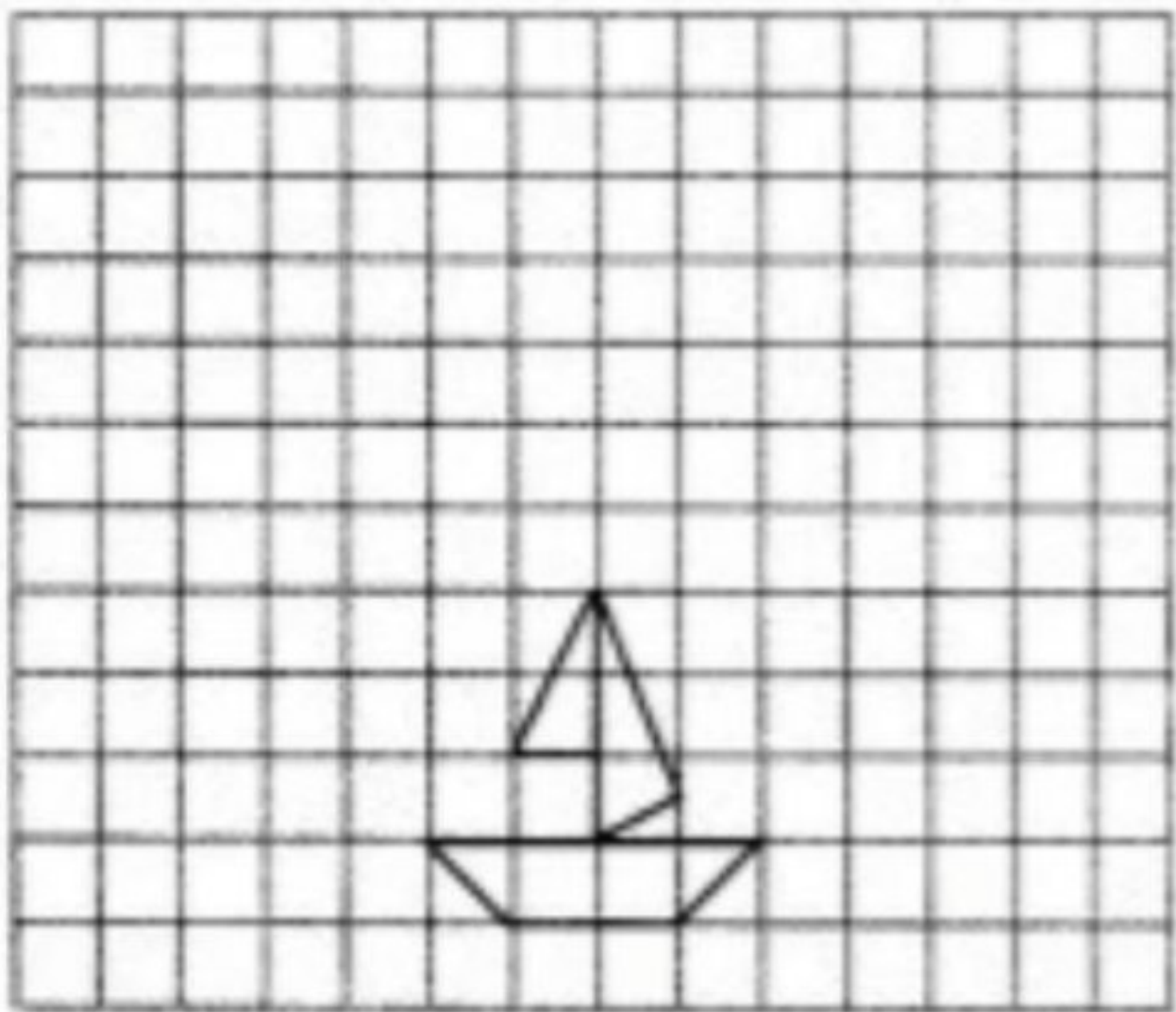
