

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

PERKAITAN DAN ALGEBRA RELATIONSHIP AND ALGEBRA

- 1 Jarak / *Distance*
 $= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
- 2 Titik Tengah / *midpoint*
 $(x, y) = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$
- 3 Laju Purata = $\frac{\text{Jumlah jarak}}{\text{Jumlah masa}}$
 $\text{Average speed} = \frac{\text{Total distance}}{\text{Total time}}$
- 4 $m = \frac{y_2 - y_1}{x_2 - x_1}$
- 5 $A^{-1} = \frac{1}{ad - bc} \begin{pmatrix} d & -b \\ -c & a \end{pmatrix}$
- 6 $m = -\frac{\text{pintasan-y}}{\text{pintasan-x}}$
 $m = -\frac{\text{y-intercept}}{\text{x-intercept}}$

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 a polygon*
 $= (n - 2) \times 180^\circ$
- 3 Lilitan bulatan = $\pi d = 2\pi r$
Circumference of circle = $\pi d = 2\pi r$
- 4 Luas bulatan = πr^2
Area of circle = πr^2
- 5 $\frac{\text{Panjang lengkok}}{2\pi r} = \frac{\theta}{360^\circ}$
 $\frac{\text{Arc length}}{2\pi r} = \frac{\theta}{360^\circ}$
- 6 $\frac{\text{Luas sektor}}{\pi r^2} = \frac{\theta}{360^\circ}$
 $\frac{\text{Area of sector}}{\pi r^2} = \frac{\theta}{360^\circ}$
- 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 parallel sides $\times$ height
- 9 Luas permukaan silinder = $2\pi r^2 + 2\pi rh$
Surface area of cylinder = $2\pi r^2 + 2\pi rh$
- 10 Luas permukaan kon = $\pi r^2 + \pi rs$
Surface area of cone = $\pi r^2 + \pi rs$
- 11 Luas permukaan sfera = $4\pi r^2$
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 = $\pi r^2 h$
Volume of cylinder = $\pi r^2 h$

- 14 Isi padu kon = $\frac{1}{3}\pi r^2 h$
Volume of cone = $\frac{1}{3}\pi r^2 h$
- 15 Isi padu sfera = $\frac{4}{3}\pi r^3$
Volume of sphere = $\frac{4}{3}\pi r^3$
- 16 Isi padu piramid = $\frac{1}{3} \times \text{luas tapak} \times \text{tinggi}$
Volume of pyramid = $\frac{1}{3} \times \text{base area} \times \text{height}$
- 17 Faktor skala, $k \square \frac{PA'}{PA}$
Scale factor, $k \square \frac{PA'}{PA}$
- 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, $\sigma^2 = \frac{\sum x^2}{N} - \bar{x}^2 = \frac{\sum (x - \bar{x})^2}{N}$
- 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 $P(A) \square \frac{n(A)}{n(S)}$
- 8 $P(A') \square 1 - P(A)$

Jawab **semua** soalan

*Answer **all** questions*

- 1** Antara yang berikut, perpuluhan yang manakah disusun dalam tertib menaik?

Which of the following decimals are arranged in ascending order?

- A** 4.009, 0.4, 0.04
- B** 0.04, 0.4, 4.009
- C** 4.009, 0.04, 0.4
- D** 0.4, 0.04, 4.009

- 2** Diberi $\sqrt{p} = 7$, cari nilai p .

Given that $\sqrt{p} = 7$, find the value of p .

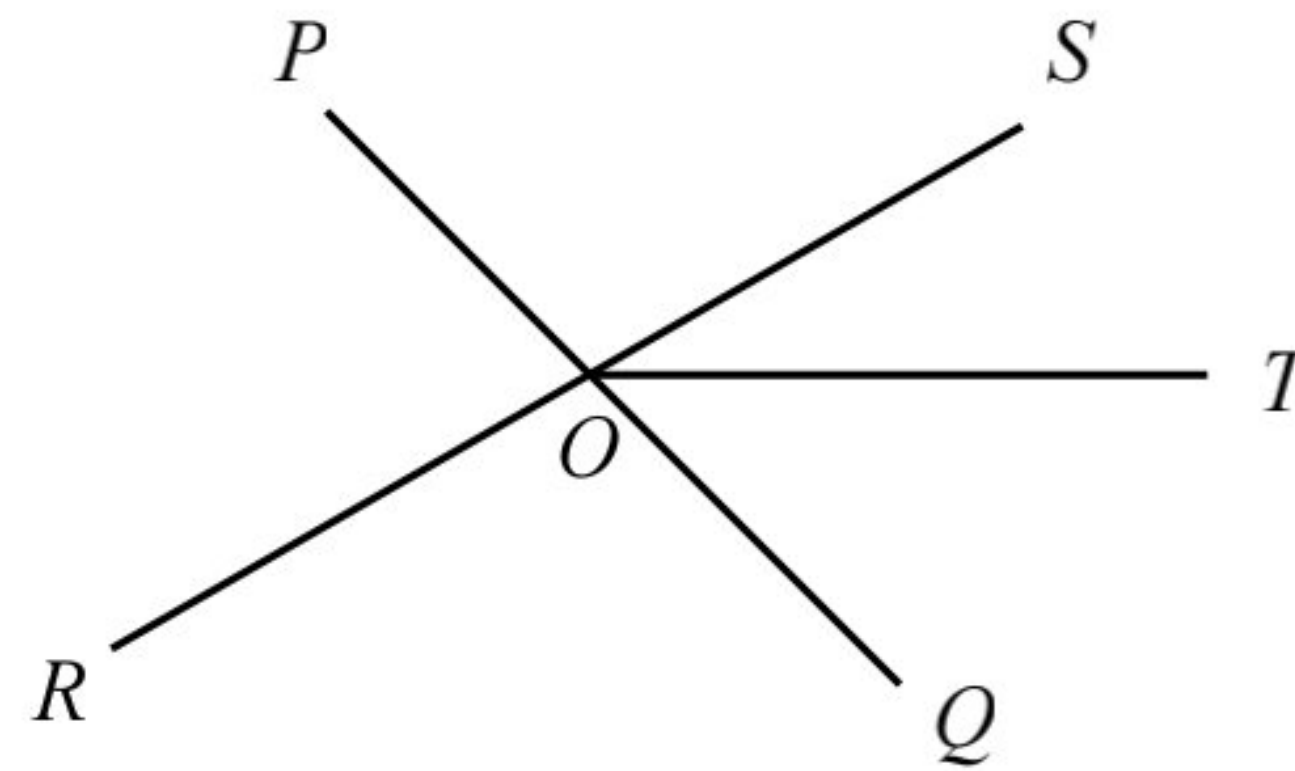
- A** 14
- B** 28
- C** 49
- D** 138

- 3** Zainal memandu lorinya dengan kelajuan 72 km/j. Tukarkan 72 km/j kepada m/s.

Zainal drives his lorry at a speed of 72 km/h. convert 72 km/h to m/s.

- A** 1200 m/s
- B** 120 m/s
- C** 20 m/s
- D** 2 m/s

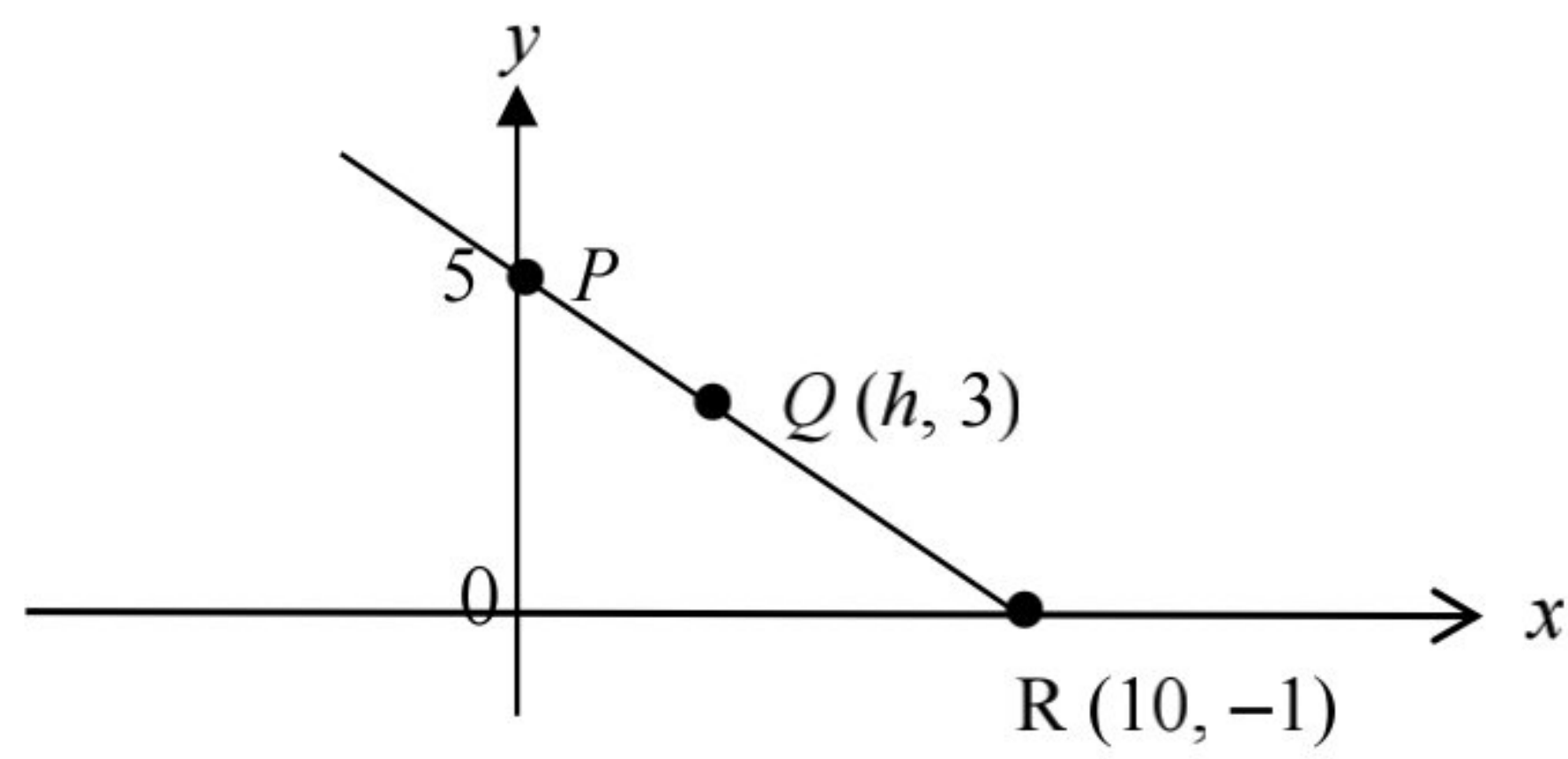
- 4 Dalam rajah di bawah, POQ dan ROS ialah garis lurus.
In the diagram below, POQ and ROS are straight lines.



Antara yang berikut, sudut yang manakah sama dengan $\angle POR$?
Which of the following angles is equal to $\angle POR$?

- A $\angle SOQ$
 - B $\angle ROQ$
 - C $\angle POS$
 - D $\angle QOT$
- 5 Sebuah kilang membungkus 5100 kg gula ke dalam paket kecil. Setiap paket kecil diisi dengan 3 g gula.
 Kira bilangan paket kecil yang dihasilkan.
A factory packs 5100 kg of sugar into small packets. Each small packet is filled with 3 g of sugar.
Calculate the number of small packets produced.
- A 1.53×10^4
 - B 1.53×10^7
 - C 1.7×10^3
 - D 1.7×10^6

- 6 Rajah 1 menunjukkan satu garis lurus PQR pada satah Cartes.
Diagram 1 shows a straight line PQR on a Cartesian plane.



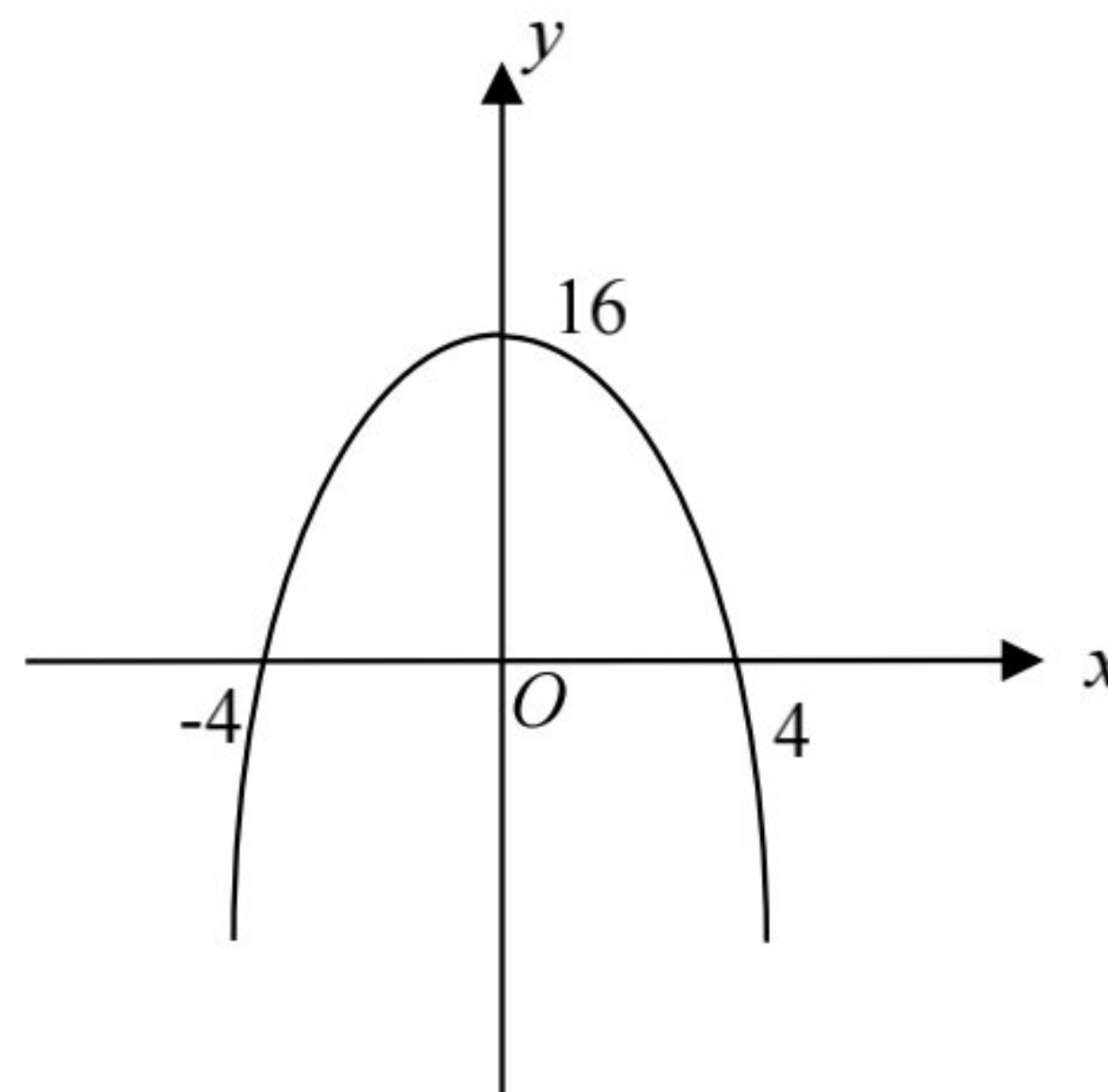
Rajah 1 / *Diagram 1*

Cari nilai h .

Find the value of h .

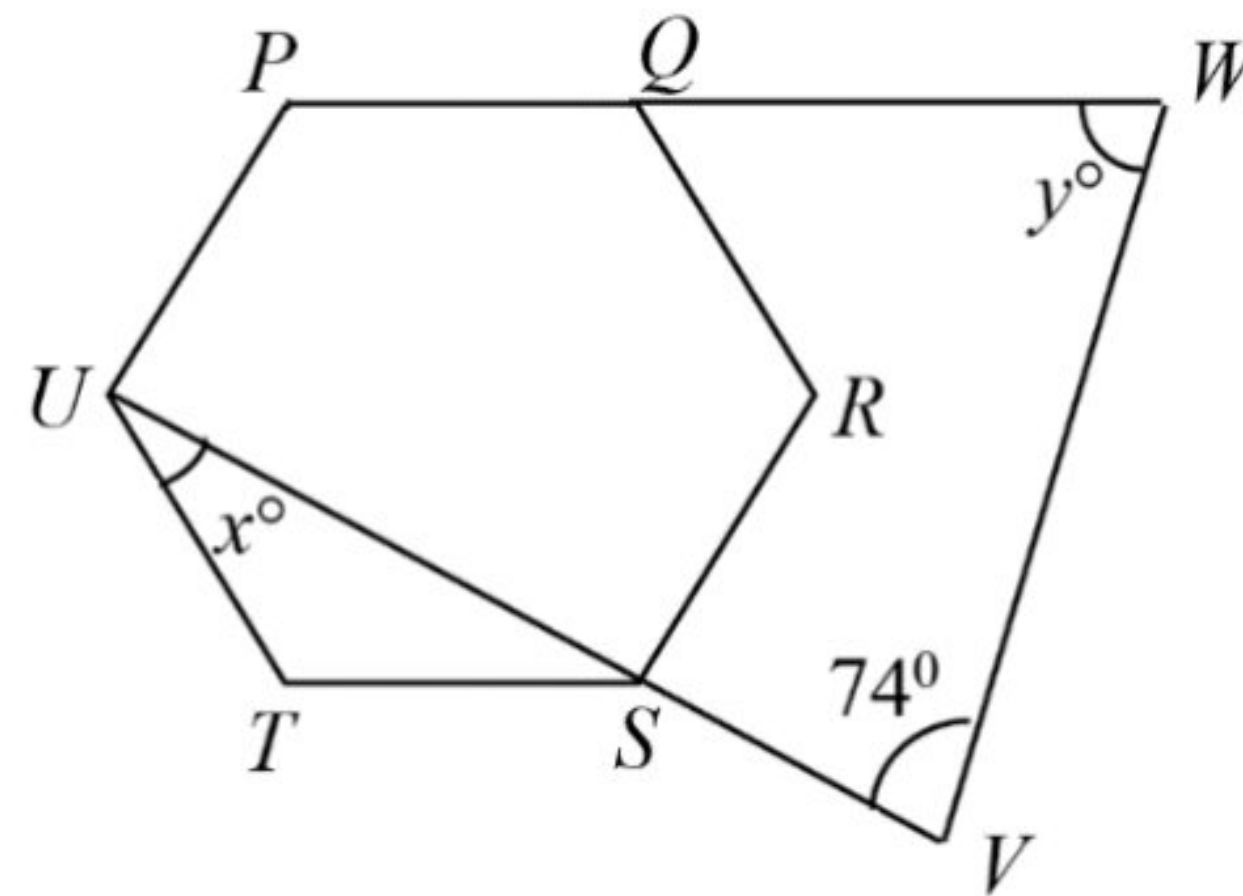
- A $\frac{5}{3}$
- B $\frac{10}{3}$
- C $\frac{2}{5}$
- D $\frac{6}{5}$

- 7 Graf di bawah mewakili
The graph below represents



- A $y = -x^2 + 16$
- B $y = x^2 + 16$
- C $y = (x + 4)^2$
- D $y = 16 - (x + 4)^2$

- 8 Dalam rajah 2, $PQRSTU$ ialah heksagon sekata. USV dan PQW adalah garis lurus.
In the diagram 2, $PQRSTU$ is a regular hexagon. USV and PQW are straight lines.



Rajah 2 / Diagram 2

- Nilai $x + y =$
The value of $x + y =$
A 106°
B 126°
C 134°
D 136°

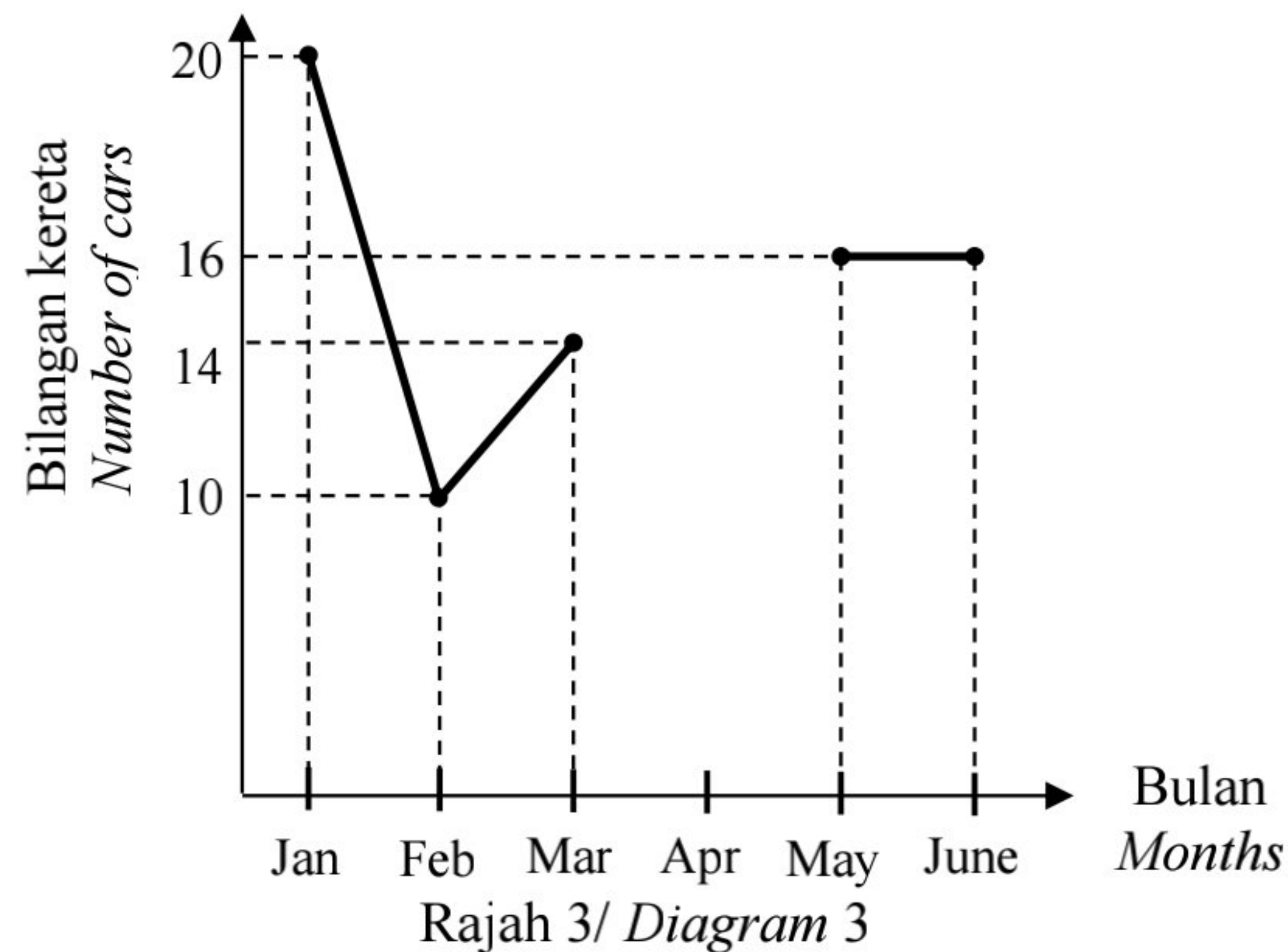
- 9 Sebuah balang mengandungi 240 gula-gula berperisa oren, laici dan kopi. Terdapat 90 gula-gula berperisa oren. Jika sebiji gula-gula dipilih secara rawak daripada balang, kebarangkalian untuk mendapat sebiji gula-gula berperisa laici ialah $\frac{1}{3}$. Berapakah jumlah gula-gula berperisa kopi yang ada?

A jar contains 240 sweets of orange, lychee and coffee flavour. There are 90 orange flavoured sweets. If a sweet is picked at random from the jar, the probability of picking a lychee flavoured sweet is $\frac{1}{3}$. How many coffee flavoured sweets are there?

- A** 10
B 50
C 70
D 80

- 10 Rajah 3 menunjukkan graf garis tidak lengkap yang mewakili bilangan kereta dijual dalam enam bulan pertama tahun itu. Keuntungan yang diperolehi pada bulan Mac ialah RM7000.00

Diagram 3 shows an incomplete line graph representing the number of car sold in the first six months of the year. The profit gained in March is RM7000.00.

