

Nama: \_\_\_\_\_ Kelas: \_\_\_\_\_

**SULIT**  
**1449/2**  
**Matematik**  
**Kertas 2**  
**Ogos**  
**2026**  
 $2\frac{1}{2}$  jam



**MAKTAB RENDAH SAINS MARA**

**PEPERIKSAAN AKHIR SIJIL PENDIDIKAN MRSMA 2026**

**MATEMATIK**

Kertas 2

Dua jam tiga puluh minit

**JANGAN BUKA KERTAS  
PEPERIKSAAN INI  
SEHINGGA DIBERITAHU**

1. Tuliskan **nama** dan **kelas** anda pada ruang yang disediakan.
2. Kertas peperiksaan ini mengandungi **tiga** bahagian: **Bahagian A, Bahagian B dan Bahagian C.**
3. Jawapan hendaklah ditulis pada ruang jawapan yang disediakan di dalam kertas peperiksaan ini.
4. Kertas peperiksaan ini adalah dalam dwibahasa.
5. Jawapan boleh ditulis dalam bahasa Melayu atau bahasa Inggeris.
6. Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.
7. Kerja mengira anda mesti ditunjukkan.
8. **Kertas peperiksaan** ini hendaklah diserahkan kepada pengawas peperiksaan pada akhir peperiksaan.

| Bahagian      | Soalan | Markah Penuh | Markah Diperoleh |
|---------------|--------|--------------|------------------|
| <b>A</b>      | 1      | 4            |                  |
|               | 2      | 3            |                  |
|               | 3      | 4            |                  |
|               | 4      | 4            |                  |
|               | 5      | 4            |                  |
|               | 6      | 4            |                  |
|               | 7      | 4            |                  |
|               | 8      | 5            |                  |
|               | 9      | 4            |                  |
|               | 10     | 4            |                  |
| <b>B</b>      | 11     | 9            |                  |
|               | 12     | 9            |                  |
|               | 13     | 9            |                  |
|               | 14     | 8            |                  |
|               | 15     | 10           |                  |
| <b>C</b>      | 16     | 15           |                  |
|               | 17     | 15           |                  |
| <b>Jumlah</b> |        |              |                  |

Kertas peperiksaan ini mengandungi 53 halaman bercetak

### NOMBOR DAN OPERASI NUMBER AND OPERATIONS

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

### PERKAITAN DAN ALGEBRA RELATIONSHIP AND ALGEBRA

- |                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                               |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1 Jarak / <i>Distance</i> = <math>\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}</math></p> <p>2 Titik Tengah / <i>Midpoint</i><br/> <math>(x, y) = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)</math></p> <p>3 Laju Purata = <math>\frac{\text{Jumlah jarak}}{\text{Jumlah masa}}</math><br/> <i>Average speed</i> = <math>\frac{\text{Total distance}}{\text{Total time}}</math></p> | <p>4 <math>m = \frac{y_2 - y_1}{x_2 - x_1}</math></p> <p>5 <math>m = -\frac{\text{pintasan} - y}{\text{pintasan} - x}</math><br/> <math>m = -\frac{\text{y-intercept}}{\text{x-intercept}}</math></p> <p>6 <math>A^{-1} = \frac{1}{ad - bc} \begin{pmatrix} d &amp; -b \\ -c &amp; a \end{pmatrix}</math></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  $= \pi d = 2\pi r$   
*Circumference of circle*  $= \pi d = 2\pi r$
- 4 Luas bulatan  $= \pi r^2$   
*Area of circle*  $= \pi r^2$
- 5  $\frac{\text{Panjang lengkok}}{2\pi r} = \frac{\theta}{360^\circ}$   
*Arc length*  $= \frac{\theta}{360^\circ}$
- 6  $\frac{\text{Luas sektor}}{\pi r^2} = \frac{\theta}{360^\circ}$   
*Area of sector*  $= \frac{\theta}{360^\circ}$
- 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 Isi padu prisma  $=$  luas keratan rentas  $\times$  tinggi  
*Volume of prism*  $= \text{cross sectional area} \times \text{height}$
- 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*  $= \frac{1}{3} \pi r^2 h$

[Lihat halaman sebelah  
**SULIT**]

- 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,  $k = \frac{PA'}{PA}$   
*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  $P(A') = 1 - P(A)$

**SULIT**

**HALAMAN KOSONG**  
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**SULIT**

**Bahagian A**

[40 markah]

Jawab **semua** soalan.

- 1** Helina membeli satu polisi insurans hayat daripada Syarikat Insurans Teguh dengan nilai muka RM250 000. Beliau membayar premium sebanyak RM120 setiap bulan. Polisi tersebut turut menyatakan peruntukan deduktibel sebanyak RM500 bagi setiap tuntutan perubatan.

*Helina purchased a life insurance policy from Syarikat Insurans Teguh with a face value of RM250 000. She pays a premium of RM120 every month. The policy also states a deductible allocation of RM500 for each medical claim.*

- (a) (i) Berapakah nilai premium tahunan yang perlu dibayar oleh Helina?  
*How much is the annual premium to be paid by Helina?*

- (ii) Nyatakan satu risiko yang diinsuranskan oleh Helina dalam polisi ini.

*State a risk insured by Helina in this policy.*

[2 markah]

[2 marks]

Jawapan / Answer:

- (a) (i)

- (ii)

- (b) Jika Helina dimasukkan ke hospital dengan kos rawatan sebanyak RM4 800, berapakah jumlah pampasan yang akan dibayar oleh syarikat insurans jika kos tersebut dilindungi di bawah polisi beliau?

*If Helina is admitted to the hospital with a treatment cost of RM4 800, how much compensation will the insurance company pay if the cost is covered under her policy?*

[2 markah]

[2 marks]

Jawapan / Answer:

(b)

- 2 (a) Pada ruang jawapan, lengkapkan Jadual 1 bagi fungsi  $P = \frac{150}{W}$  untuk  $5 \leq W \leq 30$ .

*In the answer space, complete Table 1 for the function  $P = \frac{150}{W}$  for  $5 \leq W \leq 30$ .*

[1 markah]

[1 mark]

Jawapan / Answer:

(a)

|     |    |    |    |    |    |    |
|-----|----|----|----|----|----|----|
| $W$ | 5  | 10 | 15 | 20 | 25 | 30 |
| $P$ | 30 |    | 10 |    | 6  | 5  |

Jadual 1  
Table 1

- (b) Seterusnya, lukis graf bagi  $P = \frac{150}{W}$  untuk  $5 \leq W \leq 30$ .