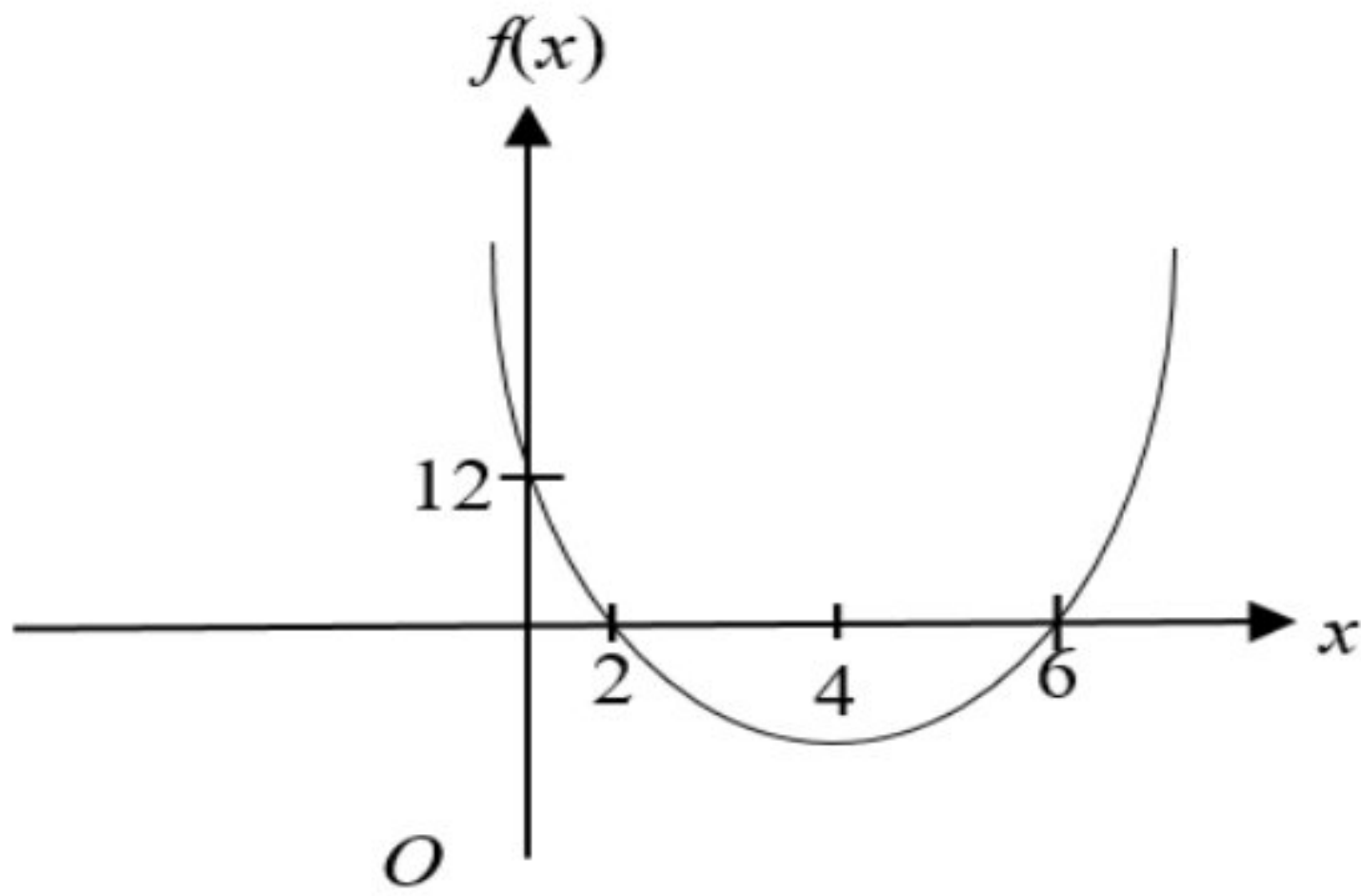
(d) (i)