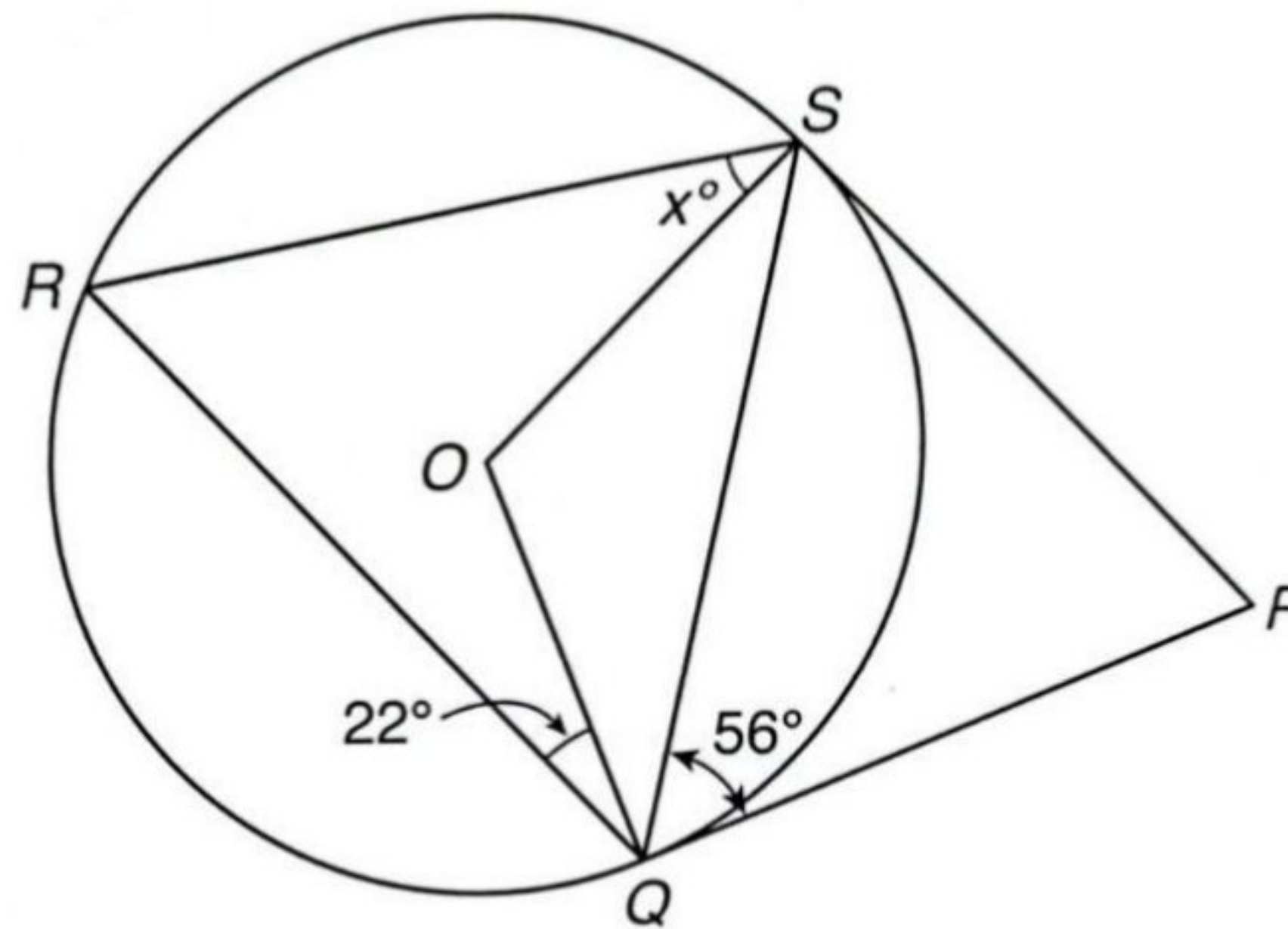


Jika jumlah keuntungan untuk enam bulan pertama ialah RM45500.00, cari bilangan kereta yang dijual pada bulan April.

If the total profit for the first six months is RM45500.00, find the number of car sold in April.

- A 14
- B 15
- C 16
- D 17

- 11** Dalam Rajah 4, PQ dan PS ialah tangen kepada bulatan dengan pusat O masing-masing di Q dan S .
In Diagram 4, PQ and PS are tangents to the circle with centre O at Q and S respectively.



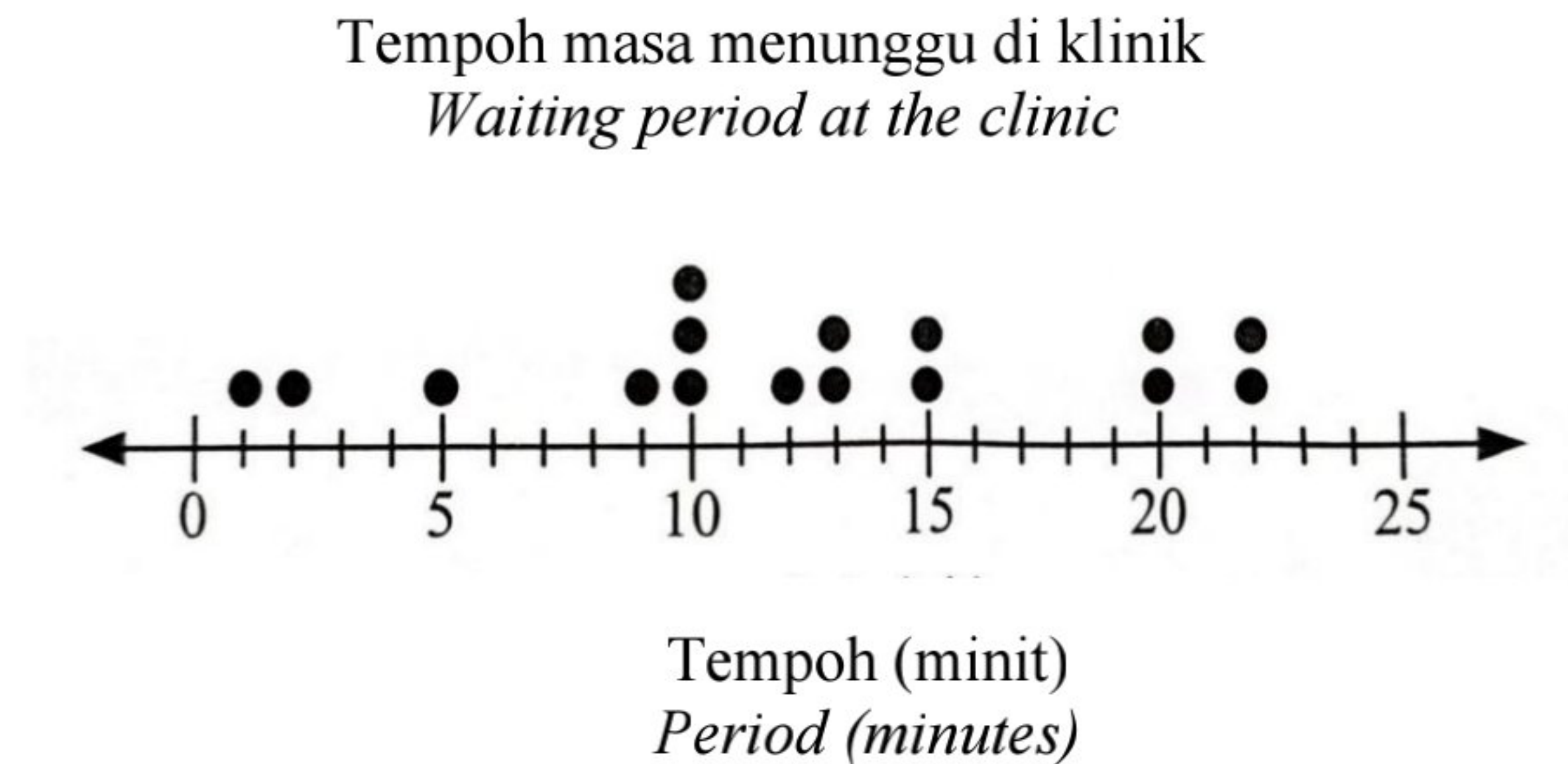
Rajah 4/ *Diagram 4*

Cari nilai x .

Find the value of x .

- A** 34
- B** 56
- C** 112
- D** 326

- 12 Rajah 5 ialah plot titik yang menunjukkan satu tinjauan tempoh masa menunggu (kepada minit yang terdekat) bagi sekumpulan pelanggan di sebuah klinik.
Diagram 5 is a dot plot that shows the waiting time period (to the nearest minute) for a group of customers at a clinic.



Rajah 5/ *Diagram 5*

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

- A Bilangan pelanggan klinik tersebut ialah 15 orang.
The number of the customers of the clinic is 15.
 - B Tempoh menunggu paling lama ialah 25 minit.
The longest waiting period is 25 minutes.
 - C Tempoh menunggu bagi 25% pelanggan ialah 10 minit.
The waiting period for 25% of the customers is 10 minutes.
 - D Bilangan pelanggan yang menunggu sekurang-kurangnya 15 minit ialah 6 orang.
The number of the customers waiting for at least 15 minutes is 6.
- 13 Nyatakan nilai digit 3 bagi nombor 4320_5 , dalam asas sepuluh.
State the value of digit 3 in the number 4320_5 , in base ten.
- A 9
 - B 15
 - C 75
 - D 300

- 14** Encik Shaiful bekerja sebagai juruteknik dan menerima gaji bulanan sebanyak RM 3200. Dia mempunyai sebuah rumah yang disewakan kepada orang lain dan bayaran sewa yang diterima ialah RM560 sebulan. Dia menyimpan 10% daripada pendapatan bulanan sebagai simpanan tetap bulanan. Berapakah simpanan tetap bulanan yang disimpan oleh Encik Shaiful?

Encik Shaiful works as a technician and he receives a monthly salary of RM 3200. He has a house which rented to other people and the rental payment received is RM560 per month. He keeps 10% of his monthly income as a monthly fixed savings. How much is the monthly fixed savings saved by Encik Shaiful?

- A** RM 264
- B** RM 320
- C** RM 560
- D** RM 376

- 15** Jadual di bawah menunjukkan kadar premium tahunan bagi setiap RM 1000 nilai muka suatu insurans hayat.

The table below shows the rate of annual premium for each RM 1000 of face value of a life insurance.

Umur Age	Perempuan / Female		Lelaki / male	
	Bukan perokok Non - smoker	Perokok Smoker	Bukan perokok Non - smoker	Perokok Smoker
30	RM 2.00	RM 2.68	RM 2.12	RM 2.79
31	RM 2.03	RM 2.71	RM 2.18	RM 2.80

Hitung premium tahunan bagi insurans hayat dengan nilai muka berjumlah RM 280 000 oleh Encik Khalid, berumur 30 tahun yang tidak merokok.

Calculate the annual premium of life insurance with a face value of RM 280 000 by Mr. Khalid, who is 30 years old and does not smoke.

- A** RM 212.00
- B** RM 280.00
- C** RM 563.90
- D** RM 593.60

- 16** Encik Karim membeli polisi insurans perubatan dengan deduktibel sebanyak RM500 dan penyertaan ko-insurans 75/25 dalam polisinya. Hitung jumlah kos perubatan jika kos perubatan yang ditanggung sendiri oleh Encik Karim ialah RM 6550.

Encik Karim buys a medical insurance policy with a deductible provision of RM 500 and a co-insurance percentage participation of 75/25 in his policy. Calculate the total medical cost if the medical cost borne by Encik Karim himself is RM 6550.

- A RM 17 220
- B RM 17 720
- C RM 24 700
- D RM 26 700

- 17** Ramli memperoleh pendapatan tahunan sebanyak RM 180 000 termasuk elaun. Diberi bahawa elaun berjumlah RM 13 200 adalah dikecualikan cukai. Pada masa yang sama, dia memberi derma kepada rumah anak-anak yatim sebanyak RM 3 000. Jumlah pelepasan cukainya pula ialah sebanyak RM 24 300. Hitung pendapatan bercukai Ramli.

Ramli earned an annual income of RM 180 000 including allowances. Given that allowances amounting to RM 13 200 are tax exempt. At the same time, he donated to the orphanage of RM 3 000. His total tax relief was RM 24 300. Calculate Ramli's chargeable income.

- A RM 139 500
- B RM 152 700
- C RM 163 800
- D RM 166 800

- 18** Jadual manakah yang mewakili hubungan $y \propto x$?
Which table represents the relation of $y \propto x$?

A

x	1	2	3	4
y	24	12	8	6

B

x	1	2	3	4
y	6	12	18	24

C

x	1	2	3	4
y	92	54	24	6

D

x	1	2	3	4
y	6	24	54	92

- 19 Diberi bahawa $y = \frac{1}{8x}$ di mana y berubah secara songsang dengan x . Antara pernyataan berikut, yang manakah tidak benar?
Given that $y = \frac{1}{8x}$ as y varies inversely as x . Which of the following statements is not true?
- A Nilai pemalar ialah 8.
The value of the constant is 8.
- B Nilai pemalar ialah $\frac{1}{8}$.
The value of the constant is $\frac{1}{8}$.
- C Nilai y bertambah apabila x berkurang.
The value of y increase when x decreases.
- D Nilai x bertambah apabila y berkurang.
The value of x increases when y decreases.
- 20 Diberi matriks $M = \begin{bmatrix} 5 & -2 & 3 \\ 3 & -6 & 4 \end{bmatrix}$. Hitung nilai $m_{21} - m_{22} + m_{13}$.
Given matrix $M = \begin{bmatrix} 5 & -2 & 3 \\ 3 & -6 & 4 \end{bmatrix}$. Calculate the value of $m_{21} - m_{22} + m_{13}$.
- A 7
 B 6
 C 9
 D 12
21. Izham membeli 3 keping sandwic dan 4 biji muffin dengan harga RM18. Sarah membeli 5 keping sandwic dan 2 biji muffin dengan harga RM16. Diberi harga sekeping sandwic ialah RM x dan harga sebiji muffin ialah RM y . Antara persamaan linear serentak dalam bentuk matriks berikut, yang manakah mewakili maklumat itu?
Izham buys 3 sandwiches and 4 muffins with the price of RM18. Sarah buys 5 sandwiches and 2 muffins with the price of RM16. Given the price of a sandwich is RM x and the price of a muffin is RM y . Which of the following simultaneous linear equations in matrix form represents the information?
- A $\begin{bmatrix} 3 & 4 \\ 5 & 2 \end{bmatrix} \begin{bmatrix} 18 \\ 16 \end{bmatrix} = \begin{bmatrix} x \\ y \end{bmatrix}$
- B $\begin{bmatrix} 2 & 4 \\ 5 & 3 \end{bmatrix} \begin{bmatrix} 16 \\ 18 \end{bmatrix} = \begin{bmatrix} x \\ y \end{bmatrix}$
- C $\begin{bmatrix} 3 & 4 \\ 5 & 2 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 16 \\ 18 \end{bmatrix}$
- D $\begin{bmatrix} 3 & 4 \\ 5 & 2 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 18 \\ 16 \end{bmatrix}$

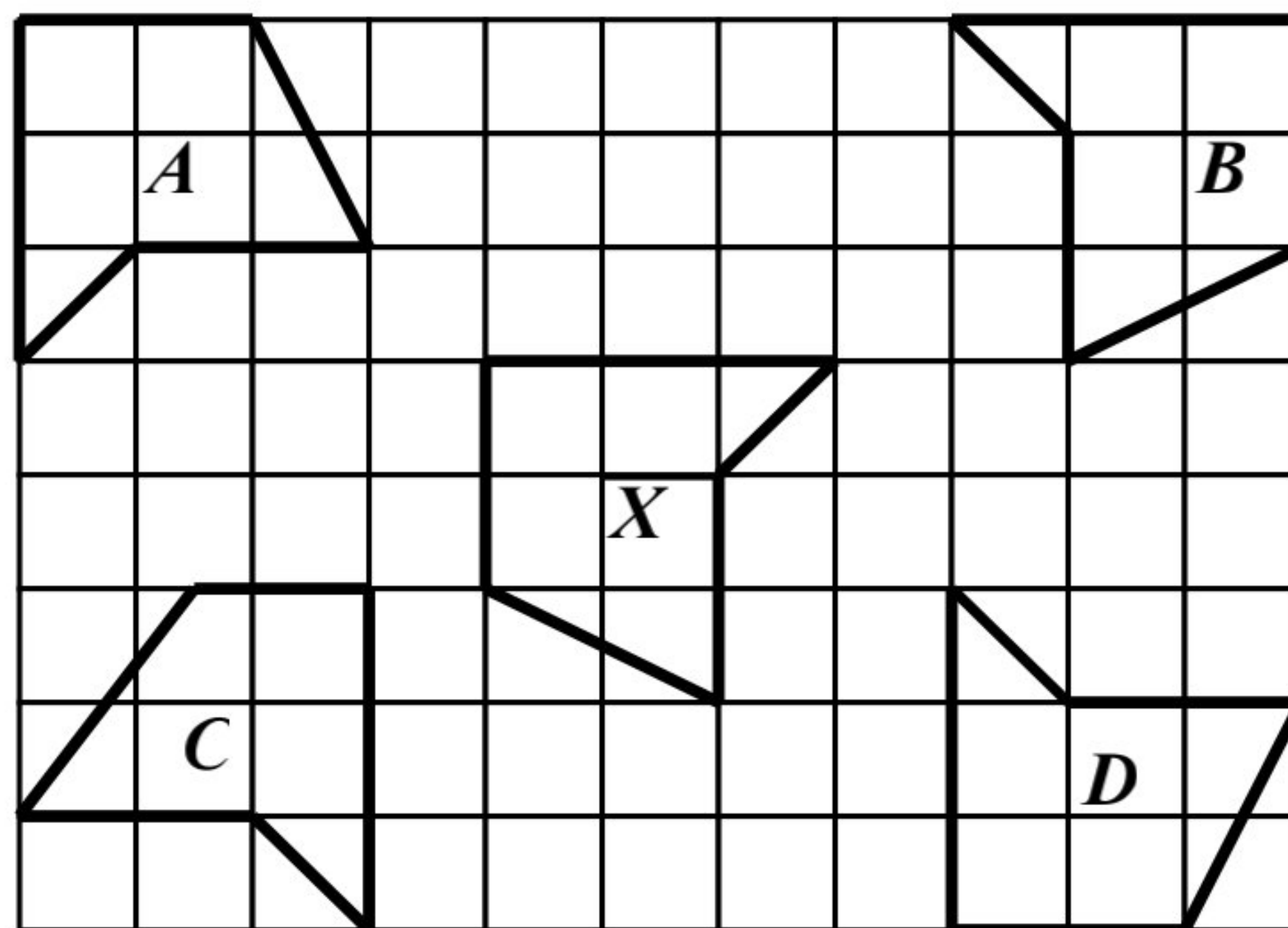
22. Harga sehelai kemeja-T ialah RM60 dan harga sehelai blaus ialah RM80. Ammar ingin menggunakan RM500 untuk membeli x helai kemeja-T dan y helai blaus dengan baki wang selebih-lebihnya RM50. Bilangan kemeja-T yang dibelinya adalah melebihi bilangan blaus. Dia membeli sekurang-kurangnya 3 helai blaus. Sistem ketaksamaan linear manakah yang mewakili situasi itu?

The price of a T-shirt is RM60 and the price of a blouse is RM80. Ammar wants to use RM500 to buy x T-shirts and y blouses with a balance which is at most RM50. The number of T-shirts that she buys is more than the number of blouses. She buys at least 3 blouses. Which system of linear inequalities represents the situations?

- A $x > y, y \geq 3, 60x + 80y \leq 450, 60x + 80y \leq 500$
 B $y > x, y \geq 3, 60x + 80y \leq 450, 60x + 80y \geq 500$
 C $x < y, x \geq 3, 60x + 80y \geq 450, 60x + 80y \geq 500$
 D $x > y, y \geq 3, 60x + 80y \geq 450, 60x + 80y \leq 500$

23. Rajah 6 menunjukkan lima buah pentagon. Antara pentagon A , B , C atau D yang manakah tidak kongruen dengan pentagon X ?

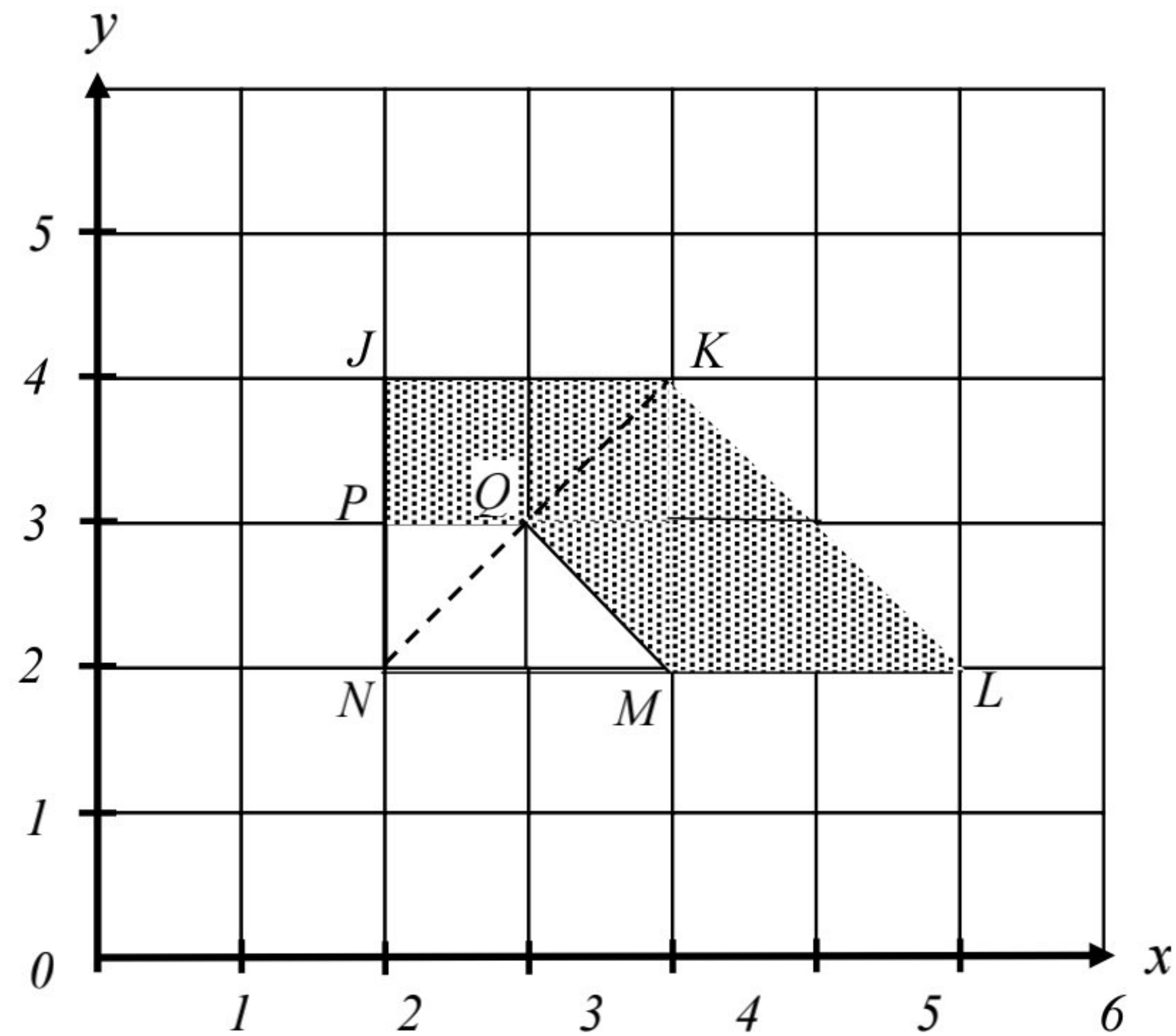
Diagram 6 shows five pentagons. Which pentagon A , B , C or D is not congruent with pentagon X ?



Rajah 6 / Diagram 6

24. Dalam rajah di bawah, trapezium $MNPQ$ ialah objek dan trapezium $JKLN$ ialah imej di bawah suatu pembesaran.

In the diagram, trapezium $MNPQ$ is the object and trapezium $JKLN$ is the image under an enlargement.