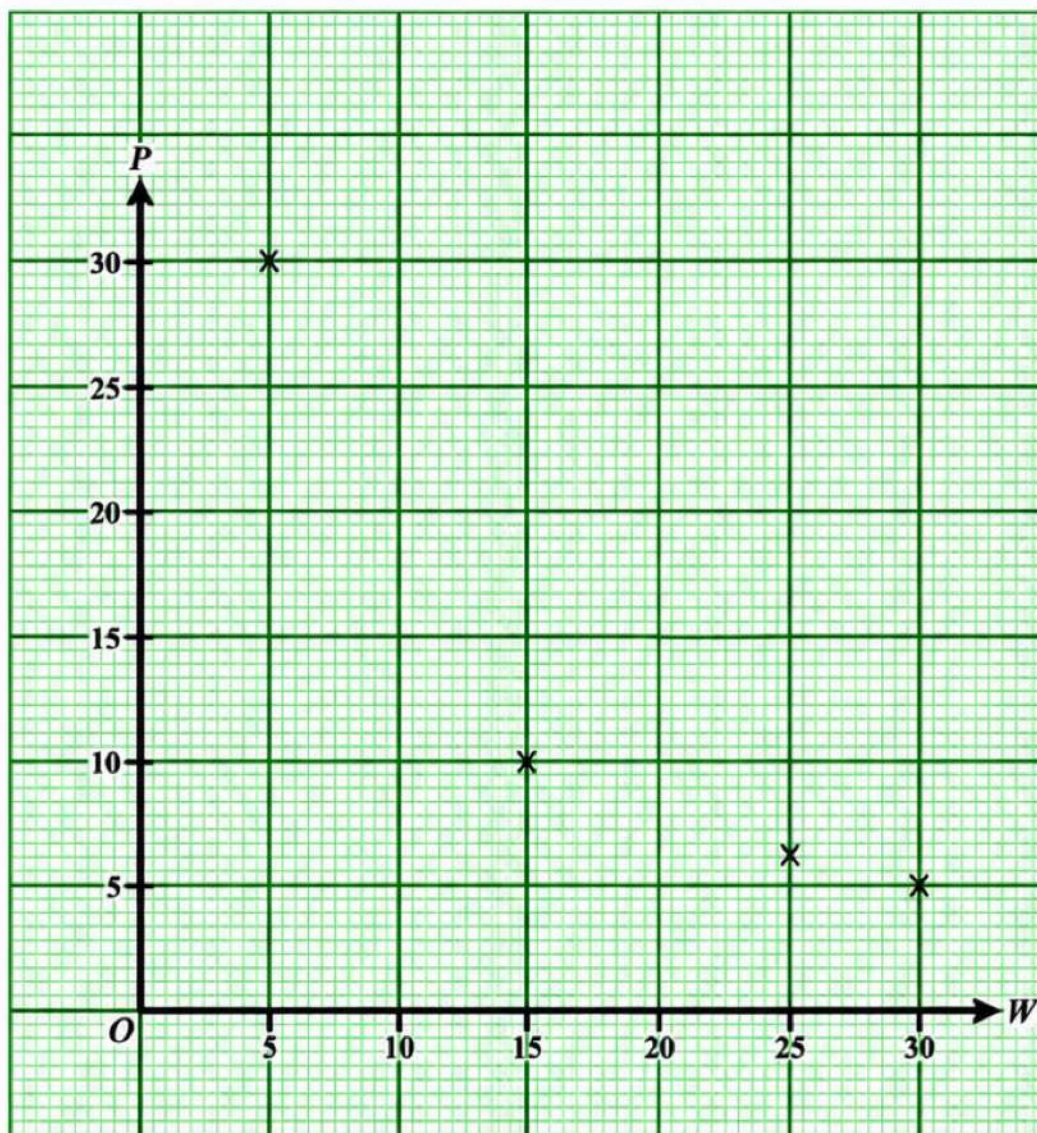
Hence, draw the graph of  $P = \frac{150}{W}$  for  $5 \leq W \leq 30$ .

[2 markah]

[2 marks]

Jawapan / Answer:

(b)



[Lihat halaman sebelah

- 3 (a) Tuliskan penafian bagi pernyataan berikut, seterusnya nyatakan nilai kebenarannya.

*Write the negation of the following statement, hence state its truth value.*

12 ialah faktor sepunya terbesar (FSTB) bagi 28 dan 42.

*12 is the highest common factor (HCF) of 28 and 42.*

[2 markah]

[2 marks]

- (b) Nyatakan sama ada hujah berikut sah dan munasabah. Sekiranya tidak, berikan justifikasi anda.

*State whether the following arguments are valid and sound. If it is not, justify your answer.*

Premis 1 : Jika  $q$  ialah nombor perdana, maka  $q$  ialah nombor nisbah.

*Premise 1 : If  $q$  is a prime number, then  $q$  is a rational number.*

Premis 2 : 12 ialah nombor perdana.

*Premise 2 : 12 is a prime number.*

Kesimpulan : 12 ialah nombor nisbah.

*Conclusion : 12 is a rational number.*

[2 markah]

[2 marks]

Jawapan / Answer:

(a)

(b)

- 4 (a) Apakah fungsi cukai pintu?

*What is the function of property assessment tax?*

[1 markah]

[1 mark]

- (b) Nurita memiliki sebuah rumah dan sewa rumah itu dianggarkan pada harga RM1 200 sebulan. Cukai pintu yang perlu dibayar oleh Nurita untuk setiap setengah tahun ialah RM288.

Hitung kadar cukai pintu yang perlu dibayar olehnya.

*Nurita owns a house and the rent of the house is estimated at RM1 200 per month. The property assessment tax payable by Nurita for each half-year is RM288.*

*Calculate the property assessment tax rate payable by her.*

[3 markah]

[3 marks]

Jawapan / Answer:

(a)

(b)

[Lihat halaman sebelah

- 5 Dalam satu eksperimen sains, masa yang diambil oleh sejenis cecair untuk menyejuk,  $t$  minit, berubah secara songsang dengan punca kuasa tiga isipadu cecair,  $V \text{ cm}^3$ . Diberi bahawa masa penyejukan ialah 15 minit apabila isipadu cecair ialah  $343 \text{ cm}^3$ .

Ungkapkan  $t$  dalam sebutan  $V$ . Seterusnya, hitung isipadu cecair apabila masa penyejukan ialah 5 minit.

*In a science experiment, the time taken for a certain liquid to cool,  $t$  minutes, varies inversely as the cube root of the volume of the liquid,  $V \text{ cm}^3$ . Given that the cooling time is 15 minutes when the volume of the liquid is  $343 \text{ cm}^3$ .*

*Express  $t$  in terms of  $V$ . Hence, calculate the volume of the liquid when the cooling time is 5 minutes.*

[4 markah]

[4 marks]

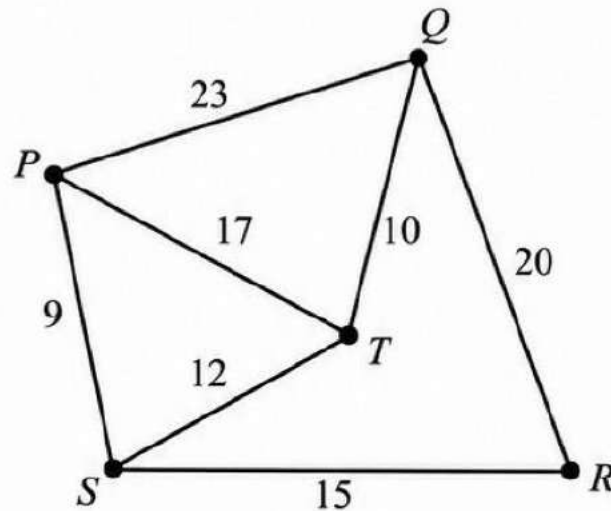
Jawapan / Answer:

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- 6 Rajah 1 menunjukkan suatu graf tak terarah dan berpemberat.

*Diagram 1 shows an undirected and weighted graph.*



Rajah 1  
*Diagram 1*

- (a) Senaraikan set tepi,  $E$ .  
*List the set of edges,  $E$ .*

[1 markah]

[1 mark]

- (b) Lengkapkan Rajah 1.1 di ruang jawapan dengan melukis satu pokok dengan jumlah nilai pemberat yang minimum. Seterusnya, nyatakan nilai minimum itu.

*Complete Diagram 1.1 in the answer space by drawing a tree with a minimum total weight. Hence, state the minimum value.*

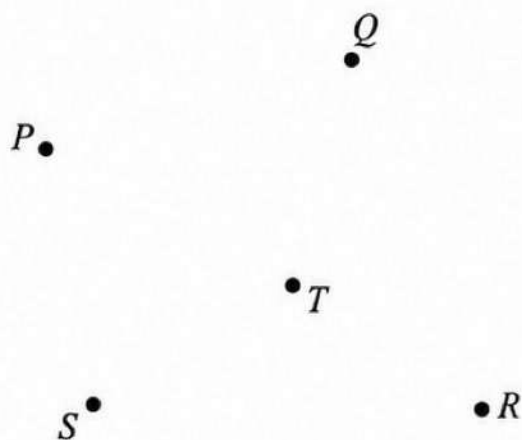
[3 markah]

[3 marks]

Jawapan / Answer:

(a)

(b)



Rajah 1.1  
Diagram 1.1

Jumlah pemberat minimum : \_\_\_\_\_

The minimum total weight : \_\_\_\_\_

[Lihat halaman sebelah

- 7 Pada suatu lukisan berskala, 20 m diwakili oleh 5 cm.

