RUMUS MATEMATIK
MATHEMATICAL FORMULAE

Rumus-rumus berikut boleh membantu anda 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
NUMBER AND OPERATION

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

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

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

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

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

10
Premium = $\frac{\text{Nilai muka polisi}}{\text{RM}x} \times$ (Kadar premium per RMx)

Premium = $\frac{Face\ value\ of\ policy}{RMx} \times (Premium\ rate\ per\ RMx)$

11
Jumlah insurans yang harus dibeli = $\begin{pmatrix}\text{Peratusan}\\ \text{ko} - \text{insurans}\end{pmatrix} \times \begin{pmatrix}\text{Nilai boleh}\\ \text{insurans harta}\end{pmatrix}$

Amount of required insurance = $\begin{pmatrix}Percentage\ of\\ co-insurance\end{pmatrix} \times \begin{pmatrix}Insurable\ value\\ of\ property\end{pmatrix}$

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 = $\frac{\text{Jumlah jarak}}{\text{Jumlah masa}}$

Average speed = $\frac{Total\ distance}{Total\ time}$

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

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

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,*
$= (n - 2) \times 180^0$

3 Lilitan bulatan $= \pi d = 2 \pi j$
Circumference of circle $= \pi d = 2 \pi r$

4 Luas bulatan $= \pi j^2$
Area of circle $= \pi r^2$

5 $$\frac{\text{Panjang lengkok}}{2\pi j} = \frac{\theta}{360°}$$

$$\frac{Arc\ length}{2\pi r} = \frac{\theta}{360°}$$

6 $$\frac{\text{Luas sektor}}{\pi \text{j}^2} = \frac{\theta}{360°}$$

$$\frac{Area\ of\ sector}{\pi r^2} = \frac{\theta}{360°}$$

7 Luas lelayang $= \frac{1}{2}$ x hasil darab panjang dua pepenjuru
Area of kite $= \frac{1}{2}$ x *product of two diagoonals*

8 Luas trapezium $= \frac{1}{2}$ x hasil tambah dua sisi selari x tinggi
Area of trapezium $= \frac{1}{2}$ x *sum of two parallel sides* x *height*

9 Luas permukaan silinder $= 2\pi j^2 + 2\pi jt$
Surface area of cylinder $= 2\pi r^2 + 2\pi rh$

10 Luas permukaan kon $= \pi j^2 + \pi js$
Surface area of cone $= \pi r^2 + \pi rs$

11 Luas permukaan sfera $= 4\pi j^2$
Surface area of sphere $= 4\pi r^2$

12 Isi padu prisma = luas keratan rentas x tinggi
Volume of prism = area of cross section x *height*

13 Isi padu silinder $= \pi j^2 t$
Volume cylinder $= \pi r^2 h$

14 Isi padu kon = $\frac{1}{3}\pi j^2 t$

Volume of cone = $\frac{1}{3}\pi r^2 h$

15 Isi padu sfera = $\frac{4}{3}\pi j^3$

Volume of sphere = $\frac{4}{3}\pi r^3$

16 Isi padu piramid = $\frac{1}{3}\times$ luas tapak × tinggi

Volume of pyramid = $\frac{1}{3}\times$ *base area* × *height*

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

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

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

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

STATISTIK DAN KEBARANGKALIAN
STATISTICS AND PROBABILITY

1 Min / *Mean*, $\bar{x} = \frac{\sum x}{N}$

2 Min / *Mean*, $\bar{x} = \frac{\sum fx}{\sum f}$

3 Varians / *Variance*, $\sigma^2 = \frac{\sum(x-\bar{x})^2}{N} = \frac{\sum x^2}{N} - \bar{x}^2$

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

Bahagian / *Section* A

[40 markah / *marks*]

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

1 Lengkapkan langkah-langkah operasi dengan nombor yang sesuai di ruang jawapan.
Complete the operation steps with the suitable numbers at the answer space.

[3 markah/*marks*]

Jawapan / *Answers*:

$\sqrt{1\frac{11}{25}} \div \sqrt{2\frac{1}{4}}$

$= \sqrt{\square} \div \sqrt{\frac{9}{4}}$

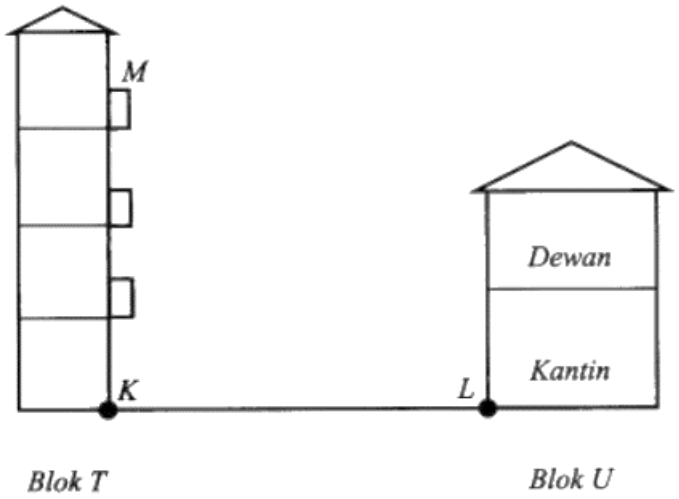
$= \frac{6}{5} \div \frac{3}{2}$

$= \frac{6}{5} \times \square$

$= \square$

2 Rajah 1 menunjukkan dua bangunan, Blok *T* dan Blok *U* di atas tanah mengufuk. Balkoni *M* ialah 12 m dari aras tanah Blok *T*. Blok *U* mengandungi dewan dan kantin. Hisham berdiri di balkoni, *M* memandang kepada kawannya yang berada di kantin *L*.

Diagram 1 *shows two buildings, Block T and Block U on horizontal ground. Balcony M is 12 m from the ground level of Block T. Block U contains the hall and canteen. Hisham stood on the balcony, M looked at his friend who was in canteen L.*



Rajah/*Diagram* 1

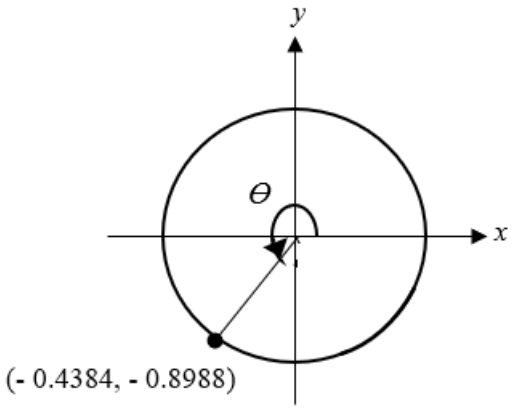
Diberi sudut tunduk *L* dari *M* ialah 55°. Hitung jarak, dalam m, antara titik *K* dan titik *L*.

Given the angle of depression L from M is 55°. *Calculate the distance, in* m, *between point K and point L.*

[3 markah/*marks*]

Jawapan/A*nswers*:

3 Rajah 2 menunjukkan satu bulatan unit dengan sudut Θ.
Diagram 2 *shows a unit circle with angle* Θ.



Rajah/*Diagram* 2

(a) Nyatakan nilai bagi sin Θ.
State the value of sin Θ.

(b) Tentukan nilai tan Θ dan seterusnya, cari sudut Θ.
Determine the value of tan Θ *and hence, find the angle* Θ.

[3 markah/*marks*]

Jawapan/A*nswers*:
(a)

(b)

Penyelesaian masalah dengan menggunakan kaedah matriks tidak dibenarkan.
***Solving problems by using matrix method is not allowed*.**

4 Pada suatu hujung minggu tertentu, Puan Syuhada mengambil bahagian dalam suatu Pesta Jualan Makanan yang berlangsung selama 2 hari. Dia menjual donut-donut itu dalam 2 pakej berlainan. Jadual 1 menunjukkan maklumat berkenaan pakej itu.

On a particular weekend, Puan Syuhada took part in Food Carnival for two days. She sold the doughnuts in two different packages. Table 1 *shows information about the packages*.

Pakej ***Package***	**Jenis donut** ***Type of doughnut***	**Harga pakej (RM)** ***Price per package*** **(RM)**
Ekonomi *Economic*	2 coklat,1 strawberi, 1 kastard 2 *chocolate, 1 strawberry*, 1 *custard*	***E***
Premium *Premium*	2 keju, 1 strawberi, 1 kastard 2 *cheese*, 1 *strawberry*, 1 *custard*	***P***

Jadual/*Table* 1

Pada hari pertama, dia berjaya menjual 70 pakej Ekonomi dan 90 pakej Premium dengan hasil jualan RM1 780. Pada hari kedua, jualan pakej Ekonomi adalah 2 kali jualannya pada hari pertama manakala jualan pakej Premium adalah $\frac{2}{3}$ daripada jualannya pada hari pertama. Jumlah jualan Puan Syuhada sepanjang pesta itu ialah RM3 900.
Hitung nilai ***E*** dan nilai ***P***.

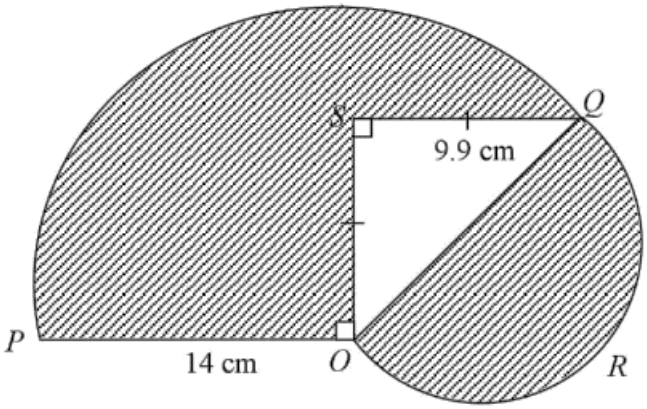
On the first day, she sold 70 *of Economic's packages and* 90 *of Premium's packages with total sale of* RM1 780. *On the second day, the number of Economic's packages sold was doubled compared to its sale on the first day and the number of Premium's packages sold were* $\frac{2}{3}$ *compared to its sale on the first day. The total sale of Puan Syuhada during the carnival was* RM3 900. *Calculate the value of* ***E*** *and of* ***P***.