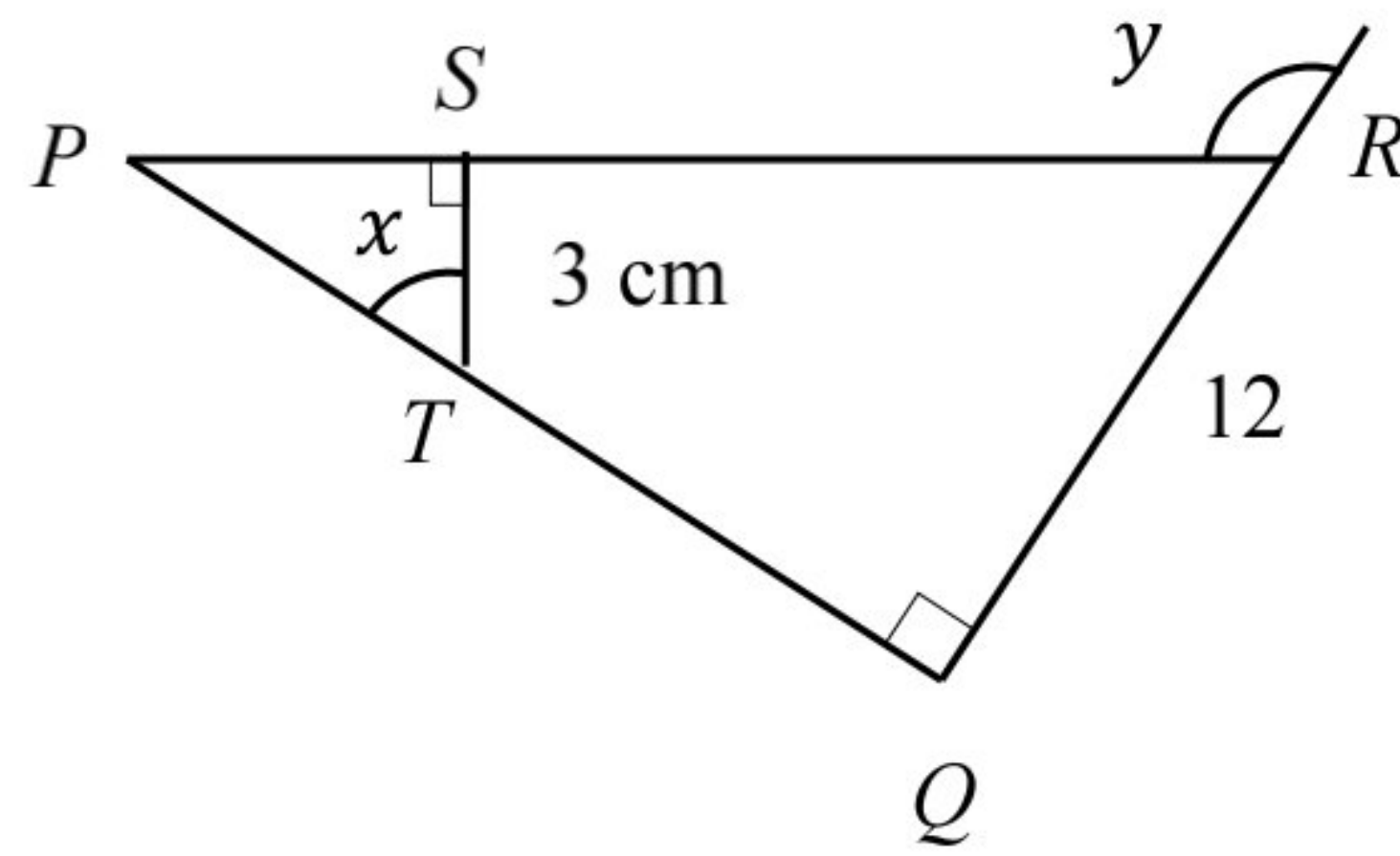


Diberi bahawa trapezium $MNPQ$ mewakili luas kawasan 60 m^2 . Hitung luas, dalam m^2 , bagi kawasan berlorek.

Given that the trapezium $MNPQ$ represent a region of area 60 m^2 . Calculate the area, in m^2 , of the shaded region.

- A 60
- B 180
- C 240
- D 300

25. Rajah di bawah menunjukkan , segitiga PQR dan PST adalah serupa.
The diagram below shows, triangles PQR and PST are similar.

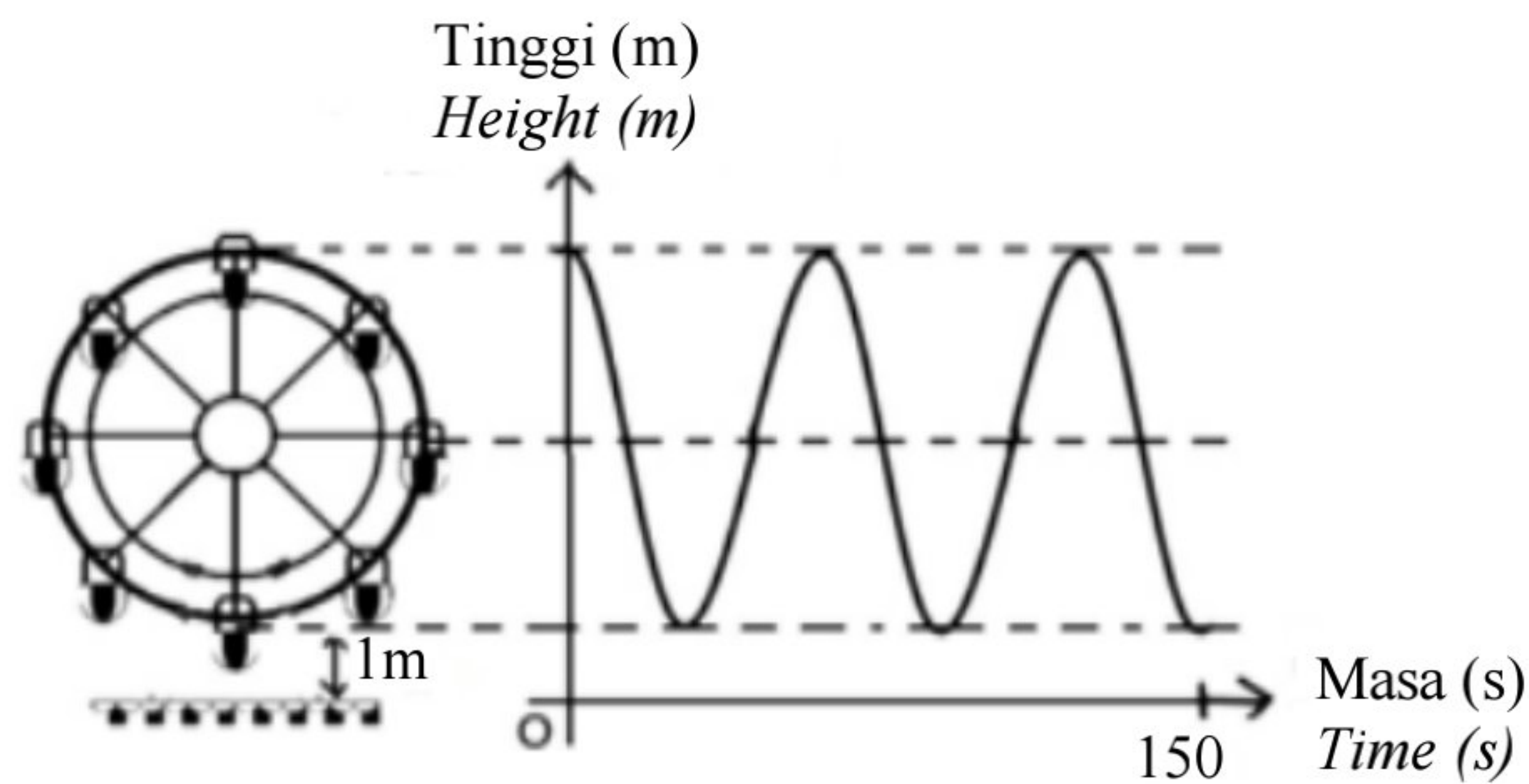


Diberi $\cos x = \frac{3}{5}$, hitung nilai $\tan y$.

Given the $\cos x = \frac{3}{5}$, calculate the value of $\tan y$.

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

26.



Rajah di atas menunjukkan sebuah roda Ferris yang berada di sebuah taman tema dengan berdiameter 16 m. Ketinggian Asyraaf daripada tanah dicatatkan ketika dia berada pada kedudukan yang paling tinggi semasa menaiki roda Ferris itu. Diberi bahawa roda Ferris itu membuat satu pusingan lengkap setiap 1 minit dan graf berikut menunjukkan ketinggian Asyraaf bagi 100 saat pertama.

The diagram above shows a Ferris wheel at a fun fair with a diameter of 16 m. The height of Asyraaf from the ground is recorded when he is at the highest position while on the Ferris wheel. It is given that the Ferris wheel makes a complete rotation every 1 minute and the following graph shows the height of Asyraaf for the first 100 seconds.

Yang manakah merupakan fungsi trigonometri untuk mewakili ketinggian Asyraaf, h pada masa, t ketika menaiki roda Ferris itu.

Which is the trigonometric function to represent Asyraaf's height, h at time, t while on the Ferris wheel.

- A $h = 8 \cos/\cos 6t + 9$
- B $h = 16 \cos/\cos 100t + 8$
- C $h = 16 \cos/\cos 50t + 8$
- D $h = 8 \sin/\sin 100t + 8$

27. Tentukan julat bagi data di bawah.
Determine the range of the data below.

4, 6, 1, 12, 10, 3, 17, 11

- A 7
 B 16
 C 13
 D 11

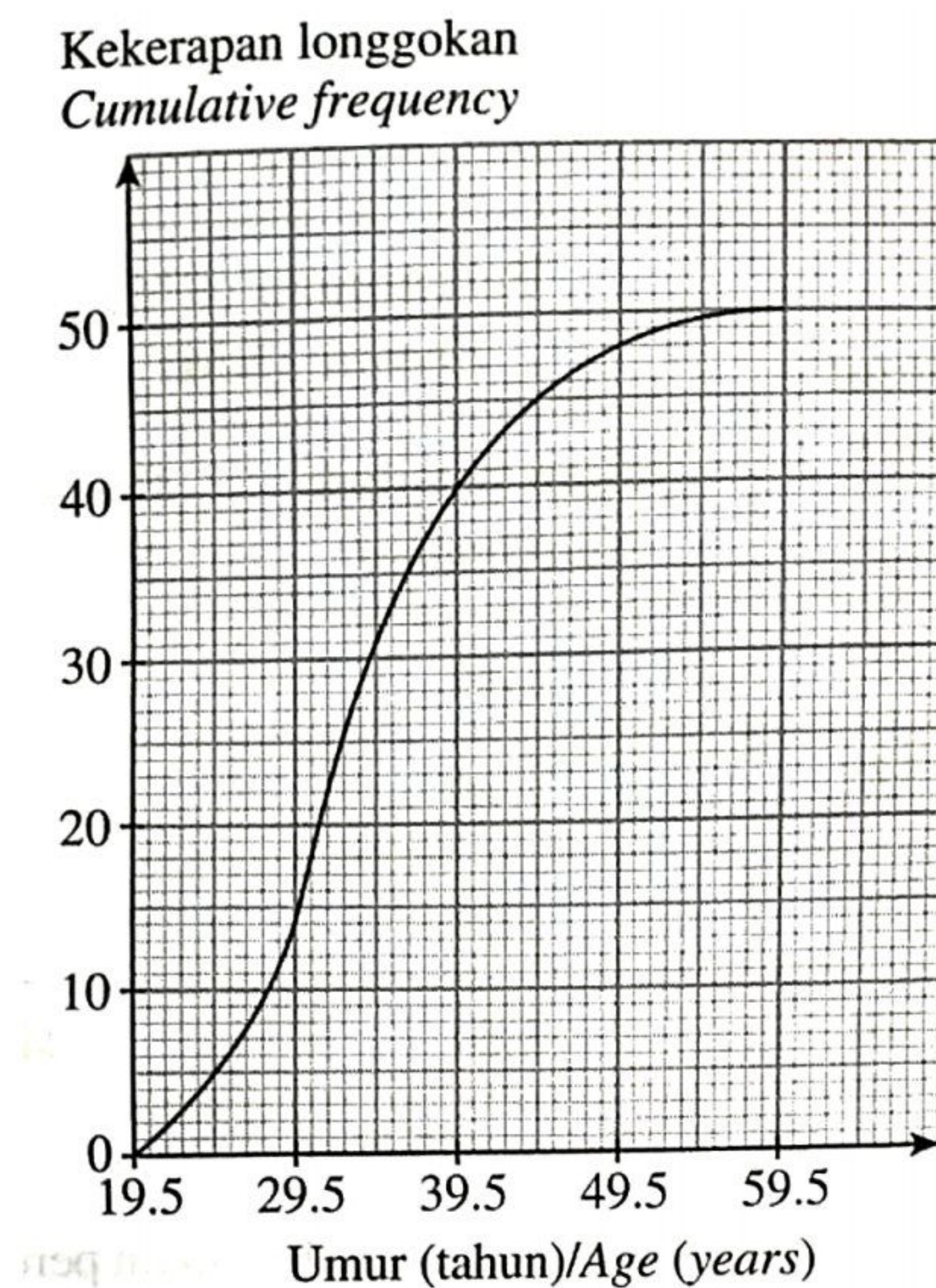
28. Data I :

$\sum x^2 = 1948, \sum x = 78$

Cari varians bagi set data { 1.75, 0.25, 3, 5.75, 8.75 }.
Find the variance of the data set { 1.75, 0.25, 3, 5.75, 8.75 }.

- A 9.14
 B 36.56
 C 146.24
 D 584.96

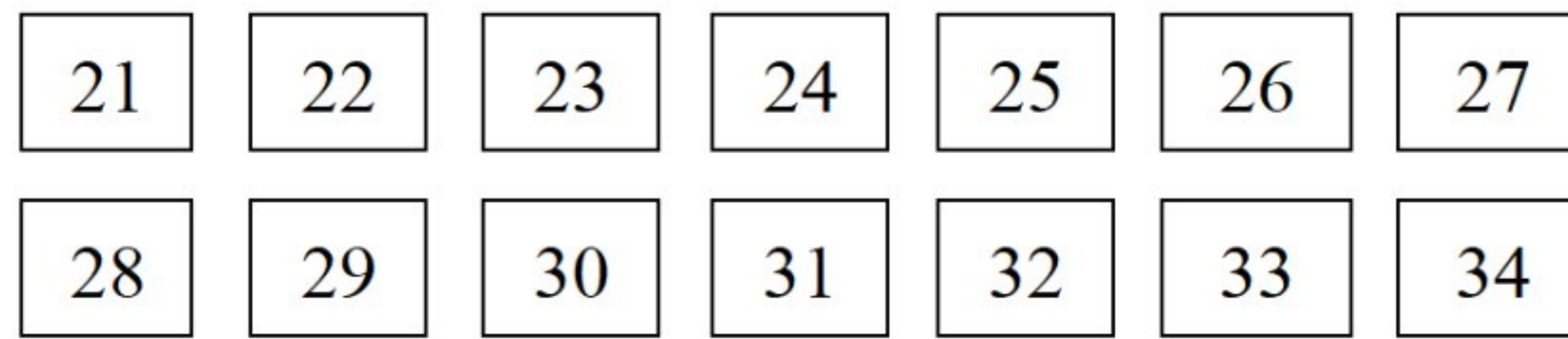
29. Rajah berikut adalah suatu ogif yang menunjukkan umur pekerja di sebuah kilang.
The following diagram is an ogive showing the ages of the workers in a factory.



Antara berikut, yang manakah benar?
Which of the following is true?

	Selang kelas <i>Class interval</i>	Kekerapan Frequency
A	20 – 29	0
B	30 – 39	16
C	40 – 49	8
D	50 - 59	50

30. Rajah menunjukkan empat belas keping kad nombor.
Diagram shows fourteen pieces of number cards.

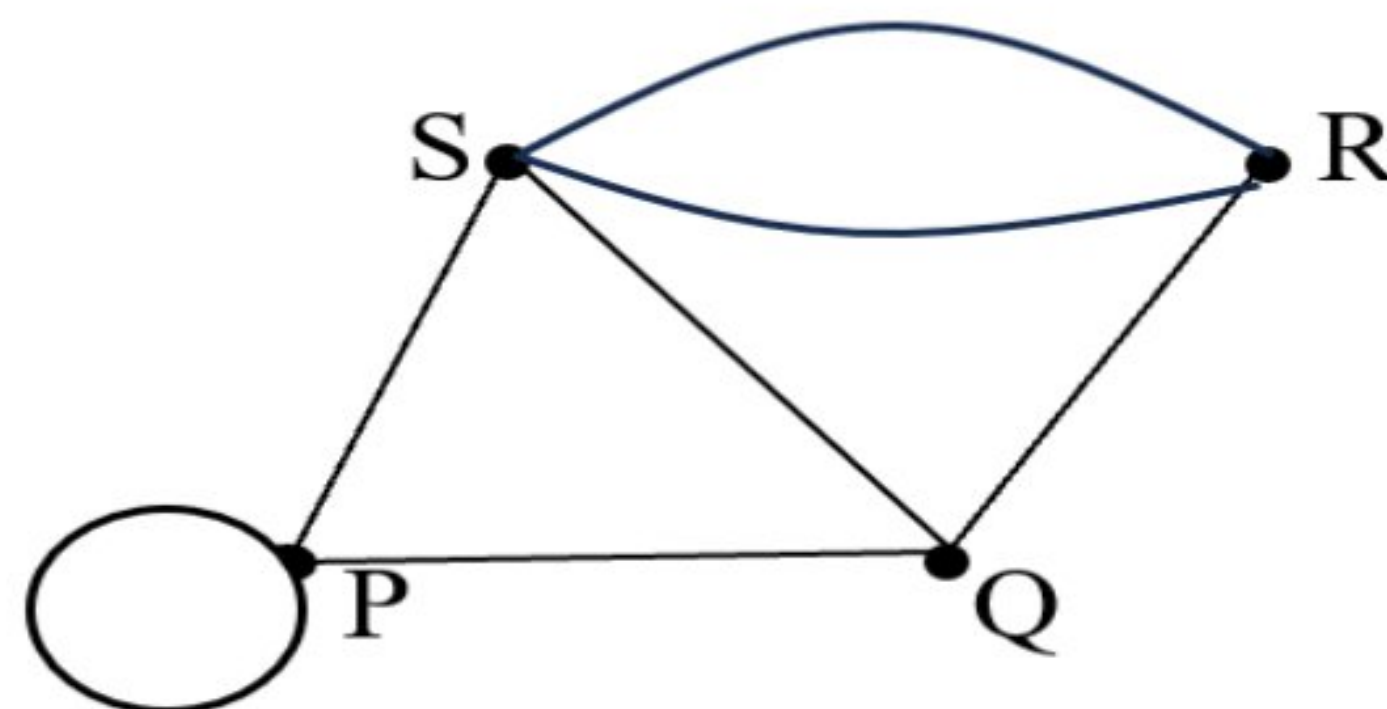


Sekeping kad dipilih secara rawak. Cari kebarangkalian bahawa kad nombor yang dipilih ialah nombor perdana.

A piece of card is chosen at random. Find the probability that the card chosen is a prime number.

- A $\frac{1}{14}$
 B $\frac{3}{14}$
 C $\frac{1}{7}$
 D $\frac{2}{7}$

31. Rajah di bawah menunjukkan graf yang mempunyai gelung dan berbilang tepi.
The diagram shows a graph with a loop and multiple edges.



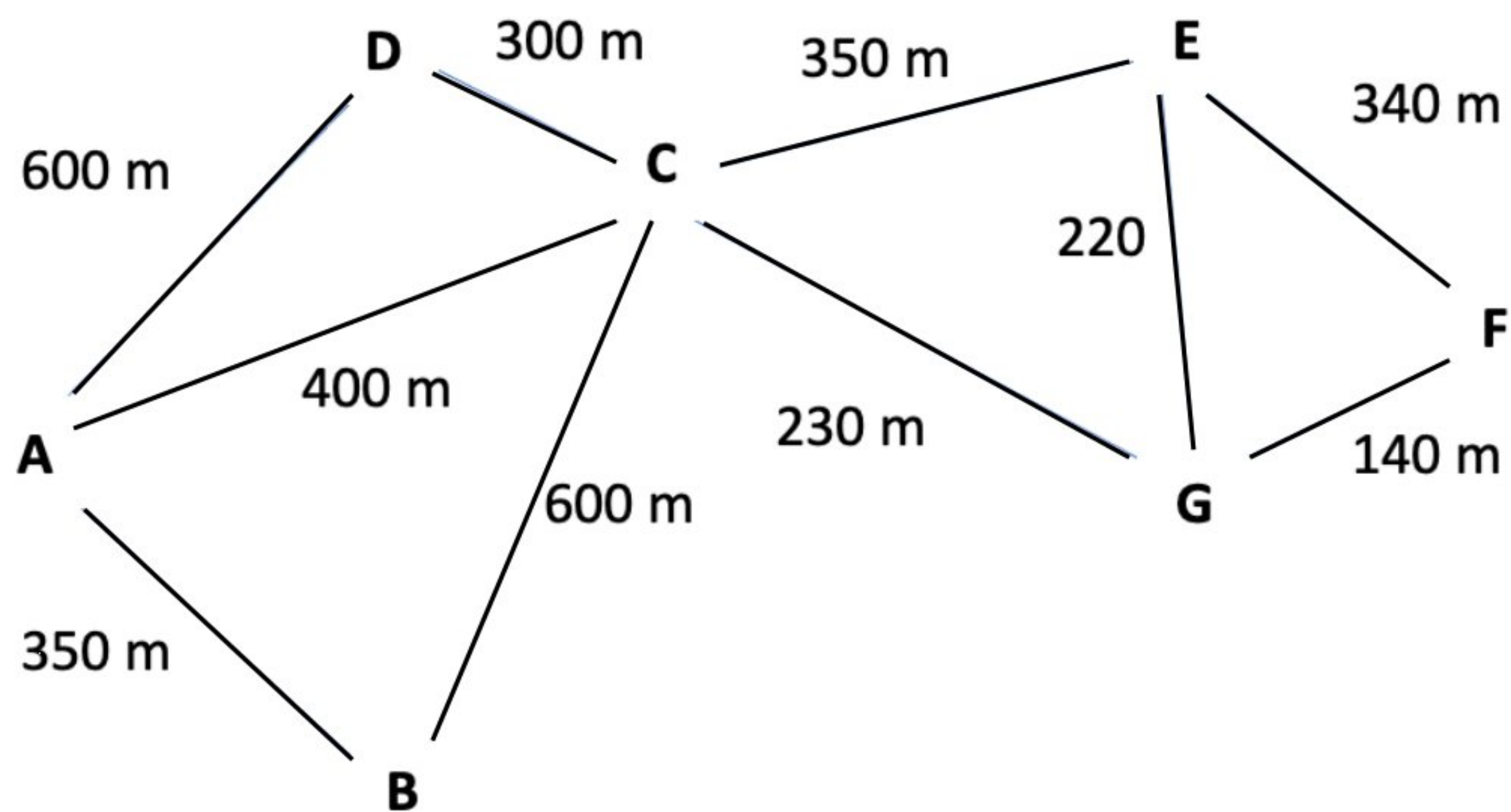
Kira jumlah darjah untuk bucu P dan R , iaitu $d(P) + d(R)$.
Calculate the total degree of vertices P and R , $d(P) + d(R)$.

- A 6
 B 7
 C 8
 D 9

32. Bagi graf $G(V, E)$, $E = \{(P, Q), (U, P), (R, Q), (T, Q), (T, R), (T, S), (R, S)\}$. Kenal pasti bucu dengan maksimum $d_{in}(v)$.
 For a graph $G(V, E)$, $E = \{(P, Q), (U, P), (R, Q), (T, Q), (T, R), (T, S), (R, S)\}$.
 Determine the vertex with the maximum $d_{in}(v)$.

- A P
- B Q
- C R
- D S

33. Rajah di bawah menunjukkan sebuah graf dan pemberat bagi jarak di antara tujuh buah rumah.
 Diagram below shows a weighted graph of distance between seven houses.



Hitung jarak terpendek untuk bergerak dari A ke F dalam m.
 Calculate the shortest distance to move from A to F in m

- A 450
- B 500
- C 770
- D 600

34. Antara yang berikut, yang manakah **bukan** pernyataan?
Which of the following is **not** a statement?

- A $x + 3x = 4x$
- B $5 + 8 = 12$
- C $5 + 8 = 13$
- D $4 + 6 - 3$

35. Pernyataan di bawah adalah songsangan bagi suatu implikasi.
The statement below is the inverse of an implication.

Jika $k + 4 \neq 9$ maka $k \neq 5$
If $k + 4 \neq 9$ then $k \neq 5$

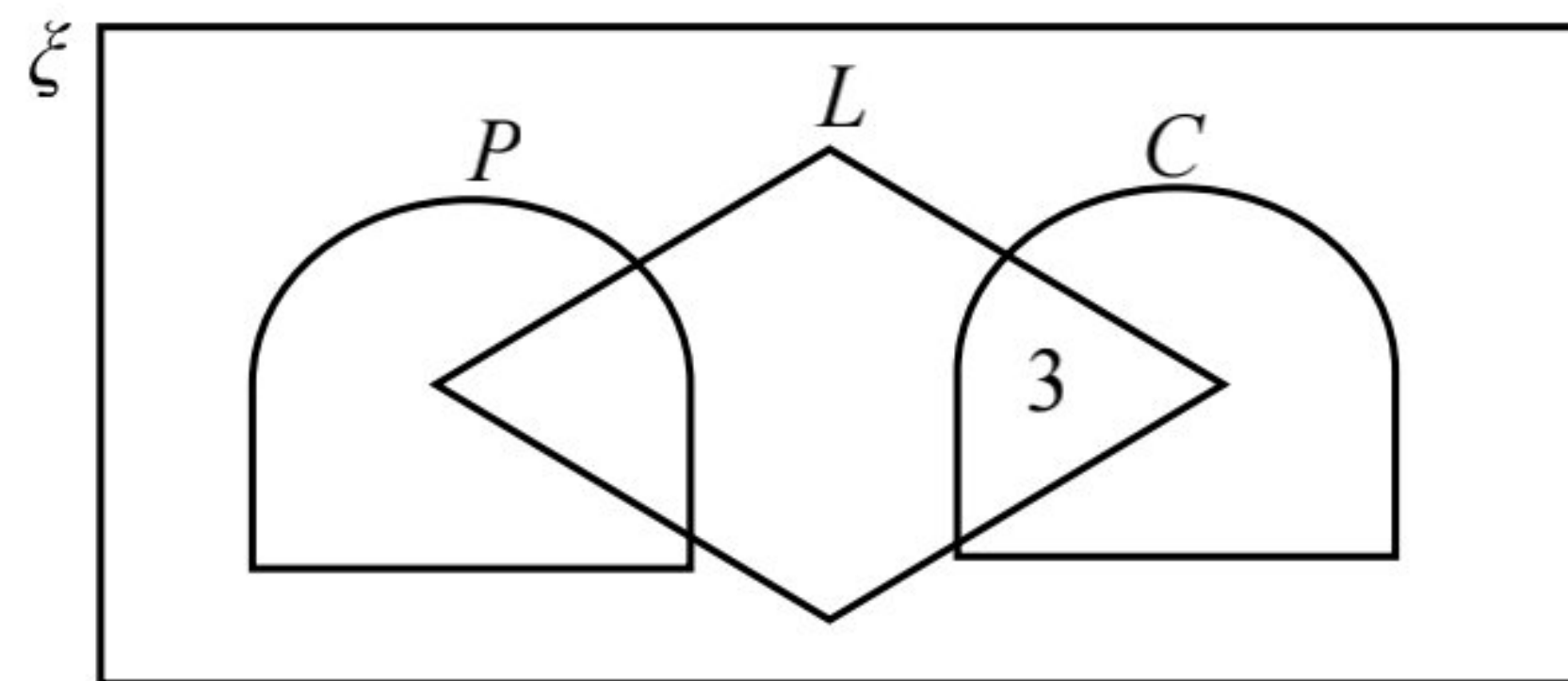
Antara berikut yang manakah adalah kontrapositif bagi implikasi tersebut?
Which of the following is the contrapositive of the implication?