*On a scale drawing, 20 m is represented by 5 cm.*

- (a) Tentukan skala lukisan tersebut dalam bentuk  $1:n$ .

*State the scale of the drawing in the form of  $1:n$ .*

[2 markah]

[2 marks]

- (b) Jika tinggi sebuah bangunan ialah 60 m, hitung tinggi, dalam cm, lukisan berskala bangunan itu.

*If the height of a building is 60 m, calculate the height, in cm, of the scale drawing of the building.*

[2 markah]

[2 marks]

Jawapan / Answer:

(a)

(b)

**HALAMAN KOSONG**  
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- 8 Jadual 2 di ruang jawapan menunjukkan data bagi masa menunggu pesanan, dalam minit, bagi 40 orang pelanggan di Kedai Kopi Ngopi.

*Table 2 in the answer space shows the order waiting time data in minutes, for 40 customers at Kedai Kopi Ngopi.*

- (a) Lengkapkan Jadual 2 di ruang jawapan.

*Complete Table 2 in the answer space.*

[1 markah]

[1 mark]

- (b) Untuk ceraian soalan ini, gunakan kertas graf yang disediakan di halaman 19.

*For this part of the question, use the graph paper provided on page 19.*

Menggunakan skala 2 cm kepada 3 minit pada paksi mengufuk dan 2 cm kepada 5 pelanggan pada paksi mencancang, lukis ogif bagi data tersebut.

*Using a scale of 2 cm to 3 minutes on the horizontal axis and*

*2 cm to 5 customers on the vertical axis, draw an ogive for the data.*

[4 markah]

[4 marks]

Jawapan / Answer:

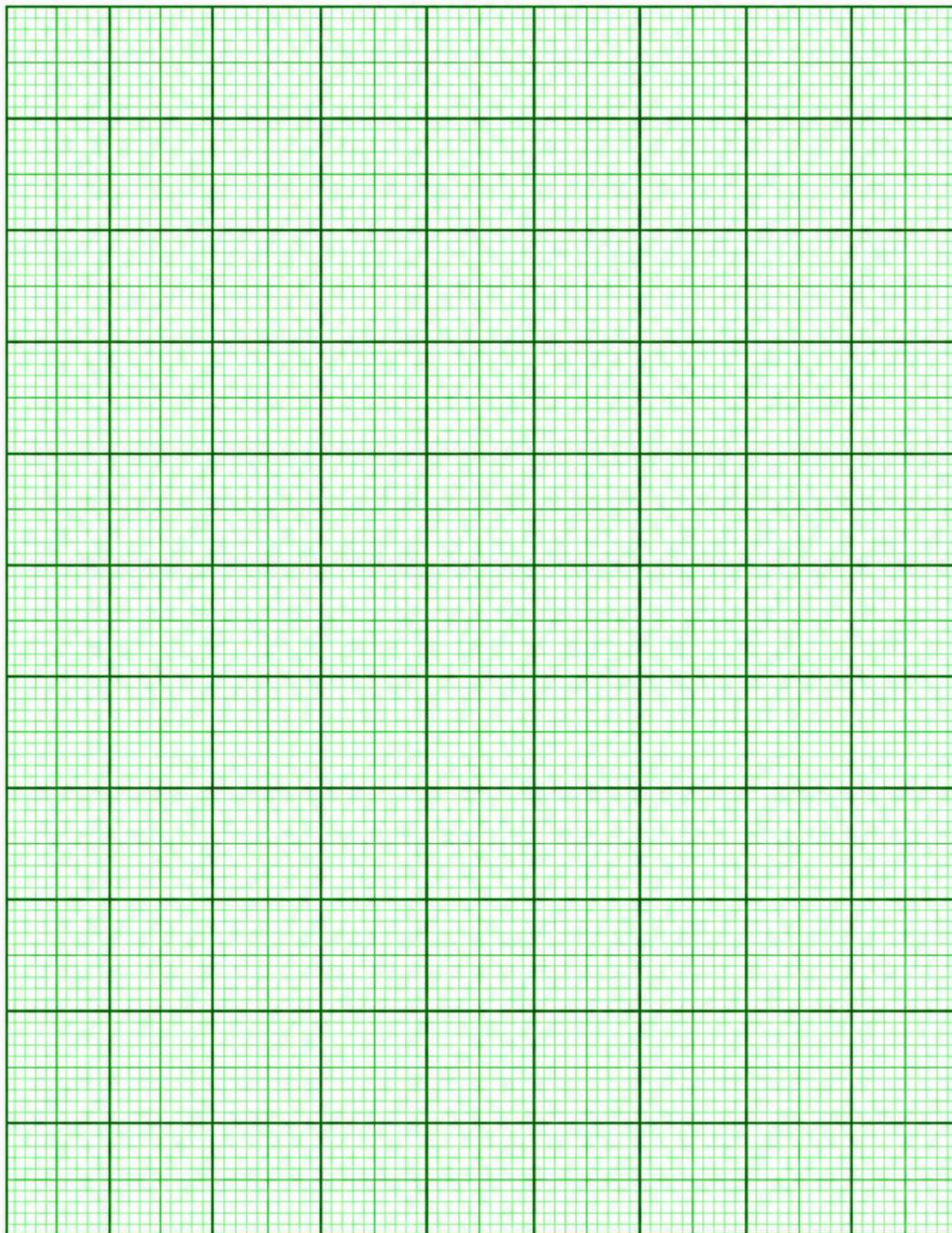
- (a)

| <b>Masa (minit)</b><br><i>Time</i><br><i>(minutes)</i> | <b>Bilangan pelanggan</b><br><i>Number of</i><br><i>customers</i> | <b>Kekerapan Longgokan /</b><br><i>Cumulative</i><br><i>Frequency</i> | <b>Sempadan atas /</b><br><i>Upper</i><br><i>boundary</i> |
|--------------------------------------------------------|-------------------------------------------------------------------|-----------------------------------------------------------------------|-----------------------------------------------------------|
| 0 – 2                                                  | 0                                                                 | 0                                                                     |                                                           |
| 3 – 5                                                  | 3                                                                 | 3                                                                     |                                                           |
| 6 – 8                                                  | 5                                                                 | 8                                                                     |                                                           |
| 9 – 11                                                 | 8                                                                 | 16                                                                    |                                                           |
| 12 – 14                                                | 14                                                                | 30                                                                    |                                                           |
| 15 – 17                                                | 8                                                                 | 38                                                                    |                                                           |
| 18 – 20                                                | 2                                                                 | 40                                                                    |                                                           |

Jadual 2

*Jadual 2*

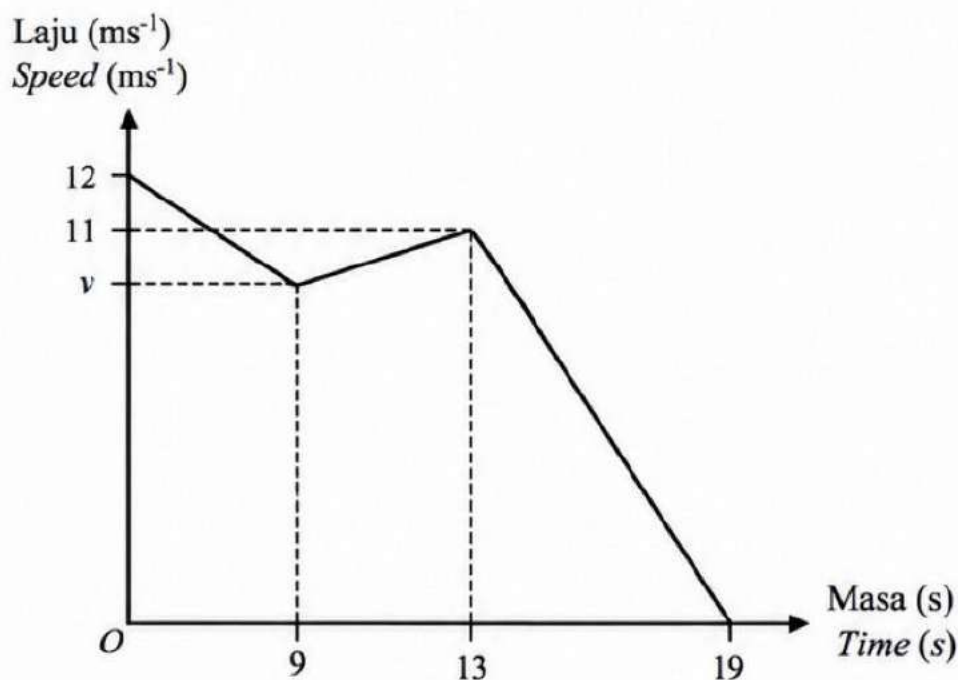
Graf untuk soalan 8(b)  
*Graph for question 8(b)*



[Lihat halaman sebelah

- 9 Rajah 2 menunjukkan graf laju-masa bagi gerakan suatu zarah dalam tempoh 19 saat.