(ii)

(iii)

KERTAS PEPERIKSAAN TAMAT
END OF QUESTION PAPER

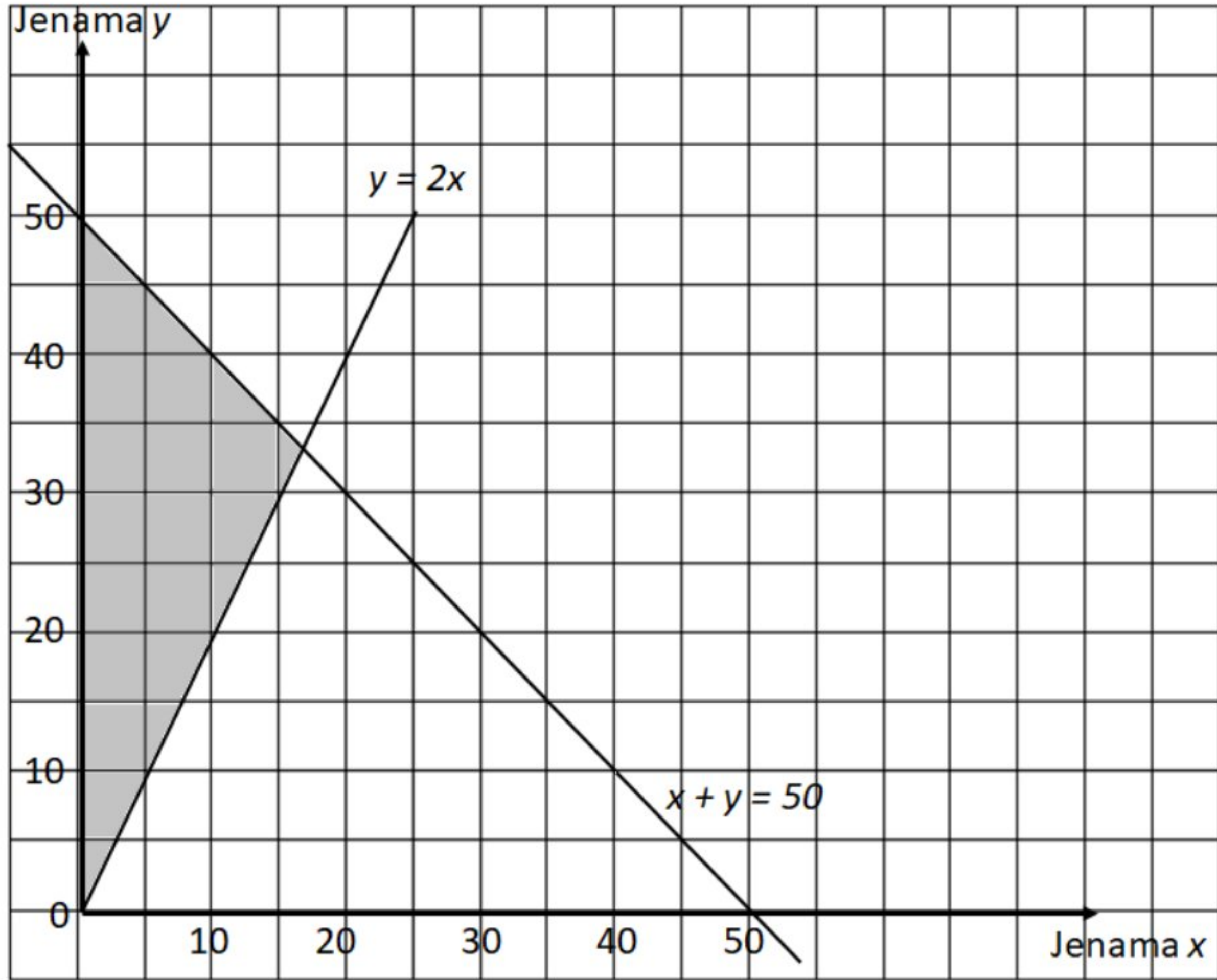
SKEMA JAWAPAN PEPERIKSAAN PERCUBAAN SPM TAHUN 2023
MATEMATIK KERTAS 2 SET 1

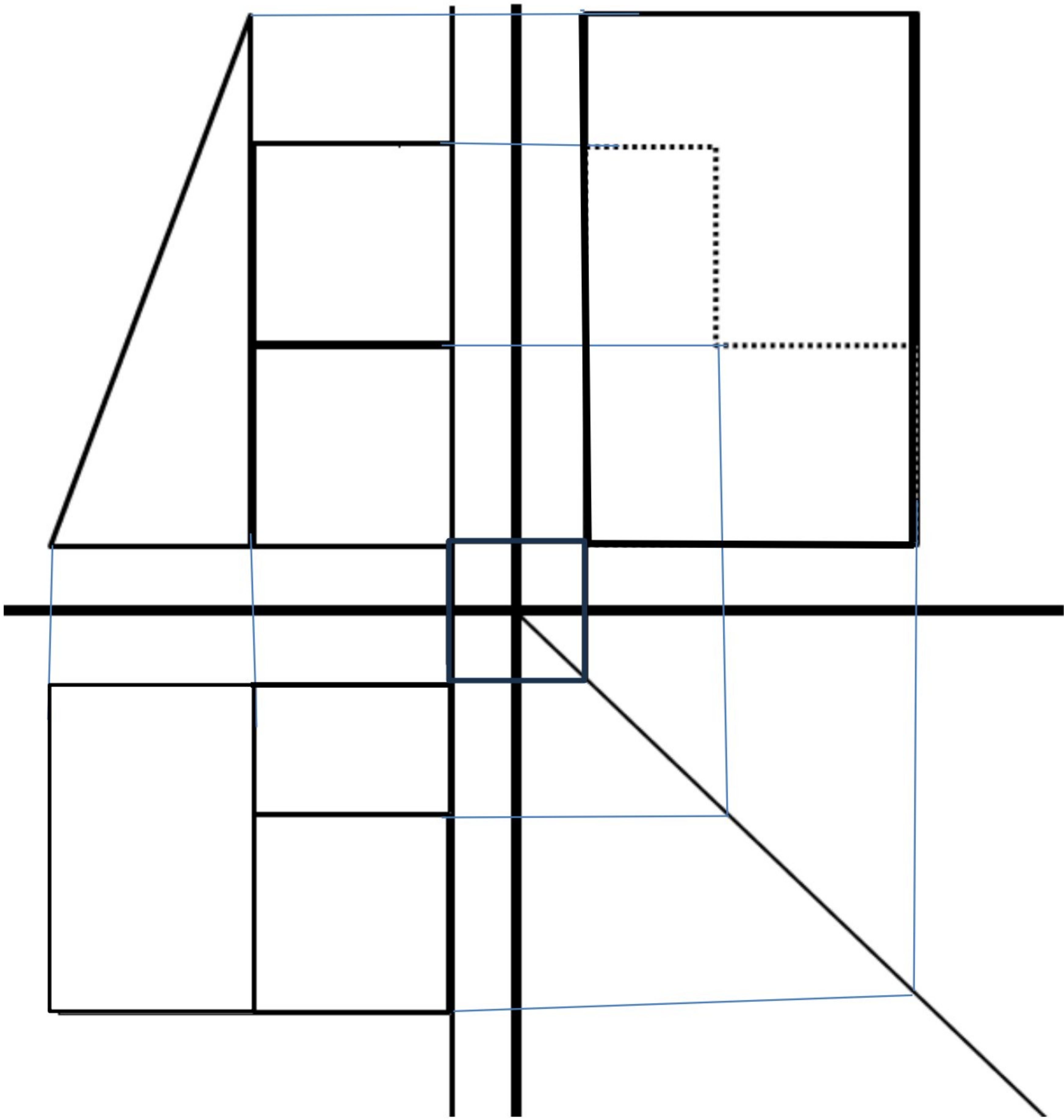
Bil	Jawapan		Markah
1	(a)	Oktagon	1m
	(b)	$360 - 95 - 50 - 80 - 50 - 45$ 40	1m 1m
2	(a)	$= 9:3$ $= \frac{9}{9} : \frac{3}{9}$ $= 1 : \frac{1}{3}$	1m
	(b)		2m
3	(a)		2m
	(b)	$x = 2$	1m
4	(a)	Cukai percukaian	1m
	(b)	$(5.80 + 7.20 + 4.50) = 17.50$ $= 17.50 \times 6\% = 1.05$ $= 17.50 + 1.05$ $= \text{RM } 18.55$ (yang dibayar)	1m 1m 1m
5	(a)	UR	1m
	(b)		