- A Jika $k = 5$ maka $k + 4 = 9$
If $k = 5$ then $k + 4 = 9$
 - B Jika $k + 4 = 5$ maka $k = 9$
If $k + 4 = 5$ then $k = 9$
 - C Jika $k + 4 = 9$ maka $k = 5$
If $k + 4 = 9$ then $k = 5$
 - D Jika $k \neq 5$ maka $k + 4 \neq 9$
If $k \neq 5$ then $k + 4 \neq 9$
36. Diberi set $P = \{ P, E, N, G, U, R, U, S, A, N \}$,
set $Q = \{ P, E, N, T, A, D, B, I, R, A, N \}$ dan set $R = \{ P, E, K, E, R, J, A \}$.
Tentukan $P \cap Q \cap R$.

Given set $P = \{ P, E, N, G, U, R, U, S, A, N \}$,
set $Q = \{ P, E, N, T, A, D, B, I, R, A, N \}$ and set $R = \{ P, E, K, E, R, J, A \}$.
Determine $P \cap Q \cap R$.

- A $\{ P, E, R, A \}$
- B $\{ P, N, A, K, R \}$
- C $\{ P, E, N, A, K, R \}$
- D $\{ P, E, N, A, K, R, A \}$

37. Rajah 7 berikut ialah gambar rajah Venn dengan set semesta, ξ , set $P = \{\text{Pelajar yang menyertai acara lontar peluru}\}$, set $L = \{\text{Pelajar yang menyertai acara merejam lembing}\}$ dan $C = \{\text{Pelajar yang menyertai acara melempar cakera}\}$
The following Figure 7 is a Venn diagram with the universe set, ξ , set $P = \{\text{Students participating in the shot put event}\}$, set $L = \{\text{Students participating in the javelin throwing event}\}$ and $C = \{\text{Students participating in the discus throwing event}\}$



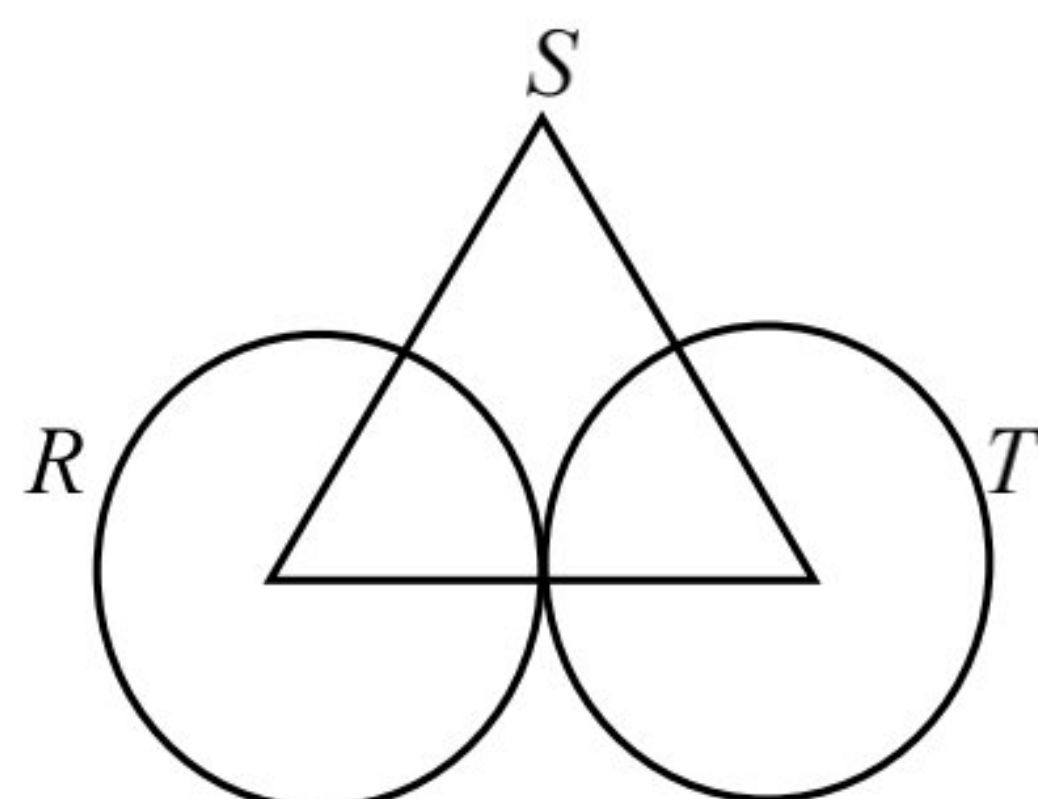
Rajah 7 / Diagram 7

Diberi $n(\xi) = 32$, $n(P) = 15$, $n(L) = 18$, $n(C) = 7$ dan $n(P \cap L) = 10$. Hitung beza antara pelajar yang tidak terlibat dengan ketiga-tiga acara dengan bilangan pelajar yang terlibat dalam acara merejam lembing?

Given $n(\xi) = 32$, $n(P) = 15$, $n(L) = 18$, $n(C) = 7$ and $n(P \cap L) = 10$. Calculate the difference between students who were not involved in the three events with the number of students involved in the javelin throwing event?

- A 13
- B 15
- C 18
- D 20

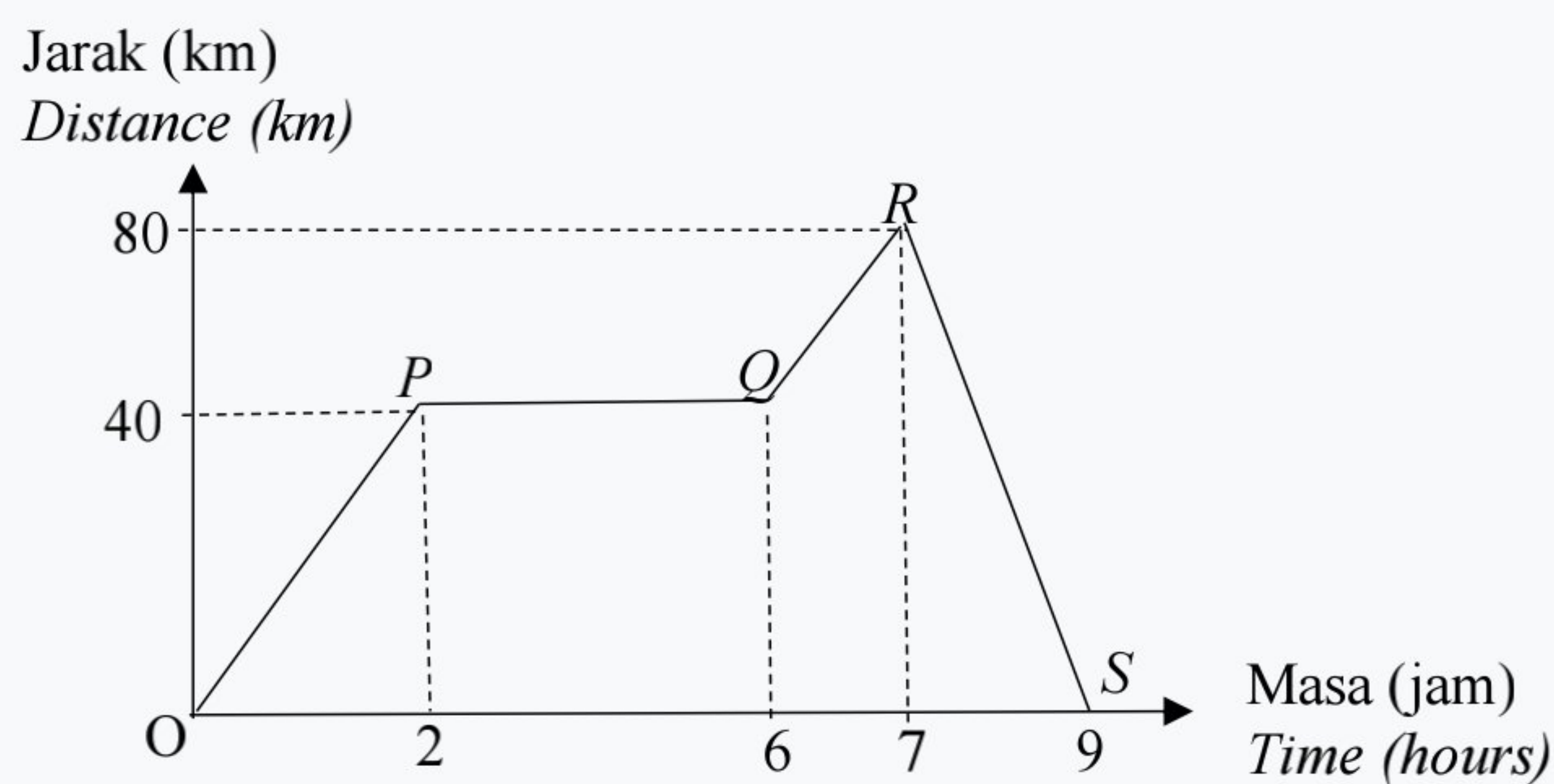
38. Rajah 8 ialah gambar rajah Venn dengan set semesta $\xi = R \cup S \cup T$.
Diagram 8 is a Venn diagram with the universal set $\xi = R \cup S \cup T$.



Rajah 8/Diagram 8

Operasi bergabung ke atas set R , set S dan set T yang manakah set kosong?
Which combined operation on the sets R , S and T is an empty set?

- A $(R \cap S) \cap T'$
 B $(R \cap S)' \cap T$
 C $(R \cup S)' \cap T'$
 D $(R \cup S)' \cap T$
39. Berdasarkan graf jarak-masa dalam rajah 9 di bawah, pada bahagian manakah tiada pergerakan objek ?
Based on the distance-time graph in diagram 9 below, in which part is there no movement of the object?



Rajah 9/Diagram 9

- A OP
 B PQ
 C QR
 D RS

40. Antara berikut, yang manakah ungkapan kuadratik dalam satu pemboleh ubah?
Which of the following is a quadratic expression in one variable?

A $x^2 + 3x^{-1} - 4$

B $2x^3 - x + 4$

C $x(x + 5)$

D $3x^2 + 5x + \frac{1}{x}$

KERTAS SOALAN TAMAT

END OF QUESTION PAPER

**RUMUS MATEMATIK
MATHEMATICAL FORMULAE**

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

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

**NOMBOR DAN OPERASI
NUMBERS 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 $a^{\frac{m}{n}} = (a^{\frac{1}{n}})^m$

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

6 Nilai matang/*Maturity value*, $MV = P \left(1 + \frac{r}{n}\right)^{nt}$

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

**PERKAITAN
RELATIONS**

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

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

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

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

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

5 $m = -\frac{\text{pintasan-y}}{\text{pintasan-x}}$

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

6 $A^{-1} = \frac{1}{ad - bc} \begin{pmatrix} d & -b \\ -c & a \end{pmatrix}$

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 $= \pi d = 2\pi r$
Circumference of circle $= \pi d = 2\pi r$
- 4 Luas bulatan $= \pi r^2$
Area of circle $= \pi r^2$
- 5 $\frac{\text{Panjang lengkok}}{2\pi r} = \frac{\theta}{360^\circ}$
 $\frac{\text{Arc length}}{2\pi r} = \frac{\theta}{360^\circ}$
- 6 $\frac{\text{Luas sektor}}{\pi r^2} = \frac{\theta}{360^\circ}$
 $\frac{\text{Area of sector}}{\pi r^2} = \frac{\theta}{360^\circ}$
- 7 Luas layang-layang $= \frac{1}{2} \times$ hasil darab panjang dua pepenjuru
Area of kite $= \frac{1}{2} \times \text{product of two diagonals}$
- 8 Luas trapezium $= \frac{1}{2} \times$ hasil tambah dua sisi selari $\times$ tinggi
Area of trapezium $= \frac{1}{2} \times \text{sum of parallel sides} \times \text{height}$
- 9 Luas permukaan silinder $= 2\pi r^2 + 2\pi rh$
Surface area of cylinder $= 2\pi r^2 + 2\pi rh$
- 10 Luas permukaan kon $= \pi r^2 + \pi rs$
Surface area of cone $= \pi r^2 + \pi rs$
- 11 Luas permukaan sfera $= 4\pi r^2$
Surface area of sphere $= 4\pi r^2$
- 12 Isipadu prisma tegak $=$ luas keratan rentas $\times$ tinggi
Volume of right prism $= \text{cross sectional area} \times \text{height}$
- 13 Isipadu silinder $= \pi r^2 h$
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 = $\frac{4}{3}\pi r^3$
- 16 Isipadu piramid tegak = $\frac{1}{3} \times \text{luas tapak} \times \text{tinggi}$
Volume of right pyramid = $\frac{1}{3} \times \text{base area} \times \text{height}$
- 17 Faktor skala, $k \square \frac{PA'}{PA}$
Scale factor, $k \square \frac{PA'}{PA}$
- 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

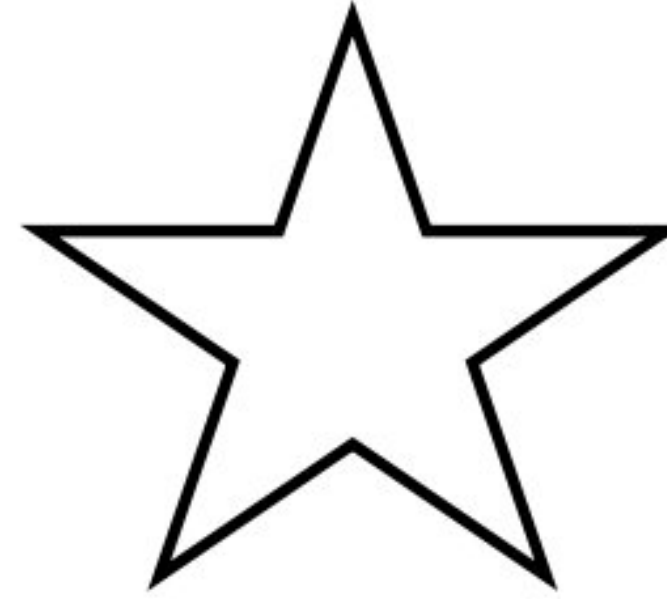
- 1 Min / Mean, $\bar{x} = \frac{\sum x}{N}$
- 2 Min / Mean, $\bar{x} = \frac{\sum fx}{f}$
- 3 Varians / Variance, $\sigma^2 = \frac{\sum (x - \bar{x})^2}{N} = \frac{\sum x^2}{N} - \bar{x}^2$
- 4 Varians / Variance, $\sigma^2 = \frac{\sum f(x - \bar{x})^2}{f} = \frac{\sum fx^2}{f} - \bar{x}^2$
- 5 Sisihan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

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.

Diagram 1 shows a polygon.Rajah 1
Diagram 1

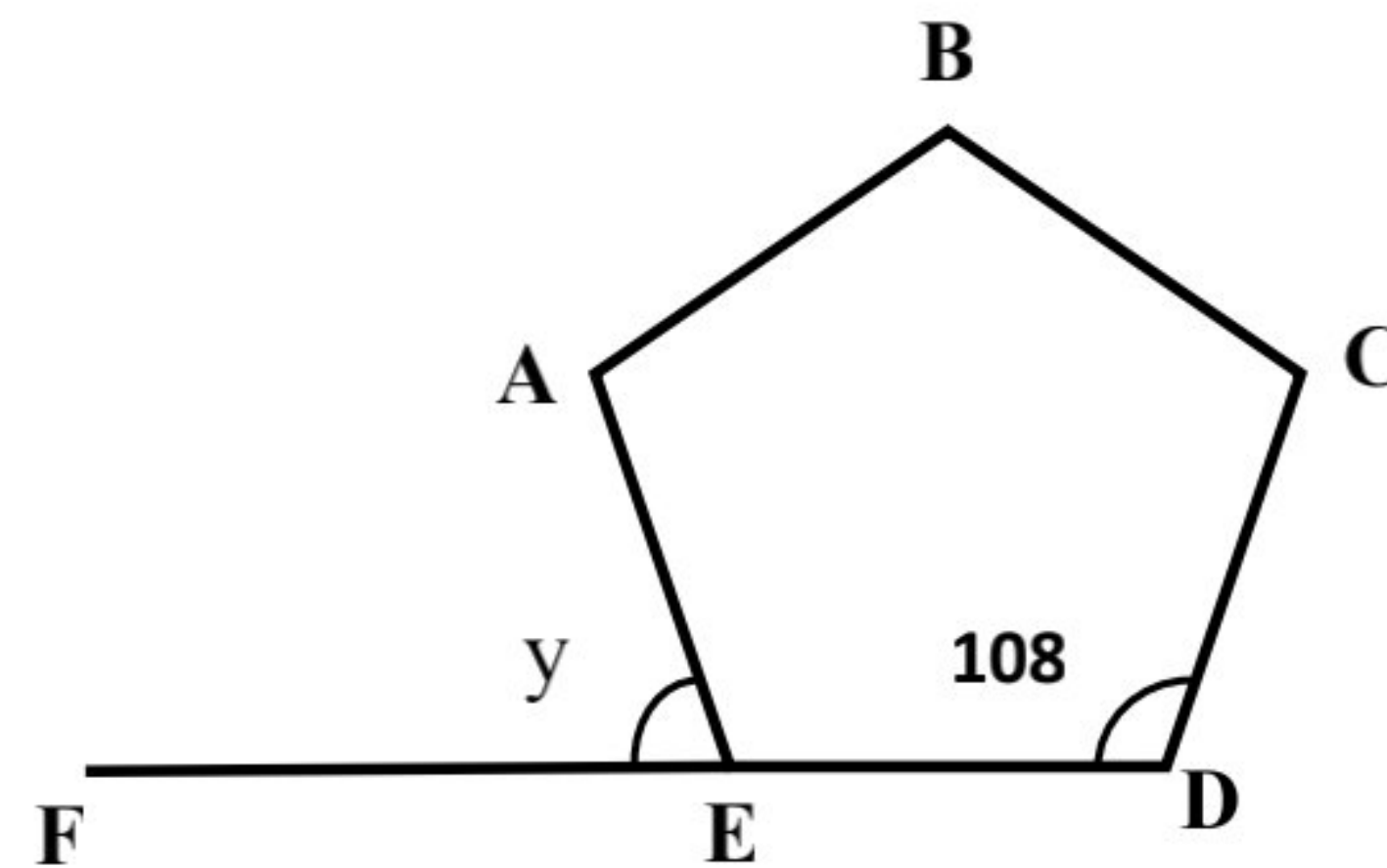
Apakah nama poligon tersebut?

[1 markah]

What is the name of the polygon?

[1 mark]

- (b) Rajah 2 menunjukkan sebuah poligon sekata. FED ialah garis lurus.

Diagram 2 shows a regular polygon. FED is a straight line.Cari nilai y .

[2 markah]

*Find the value of y .*Rajah 2
Diagram 2

[2 marks]

Jawapan/ *Answer* :

(a)

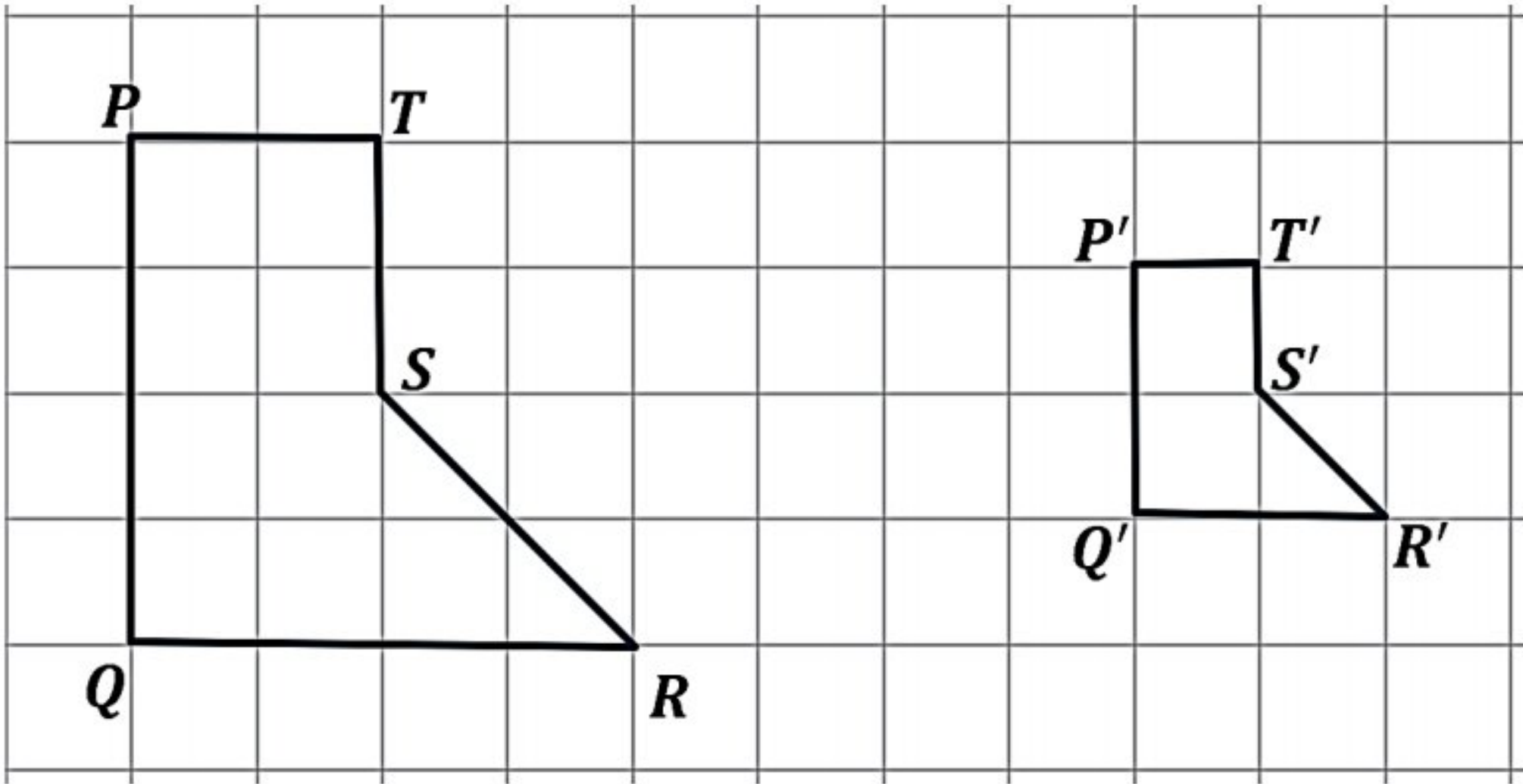
(b)

2 (a) Tentukan skala yang digunakan dalam bentuk 1: *n*.

[1 markah]

Determine the scale used in the form 1: *n*.