[4 markah/*marks*]

Jawapan/A*nswers*:

5 Dalam Rajah 3, *OPQ* ialah sebuah sektor bulatan berpusat *O* dan *OQR* ialah sebuah semi bulatan.

In Diagram 3 *OPQ is a sector of a circle with centre O and OQR is a semicircle.*



Rajah/*Diagram* 3

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

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

(a) perimeter, dalam cm, seluruh rajah itu,
the perimeter, in cm, of the whole diagram,

(b) luas dalam cm^2, kawasan yang berlorek
the area, in cm^2, *of the shaded region.*

[6 markah/*marks*]

Jawapan/A*nswers*:

(a)

(b)

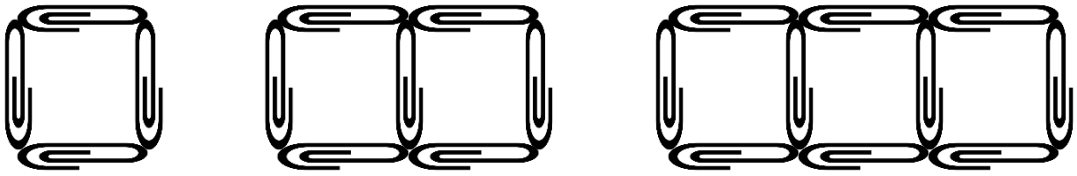
6 (a) Nyatakan kontrapositif bagi implikasi berikut. Tentukan sama ada kontrapositif itu adalah benar atau palsu.
State the contrapositive of the following implications. Determine whether the contrapositive is true or false.

Jika Zaki mendapat markah 90 dan lebih, maka Zaki mendapat gred A+.

***If Zaki gets a score* 90 *and above, then Zaki gets* A+ *grade*.**

[2 markah/*marks*]

(b) Rajah 4 menunjukkan corak yang dibina dengan menggunakan beberapa klip kertas.
Diagram 4 *shows the pattern constructed using several paper clips*.



Corak 1 *Pattern* 1 | Corak 2 *Pattern* 2 | Corak 3 *Pattern* 3

Rajah/*Diagram* 4

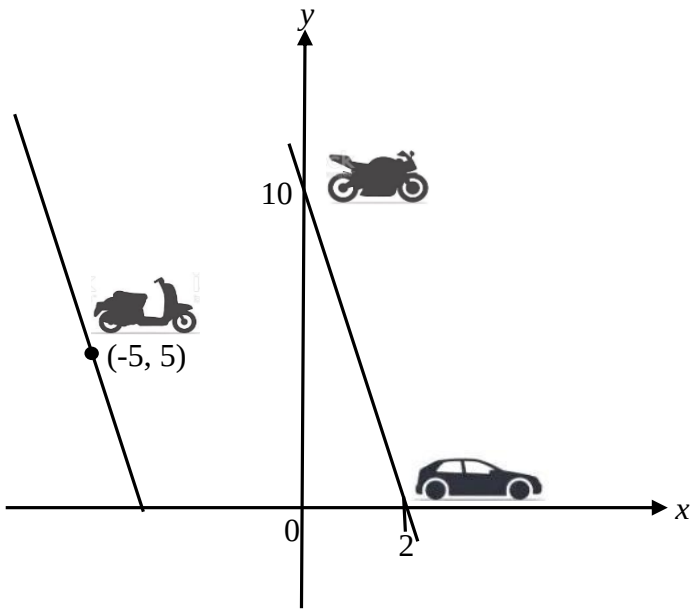
Cari bilangan klip kertas yang diperlukan untuk membina corak ke-4. Seterusnya, buat satu kesimpulan umum secara induktif bagi sebutan ke-*n*.
Find the number of paper clips needed to construct the 4^{th} *pattern. Hence, make a general conclusion by induction for the* n^{th} *terms.*

[3 markah/*marks*]

Jawapan/A*nswers*:
(a)

(b)

7 Rajah 5 menunjukkan kedudukan tiga kenderaan yang dilukis pada suatu satah Cartes. Kereta Dhaniyah terletak pada paksi-*x*, motosikal Solihin terletak pada paksi-*y* dan motosikal Pandia berada pada koordinat $(-5, 5)$.
Diagram 5 *shows the location of three vehicles drawn on a Cartesian plane. Dhaniyah's car is located on the x-axis, Solihin's motorcycle is located on the y-axis and Pandia's motorcycle is on the coordinates* $(-5, 5)$.