			1m 1m 1m															
6	(a)	kapasiti enjin/ nilai kenderaan	1m															
	(b)	<table border="1"> <tr> <td>(a)</td> <td>Kadar untuk RM1 000 pertama <i>The rate for the first RM1 000</i></td> <td>RM 339.10</td> </tr> <tr> <td>(b)</td> <td>Nilai baki jumlah yang diinsuranskan <i>The value of the remaining of sum insured</i></td> <td>$79 \times 20.30 = \text{RM}1603.70$</td> </tr> <tr> <td>(c)</td> <td>Premium asas / <i>basic premium</i></td> <td>RM1942.80</td> </tr> <tr> <td>(d)</td> <td>NCD 30%</td> <td>RM582.84</td> </tr> <tr> <td>(e)</td> <td>Premium kasar / <i>Gross premium</i></td> <td>RM1359.96</td> </tr> </table>	(a)	Kadar untuk RM1 000 pertama <i>The rate for the first RM1 000</i>	RM 339.10	(b)	Nilai baki jumlah yang diinsuranskan <i>The value of the remaining of sum insured</i>	$79 \times 20.30 = \text{RM}1603.70$	(c)	Premium asas / <i>basic premium</i>	RM1942.80	(d)	NCD 30%	RM582.84	(e)	Premium kasar / <i>Gross premium</i>	RM1359.96	1m 1m 1m 1m
(a)	Kadar untuk RM1 000 pertama <i>The rate for the first RM1 000</i>	RM 339.10																
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7	(a)	$y = 5$	1m															
	(b)	<p>Pintasan-y Apabila $x = -2$ dan $y = 5$</p> $5 = 2(-2) + c$ $5 = -4 + c$ $c = 5 + 4$ $c = 9$ <p>Persamaan garis lurus PS ialah $y = 2x + 9$</p>	1m 1m 1m															
8	(a)	$S = \{(S,T), (S,5), (S,7), (S,2), (S,9), (T,S), (T,5), (T,7), (T,2), (T,9), (5,S), (5,T), (5,7), (5,2), (5,9), (7,S), (7,T), (7,5), (7,2), (7,9), (2,S), (2,T), (2,5), (2,7), (2,9), (9,S), (9,2), (9,7), (9,5), (9,T), (9,S)\}$	2m															

		<p>(9,T), (9,5), (9,7). (9, 2)}</p> <p>Jika salah ≤ 2..... tolak 1m Salah > 2 0 markah</p>	
	(b)	<p>{(T,S), (T,5), (T,7), (T,2), (T,9), (5,S), (5,T), (5,7), (5,2), (5,9), (7,S), (7,T), (7,5), (7,2), (7, 9), (2,S), (2,T), (2,5), (2,7). (2, 9)}</p> <p>$20/30 = 2/3$</p> <p>@ $3/6 + 1/6 = 2/3$</p>	<p>1m</p> <p>1m</p>
9	(a)	<p>Encik Anuar menggunakan pendekatan konsep SMART Kerana pilih mana-mana jawapan berikut.</p> <p>Specific[Khusus] Matlamat Encik Anuar adalah untuk bercuti di Melaka. Dalam Hal ini, matlamat Encik Anuar bukan sekadar ingin pergi bercuti tetapi beliau menetapkan lokasi yang specific(khusus)</p> <p>Measurable[Boleh diukur] Matlamat Khusus Encik Anuar boleh dihitung kerana beliau mengetahui jumlah wang yang akan diperlukan untuk bercuti. Dalam hal ini, matlamat Encik Anuar bukan sekadar memerlukan wang tetapi beliau mengetahui jumlah wang yang diperlukan untuk bercuti.</p> <p>Atatrainable[Boleh dicapai] Matlamat kewangan Encik Anuar boleh dicapai dengan menyimpan RM200 sebulan daripada jumlah pendapatan bulanan beliau RM5 000.</p> <p>Realistic[Bersifat realistic] Matlamat kewangan Encik Anuar ingin bercuti di Melaka dalam 5 bulan adalah realistik. Beliau menyimpan RM200 sebulan untuk mencapai tujuan tersebut.</p> <p>Time-bound[Tempoh masa] Matlamat kewangan Encik Anuar mempunyai tempoh masa iaitu 5 bulan.</p>	<p>1m</p> <p>1m</p>
	(b)	<p>(i) $X = RM\ 5\ 000 - RM\ 1\ 500 - RM\ 8\ 00 - RM\ 1\ 000 - RM\ 250 - RM\ 400 - RM\ 800 - RM\ 200$ $= RM\ 50$ Aliran Tunai positif.</p>	<p>1m</p> <p>1m</p>
		<p>(ii) Encik Anuar dapat mencapai matlamat kewangan untuk pergi bercuti dengan wang simpanan RM1000.</p> <p>Beliau juga mempunyai lebihan RM50 untuk menghadapi situasi kecemasan.</p>	<p>1m</p> <p>1m</p>