[1 mark]



Objek
Object

Lukisan berskala
Scale drawing

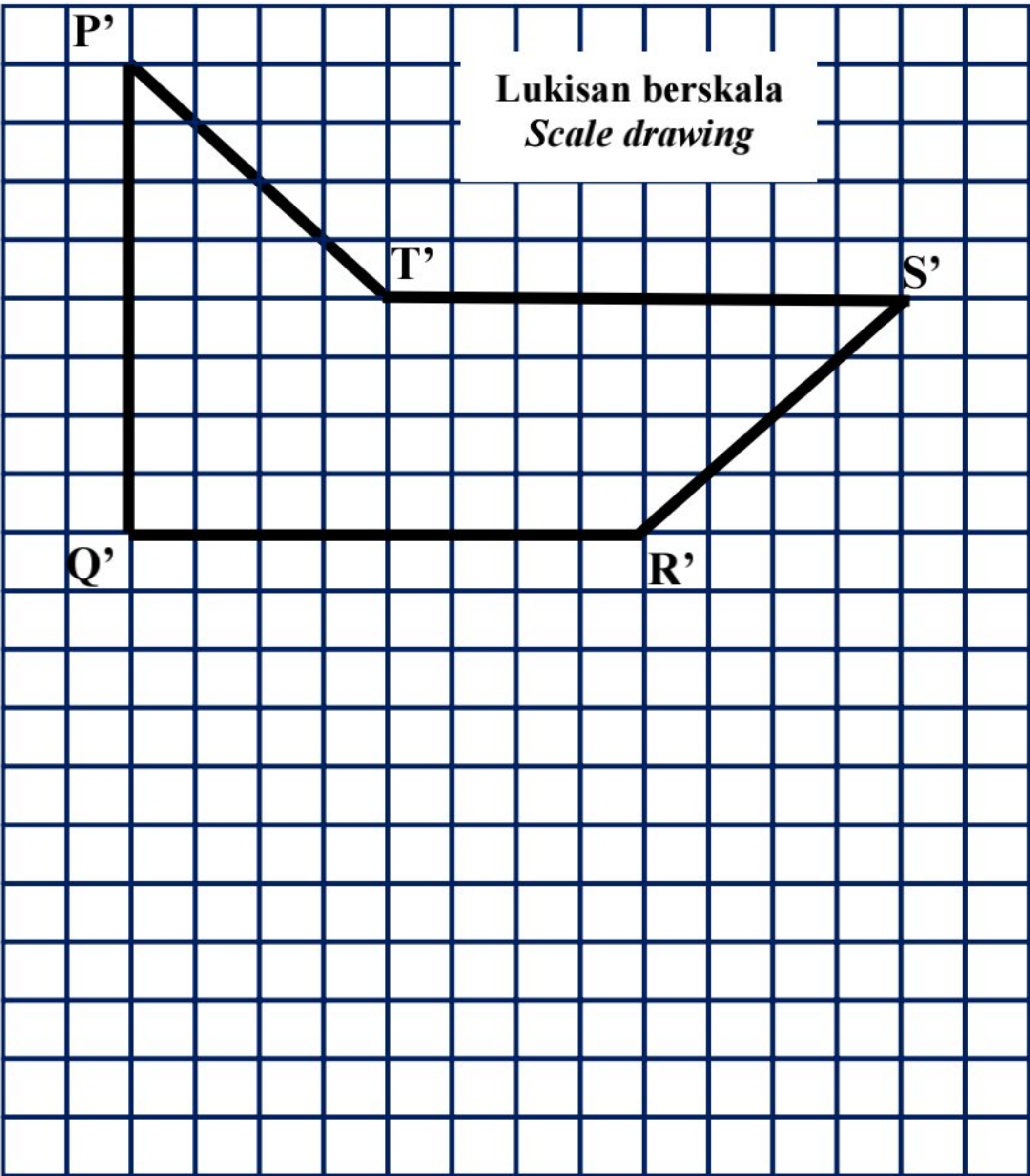
(b) Rajah 3 menunjukkan lukisan berskala bagi bentuk yang dilukis dengan skala yang diberi. Lukis objek sebenar bagi bentuk itu.

[2 markah]

Diagram 3 shows the scale drawing of shape that are drawn to the given scale. Draw the actual object for the shape.

[2 marks]

Skala/Scale = 1 : $\frac{1}{2}$

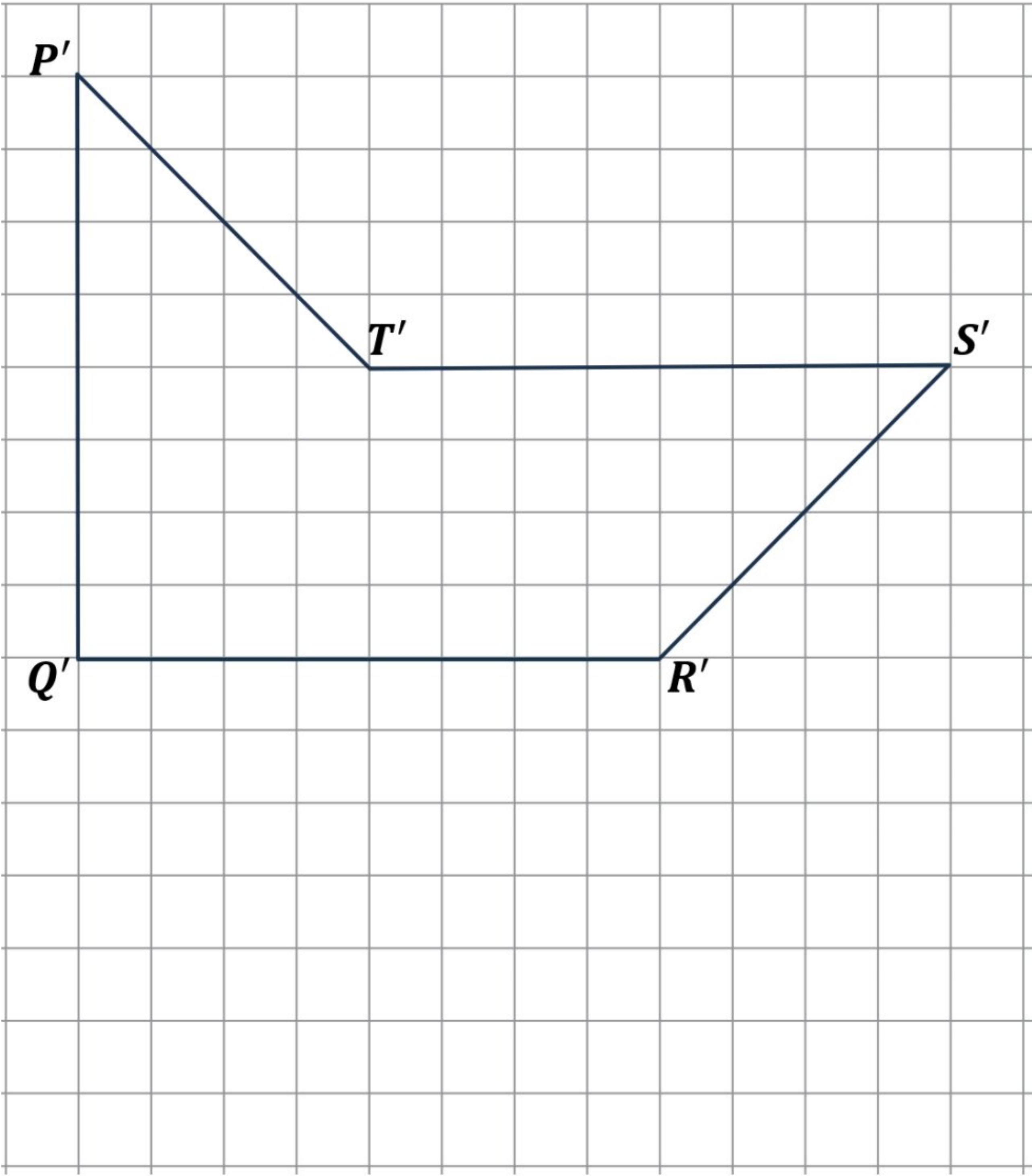


Rajah 3
Diagram 3

Jawapan/ *Answer* :

(a)

(b)



- 3 (a) Lakar graf kuadratik $f(x) = -x^2 + 6x - 18$.

[2 markah]

Sketch a quadratic graph $f(x) = -x^2 + 6x - 18$.

[2 marks]

- (b) Cari persamaan paksi simetri.

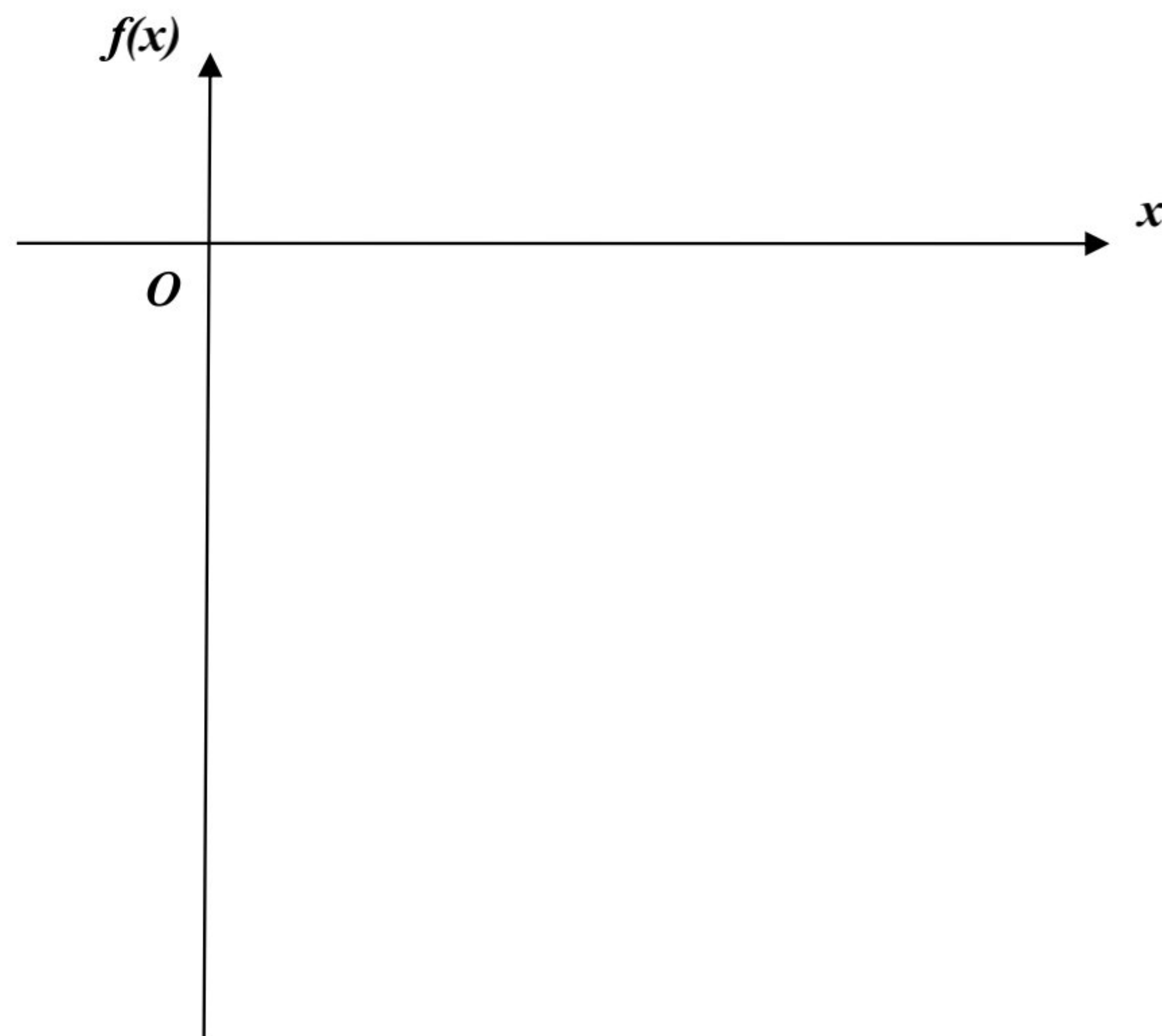
[1 markah]

Find equation of axis symmetric.

[1 mark]

Jawapan/ Answer :

(a)



(b)

- 4 Salmi dan rakan-rakannya telah makan di sebuah restoran terkemuka. Mereka telah makan 4 pinggan nasi ayam, 2 pinggan nasi goreng, 1 pinggan mi goreng, 1 set pizza dan 6 gelas minuman berlainan jenis. Restoran ini mengenakan caj perkhidmatan sebanyak 10% dan cukai 6%. Jadual 1 berikut ialah harga makanan dan minuman yang ditawarkan kepada pelanggan:

Salmi and her friends had eaten at a famous restaurant. They have eaten 4 plates of chicken rice, 2 plates of fried rice, 1 plate of fried noodles, 1 set of pizza and 6 glasses of different types of drinks. This restaurant charges a service charge of 10% and a tax of 6%. Table 1 shows the prices of food and drinks offered to customers:

JENIS MAKANAN <i>TYPE OF FOOD</i>	HARGA <i>PRICE</i>
Nasi ayam / <i>chicken rice</i>	RM12
Nasi goreng / <i>fried rice</i>	RM10
Mi goreng / <i>fried noodles</i>	RM9.50
Pizza / <i>pizza</i>	RM25
Semua harga minuman ialah RM6.50 segelas. <i>All drinks prices are RM6.50 a glass.</i>	

Jadual 1
Table 1

- (a) Nyatakan nama cukai yang dikenakan kepada Salmi dan rakan-rakannya.

[1 markah]

State the name of the tax imposed on Salmi and her friends.

[1 mark]

- (b) Hitung jumlah yang perlu dibayar oleh Salmi dan rakan-rakannya.

[3 markah]

Calculate the amount to be paid by Salmi and her friends.

[3 marks]

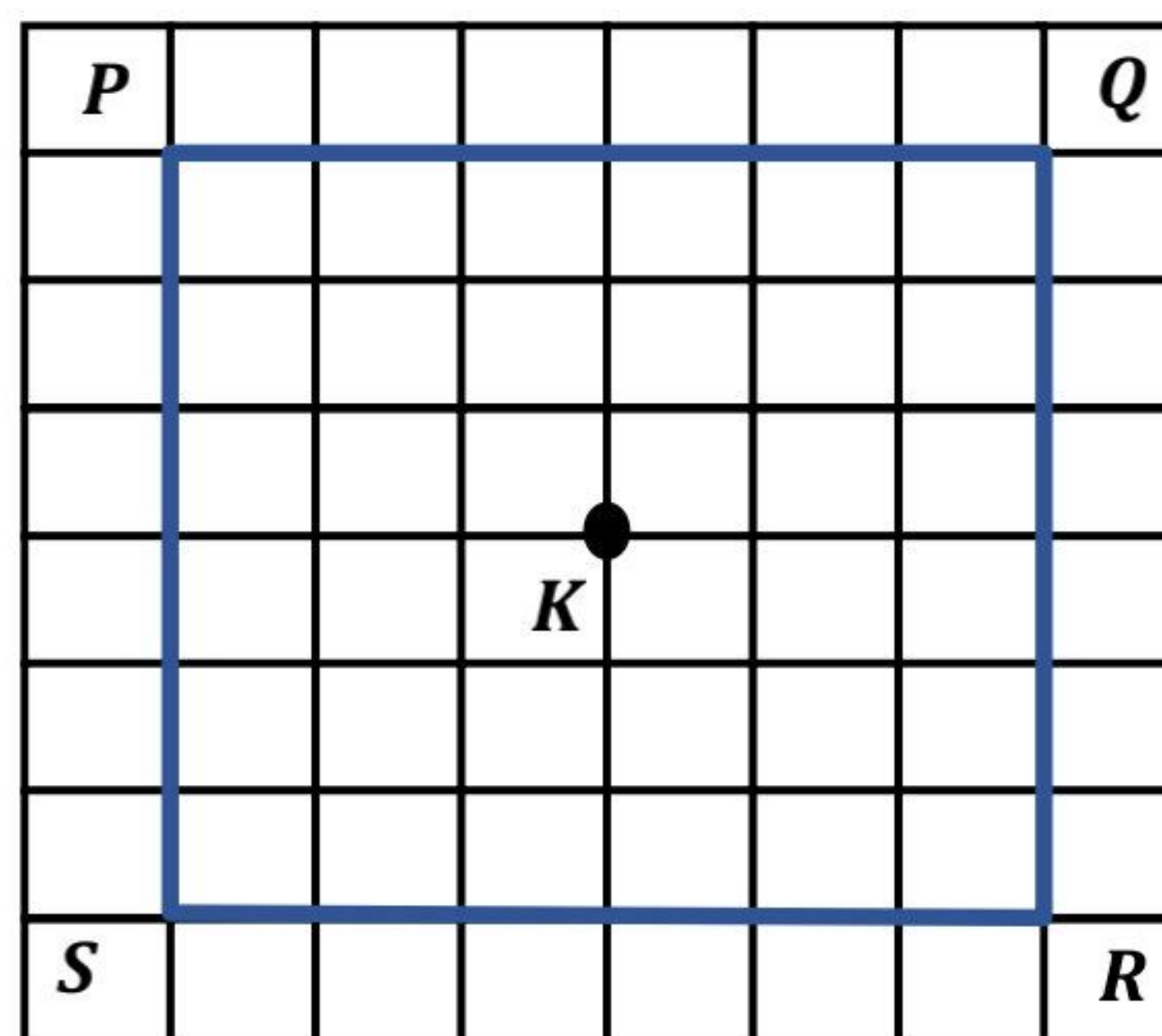
Jawapan / Answer :

(a)

(b)

- 5 Rajah 4 menunjukkan sebuah segi empat sama PQRS dengan sisi 6 unit yang dilukis pada grid segi empat sama bersisi 1 unit. W, X dan Y adalah tiga titik yang bergerak di dalam segi empat sama itu.

Diagram 4 below shows a square PQRS with sides of 6 units drawn on a grid of squares of sides of 1 unit. W, X and Y are the three points that move inside the square.



Rajah 4
Diagram 4

- (a) W ialah titik yang bergerak dengan keadaan jaraknya adalah sentiasa sama dari titik P dan titik R. Dengan menggunakan huruf di dalam rajah, nyatakan lokus bagi W.

[1 markah]

W is a moving point which the distance is always the same from point P and point R. Using the letters in the diagram, state the locus of W.

[1 mark]

- (b) Pada rajah di ruangan jawapan, lukis,
On the diagram in the answer space, draw,

- (i) lokus bagi titik X yang bergerak dengan keadaan jaraknya adalah sentiasa sama dari garis lurus PQ dan PS,

[1 markah]

- (i) *the locus of a point X that moves with the condition that its distance is always the same from the straight lines PQ and PS,*

[1 mark]

- (ii) lokus bagi titik Y yang bergerak dengan keadaan titik itu sentiasa berjarak 2 unit dari titik K.

[1 markah]

- (ii) *the locus of point Y that moves with the condition of the point is always 2 units away from point K.*

[1 mark]

- (c) Seterusnya, tandakan dengan simbol $\otimes$ kedudukan bagi semua persilangan lokus X dan lokus Y itu.

[1 markah]

Hence, mark with the symbol $\otimes$ the positions of all intersections of the X locus and the Y locus.

[1 mark]

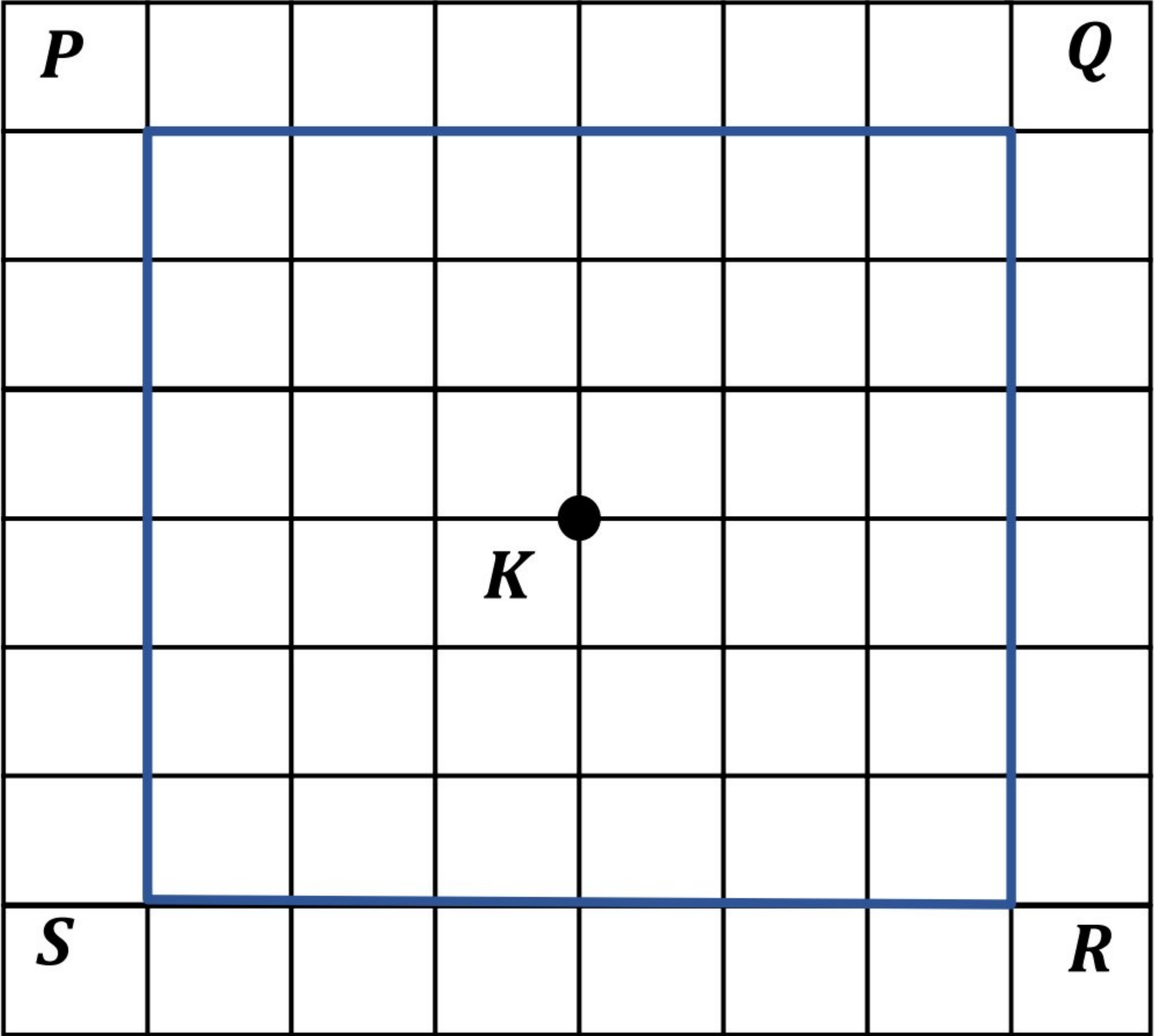
Jawapan / Answer :

(a)

(b) (i)

(ii)

(c)



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

Table 2 shows 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</i>	Polisi komprehensif <i>Comprehensive policy (RM)</i>	Polisi pihak ketiga <i>Third party</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

Jadual 2

Table 2

*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.*

- (a) Nyatakan satu faktor yang mempengaruhi pembayaran premium kasar insurans motor.

[1 markah]

State one factor that affects the gross premium payment of motor insurance.

[1 mark]

- (b) Chandran menetap di Kota Kinabalu, Sabah dan ingin membeli satu polisi insurans motor dan berikut ialah maklumat kenderaan yang ingin dinsuranskannya.

Chandran stays in Kota Kinabalu, Sabah and wants to buy a motor insurance policy. The following is the information regarding the vehicle he wants to insure.

Jumlah yang ingin diinsuranskan / <i>Sum insured</i> : RM90 000	
Umur kenderaan / <i>Age of vehicle</i>	: 8 tahun
Kapasiti enjin / <i>Engine capacity</i>	: 1800 cc
NCD	: 30%

Hitung premium kasar bagi polisi komprehensif berdasarkan Jadual 2.