*Diagram 2 shows the speed-time graph for the motion of a particle for a period of 19 seconds.*



Rajah 2  
Diagram 2

- (a) Nyatakan tempoh masa, dalam saat, apabila zarah itu memecut.

*State the duration of time, in seconds, when the particle accelerates.*

[1 markah]

[1 mark]

- (b) Hitung nilai  $v$ , dalam  $\text{ms}^{-1}$ , jika jumlah jarak yang dilalui oleh zarah itu untuk tempoh 13 saat yang pertama ialah 134.5 m.

*Calculate the value of  $v$ , in  $\text{ms}^{-1}$ , if the total distance travelled by the particle for the first 13 seconds is 134.5 m.*

[3 markah]

[3 marks]

Jawapan / *Answer*:

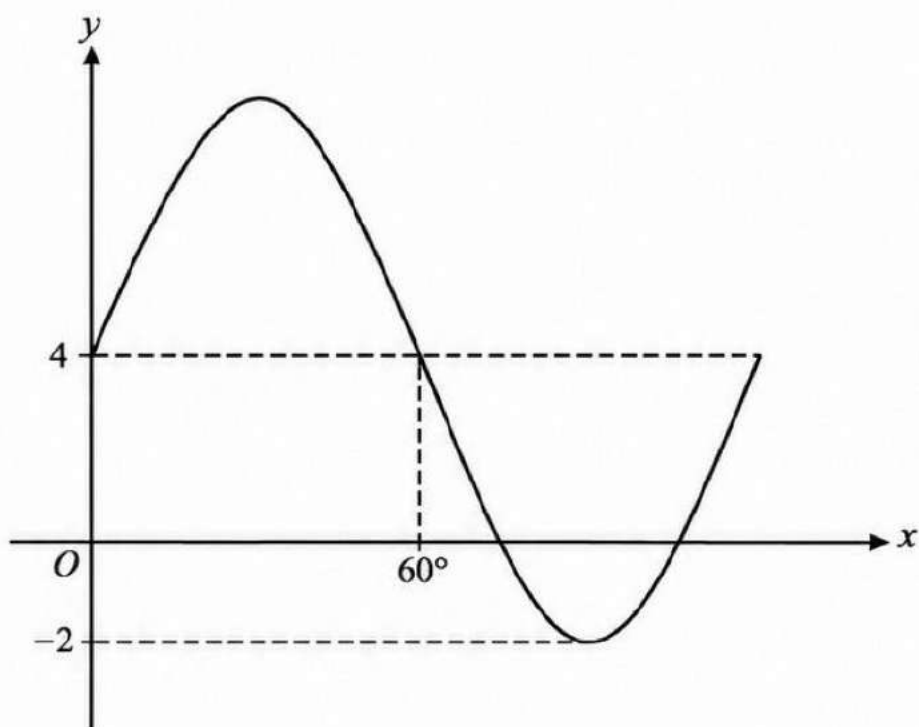
(a)

(b)

[Lihat halaman sebelah

- 10 Rajah 3 menunjukkan graf fungsi  $y = a \sin bx + c$  bagi  $0^\circ \leq x \leq 360^\circ$ .

Diagram 3 shows the graph of function  $y = a \sin bx + c$  for  $0^\circ \leq x \leq 360^\circ$ .



Rajah 3  
Diagram 3

- (a) Nyatakan amplitud bagi graf tersebut.

State the amplitude of the graph.

[1 markah]

[1 mark]

- (b) Tulis fungsi graf itu dalam bentuk  $y = a \sin bx + c$ . Seterusnya, hitung nilai  $y$  apabila  $x = 45^\circ$ .

Write a function in the form  $y = a \sin bx + c$ . Hence, calculate the value of  $y$  when  $x = 45^\circ$ .

[3 markah]

[3 marks]

Jawapan / *Answer*:

(a)

(b)

[Lihat halaman sebelah

**Bahagian B**

[45 markah]

**Jawab semua soalan.**

- 11 (a) Diberi set semesta,  $\xi = \{x : x \text{ ialah integer, } 1 \leq x \leq 10\}$ ,  
set  $P = \{x : x \text{ ialah nombor kuasa dua sempurna}\}$ ,  
set  $Q = \{x : x \text{ ialah faktor perdana bagi } 12\}$  dan  
set  $R = \{3, 6, 9\}$ .

*Given the universal set,  $\xi = \{x : x \text{ is an integer, } 1 \leq x \leq 10\}$ ,  
set  $P = \{x : x \text{ is a perfect square number}\}$ ,  
set  $Q = \{x : x \text{ is a prime factor of } 12\}$  and  
set  $R = \{3, 6, 9\}$ .*

- (i) Senaraikan unsur-unsur bagi set  $P$  dan set  $Q$  dengan menggunakan tatatanda set.

*List the elements of set  $P$  and set  $Q$  by using the set notation.*

[2 markah]

[2 marks]

- (ii) Lukis satu gambar rajah Venn untuk mewakili set semesta, set  $P$ , set  $Q$  dan set  $R$ .

*Draw a Venn diagram to represent the universal set, set  $P$ , set  $Q$  and set  $R$ .*

[3 markah]

[3 marks]

Jawapan / *Answer*:

(a) (i)  $P =$

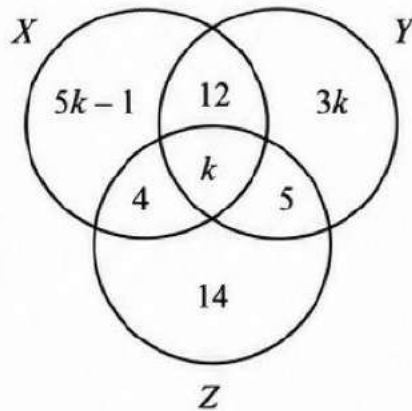
$$Q =$$

(ii)

[Lihat halaman sebelah

- (b) Rajah 4 ialah gambar rajah Venn yang menunjukkan set  $X$ , set  $Y$  dan set  $Z$  dengan keadaan set semesta,  $\xi = X \cup Y \cup Z$ .

Diagram 4 is a Venn diagram which shows set  $X$ , set  $Y$  and set  $Z$  such that the universal set,  $\xi = X \cup Y \cup Z$ .



Rajah 4  
Diagram 4

Diberi bahawa  $n(X) = n(Z)$ , hitung

Given that  $n(X) = n(Z)$ , calculate

- (i) nilai  $k$ ,  
value of  $k$ ,
- (ii)  $n(X \cup Z \cap Y)$ .

[4 markah]

[4 marks]

Jawapan / Answer:

(b) (i)

(ii)

- 12 (a) Nyatakan satu ciri teselasi.  
*State one property of tessellation.*

[1 markah]

[1 mark]

- (b) Nyatakan koordinat imej bagi  $(4, 6)$  di bawah translasi  $\begin{pmatrix} 3 \\ -3 \end{pmatrix}$ .