Rajah/*Diagram* 5

(a) (i) Diberi 1 unit = 2 km, cari jarak, dalam km, kedudukan motosikal Solihin dari titik asalan.
Given 1 unit = 2 km, *find the distance, in* km*, location of Solihin's motorcycle from the origin.*

(ii) Nyatakan persamaan garis lurus, dalam bentuk $\frac{x}{a} + \frac{y}{b} = 1$, yang menghubungkan motosikal Solihin dan kereta Dhaniyah.
State the equation of the straight line, in the form $\frac{x}{a} + \frac{y}{b} = 1$, *that connects Solihin's motorcycle and Dhaniyah's car.*

[2 markah/*marks*]

Jawapan/A*nswers*:
(a) (i)

(ii)

7 (b) Motosikal Pandia sedang melalui sebatang jalan yang selari dengan jalan yang menghubungkan Solihin dan Dhaniyah.
Cari persamaan garis lurus mewakili jalan yang dilalui oleh Pandia.
Pandia's motorcycle was going through a road parallel to the road that connects Solihin and Dhaniyah.
Find the equation of the straight line that represents the road taken by Pandia.
[3 markah/*marks*]

Jawapan/A*nswers*:
(b)

8 Permudahkan / *Simplify*
(a) $a^3 \times a^2$

(b) $c^5 \div c^{-5}$

(c) $(p^{-2}q^5)^3$

[4 markah/*marks*]

Jawapan/A*nswers*:
(a)

(b)

(c)

9 Encik Kamarul membeli sebuah kereta bernilai RM 77 873 secara kredit. Beliau membayar bayaran pendahuluan sebanyak 10% dan bakinya dibayar secara ansuran selama 9 tahun. Kadar faedah sama rata yang dikenakan oleh bank ialah 3% setahun. Berapakah jumlah bayaran ansuran bulanan yang perlu dibayar oleh Encik Kamarul?

Encik Kamarul bought a car worth RM 77 873 on credit. He paid a down payment of 10% and the balance was paid in installments over 9 years. The flat rate of interest charged by the bank is 3% per annum. How much is the monthly installment payment that Encik Kamarul has to pay?

[3 markah/*marks*]

Jawapan/A*nswers*:

10 Rajah 6 menunjukkan tinggi, dalam cm, bagi 12 orang pemain bola keranjang.
Diagram 6 *shows the height, in cm, of 12 basketball players.*

175	180	178	169	177	170
183	175	176	172	173	179

Rajah/*Diagram* 6

Tentukan / *Determine*

(a) median
(b) julat antara kuartil / *interquartile range*

[4 markah/*marks*]

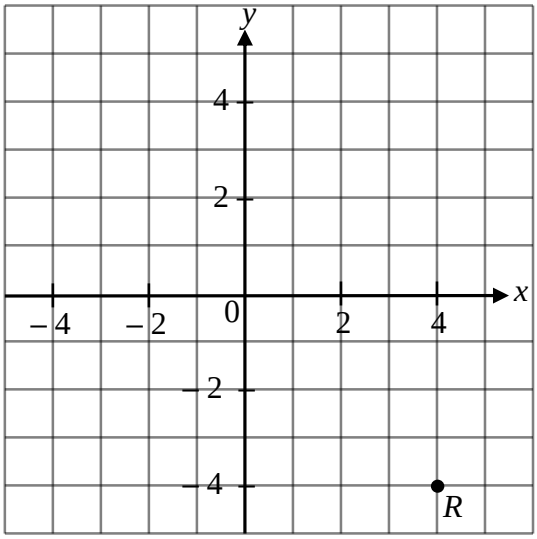
Jawapan /A*nswers*:
(a)

(b)

Bahagian / *Section* B
[45 markah / *marks*]

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

11 (a) Rajah 7(i) menunjukkan satu titik *R*, pada satah Cartes.
Diagram 7(i) *shows a point R, on a Cartesian plane*.



Rajah/*Diagram* 7(i)

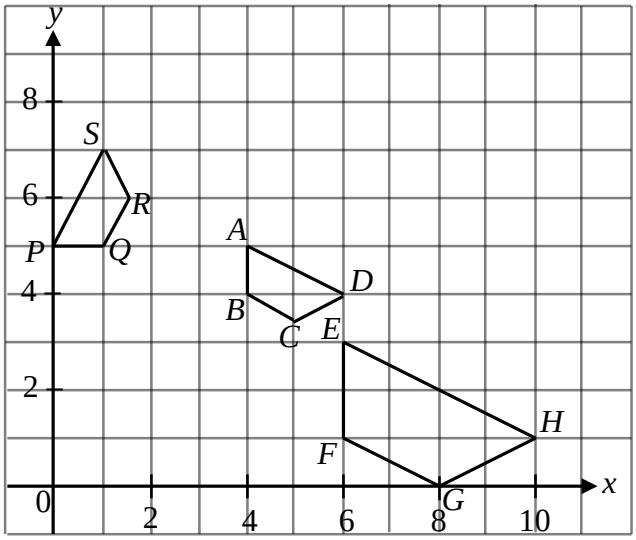
Transformasi ***T*** ialah translasi $\begin{pmatrix}-3\\3\end{pmatrix}$.
Transformasi ***S*** ialah pantulan pada garis lurus $y = -2$.
Nyatakan koordinat imej bagi titik R di bawah transformasi berikut:
Transformation **T** *is a translation* $\begin{pmatrix}-3\\3\end{pmatrix}$
Transformation **S** *is a reflection in the line* $y = -2$.
State the coordinate of image of point R under the following transformation:
(i) ***T*** (ii) ***TS***