[3 markah]

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

[3 marks]

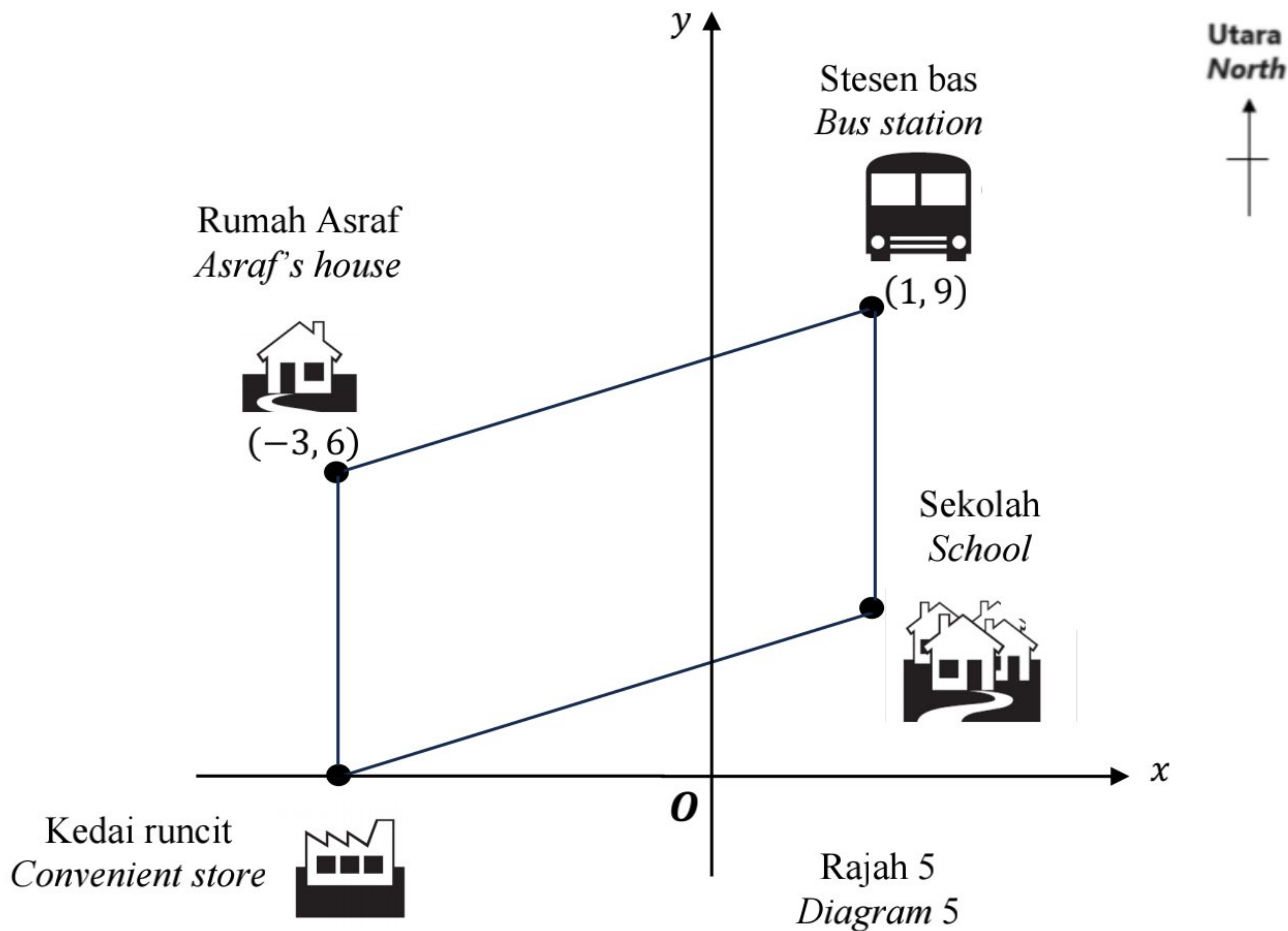
Jawapan / *Answer* :

(a)

(b) Bagi polisi komprehensif / *For comprehensive policy*:

- 7 Rajah 5 menunjukkan segi empat selari yang dilukis pada suatu satah Cartes, yang mewakili kedudukan rumah Asraf, stesen bas, kedai runcit dan sekolah.

Diagram 5 shows a parallelogram drawn on a Cartesian plane, representing Asraf's house, bus station, convenient store and school.



- (a) Nyatakan persamaan garis lurus mencancang yang menghubungkan rumah Asraf dan kedai runcit.

[1 markah]

State the equation of the vertical straight line that connects Asraf's house and convenient store.

[1 mark]

- (b) Sebuah restoran akan dibina di bahagian selatan sekolah. Jarak di antara restoran dengan sekolah adalah sama dengan jarak di antara sekolah dengan stesen bas. Cari persamaan garis lurus dalam bentuk $y = mx + c$ yang menghubungkan rumah Asraf dengan restoran.

[3 markah]

A restaurant will be built in the south direction of the school. The distance between the restaurant and the school is the same as the distance between school and the bus station. Find the equation of the straight line in the form of $y = mx + c$ that connects Asraf's house to the restaurant.

[3 marks]

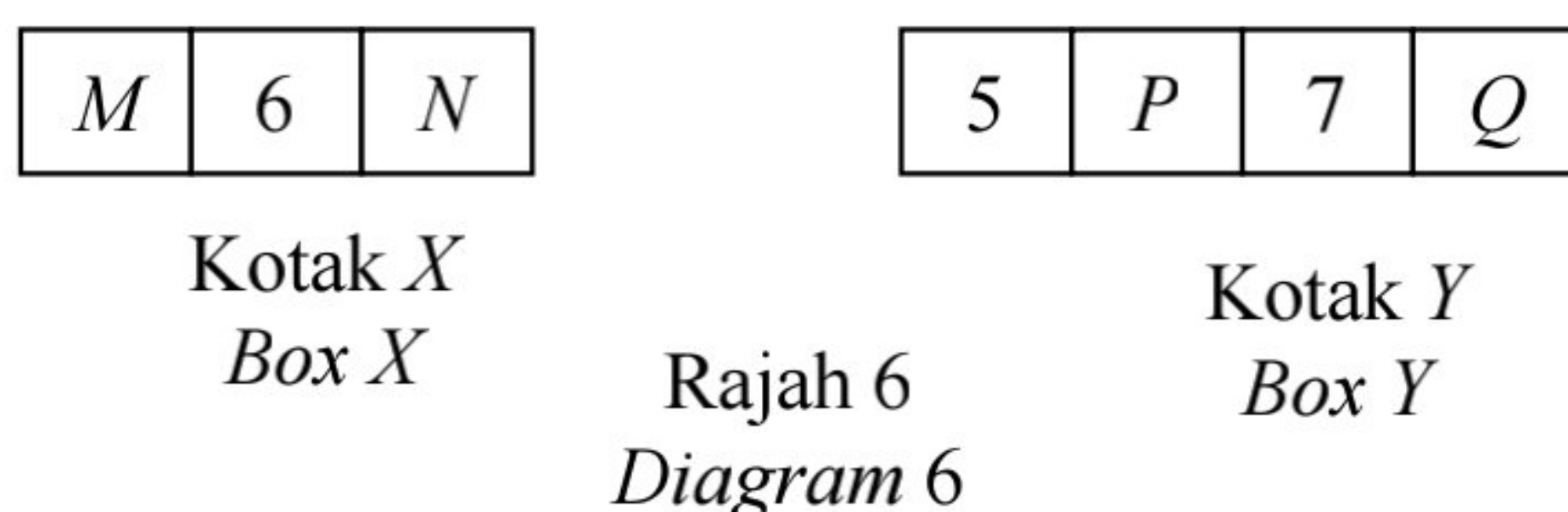
Jawapan/ *Answer* :

(a)

(b)

- 8 Rajah 6 di bawah menunjukkan beberapa huruf dan angka di dalam dua buah kotak.

Diagram 6 shows a few letters and numbers in two boxes.



Dua keping kad dipilih secara rawak dari kotak satu demi satu. Kad pertama dipilih secara rawak dari kotak *X* dan dicatatkan. Jika kad pertama berlabel huruf, kad kedua akan dipilih dari kotak *Y*. Jika kad pertama berlabel angka, kad kedua akan dipilih dari kotak *X*.

*Two cards are randomly selected one by one from the box. The first card is randomly selected from *X* and recorded. If the first card labelled with letter is selected, the second card is randomly selected from box *Y*. If the first card labelled with number is selected, the second card is randomly selected from box *X*.*

- (a) Senaraikan ruang sampel.

[2 markah]

List the sample space.

[2 marks]

- (b) Dengan menyenaraikan semua kesudahan yang mungkin, hitung kebarangkalian kad pertama berlabel “*N*” atau kad kedua berlabel nombor “7”.

[2 markah]

*By listing all the possible outcomes, calculate the probability the first card is labelled with the letter “*N*” or the second card is labelled with number “7”.*

[2 marks]

Jawapan / *Answer* :

(a)

(b)

- 9 (a) Encik Ramli akan mengadakan majlis perkahwinan sendiri di Tangkak dalam tempoh 10 bulan. Majlis ini akan menggunakan sebanyak RM15 000. Encik Ramli perlu menyimpan RM1 500 sebulan daripada pendapatannya sebanyak RM5 000 sebulan untuk mencapai matlamat kewangan beliau. Nyatakan 2 pendekatan SMART yang digunakan oleh Encik Ramli dengan justifikas berkenaan.

[2 markah]

Mr Ramli is going to held his own wedding ceremony at Tangkak in the recent 10 months. This ceremony will cost him RM15 000. He has to save RM1 500 monthly from his monthly income which is RM 5 000 to achieve his financial goal. State two SMART strategy used by Mr Ramli together with the justifications.

[2 marks]

- (b) Maklumat di bawah berkaitan dengan pelan kewangan Encik Zul.

The information below is related to Mr Zul's financial planning.

Pendapatan dan perbelanjaan <i>Income and expenses</i>	Pelan kewangan <i>Financial plan</i>	
Pendapatan Bersih/Net income		
Pendapatan bulanan/ <i>Monthly income</i>	7 000	
Tolak simpanan untuk dana kecemasan/ <i>Minus saving for income</i>	700	
Baki pendapatan/ <i>Income balance</i>		6 300
Perbelanjaan tetap bulanan / <i>Monthly fixed expense</i>		
Pinjaman bank/ <i>Bank loans</i>	2 500	
Premium insurans / <i>Insurance premium</i>	650	
Jumlah perbelanjaan tetap bulanan / <i>Total monthly fixed expenses</i>		P
Perbelanjaan tidak tetap bulanan / <i>Monthly variable expenses</i>		
Bil utiliti/ <i>Utility bills</i>	650	
Makanan dan Minuman / <i>Food and drinks</i>	1 500	
Perbelanjaan Petrol/ <i>Petrol expenses</i>	500	
Hiburan / <i>Entertainment</i>	400	
Jumlah perbelanjaan tidak tetap bulanan / <i>Total monthly variable expenses</i>		3050
Lebihan pendapatan (defisit) / <i>Surplus of income (deficit)</i>		Q

- (i) Daripada pelan kewangan Encik Zul, tentukan nilai P dan Q.

From the financial plan of Mr Zul, determine the values of P and Q.

[2 markah]

- (ii) Encik Zul ingin membeli sebuah komputer riba baharu yang berharga RM2 400 dalam masa setengah tahun. Adakah Encik Zul boleh mencapai matlamat kewangannya ini? Berikan justifikasi anda.

Mr Zul wants to buy a new laptop with the price RM2 400 in half year. Can Mr Zul achieve his financial goals? Give your justification.

[2 marks]

Jawapan/ Answer :

(a)

(b)

- 10 (a) Cari nilai $\sin 105^\circ$ dengan menunjukkan sudut sepadan 105° .

[2 markah]

Find the value of $\sin 105^\circ$ by stating the corresponding angle of 105° .

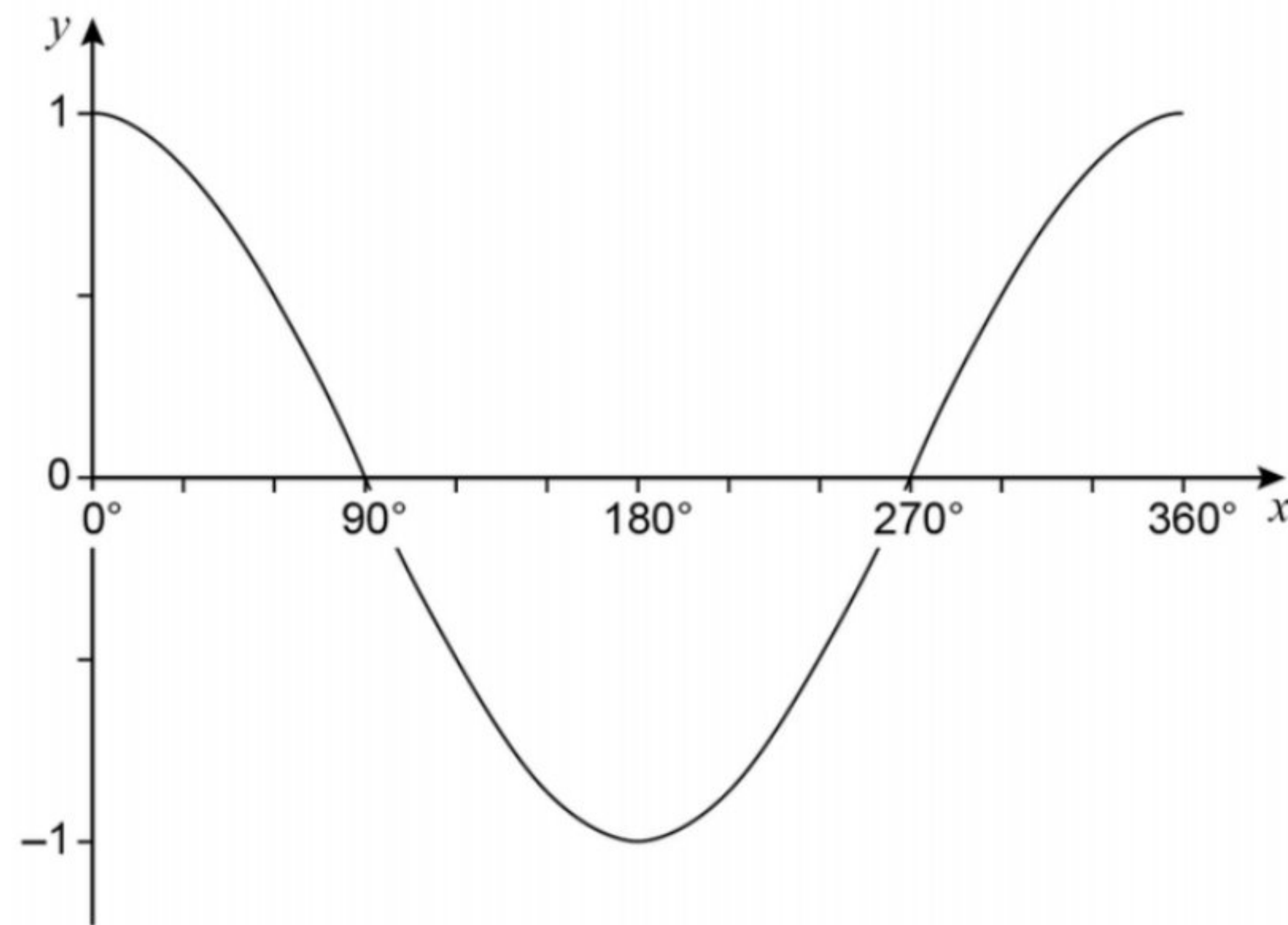
[2 marks]

- (b) (i) Rajah 7 menunjukkan satu graf fungsi trigonometri bagi $0^\circ \leq x \leq 360^\circ$. Tentukan graf fungsi trigonometri tersebut.

[1 markah]

Diagram 7 shows a graph of the trigonometric function of $0^\circ \leq x \leq 360^\circ$. Determine the graph of the trigonometric function.

[1 marks]



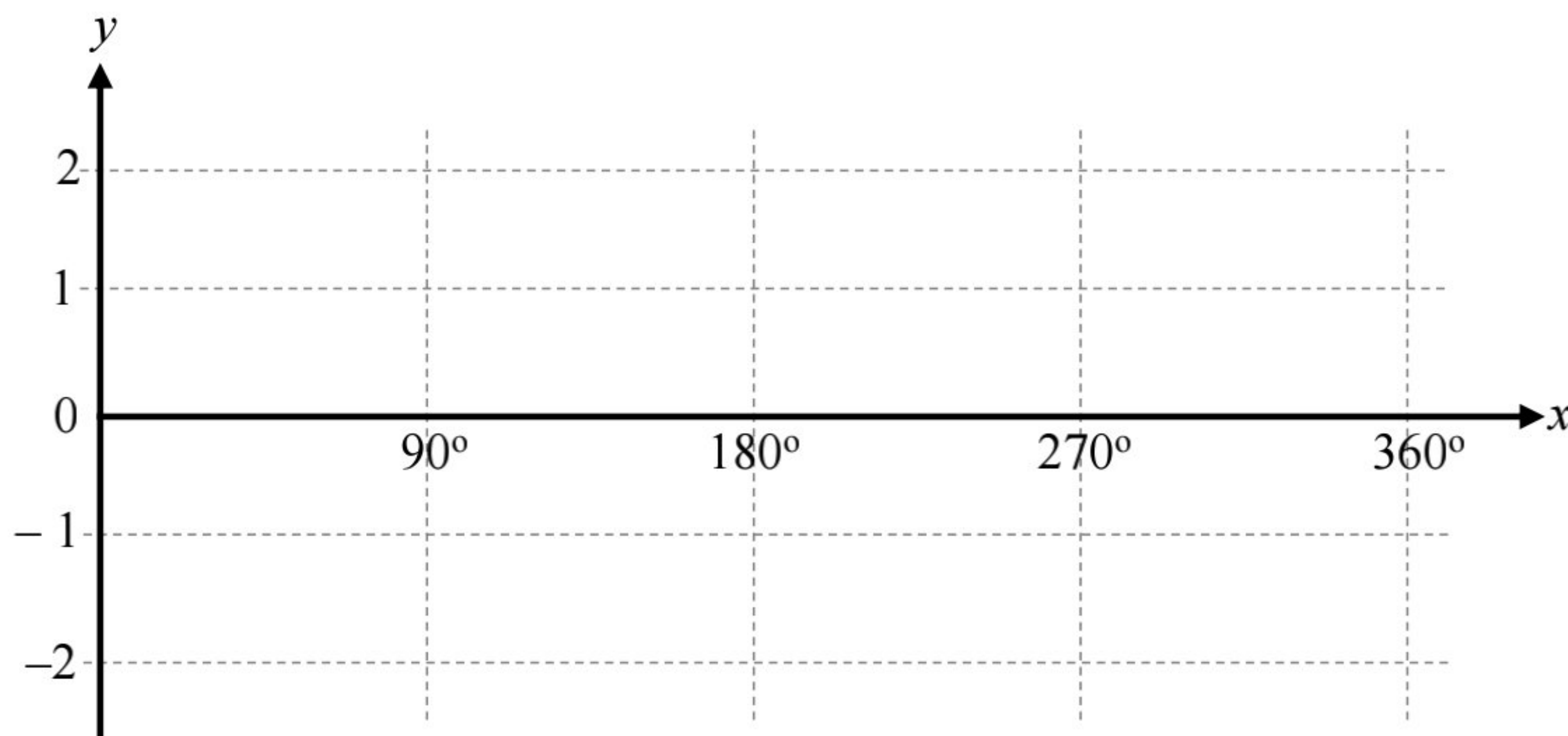
Rajah 7
Diagram 7

- (ii) Lakarkan graf $y = 2 \sin 0.5x$ bagi $0^\circ \leq x \leq 360^\circ$.

[2 markah]

Sketch the graph $y = 2 \sin 0.5x$ for $0^\circ \leq x \leq 360^\circ$.

[2 marks]



Jawapan / *Answer* :

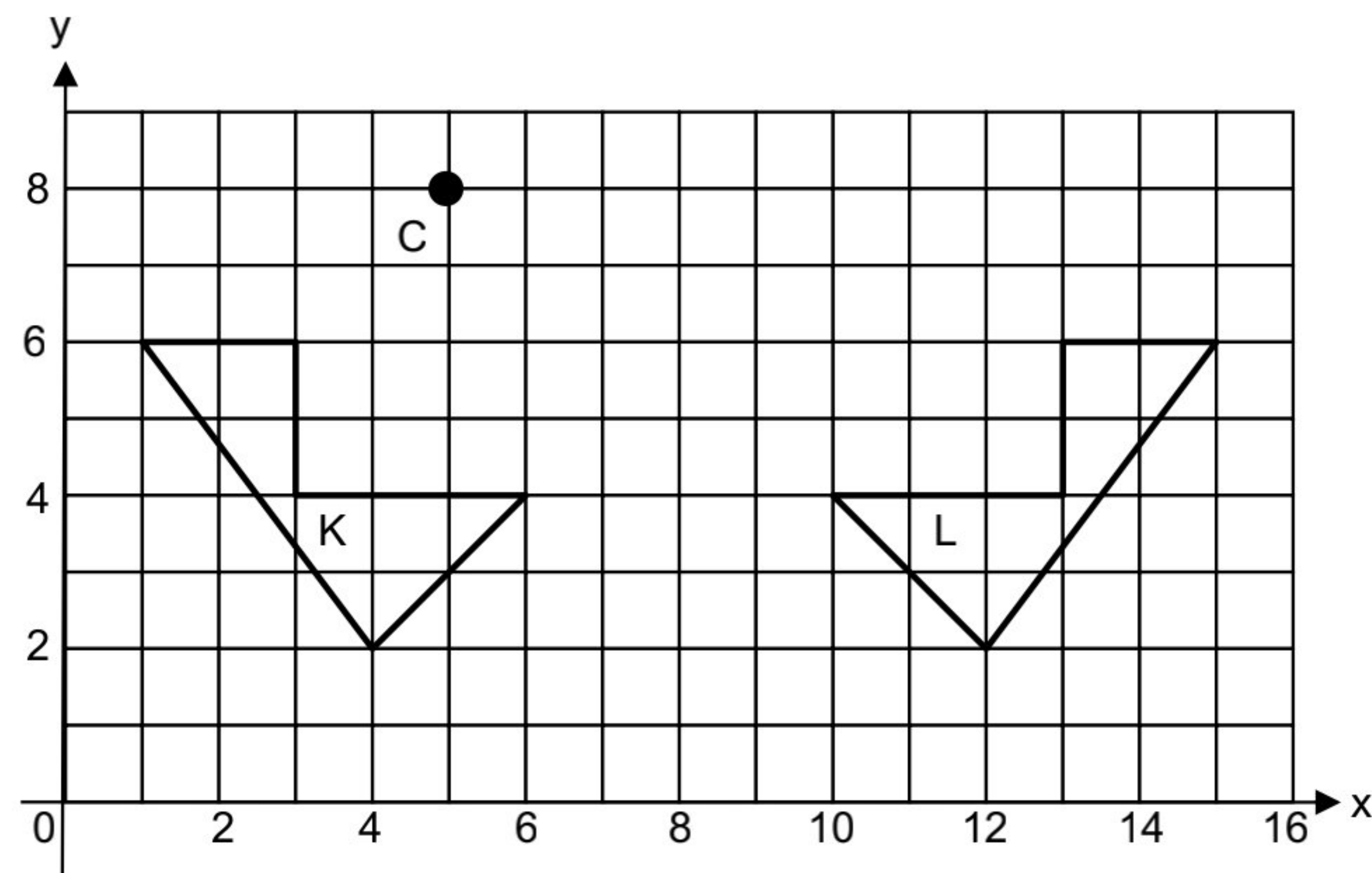
(a)

Jawab **semua** soalan dalam bahagian ini.

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

- 11(a) Rajah 8(i) menunjukkan titik C, dan dua pentagon, K dan L, dilukis pada suatu satah Cartesan.

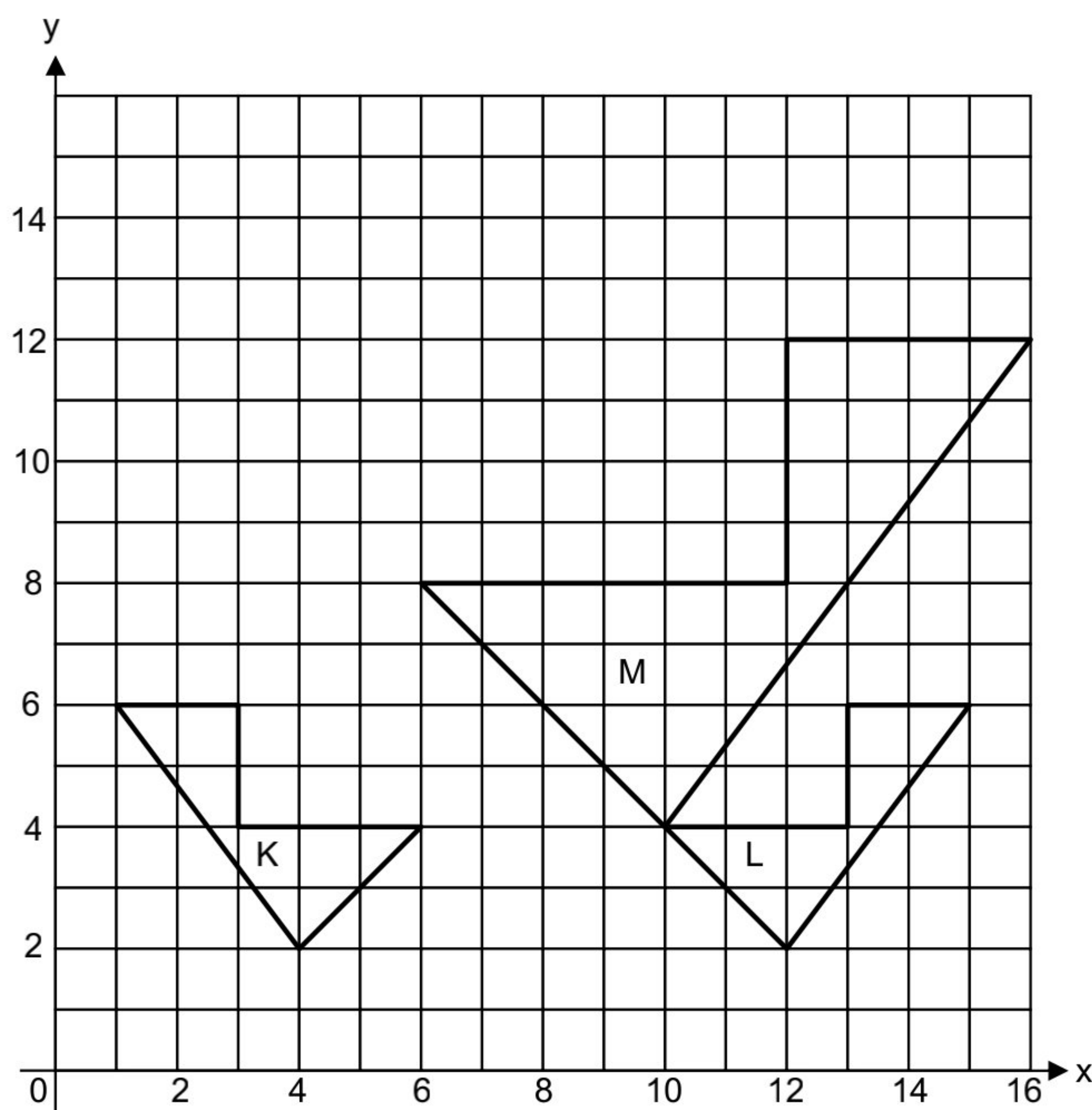
Diagram 8(i) shows point C and two pentagons, K and L, drawn on a Cartesian plane.