*State the coordinates of the image of  $(4, 6)$  under a translation  $\begin{pmatrix} 3 \\ -3 \end{pmatrix}$ .*

[1 markah]

[1 mark]

Jawapan / Answer:

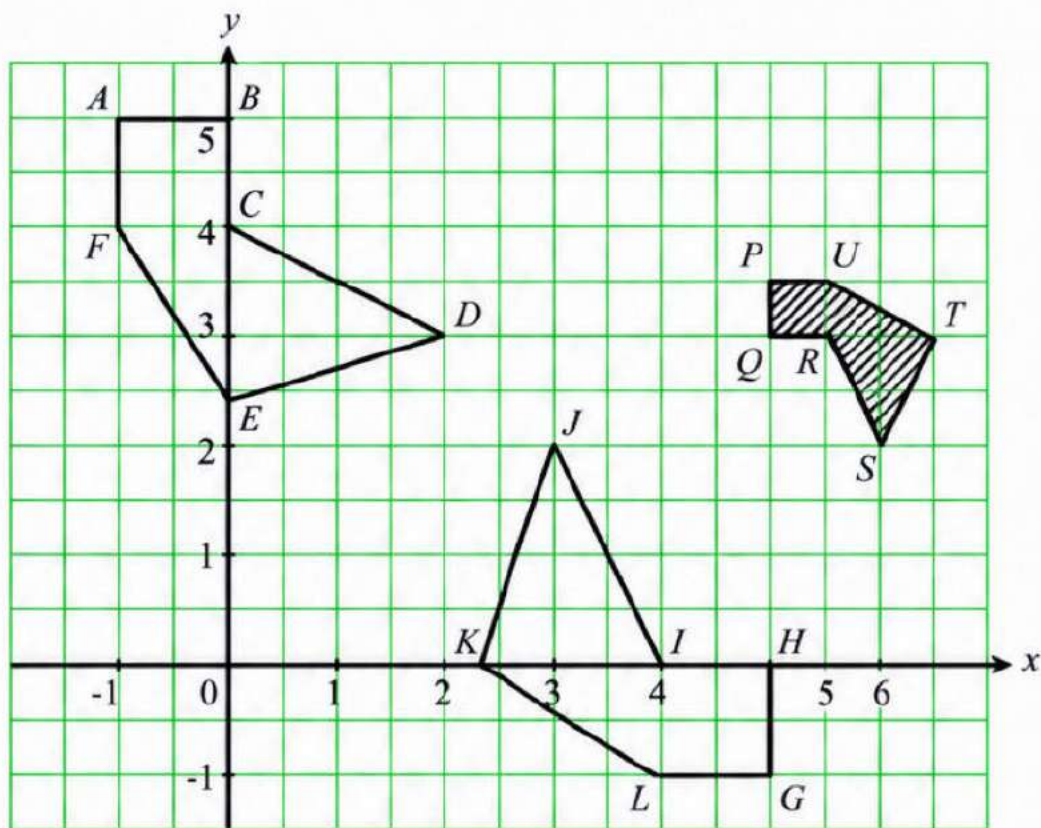
(a)

(b)

[Lihat halaman sebelah

- (c) Rajah 5 menunjukkan tiga heksagon  $ABCDEF$ ,  $GHIJKL$  dan  $PQRSTU$  dilukis pada suatu satah Cartes.

Diagram 5 shows three hexagons  $ABCDEF$ ,  $GHIJKL$  and  $PQRSTU$  are drawn on a Cartesian plane.



Rajah 5  
Diagram 5

- (i)  $GHIJKL$  ialah imej  $ABCDEF$  di bawah transformasi  $Y$ .  
 $PQRSTU$  ialah imej  $GHIJKL$  di bawah transformasi  $X$ .  
 Perihalkan selengkapnya transformasi

$GHIJKL$  is the image of  $ABCDEF$  under transformation  $Y$ .  
 $PQRSTU$  is the image of  $GHIJKL$  under transformation  $X$ .  
 Describe in full, the transformation

- (a)  $Y$   
 (b)  $X$

[5 markah]

[5 marks]

- (ii) Diberi luas heksagon  $ABCDEF$  ialah  $60 \text{ unit}^2$ .  
Hitung luas, dalam  $\text{unit}^2$ , kawasan yang berlorek.

*Given that the area of hexagon  $ABCDEF$  is  $60 \text{ unit}^2$ .*

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

[2 markah]

[2 marks]

Jawapan / Answer:

(c) (i) (a)  $Y =$

(b)  $X =$

(ii)

**HALAMAN KOSONG**  
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- 13 (a) Nyatakan dua jenis pelaburan.  
*State two types of investment.*

[2 markah]

[2 marks]

- (b) Asrul menyimpan wang sebanyak RM18 000 dalam akaun simpanan tetap di Bank *Q* pada awal suatu tahun dengan kadar faedah 4% setahun dan pengkompaunan setiap 3 bulan.

Hitung jumlah faedah yang diperoleh Asrul selepas setahun.

*Asrul saved RM18 000 in a fixed deposits account at Bank Q at the beginning of a year with an interest rate of 4% per annum and compounded every 3 months.*

*Calculate the total interest earned by Asrul after one year.*

[3 markah]

[3 marks]

Jawapan / Answer:

(a)

(b)

[Lihat halaman sebelah

- (c) Asrul membeli sebuah rumah dengan harga RM350 000 dan telah menjelaskan 10% wang pendahuluan. Dia menjual rumah tersebut pada harga RM600 000 setelah genap memiliki rumah tersebut selama 15 tahun dan mengharapkan pulangan sebanyak 40% dalam tempoh 15 tahun itu. Delkut tempoh tersebut, dia berjaya memperoleh sewa sebanyak RM80 000. Berikut ialah perbelanjaan-perbelanjaan lain yang terlibat. Jumlah ansuran yang telah dilunaskan kepada pihak bank ialah RM440 000. Lain-lain perbelanjaan ditunjukkan seperti dalam Jadual 3.

*Asrul bought a house at a price of RM350 000 and cleared a 10% down payment. He sold the house at a price of RM600 000 after having owned the house for 15 years and expects a return of 40% over 15 years. During that period, he managed to earn a rent of RM80 000. The total loan amount amortised to the bank was RM440 000. Other expenses incurred are as in Table 3.*

| <b>Perbelanjaan</b><br><i>Expeness</i>                                               | <b>Jumlah (RM)</b><br><i>Total (RM)</i> |
|--------------------------------------------------------------------------------------|-----------------------------------------|
| Duti setem (semasa urusan jual beli)<br><i>Stamp duty (during sale and purchase)</i> | 7 000                                   |
| Komisen ejen<br><i>Agent's commission</i>                                            | 5 000                                   |
| Kos guaman<br><i>Legal cost</i>                                                      | 9 000                                   |

Jadual 3

Table 3

Hitung nilai pulangan pelaburan Asrul. Adakah dia berjaya mencapai hasratnya untuk mendapatkan pulangan sebanyak 40% ?

*Calculate the return on investment for Asrul. Did he achieve his expectation to get a return of 40%?*

[4 markah]

[4 marks]

Jawapan / *Answer*:

(c)

- 14 Wafi ingin membeli nasi lemak,  $L$  atau nasi goreng,  $G$  untuk sarapan pagi. Dia juga akan memilih sama ada ayam goreng,  $A$  atau telur goreng,  $T$  sebagai tambahan dalam pesanannya. Diberi bahawa kebarangkalian Wafi membeli nasi goreng ialah  $\frac{4}{7}$  dan kebarangkalian dia memilih ayam goreng ialah  $\frac{2}{5}$ .

*Wafi wants to buy nasi lemak,  $L$  or fried rice,  $G$  for breakfast. He also will choose either fried chicken,  $A$  or fried egg,  $T$  as an add-on to his order. Given that the probability Wafi buys fried rice is  $\frac{4}{7}$  and the probability he chooses fried chicken is  $\frac{2}{5}$ .*

- (a) Lengkapkan gambar rajah pokok di ruang jawapan.