[3 markah/*marks*]

Jawapan/A*nswers*:
(a) (i)

(ii)

11 (b) Rajah 7(ii) menunjukkan tiga trapezium *ABCD*, *EFGH* dan *PQRS* dilukis pada suatu satah Cartes.
Diagram 7(ii) *shows three trapezium ABCD, EFGH and PQRS on a Cartesian plane*.



Rajah/*Diagram* 7(ii)

Trapezium *EFGH* ialah imej bagi trapezium *PQRS* di bawah gabungan transformasi ***KL***. Huraikan selengkapnya transformasi:
Trapezium EFGH is the image of trapezium PQRS under the combined transformation **KL**. *Describe in full, the transformation*:

(i) **L** (ii) **K**

[6 markah/*marks*]

Jawapan/A*nswers*:

(b) (i)

(ii)

12 (a) Lengkapkan Jadual 2 pada ruang jawapan bagi persamaan $y = -x^3 + 6x - 4$.
Complete Table 2 *in the answer space for the equation* $y = -x^3 + 6x - 4$.

[2 markah/*marks*]

(b) Untuk ceraian soalan ini, gunakan kertas graf yang disediakan. Anda boleh menggunakan pembaris fleksibel.
For this part of the question, use the graph paper provided. You may use a flexible curve ruler.
Menggunakan skala 2 cm kepada 1 unit pada paksi-x dan 2 cm kepada 5 unit pada paksi-y, lukis graf $y = -x^3 + 6x - 4$ untuk $-3 \le x \le 3.6$.
Using a scale of 2 cm *to* 1 *unit on the x-axis and* 2 cm *to* 5 *units on the y-axis, draw the graph of* $y = -x^3 + 6x - 4$ *for* $-3 \le x \le 3.6$.

[4 markah/*marks*]

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

(i) nilai y apabila $x = -2.5$,
the value of y *when* $x = -2.5$,
(ii) nilai x apabila $y = -20$.
the value of x *when* $y = -20$.

[2 markah/*marks*]

Jawapan/A*nswers*:

(a) $y = -x^3 + 6x - 4$

x	-3	-2	-1.5	-1	0	1	2	3	3.6
y		-8	-9.6	-9	-4	1	0		-29

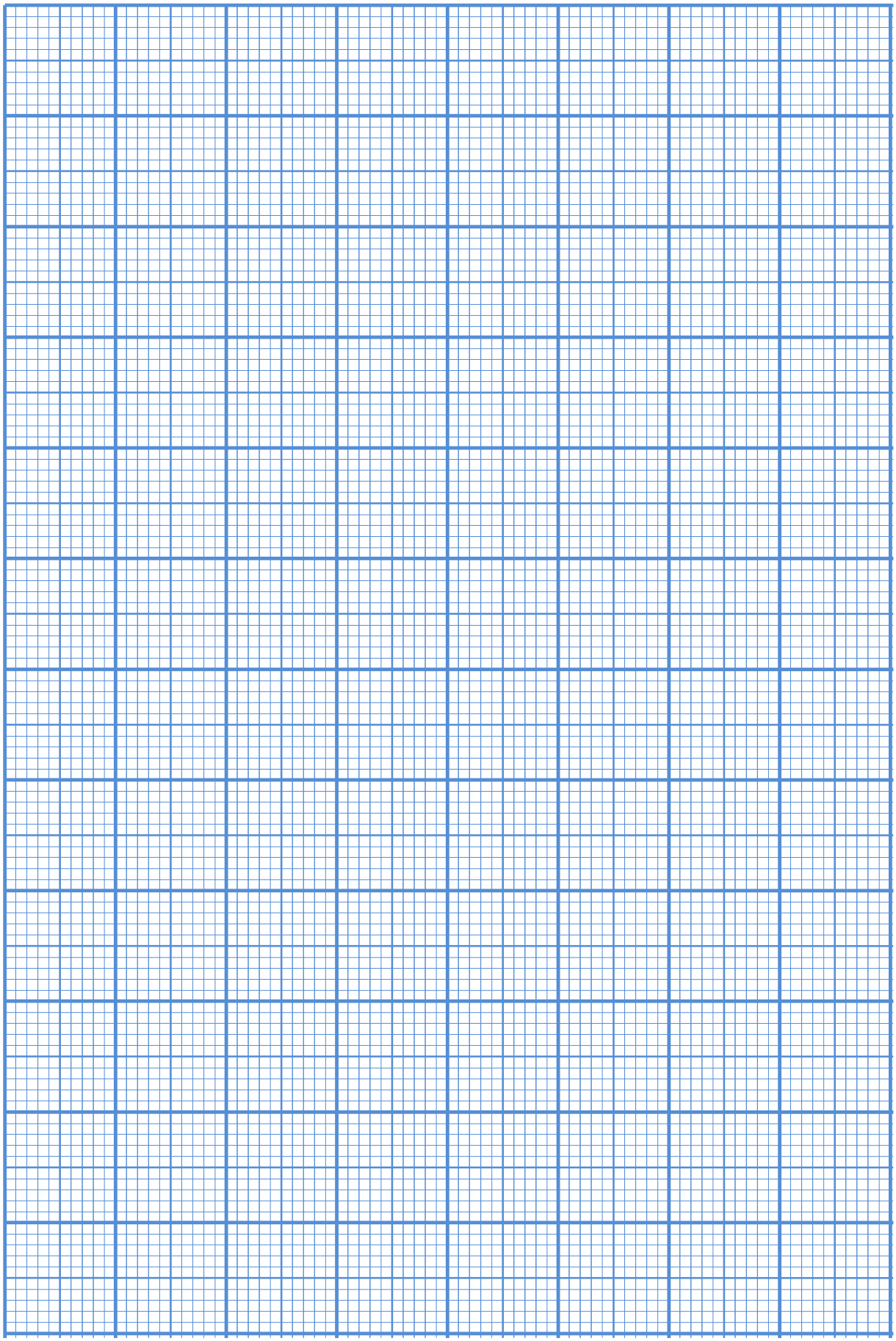
Jadual/*Table* 2

(b) Rujuk graf / *Refer graph*.

(c) (i) y = ……

(ii) x = ……..

Graf untuk Soalan **12**
Graph for Question **12**



13 (a) Encik Adnan telah membeli insurans kebakaran untuk rumahnya. Nilai boleh insurans rumah itu ialah RM2.4 juta. Polisi insurans kebakaran yang dibelinya itu mempunyai peruntukan ko-insurans untuk menginsuranskan 75% daripada nilai boleh insurans hartanya dan deduktibel sebanyak RM20 000. Lapan bulan kemudian, rumah Encik Adnan terbakar dan menyebabkan dia mengalami kerugian sebanyak RM500 000.
Encik Adnan has purchased fire insurance for his house. The insurable value of the house is RM2.4 million with a co-insurance provision of 75% of insurable value and a deductible of RM20 000. Eight months later, Encik Adnan's house caught on fire that caused a loss of RM500 000.

(i) Nyatakan jumlah deduktibel.
State the amount of deductible.

[1 markah/*mark*]

(ii) Hitung jumlah insurans yang harus dibeli oleh Encik Adnan. Seterusnya hitung nilai insurans yang dibeli oleh Encik Adnan ke atas rumahnya jika dia menerima bayaran pampasan sebanyak RM430 000.
Calculate the amount of required insurance for Encik Adnan. Hence calculate the amount of insurance purchased by Encik Adnan if he received a compensation of RM430 000.

[4 markah/*marks*]

Jawapan/A*nswers*:

(a) (i)

(ii)

13 (b) (i) Nyatakan pihak yang mengutip cukai pendapatan.
State the entity responsible in collecting the income tax.

[1 markah/*mark*]

(ii) Pendapatan tahunan Encik Syakirin adalah sebanyak RM120 000. Beliau telah menderma sebanyak 8% daripada pendapatan tahunannya kepada pertubuhan amal yang diiktiraf oleh kerajaan dan membayar zakat sebanyak RM4500. Jadual 3 menunjukkan pelepasan cukai yang dituntut oleh Encik Syakirin manakala Jadual 4 menunjukkan kadar cukai pendapatan perseorangan.
The yearly income of Encik Syakirin was RM120 000. He donated 8% of her annual income to a government approved charity organization and paid RM4500 for zakat. Table 3 *shows the claimed of tax relief by Encik Syakirin whereas Table* 4 *shows the individual income tax rate.*

Pelepasan cukai/ *Tax relief*	Amaun/*Amount* (RM)
Individu/*Individual*	9 000
Gaya hidup/*Lifestyle* (had/*limited to* RM2500)	13 010
Insurans hayat dan KWSP/*Life insurance and EPF* (had/*limit* RM7 000)	12 550
Insurans perubatan/Medical Insurance (had/*limit* RM3 000)	2900