Rajah / Diagram 8 (i)

- (i) Diberi bahawa transformasi R ialah translasi $\begin{pmatrix} 5 \\ -3 \end{pmatrix}$.
Given that transformation R is translation $\begin{pmatrix} 5 \\ -3 \end{pmatrix}$.
 Nyatakan koordinat imej bagi titik C di bawah transformasi R.
State the coordinate of the image of point C under the transformation R.
 [1 markah / mark]
- (ii) Kenal pasti sama ada pentagon K dan pentagon L pada Rajah 8(i) kongruen atau bukan kongruen. Berikan justifikasi.
Identify whether pentagon K and pentagon L in diagram 8(i) is congruent or not congruent. Justify.
 [2 markah / marks]

Diagram 8(ii) shows three pentagons, K , L and M , drawn on a Cartesian plane.



Rajah / Diagram 8(ii)

Given that M is the image of K under the combined transformation WV . Describe in full, the transformation:

- $$(i) \quad V \quad \quad \quad ii) \quad W$$

[5 markah /5 *marks*]

Jawapan / *Answer* :

(a) (i)

(ii)

(b) (i) $V =$

(ii) $W =$

12 (a) (i) Diberi $\begin{bmatrix} 1 & p \\ 2 & 4 \end{bmatrix} \begin{bmatrix} 3 \\ 2 \end{bmatrix} = \begin{bmatrix} -1 \\ q \end{bmatrix}$, cari nilai p dan nilai q.

Given that $\begin{bmatrix} 1 & p \\ 2 & 4 \end{bmatrix} \begin{bmatrix} 3 \\ 2 \end{bmatrix} = \begin{bmatrix} -1 \\ q \end{bmatrix}$, find the value of p and of q.

[2 markah / marks]

(ii) Diberi $\frac{1}{h} \begin{bmatrix} 1 & k \\ -2 & 6 \end{bmatrix} \begin{bmatrix} 6 & -4 \\ 2 & 1 \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$, cari nilai h dan nilai k.

Given that $\frac{1}{h} \begin{bmatrix} 1 & k \\ -2 & 6 \end{bmatrix} \begin{bmatrix} 6 & -4 \\ 2 & 1 \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$, find the value of h and of k.

[2 markah / marks]

- (b) Alisa menjual kasut lelaki dan kasut perempuan. Pada suatu hari, Alisa telah menjual 9 pasang kasut lelaki dan 12 pasang kasut perempuan dengan harga RM 960. Pada keesokan harinya, Alisa menjual 6 pasang kasut lelaki dan 3 pasang kasut perempuan dengan harga RM 450.

Alisa sell men's and women's shoes. One day, Alisa has sold 9 pairs of men's shoes and 12 pairs of women's shoes at a price RM 960. On the next day, Alisa has sold 6 pairs of men's shoes and 3 pairs of women's shoes for RM 450.

- (i) Tulis dua persamaan linear dalam sebutan x dan y untuk mewakili maklumat di atas.
Write two linear equations in terms of x and y to represent the above information.

[2 markah / marks]

- (ii) Seterusnya, menggunakan kaedah matriks, hitung nilai x dan nilai y.
Hence, by using matrix method, calculate the value of x and of y.

[4 markah / marks]

Jawapan / *Answer* :

(a) (i)

(ii)

(b) (i)

(ii)

- 13(a) (i) Sebuah hospital swasta mengupah beberapa orang doktor dan jururawat untuk merawat pesakit. Jumlah bilangan doktor dan jururawat yang diupah ialah selebih-lebihnya 24 orang. Bilangan jururawat yang diupah adalah sekurang-kurangnya tiga kali bilangan doktor yang diupah.

A private hospital hires several number of doctors and nurses to treat patients. The total number of doctors and nurses hired are at most 24. The number of nurses hired is at least three times the number of doctors hired.

Tulis dua ketaksamaan linear, selain $x \geq 0$ dan $y \geq 0$, yang mewakili situasi di atas. Write two linear inequalities, other than $x \geq 0$ and $y \geq 0$, which represent the situation above. [2 markah / marks]

- (ii) Dengan menggunakan skala 2 cm kepada 5 unit pada paksi yang mewakili bilangan doktor dan 2 cm kepada 5 unit pada paksi yang mewakili bilangan jururawat, lukis graf yang memuaskan semua ketaksamaan di atas. Seterusnya, lorek rantau yang memuaskan sistem ketaksamaan linear tersebut.

By using a scale of 2 cm to 2 units on the axis representing the number of doctors and 2 cm to 2 units on the axis representing the number of nurses, draw a graph that satisfies all of the inequalities above. Hence, shade the region that satisfies the system of linear inequalities.

[4 markah / 4 marks]

- (b) (i) Daripada graf, tentukan bilangan maksimum doktor dan bilangan dan jururawat yang boleh diupah sekiranya bilangan jururawat yang diupah semestinya tiga kali bilangan doktor yang diupah.

From the graph, state the maximum number of doctors and nurses that can be hired if the number of nurses hired must be three times the number of doctors hired.

[2 markah / 2 marks]

- (ii) Nyatakan satu sebab mengapa hospital swasta tersebut tidak boleh mengupah 12 orang doktor dan 8 orang jururawat.

State a reason why the private hospital cannot hire 12 doctors and 8 nurses.

[1 markah / 1 mark]

Jawapan / *Answer* :

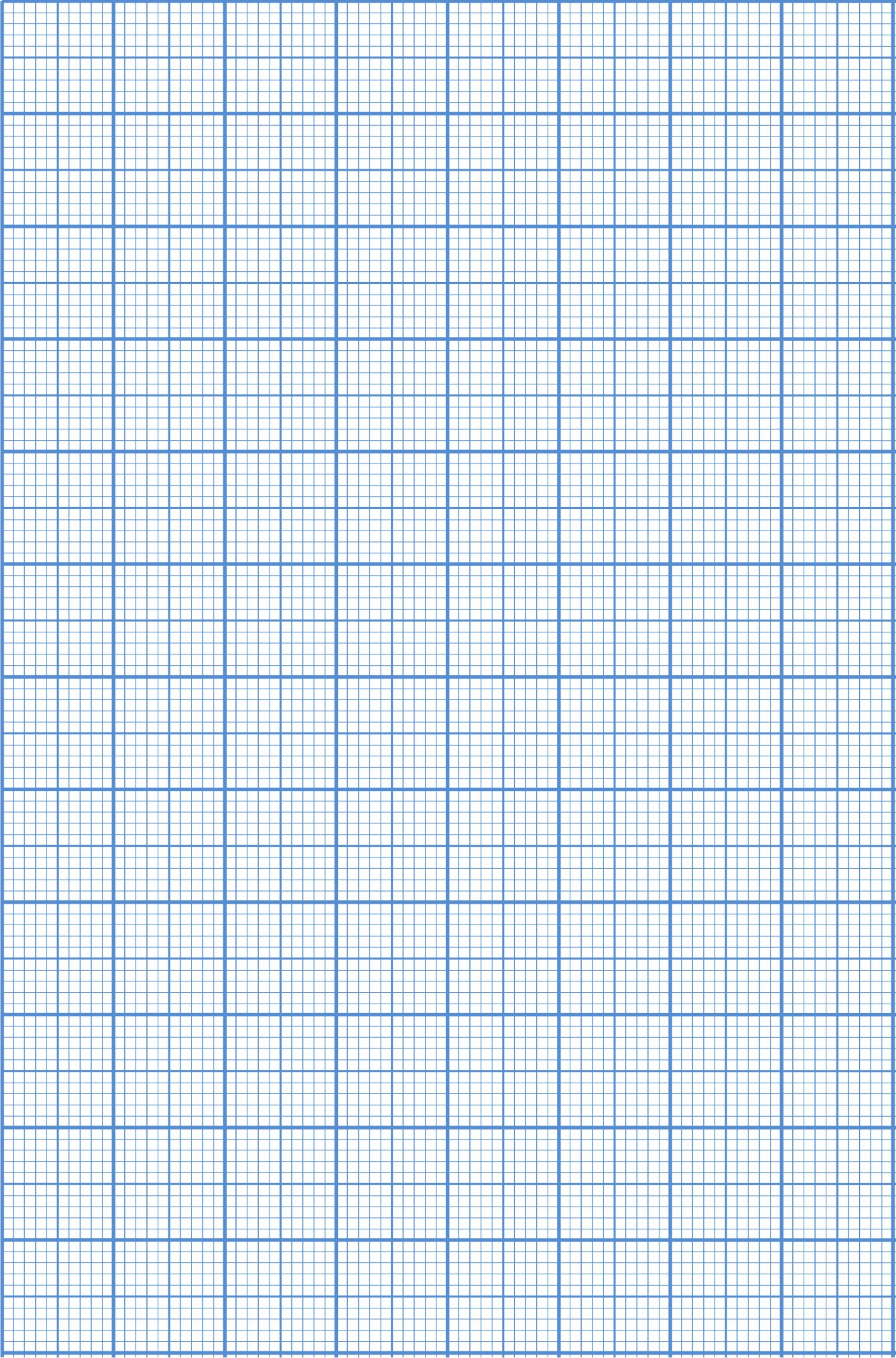
(a) (i)

(ii) Rujuk graf

Refer to the graph

(b) (i)

(ii)



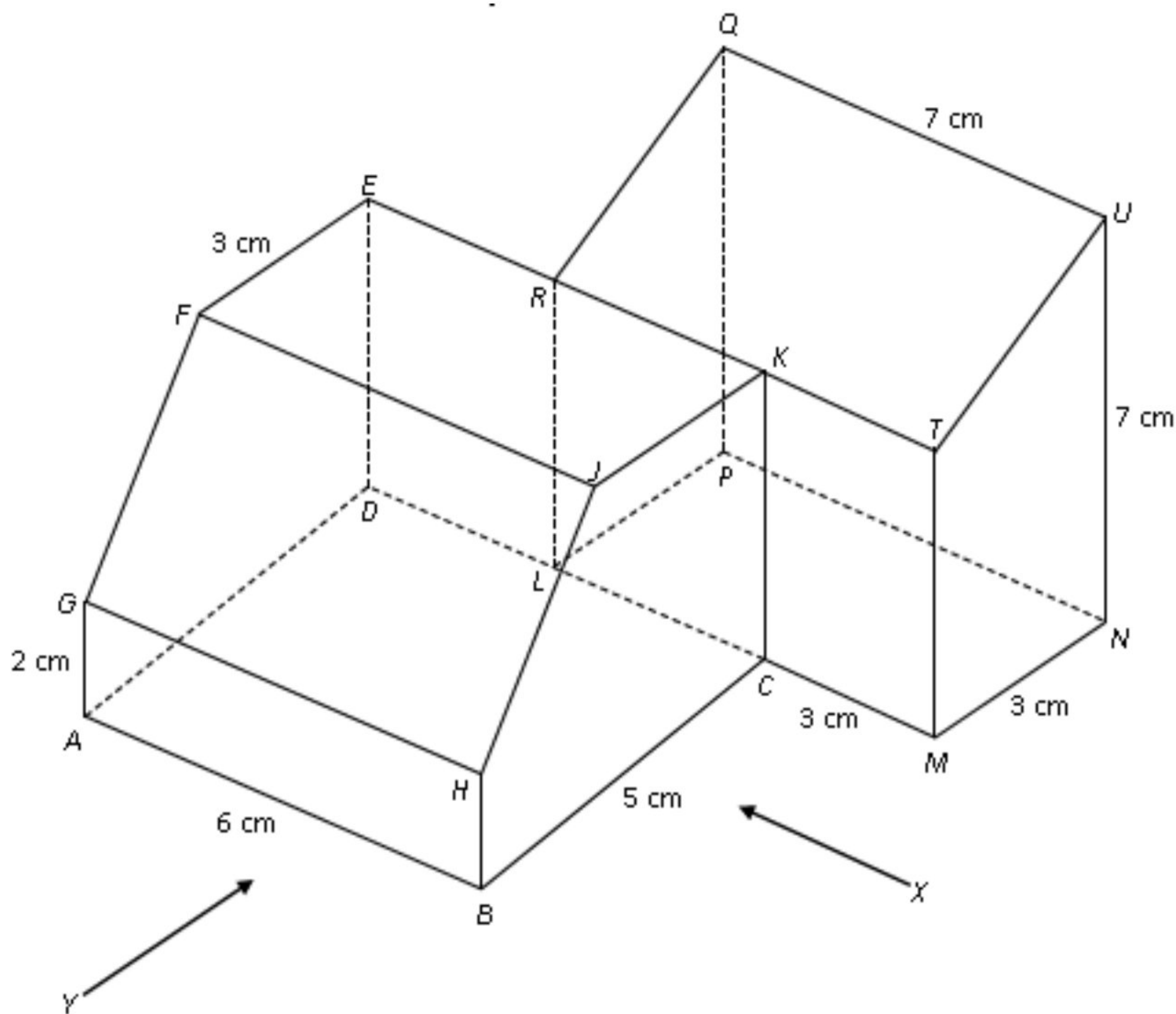
14. **SULIT**

29

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

Rajah 9 menunjukkan gabungan pepejal berbentuk prisma tegak. Permukaan $BCKJH$ ialah keratan rentas seragam prisma itu. Segi empat tepat $FGHJ$ ialah satah condong. Segi empat tepat $EFJK$ ialah satah mengufuk. Tepi AG dan BH adalah tegak. Tapak $ABCMNPLD$ terletak di atas satah mengufuk. Diberi bahawa $KC = TM = 5$ cm dan $UN = 7$ cm.

Diagram 9 shows a composite solid of right prism. The surface $BCKJH$ is the uniform cross section of the prism. Rectangle $FGHJ$ is an inclined plane. Rectangle $EFJK$ is a horizontal plane. Edges AG and BH are vertical. $ABCMNPLD$ lies on a horizontal plane. It is given that $KC = TM = 5$ cm dan $UN = 7$ cm.



Rajah / Diagram 9

Lukis dengan skala penuh,
Draw to full scale

- (a) dongakan gabungan pepejal itu pada satah mencancang yang selari dengan BC sebagaimana dilihat dari X .

the elevation of the combined solid on a vertical plane parallel to BC as viewed from X .

[4 markah/*marks*]

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

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

[5 markah/*marks*]

Jawapan / *Answer* :

- (a)

(b)

- 15 (a) Satu kajian telah dijalankan untuk mengumpul data tentang pendapatan isi rumah bulanan bagi penduduk di dua daerah A dan B. Hasil kajian dipaparkan dalam bentuk plot batang-dan-daun yang ditunjukkan di bawah.

A survey was carried out to gather data on the monthly household incomes of residents in two districts A and B. The results are displayed as the stem-and-leaf plot as shown below.

Pendapatan isi rumah bulanan daerah A <i>Monthly household incomes in district A</i>	Pendapatan isi rumah bulanan daerah B <i>Monthly household incomes in district B</i>
	2 0 4 9
9	3 1 4 5 5 6 7
5	4 1 7 8
7 4 3 3 1 0	5
3 2 1 1	6
Kekunci: 3 1 bermaksud RM 3100 <i>Keys : 3 1 means RM 3100</i>	

Berdasarkan plot batang-dan-daun, hitung julat bagi kedua-dua daerah. Seterusnya kenal pasti daerah manakah yang mempunyai pendapatan isi rumah bulanan yang lebih tinggi.

Based on stem-and-leaf, calculate the range for both districts. Hence, determine which district have higher monthly household incomes.

[2 markah / marks]

Jawapan / Answer :

15 (b)

Jadual 3.1 di bawah menunjukkan bil elektrik bagi unit pangsapuri dalam satu bulan tertentu.

Table 3.1 below shows the electricity bills of apartment units for a certain month.

Bil elektrik (RM) <i>Electricity bill (RM)</i>	Bilangan unit pangsapuri <i>Number of apartment units.</i>
30 – 49	4
50 – 69	9
70 – 89	11
90 – 109	15
110 – 129	13

Jadual / Table 3.1

- (i) Berdasarkan Jadual 3.1, lengkapkan Jadual 3.2 di ruangan jawapan.
Based on Table 3.1, complete Table 3.2 in the answer space.

[3 markah / marks]

- (ii) Gunakan kertas graf untuk ceraiian soalan ini. Anda boleh menggunakan pembaris fleksibel.

Use graph paper for this part of the questions. You may use a flexible ruler.

Dengan menggunakan skala 2 cm kepada R20 pada paksi mengufuk dan 2 cm kepada 5 unit pangsapuri pada paksi mencancang, lukis satu ogif bagi data tersebut.

By using a scale 2cm to RM20 on the horizontal axis and 2 cm to 5 units on the vertical axis, draw an ogive for the data.

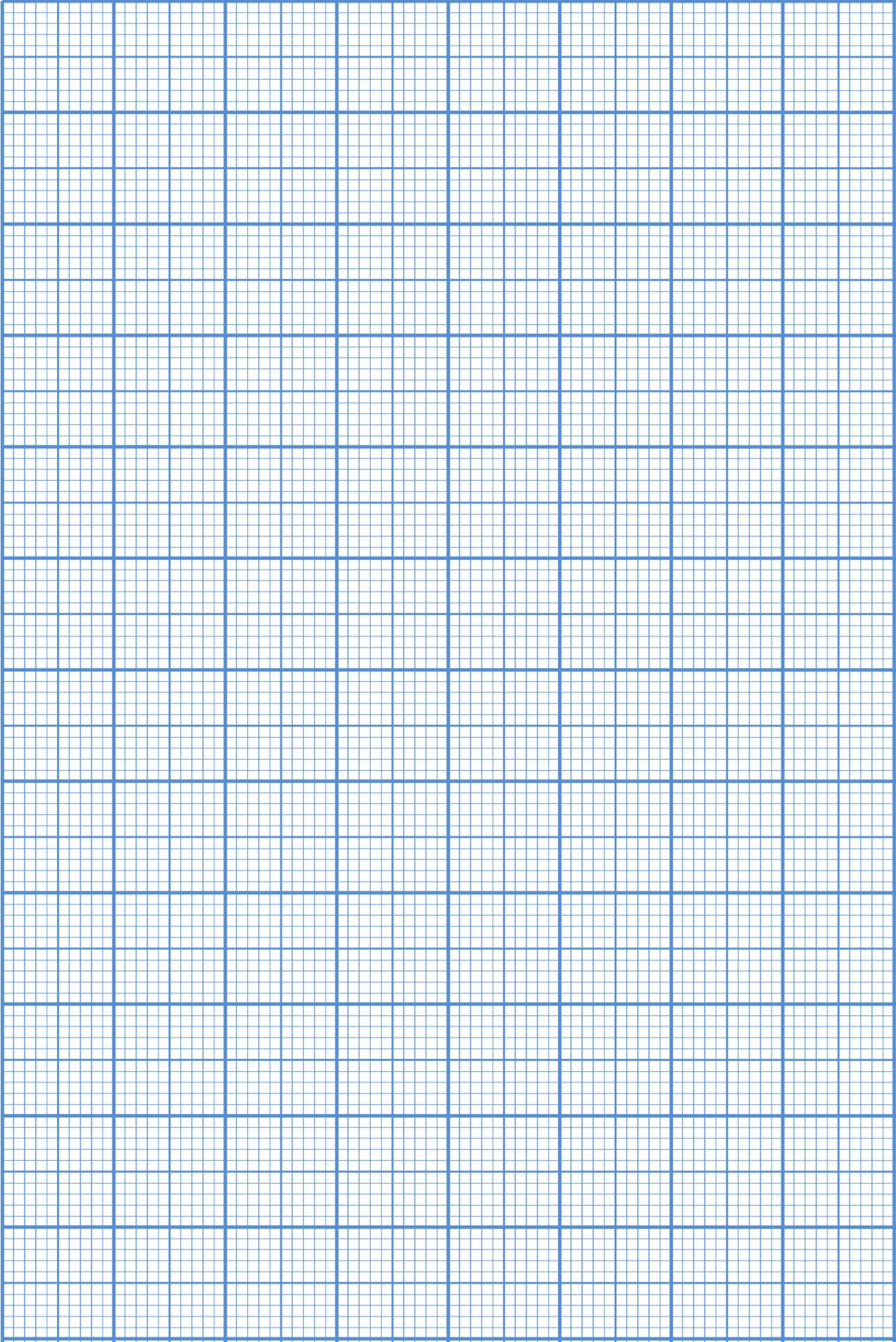
[4 markah/marks]

(b) Jawapan / Answer :

(i)

Bil elektrik (RM) <i>Electricity bill (RM)</i>	Bilangan unit pangsapuri <i>Number of apartment units.</i>	Kekerapan longgokan <i>Cumulative frequency</i>	Sempadan atas <i>Upper boundary</i>
10 – 29	0		
30 – 49	4		
50 – 69	9		
70 – 89	11		
90 – 109	15		
110 – 129	13		

Jadual / Table 3.2



BAHAGIAN C
SECTION C

Bahagian C / Section C

[15 markah / 15 marks]

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

*Answer any **one** question from this section*

- 16 Cikgu Sharil seorang guru di SMK Sri Jaya dan beliau merupakan pengurus pasukan atlet sekolah.
Mr Sharil is a teacher in SMK Sri Jaya and he is the coach of school athlete team.

- (a) (i) Cikgu Sharil membentuk satu pasukan olahraga sekolah yang terdiri daripada murid perempuan dan lelaki. Jumlah bilangan murid perempuan, x dan murid lelaki, y sebanyak 36 orang. Bilangan murid perempuan adalah dua kali ganda daripada bilangan murid lelaki. Bentuk dua persamaan linear berdasarkan maklumat yang diberikan.

[2 markah]

Mr Sharil formed a team of school athlete which consisted of girls and boys. Total numbers of girls, x and boys, y are 36 people. The number of the girls is two times of the number of the boys. Form two linear equations based on the given information.

[2 marks]

- (ii) Cikgu Sharil mengayuh basikal ke sesi latihan olahraga setiap petang. Pergerakan dari rumah Cikgu Sharil ke padang sekolah pada suatu hari tertentu direkodkan dalam jadual 4.1.

Mr Sharil rides his bicycle for a sports training session every afternoon. His movement from his house to the school field on a particular day is recorded in Table 4.1.

Jam 1600 bertolak dari rumah. <i>1600 hours departed from house.</i>
Menambah kelajuan selepas 0.2 km. <i>Increased speed after 0.2 km.</i>
Selepas 0.3 km, tiba di padang sekolah pada jam 1624. <i>After 0.3 km, arrived at the school field at 1625 hours.</i>
Menjalani latihan olahraga selama 1 jam 30 minit. <i>Sport training session for 1 hour 30 minutes.</i>
Selepas itu balik dan tiba di rumah dalam masa 15 minit. <i>Went home and arrived in 15 minutes after the training.</i>

Jadual 4.1
Table 4.1

Lengkapkan graf jarak- masa dalam ruang jawapan.