10	(a)	$\cos x = -\cos 58^\circ$ $\theta = 58^\circ$ $x = 180^\circ + 58^\circ \dots\dots\dots$ $x = 238^\circ \dots\dots\dots$	1 m 1 m
	(b)	(i) $y = \cos x$	1 m
			Bentuk graf betul 5 titik ditanda betul 2 m
11	(a)	(i) $A(3,6) \rightarrow A'(-1,3)$	1 m
		(ii) Kongruen.	1 m
		Kedua-dua segi tiga mempunyai luas yang sama dan semua sisi sepadan adalah sama (sifat kongruen segi tiga SSS)	1 m
	(b)	(i) U ialah pantulan pada paksi $y = 6$	2 m
		(ii) V ialah pembesaran dengan faktor skala $\frac{1}{2}$, pada pusat $E(1,5)$	3 m
12	(a)	(i) $28 - 3x = 22$ $x = 2$	1 m 1 m
		(ii) $n = 0$ $m = (-3 \times 0) - (-5 \times 2) = 10$	1 m 1 m
	(b)	(i) $12x + 9y = 2415$ $x + y = 210$	1 m 1 m
		(ii) $\begin{pmatrix} 12 & 9 \\ 1 & 1 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 2415 \\ 210 \end{pmatrix}$ $\frac{1}{12(1) - 9(1)} \begin{pmatrix} 1 & -9 \\ -1 & 12 \end{pmatrix} \begin{pmatrix} 2415 \\ 210 \end{pmatrix}$ $x = 175, y = 35$	1 m 1 m 1 m, 1 m
13	(a)	(i) $x + y \leq 50$	P1

	<p style="text-align: center;">$y \geq 2x$</p> <p>(ii)</p>  <ul style="list-style-type: none"> • Skala paksi-x dan paksi-y yang seragam. • Garis lurus dan padat $x + y = 50$ dan $y = 2x$ yang betul. • Kawasan lorekkan yang betul. <p><u>Nota:</u> 1) Lorekkan kurang daripada 80% → N0</p>	<p style="text-align: center;">P1</p>
(b)	<p>(i) Bilangan minimum = 10 Bilangan maksimum = 45</p>	<p style="text-align: center;">N1 N1</p>
	<p>(ii) Tidak, kerana $x = 25$ dan $y = 25$ berada di luar rantau berlorek</p> <p><u>Nota:</u> 1) Tidak // $x = 25$ berada di luar rantau berlorek sahaja → N0</p>	<p style="text-align: center;">N1</p>