Jadual/*Table* 3

Banjaran pendapatan bercukai *Chargeable income* (RM)	Pengiraan *Calculations* (RM)	Kadar/*Rate* (%)	Cukai/*Tax* (RM)
70 001-100 000	70 000 pertama *On the first 70 000* 30 000 berikutnya *Next 30 000*	21	4 600 6 300
100 001-250 000	100 000 pertama *On the first 100 000* 150 000 berikutnya *Next 150 000*	24	10 900 36 000

Jadual/*Table* 4

Berdasarkan maklumat yang diberi, hitung pendapatan bercukai Encik Syakirin. Seterusnya, hitung cukai pendapatan yang perlu dibayar oleh Encik Syakirin.
Based on the information given, calculate the chargeable income for Encik Syakirin. Hence, calculate the income tax to be paid by Encik Syakirin.

[4 markah/*marks*]

Jawapan/A*nswers*:

(b) (i)

(ii)

14 Fakri dan adiknya berhasrat untuk membeli hadiah untuk rakan sekelas mereka sebelum berpindah ke Kota Bharu dengan menggunakan duit simpanan mereka berjumlah RM900. Mereka telah menyenarai pendek dua pilihan hadiah. Jadual 5 menunjukkan kedua-dua pilihan tersebut.
Fakri and his brother plan to buy presents for their classmates before transferring to Kota Bharu using their savings of RM900. They have shortlisted two choices of presents. Table 5 shows both choices.

Pilihan ***Choice***	**Harga hadiah bagi setiap murid lelaki (RM)** ***Price of present for each boy (RM)***	**Harga hadiah bagi setiap murid perempuan (RM)** ***Price of present for each girl (RM)***
Pertama *First*	16	20
Kedua *Second*	18	18

Jadual/*Table* 5

(a) Pilihan pertama akan menggunakan keseluruhan simpanan itu manakala pilihan kedua akan berbaki RM18 daripada jumlah simpanan. Jika terdapat *x* orang murid lelaki dan *y* orang murid perempuan, hitung nilai *x* dan *y* dengan menggunakan kaedah matriks.
The first choice will be using all the savings while the second choice will have a balance of RM18 from the total savings. If there are x boys and y girls, calculate the values of x and y using the matrix method.

[5 markah/*marks*]

Jawapan/A*nswers*:

(a)

(b) Fakri dan adiknya bercadang untuk memohon sumbangan daripada ayahnya untuk membeli kotak bungkusan hadiah tersebut. Harga bagi satu kotak bungkusan hadiah bagi pilihan pertama dan kedua masing-masing berharga RM4 dan RM5. Fakri menyatakan bahawa pilihan kedua lebih menjimatkan berbanding dengan pilihan pertama setelah kos kotak bungkusan diambil kira. Dengan menggunakan jawapan di 14(a), adakah anda bersetuju dengan Fakri?
Justifikasikan jawapan anda.

Fakri and his brother plan to ask for a contribution from their father to buy the gift boxes for the presents. The prices of a gift box for the present of the first choice and second choice is RM4 and RM5 respectively. Fakri states that the second choice will cost less than first choice after the cost of the gift boxes is taken into account. By using the answer in 14(a), do you agree with Fakri?
Justify your answer.

[4 markah/*marks*]

Jawapan/A*nswers*:

(b)

15 Jadual 6 menunjukkan imbangan pendapatan dan perbelanjaan yang tidak lengkap milik Encik Adham.

Table 6 shows Encik Adham's incomplete incomes and expenses balancing.

Pendapatan / *Income*	**RM**	**Perbelanjaan / *Expenditue***	**RM**
Gaji / *Salary*	3 100	Sewa rumah *House rental*	1 500
Elaun / *Allowances*	1 000	Ansuran pinjaman kereta *Car loan instalments*	950
Komisen / *Commissions*	***X***	Bil utiliti *Utility bills*	325
Bonus dan lain-lain *Bonuses and others*	515	Perbelanjaan barangan dapur *Groceries expenses*	***Y***
		Insurans / *Insurance*	200
		Lain-lain perbelanjaan *Other expenses*	500
		Simpanan ASB *ASB savings*	250
Jumlah pendapatan bulanan Total monthly income	**5 250**	**Jumlah perbelanjaan bulanan Total monthly expenses**	**5 250**

Jadual/*Table* 6

(a) Berdasarkan imbangan pendapatan dan perbelanjaan Encik Adham, hitung setiap yang berikut:
Based on Encik Adham's incomes and expenses balancing, calculate each of the following:

(i) nilai ***X***
the value of ***X***

(ii) nilai ***Y***
the value of ***Y***

(iii) Peratus perbelanjaan tetap
Percentage of fixed expenses

[4 markah/*marks*]

Jawapan/A*nswers*:

(a) (i)

(ii)

(iii)

15 (b) Pada bulan berikutnya, Encik Adham mendapat tunggakan gaji sebanyak RM1 200, kenaikan gaji sebanyak 3% dan faedah simpanan bank berjumlah RM167. Apabila Perintah Kawalan Pergerakan dijalankan, beliau telah melanggan perkhidmatan internet berjumlah RM90 sebulan dan menyebabkan bil utiliti bertambah sebanyak RM55. Selain itu, perbelanjaan barangan dapur turut bertambah 20% dan beliau juga membuat simpanan ASB sebanyak RM500. Pada Jadual 7 di ruang jawapan, lengkapkan imbangan pendapatan dan perbelanjaan Encik Adham pada bulan tersebut.