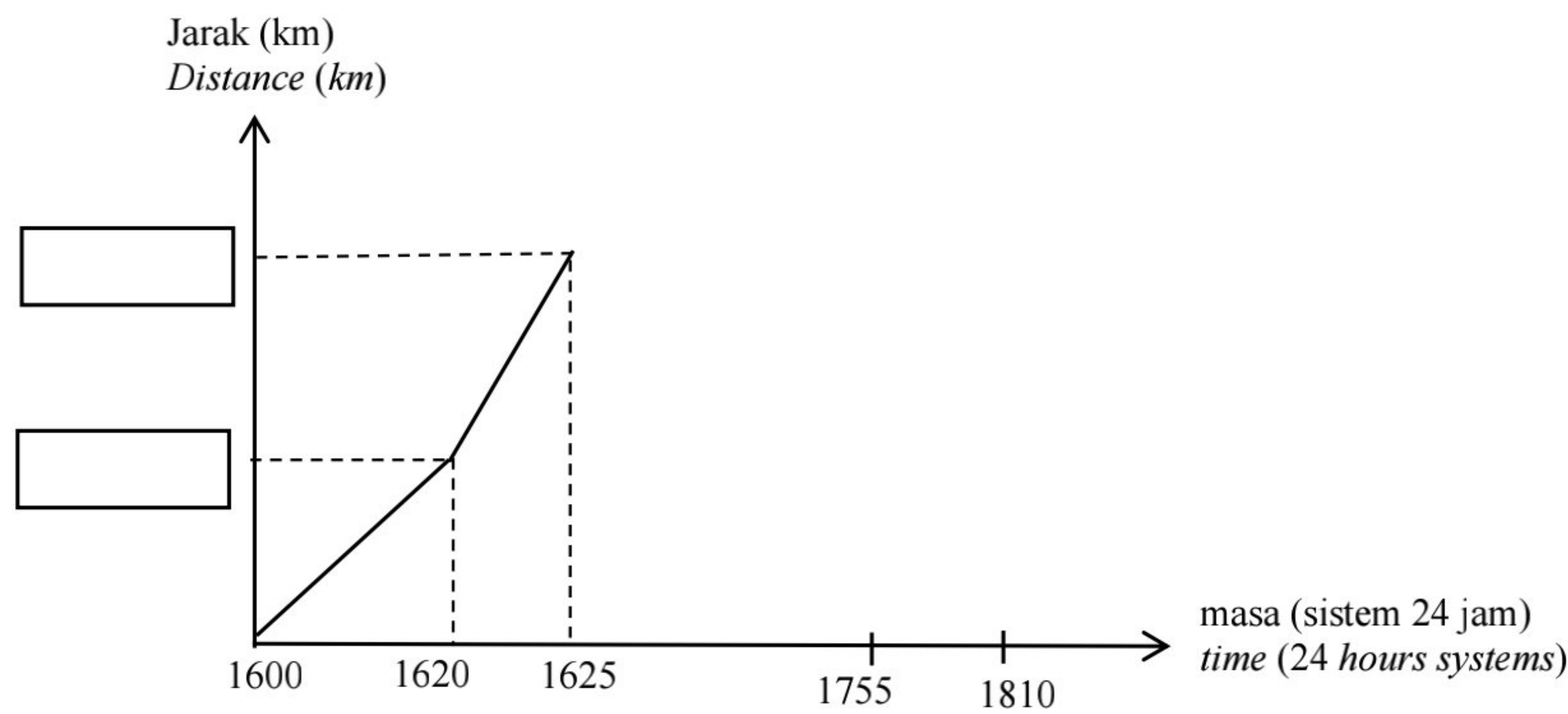
Complete the distance- time graph in the space provided below.

[2 markah/ marks]

Jawapan / Answer :

(a) (i)

(ii)



- (b) (i) Cikgu Sharil hendak memilih seorang ketua pasukan. Terdapat 4 nama murid perempuan dan 5 nama murid lelaki telah dimasukkan ke dalam sebuah kotak. Cikgu Sharil memilih secara rawak nama calon daripada kotak itu. Hitung kebarangkalian memilih seorang murid lelaki sebagai ketua pasukan.

[1 markah]

Mr Sharil wants to choose a team leader. There are 4 girls and 5 boys who have been nominated and their names are put in a box. Mr Sharil selects a candidate's name randomly from the box. Calculate the probability of choosing a boy as the team leader.

[1 mark]

- (ii) Jadual 4.2 menunjukkan catatan masa, dalam saat, lima percubaan bagi pemilihan atlet acara larian 100 m.

Table 4.2 shows the times, in seconds, recorded in the five trials for the 100 m athlete selection.

	Σx	Σx^2
Atlet A/ Athlete A	63.65	810.5785
Atlet B/ Athlete B	63.65	810.9511

Jadual 4.2

Table 4.2

Dengan menggunakan sukatan serakan yang sesuai, membantu Cikgu Sharil untuk menentukan siapa yang akan dipilih untuk mewakili sekolah pada peringkat daerah. Justifikasi jawapan anda.

[3 markah]

By using appropriate measures of dispersion, help Mr Sharil to determine a person who will be selected to represent his school in the district level. Justify your answer.

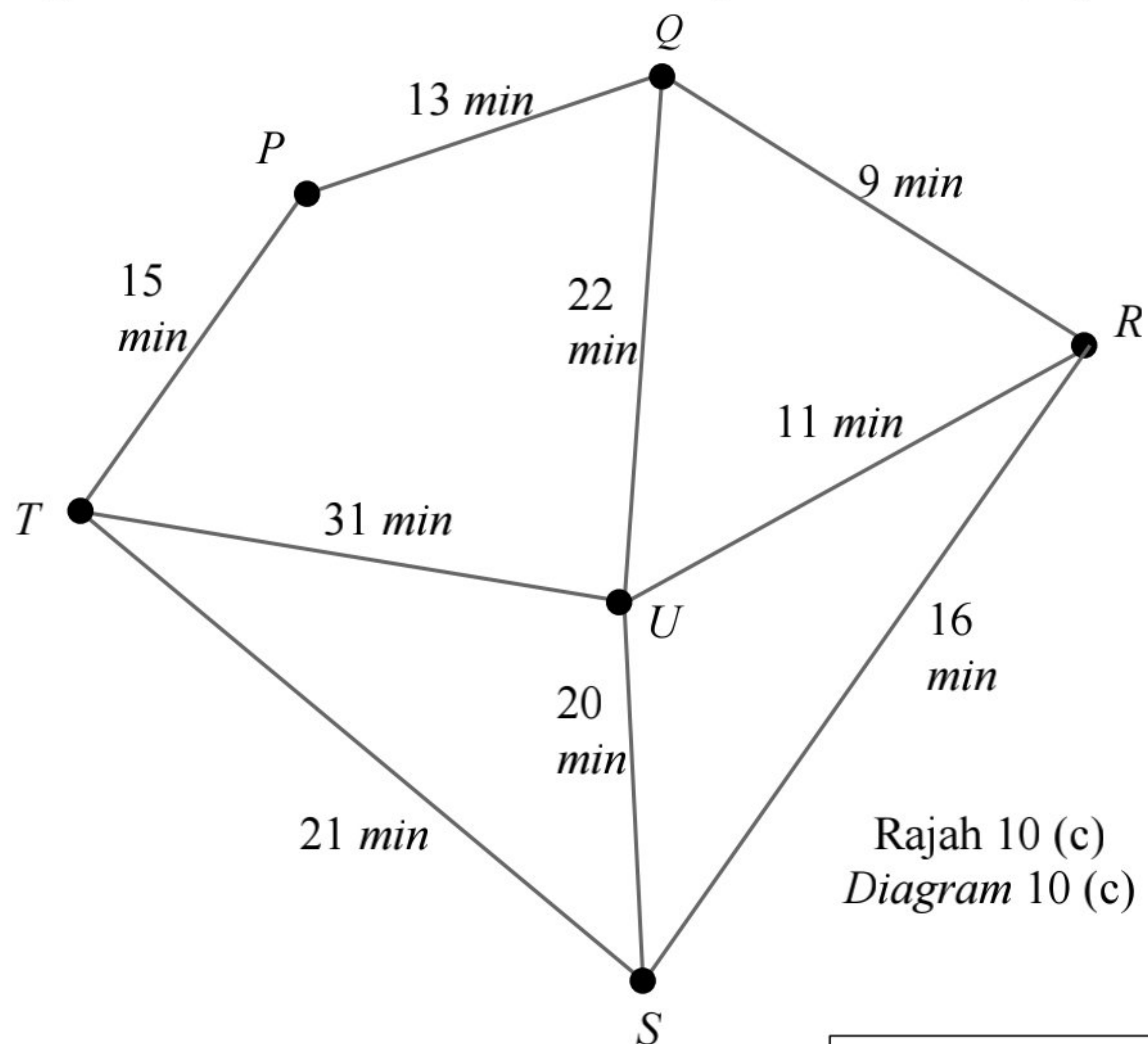
[3 marks]

Jawapan / Answer :

- (b) (i)

- (ii)

- (c) Rajah 10 menunjukkan laluan- laluan dalam perjalanan pergi ke stadium, P dari sekolah, S .
Diagram 10 shows the routes on the trip to the stadium, P from the school, S .



Rajah 10 (c)
 Diagram 10 (c)

Petunjuk/ Legend:

P	Stadium/ Stadium
Q	Hotel Rainbow/ Rainbow Hotel
R	Balai polis/ Police station
S	Sekolah/ School
T	Bandar Sialang/ Sialang City
U	Dataran Merdeka/ Merdeka Square

Demi menjimatkan masa. Cikgu Sharil bercadang pergi ke Stadium melalui Bandar Sialang manakala Cikgu Chong bercadang melalui Hotel Rainbow. Pada pendapat anda, cadangan siapakah yang lebih baik? Berikan justifikasi anda.

[3 markah]

For the sake of saving time, Mr Sharil suggested to the stadium via Sialang City whereas Mr Chong suggested to pass through the Rainbow Hotel. In your opinion, whose suggestion is better? Give your justification.

[3 marks]

Jawapan / Answer :

- (d) Cikgu Sharil akan bersara dalam tempoh 10 tahun dan beliau bercadang untuk menyimpan wang untuk simpanan persaraannya. Beliau menyimpan RM 20 000 pada tahun ini dalam akaun simpanan tetap di Bank Asia selama 2 tahun dengan kadar faedah 6% setahun. Hitung perbezaan di antara jumlah faedah yang diperoleh Cikgu Sharil jika beliau diberikan faedah kompaun (dengan pengkompaunan 4 bulan sekali) berbanding dengan faedah mudah.

[4 markah]

Mr Sharil will retire in 10 years and he decides to save money for his retirement fund. He saves RM 20 000 for this year in the account at Asia Bank for 2 years with an interest rate of 6% per annum. Calculate the difference between the total interest obtained by Mr Sharil if he is given an interest compound (with compounded once every 4 months) compare to the simple interest.

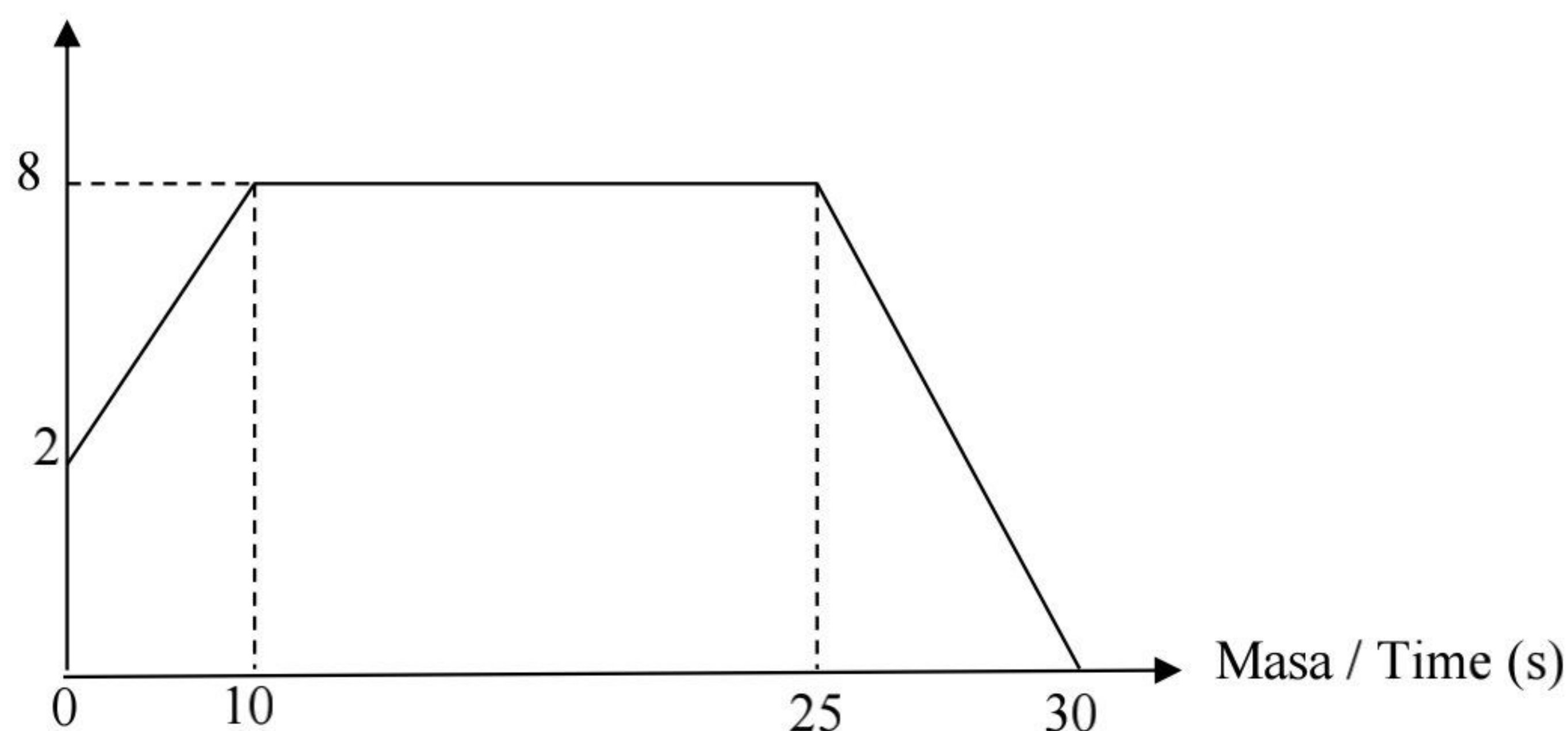
[4 marks]

Jawapan / Answer :

- 17 (a) Encik Kamil merupakan seorang jurulatih pasukan olahraga SMK Seri Intan. Beliau telah membuat persiapan untuk Hari Sukan yang akan datang. Graf di bawah menunjukkan graf laju-masa bagi gerakan seorang atlet dalam suatu latihan lari pecut.

Encik Kamil is a coach of SMK Seri Intan athletic team. He has made preparations for the upcoming Sports Day. The graph below shows the speed-time graph of the motion of an athlete in a sprint training.

Laju / Speed (ms^{-1})



Rajah / Diagram 11

- (i) Nyatakan laju seragam, dalam ms^{-1} , atlet itu. Seterusnya hitung kadar perubahan laju, dalam m s^{-2} , atlet itu dalam tempoh 10 saat yang pertama.

State the uniform speed, in ms^{-1} , of the athlete. Hence calculate the rate of change of speed, in m s^{-2} , of the athlete?

[3 markah/marks]

- (ii) Tempoh masa, t , bagi seorang atlet untuk berhenti adalah berubah secara langsung dengan kuasa dua laju, v dan berubah secara songsang dengan jarak yang dilalui, s . Diberi $t = 15 \text{ s}$, $v = 10 \text{ ms}^{-1}$ dan $s = 36 \text{ m}$. Hitung nilai s apabila $t = 20$, $v = 8 \text{ ms}^{-1}$.

Time taken, t , by an athlete to stop varies directly as the square of velocity, v and varies inversely as the distance travelled, s . Given $t = 15 \text{ s}$, $v = 10 \text{ ms}^{-1}$, and $s = 36 \text{ m}$. Calculate the value of s when $t = 20 \text{ s}$, $v = 8 \text{ ms}^{-1}$.

[2 markah/marks]

- 17 (b) Gambarajah Venn di bawah menunjukkan bilangan murid yang menyertai beberapa acara balapan yang di pertandingan sewaktu sukan tahunan.

The Venn diagram below shows the number of students who participate in some of the events that are contested during the annual sports.

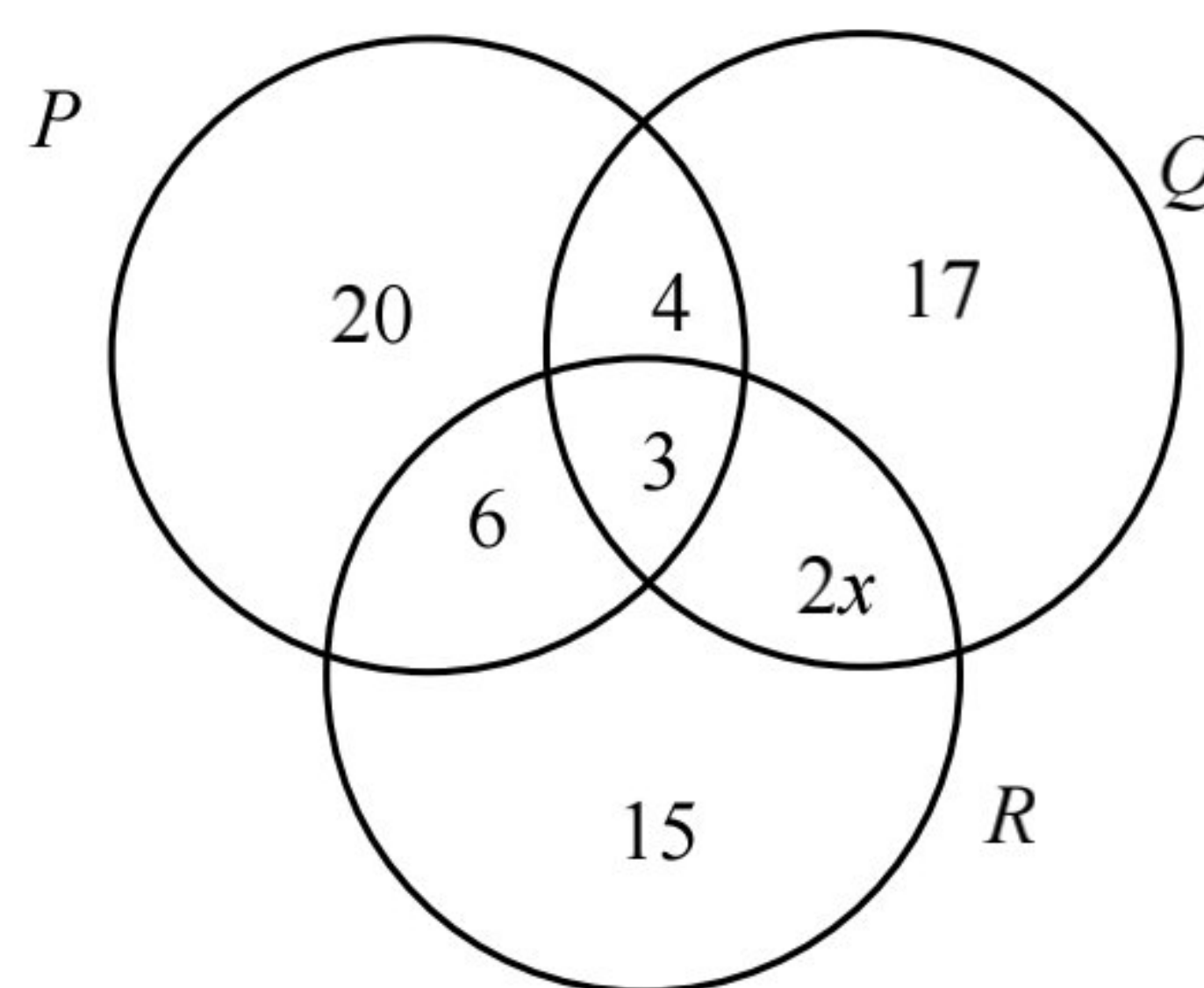
$P = \{\text{Acara 100 m / 100 m event}\}$

$Q = \{\text{Acara 400 m / 400 m event}\}$

$R = \{\text{Acara 800 m / 800 m event}\}$

dan set semesta, $\xi = P \cup Q \cup R$

and universal set, $\xi = P \cup Q \cup R$



- (i) Berdasarkan acara balapan yang di pertandingan, senaraikan acara balapan tersebut.

Based on the events that are contested, list the events.

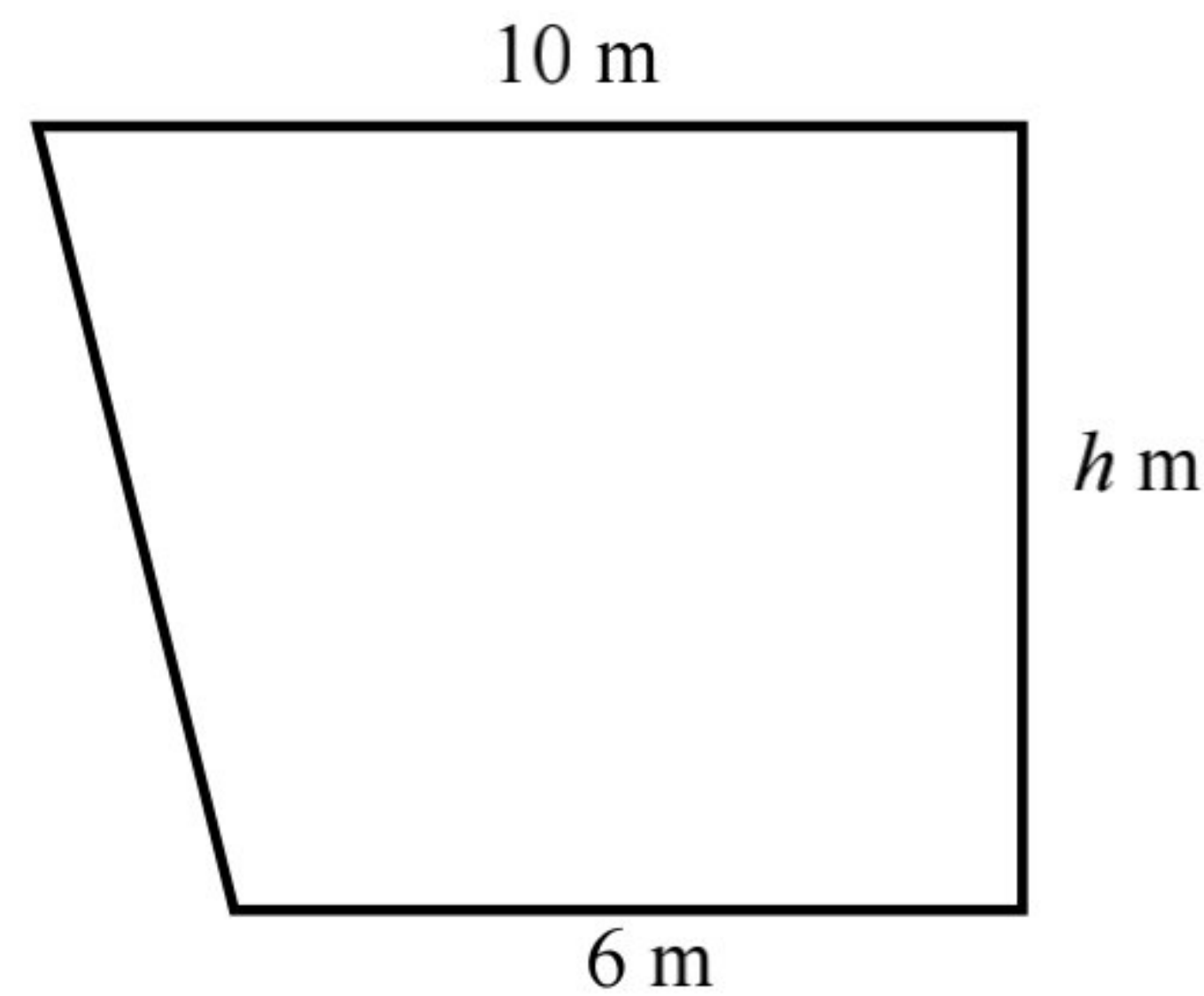
[1 markah /mark]

- (ii) Jika bilangan murid yang mengambil bahagian dalam acara 400 m dan 800 m ialah 11 orang. Cari nilai x . Seterusnya tentukan bilangan murid yang mengambil bahagian dalam dua acara sahaja.

If the number of students participating in the 400 m and 800 m events is 11 people. Find the value of x . Hence, determine how many the number of students who participated in two events only.

[3 markah /marks]

- 17 (c) Semua atlet telah ditempatkan seperti yang ditunjukkan di gambar rajah di bawah.
All the athletes were placed as shown in the diagram below.



Diberi bahawa luas trapezium ialah 40 m^2 . Hitung nilai h , dalam m.
Given that the area of trapezium is 40 m^2 . Calculate the value of h , in m.

[2 markah/marks]

- (d) Encik Kamil mempunyai sebuah kereta berusia 8 tahun, Encik Kamil bercadang untuk membeli sebuah kereta baru untuk menghantar beberapa atlet ke MSSJ yang akan diadakan pada 2 minggu yang akan datang. Encik Kamil membeli sebuah kereta bernilai RM 84 000. Dia telah membayar wang pendahuluan sebanyak 10% dan bakinya mendapat pinjaman daripada sebuah bank unuk tempoh 7 tahun dengan kadar faedah sama rata 2.96%.

Encik Kamil owns an 8 years-old car, Encik Kamil plans to buy a new car to send some athletes to the MSSJ that will be held in the next 2 weeks. Encik Kamil bought a car worth RM 84 000. He paid 10% down payment and got a loan for the balance from a bank for a period of 7 years with a flat interest rate of 2.96% per annum.

Hitung,
Calculate,

- (i) wang pendahuluan yang perlu dibayar oleh Encik Kamil.
the down payment that Encik Kamil have to pay.
[1 markah / mark]
- (ii) jumlah bayaran balik yang perlu dibayar oleh Encik Kamil bagi pinjaman tersebut.
Total repayment to be paid by Encik Kamil for the loan.
[2 markah/marks]
- (iii) Bayaran ansuran bulanan yang perlu dibayar oleh Encik Kamil ?
The monthly instalment payable by Encik Kamil ?
[1 markah / mark]

Jawapan / *Answer* :

(a) (i)

(ii)

(b) (i)

(ii)

(c)

(d) (i)

(ii)

(iii)

KERTAS PEPERIKSAAN TAMAT
END OF QUESTION PAPER