*Complete the tree diagram in the answer space.*

[3 markah]

[3 marks]

- (b) Hitung kebarangkalian bahawa Wafi memilih nasi lemak yang ditambah dengan telur goreng.

*Calculate the probability that Wafi chooses nasi lemak with fried egg.*

[2 markah]

[2 marks]

- (c) Hitung kebarangkalian bahawa Wafi memilih sarapan pagi dengan ayam goreng.

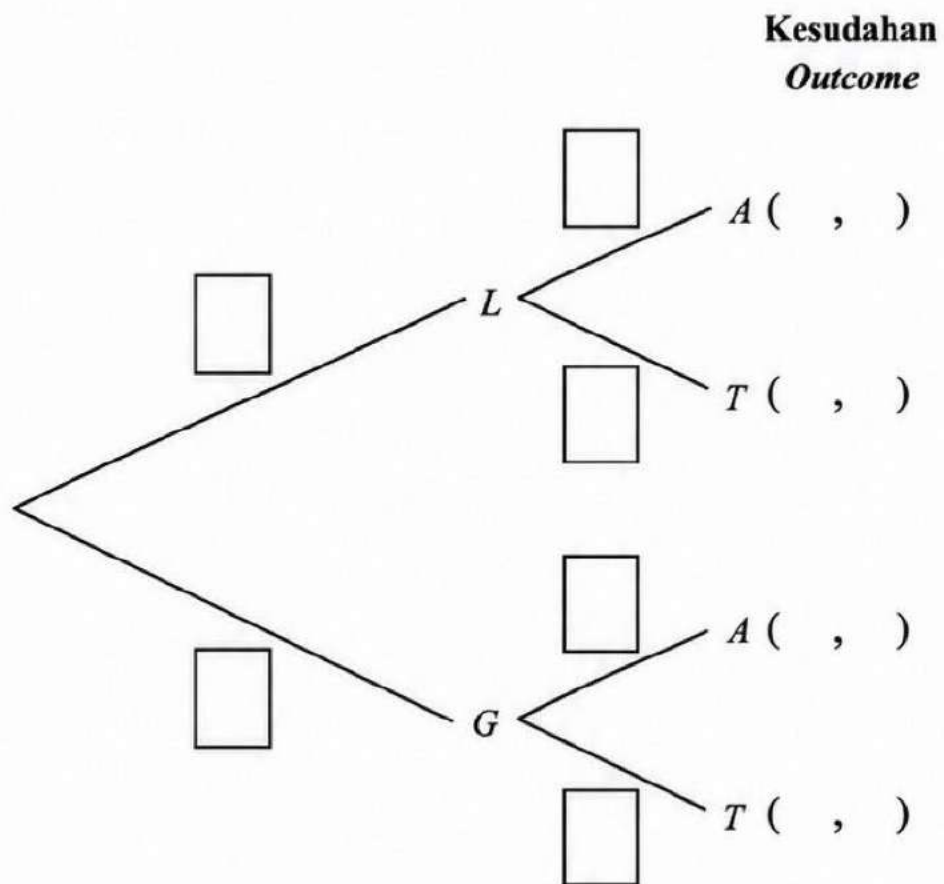
*Calculate the probability that Wafi chooses any breakfast menu with fried chicken.*

[3 markah]

[3 marks]

Jawapan / *Answer*:

(a)



(b)

(c)

[Lihat halaman sebelah

**SULIT**

- 15 Sakinah ingin mengadakan kelas intervensi matematik untuk murid tingkatan empat. Dia menetapkan selebih-lebihnya 30 orang murid boleh menyertai kelas ini dan bilangan murid lelaki mestilah lebih daripada separuh bilangan murid perempuan.

*Sakinah wants to organise a mathematics intervention class for form four pupils. She decides at most 30 pupils are allowed to participate in this class and the number of boys must be more than half of the number of girls.*

- (a) Menggunakan  $x$  untuk mewakili bilangan murid perempuan dan  $y$  untuk mewakili bilangan murid lelaki, tulis dua ketaksamaan linear selain daripada  $x \geq 0$  dan  $y \geq 0$  bagi mewakili situasi yang diberi.

*Using  $x$  to represent the number of girls and  $y$  to represent the number of boys, write two linear inequalities other than  $x \geq 0$  and  $y \geq 0$  to represent the given situation.*

[2 markah]

[2 marks]

- (b) Untuk ceraian soalan ini, gunakan kertas graf yang disediakan pada halaman 37. Dengan menggunakan skala 2 cm kepada 4 orang murid pada kedua-dua paksi, lukis dan lorek rantau yang memuaskan sistem ketaksamaan linear di 15(a).

*For this part of question, use the graph paper provided on page 37.*

*By using the scale of 2 cm to 4 pupils on both axes, draw and shade the region that satisfies the system of linear inequalities in 15(a).*

[4 markah]

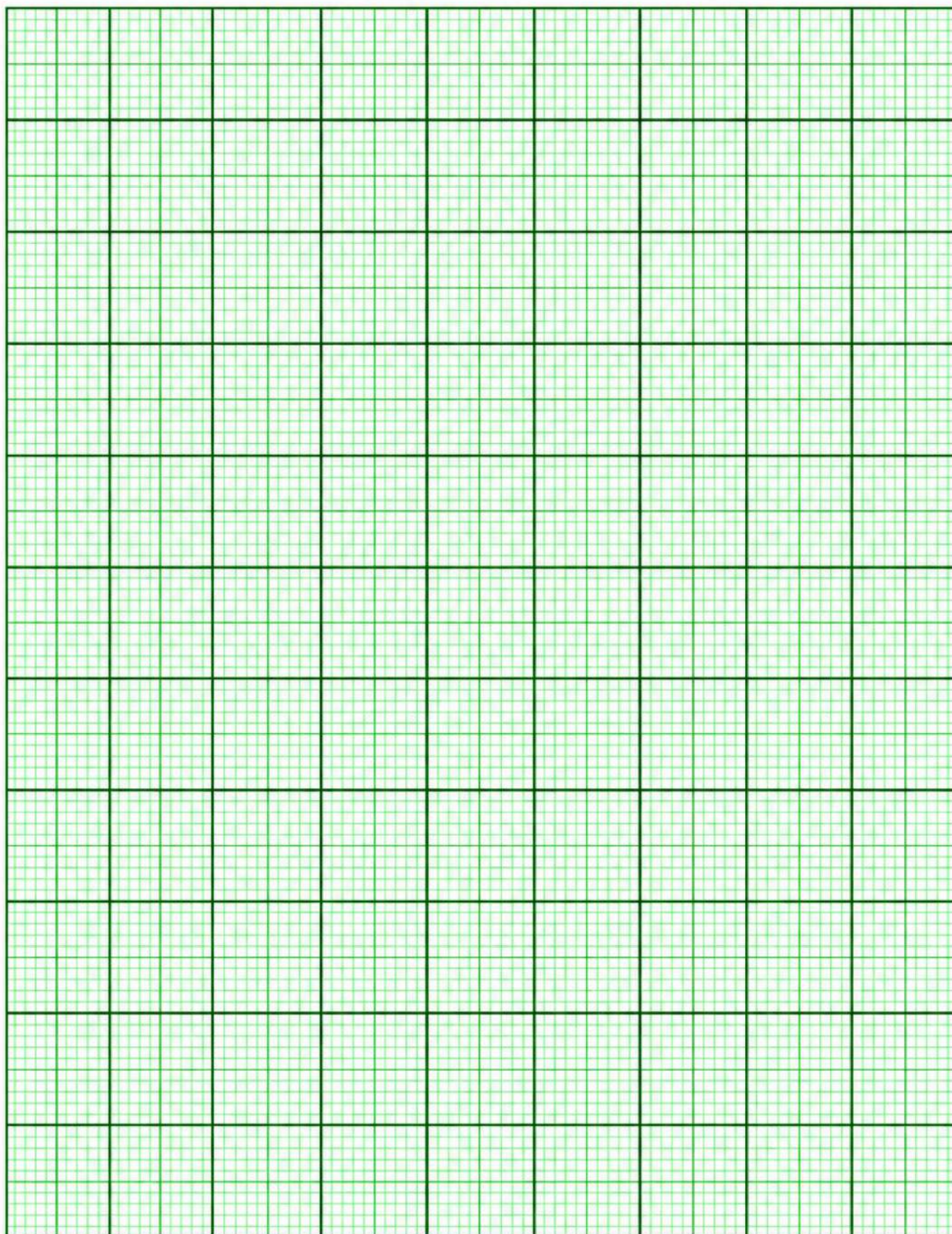
[4 marks]

Jawapan / Answer :

(a)

- (b) Rujuk graf di muka surat 37  
*Refer the graph on page 37*

Graf untuk soalan 15(b)  
*Graph for question 15(b)*



[Lihat halaman sebelah

- (c) Berdasarkan graf 15(b),  
*Based on graph in 15(b),*

- (i) tentukan bilangan minimum dan maksimum murid lelaki apabila  
murid perempuan ialah 12 orang.