15	(a) 94 – 42	1m
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		52		1m																															
(b)	(i)	<table border="1"> <thead> <tr> <th>Elaun (RM) <i>Allowance (RM)</i></th> <th>Kekerapan <i>Frequency</i></th> <th>Kekerapan longgokan <i>Cumulative frequency</i></th> <th>Sempadan atas <i>Upper boundary</i></th> </tr> </thead> <tbody> <tr> <td>1 – 10</td> <td>0</td> <td>0</td> <td>10.5</td> </tr> <tr> <td>11 – 20</td> <td>5</td> <td>5</td> <td>20.5</td> </tr> <tr> <td>21 – 30</td> <td>7</td> <td>12</td> <td>30.5</td> </tr> <tr> <td>31 – 40</td> <td>18</td> <td>30</td> <td>40.5</td> </tr> <tr> <td>41 – 50</td> <td>27</td> <td>57</td> <td>50.5</td> </tr> <tr> <td>51 - 60</td> <td>18</td> <td>75</td> <td>60.5</td> </tr> <tr> <td>61 – 70</td> <td>5</td> <td>80</td> <td>70.5</td> </tr> </tbody> </table>	Elaun (RM) <i>Allowance (RM)</i>	Kekerapan <i>Frequency</i>	Kekerapan longgokan <i>Cumulative frequency</i>	Sempadan atas <i>Upper boundary</i>	1 – 10	0	0	10.5	11 – 20	5	5	20.5	21 – 30	7	12	30.5	31 – 40	18	30	40.5	41 – 50	27	57	50.5	51 - 60	18	75	60.5	61 – 70	5	80	70.5	1m 1m 1m
Elaun (RM) <i>Allowance (RM)</i>	Kekerapan <i>Frequency</i>	Kekerapan longgokan <i>Cumulative frequency</i>	Sempadan atas <i>Upper boundary</i>																																
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41 – 50	27	57	50.5																																
51 - 60	18	75	60.5																																
61 – 70	5	80	70.5																																
	(ii)		1m 2m 1m																																

16	(a)	(i)	$2x + 3y = 150$	2 m
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		$3x + y = 130$	
	(ii)	<p>Jarak (km) <i>Distance</i></p>	2 m
(b)	(i)	$\frac{4}{7}$	1 m
	(ii)	<p>Sisihan Piawai Lelaki = $\sqrt{\frac{21415}{25} - 28.6^2} \sqrt{\frac{21415}{25} - 28.6^2}$ = 6.216</p> <p>Sisihan Piawai Perempuan = $\sqrt{\frac{29240}{25} - 33.6^2} \sqrt{\frac{29240}{25} - 33.6^2}$ = 6.375</p> <p>Larian kategori lelaki lebih konsisten kerana sisihan piawai lelaki lebih kecil dari sisihan piawai perempuan.</p>	1m 1m 1m
(c)		<p>Jarak terpendek = 1450 m = 1.45 km</p>	3 m
(d)		Pakej A	

		Keuntungan : $\frac{6}{100} \times 6000 \times 2 = RM720$ $\frac{6}{100} \times 6000 \times 2 = RM720$	1m
		Pakej B	
		Keuntungan: $MV - RM6000$ $= 6000 \left(1 + \frac{0.06}{3}\right)^{2 \times 3} \left(1 + \frac{0.06}{3}\right)^{2 \times 3} - RM6000$ $= RM 6756.97 - RM 6000$ $= RM 756.97$	1m
		Pakej B	1m
		Mendapat keuntungan yang lebih dari pakej A iaitu RM 36.97	1m
17(a)	(i)(a)	Tempoh laju seragam = $10 - 5$ $= 5$ saat	1 m
	(b)	Kadar perubahan laju = $\frac{\text{Perubahan laju}}{\text{Perubahan masa}}$ $= \frac{(16-8)ms^{-1}}{(18-10)s}$ $= 1 ms^{-2}$	1 m 1 m
	(ii)	$t = \frac{kc}{p}$ $30 = \frac{k(50)}{5}$ $k = \frac{30}{10}$ $k = 10$ $t = \frac{10c}{p}$	1 m 1 m
(b)	(i)	{Ah Seng, Syafik, Kamal}	N1

	(ii)			K2
		{Laila, Ali, Raju, Syahirah}	P1	
17	(c)	$\frac{1}{2} \times (1.5 + 2) \times t = 2.1$ $t = 1.2 \text{ m}$	1 1	
	(d)	(i) RM 500	P1	
		(ii) $4500 + (4500) \left(\frac{6}{100}\right) \left(\frac{6}{12}\right) // \text{ setara}$ $= \text{RM } 4\,635$	K1 N1	
		(iii) RM 772.50	P1	

Selamat mengulangkaji dari telegram@soalanpercubaanspm
Tamat