*determine the minimum and maximum number of boys when the  
number of girls is 12.*

[2 markah]

[2 marks]

- (ii) jika 10 orang murid perempuan dan 4 orang murid lelaki ingin  
menyertai kelas tersebut, adakah syarat yang ditetapkan dipatuhi  
atau tidak?

Justifikasikan jawapan anda.

*if 10 girls and 4 boys want to join the class, does the condition is  
satisfied or not?*

*Justify your answer.*

[2 markah]

[2 marks]

Jawapan / Answer:

- (c) (i)

- (ii)

**HALAMAN KOSONG**  
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## Bahagian C

[15 markah]

Jawab **satu** soalan sahaja.

- 16 Muaz merupakan seorang pengurus Syarikat Dinamik.

*Muaz is a manager of Syarikat Dinamik.*

- (a) Satu pesta ria telah dianjurkan oleh Syarikat Dinamik. Rajah 6 menunjukkan sebuah peti besi milik syarikat tersebut yang mempunyai kod laluan. Muaz ingin menyimpan hasil keuntungan pesta ria di dalam peti besi itu.

*A funfair was organized by Syarikat Dinamik. Diagram 6 shows a safe belongs to the company that has a passcode. Muaz wanted to keep the profit of the funfair in the safe.*



Rajah 6  
Diagram 6

Kod laluan bagi peti tersebut adalah hasil tambah antara dua nombor berikut:

*The passcode for the safe is the sum of the two numbers below:*

|                   |
|-------------------|
| 1540 <sub>9</sub> |
|-------------------|

|                   |
|-------------------|
| 2800 <sub>9</sub> |
|-------------------|

Nyatakan kod laluan bagi peti besi tersebut dalam asas sepuluh.

*State the passcode for the safe in base ten.*

[3 markah]

[3 marks]

**Jawapan / Answer:**

**(a)**

- (b) Pendapatan bulanan Muaz ialah sebanyak RM5 700. Dia mempunyai perbelanjaan tetap sejumlah RM2 250 dan perbelanjaan tidak tetap sebanyak RM1 645 pada setiap bulan. Dia menyimpan 10% daripada pendapatannya sebagai dana kecemasan dan baki daripada aliran tunai bulanannya akan disimpan untuk membeli pakej pelancongan keluarga bernilai RM9 640. Hitung tempoh masa, dalam bulan, Muaz perlu menyimpan untuk membeli pakej pelancongan itu.

*Muaz's monthly income is RM5 700. He has fixed expenses of RM2 250 and variable expenses of RM1 645 each month. He saves 10% of his income as an emergency fund and the remaining balance of his monthly cash flow to purchase a family holiday package worth RM9 640. Calculate the period of time, in months, Muaz needs to save to purchase the holiday package.*

[4 markah]

[4 marks]

**Jawapan / Answer:**

(b)

- (c) Semasa melancong, Muaz ingin membeli 12 cenderahati untuk rakan-rakan sekerjanya. Dia bercadang untuk membelanjakan RM112 untuk membeli magnet peti sejuk dan t-shirt yang masing-masing berharga RM5.50 seunit dan RM17 sehelai. Menggunakan kaedah matriks, hitung bilangan magnet peti sejuk dan t-shirt yang akan dibeli oleh Muaz.

*While travelling, Muaz intends to buy 12 souvenirs for his colleagues. He plans to spend RM112 to buy fridge magnets and t-shirts which cost RM5.50 and RM17 respectively. Using the matrix method, calculate the number of fridge magnets and t-shirts that Muaz will buy.*

[5 markah]

[5 marks]

Jawapan / Answer:

(c)

- (d) Jadual 4 menunjukkan perbelanjaan harian Muaz sekeluarga semasa melancong.

*Table 4 shows the daily expenses of Muaz and his family during the vacation.*

| <b>Hari</b><br><i>Day</i> | <b>Perbelanjaan (RM)</b><br><i>Expenses (RM)</i> |
|---------------------------|--------------------------------------------------|
| Pertama<br><i>First</i>   | 550                                              |
| Kedua<br><i>Second</i>    | 480                                              |
| Ketiga<br><i>Third</i>    | 570                                              |
| Keempat<br><i>Fourth</i>  | 1 000                                            |
| Kelima<br><i>Fifth</i>    | 425                                              |

Jadual 4

*Table 4*

- (i) Hitung min perbelanjaan harian Muaz sekeluarga.

*Calculate the mean daily expenses of Muaz and his family.*

- (ii) Nyatakan sukatan kecenderungan memusat yang paling sesuai untuk mewakili perbelanjaan harian Muaz sekeluarga.

*State the most appropriate measure of central tendency to represent the daily expenses of Muaz and his family.*

[3 markah]

[3 marks]

Jawapan / *Answer*:

(d) (i)

(ii)

- 17 (a) Iskandar menetap di Terengganu dan mempunyai sebuah motosikal berkuasa tinggi. Dia ingin membeli satu polisi insurans motor dan Rajah 7 menunjukkan maklumat kenderaan yang ingin diinsuranskannya.

*Iskandar stays in Terengganu and has a high-powered motorcycle. He wants to buy a motorcycle insurance policy and Diagram 7 shows the information of the vehicle he wants to insure.*



|                                                                 |   |                 |
|-----------------------------------------------------------------|---|-----------------|
| Jumlah yang diinsuranskan<br><i>Sum insured</i>                 | : | RM98 000        |
| Umur kenderaan<br><i>Age of vehicle</i>                         | : | 3 tahun / years |
| Kapasiti enjin<br><i>Engine capacity</i>                        | : | 1977 cc         |
| Klausa Diskaun Tanpa Tuntutan<br><i>No Claim Discount (NCD)</i> | : | 30%             |

Rajah 7  
*Diagram 7*

Jadual 5 menunjukkan pengkadaran premium bawah Tarif Motor bagi polisi motor yang dikeluarkan di Semenanjung Malaysia, Sabah dan Sarawak.

*Table 5 shows the premium rates under the Motor Tariff for motor policies issued in Peninsular Malaysia, Sabah and Sarawak.*

| Kapasiti enjin tidak melebihi (cc)<br><i>Engine capacity not exceeding (cc)</i> | Semenanjung Malaysia<br><i>Peninsular Malaysia</i>           |                                                            | Sabah dan Sarawak<br><i>Sabah and Sarawak</i>                |                                                            |
|---------------------------------------------------------------------------------|--------------------------------------------------------------|------------------------------------------------------------|--------------------------------------------------------------|------------------------------------------------------------|
|                                                                                 | Polisi komprehensif (RM)<br><i>Comprehensive policy (RM)</i> | Polisi pihak ketiga (RM)<br><i>Third party policy (RM)</i> | Polisi komprehensif (RM)<br><i>Comprehensive policy (RM)</i> | Polisi pihak ketiga (RM)<br><i>Third party policy (RM)</i> |
| 1 650                                                                           | 305.50                                                       | 135.00                                                     | 220.00                                                       | 75.60                                                      |
| 2 200                                                                           | 339.10                                                       | 151.20                                                     | 243.90                                                       | 85.20                                                      |

Jadual 5  
*Table 5*

Hitung premium kasar yang perlu dibayar oleh Iskandar bagi polisi komprehensif.

*Calculate the gross premium that Iskandar has to pay under the comprehensive policy.*

[4 markah]  
[4 marks]

Jawapan / Answer:

(a)

- (b) Iskandar pergi ke sebuah bengkel untuk membuat penyelenggaraan motosikalnya. Pada hari tersebut, bengkel itu menawarkan dua jenis perkhidmatan utama iaitu servis motosikal dan penukaran minyak enjin.

*Iskandar went to a workshop to have his motorcycle serviced. On that day, the workshop offered two main services which are motorcycle service and engine oil change.*

Daripada rekod pelanggan hari itu:

*From the customer records that day:*

- 60% pelanggan memilih untuk membuat servis motosikal, *M*.  
*60% of customers choose to do a motorcycle service, M.*
- 50% pelanggan memilih untuk menukar minyak enjin, *E*.  
*50% of customers choose to change engine oil, E.*
- 30% pelanggan memilih untuk melakukan kedua-dua perkhidmatan.  
*30% of customers choose to do both services.*

Rajah 8 pada ruang jawapan menunjukkan gambar rajah Venn yang tidak lengkap. Berdasarkan maklumat di atas, lengkapkan gambar rajah Venn tersebut. Seterusnya, hitung kebarangkalian Iskandar memilih sekurang-kurangnya satu daripada dua perkhidmatan tersebut.

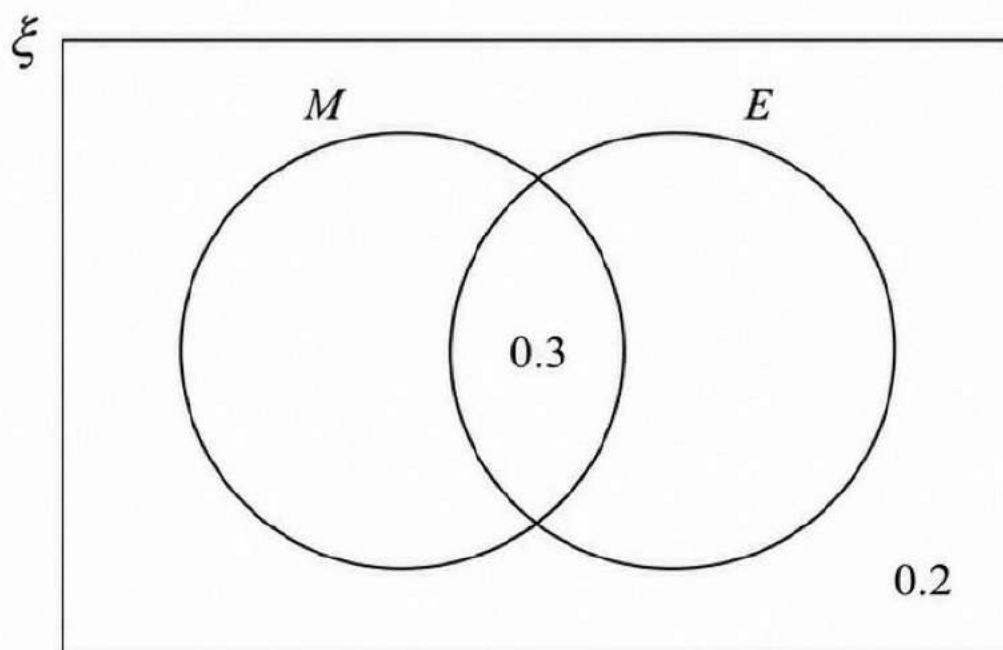
*Diagram 8 in the answer space shows an incomplete Venn diagram. Based on the informations above, complete the Venn diagram. Hence, calculate the probability that Iskandar would choose at least one of the two services.*

[3 markah]

[3 marks]

Jawapan / Answer:

(b)



Rajah 8  
Diagram 8

- (c) Pada hari berikutnya, Iskandar menunggang motosikalnya dengan laju purata  $(200t + 30) \text{ kmj}^{-1}$  dalam masa  $t$  jam di lebuh raya. Jarak yang dilalui oleh Iskandar ialah 35 km. Had laju bagi lebuh raya berkenaan ialah  $110 \text{ kmj}^{-1}$ . Adakah Iskandar mematuhi peraturan had laju lebuh raya?

*On the next day, Iskandar rides his motorcycle at an average speed of  $(200t + 30) \text{ kmh}^{-1}$  for  $t$  hours along a highway. The distance travelled by Iskandar is 35 km. The highway speed limit is  $110 \text{ kmh}^{-1}$ . Did Iskandar follow the highway speed limit?*

[5 markah]

[5 marks]

Jawapan / Answer:

(c)

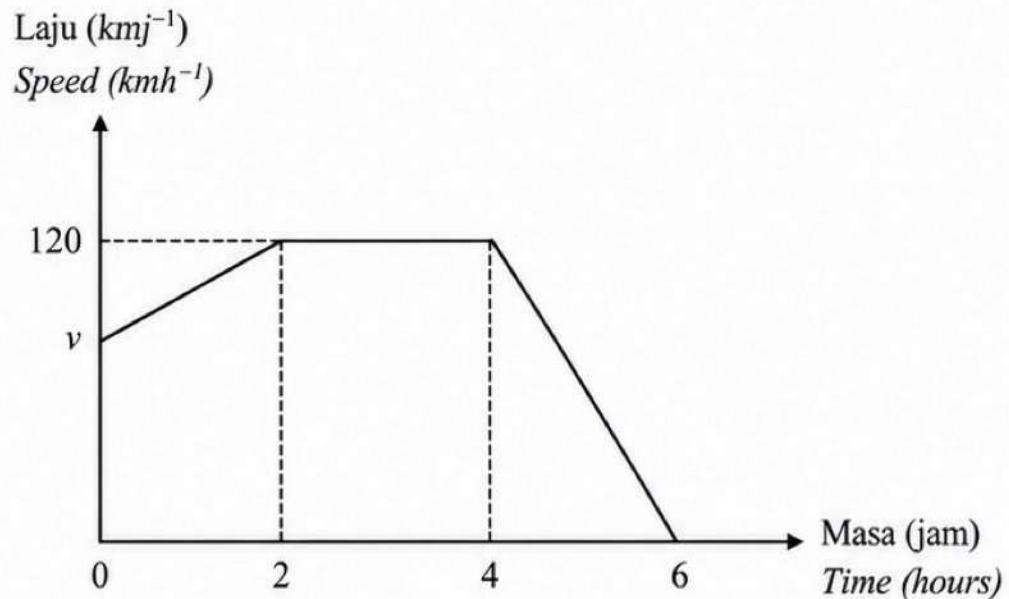
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- (d) Iskandar menunggang motosikal bersama rakan-rakannya dari Terengganu ke Seremban secara konvoi bersama KVC MEMBERS.

Rajah 9 menunjukkan graf laju-masa motosikal Iskandar.

*Iskandar rides the motorcycle with his friends from Terengganu to Seremban in convoy with KVC MEMBERS.*

*Diagram 9 shows the speed-time graph of Iskandar's motorcycle.*



Rajah 9  
Diagram 9

Berdasarkan graf laju-masa itu,

*Based on the speed-time graph,*

- nyatakan laju seragam, dalam  $\text{kmj}^{-1}$ .  
*state the uniform speed, in  $\text{kmh}^{-1}$ .*
- hitung nilai  $v$  jika pecutan dalam 1 jam pertama ialah  $17 \text{ kmj}^{-2}$ .  
*calculate the value of  $v$  if the acceleration in the first hour is  $17 \text{ kmh}^{-2}$ .*

[3 markah]

[3 marks]

Jawapan / *Answer*:

(d) (i)

(ii)

**KERTAS PEPERIKSAAN TAMAT**  
***END OF QUESTION PAPER***