On the following month, Encik Adham receives an arrears of RM1 200, a 3% salary increment and a bank interest of RM167. When the Movement Control Order is implemented, he subscribes the Internet service which costs RM90 per month and causes his utility bills to increase RM55. Other than that, his groceries expenses have also increased 20% and he saved RM500 in ASB. In Table 7 at the answer space, complete Encik Adham's incomes and expenses balancing for that month.

[5 markah/*marks*]

Jawapan/A*nswers*:

(b)

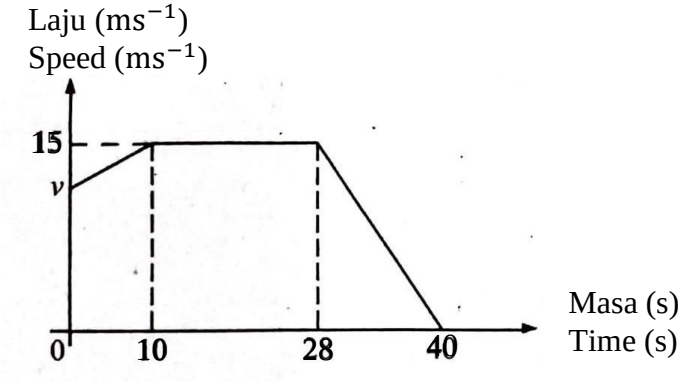
Pendapatan **Income**	**RM**	**Perbelanjaan** **Expenditure**	**RM**
Gaji *Salary*		Sewa rumah *House rental*	1 500
Elaun *Allowance*	1000	Ansuran pinjaman kereta *Car loan installments*	950
Komisen *Commision*	635	Bil utility *Utility bills*	
Bonus dan lain-lain *Bonuses and others*		Perbelanjaan barangan dapur *Groceries expenses*	
		Insurans *Insurance*	200
		Lain-lain perbelanjaan *Other expenses*	
		Simpanan ASB *ASB savings*	500
		Langganan perkhidmatan internet *Internet service subscription*	90
Jumlah pendapatan bulanan ***Total monthly income***		**Jumlah perbelanjaan bulanan** ***Total monthly expenses***	

Jadual/*Table 7*

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

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

16 (a) Sara menunggang motosikal ke sebuah poliklinik di Bandar A untuk mendapatkan rawatan. Rajah 8 menunjukkan graf laju-masa bagi pergerakan motosikal Sara dari rumah ke persimpangan lampu isyarat sebelum sampai ke poliklinik tersebut dalam tempoh 40 saat.
Sara rides a motorcycle to a polyclinic in City A. Diagram 8 *shows the speed-time graph for Sara's motorcycle movement from her house to the traffic light junction before she reaches at the polyclinic for a period of 40 seconds.*



Rajah/*Diagram* 8

(i) Nyatakan tempoh masa, dalam saat, motosikal Sara bergerak dengan laju seragam.
State the duration of time, in second, for which Sara's motorcycle moves with uniform speed.

[1 markah/*mark*]

(ii) Hitung kadar perubahan laju, dalam ms^{-2}, motosikal itu dalam tempoh 12 saat yang terakhir.
Calculate the rate of change of speed, in ms^{-2}, *of the motorcycle for the last 12 seconds.*

[2 markah/*marks*]

(iii) Hitung nilai *v*, jika jumlah jarak yang dilalui dalam tempoh 40 saat ialah 500m.
Calculate the value of v, *if the total distance travel for the period of* 40 *seconds is* 500m.

[3 markah/*marks*]

Jawapan/A*nswers*:

(a) (i)

(ii)

(iii)

(b) Jadual 8 di ruang jawapan menunjukkan masa menunggu, dalam minit, bagi 40 pesakit yang ingin mendapatkan rawatan di sebuah poliklinik di Bandar A.
Table 8 *in the answer space shows the waiting time, in minutes, for 40 patients who seek treatment at a polyclinic in City A.*

(i) Lengkapkan Jadual 8 di ruang jawapan.
Complete Table 8 in the answer space.

[2 markah/*marks*]

Untuk ceraian soalan ini, gunakan kertas graf yang disediakan.
For this part of questions, use the graph paper provided.

(ii) Dengan menggunakan skala 2 cm kepada 4 minit pada paksi mengufuk dan 2 cm kepada 4 pesakit pada paksi mencancang, lukis ogif bagi data tersebut.
By using a scale of 2 cm *to* 4 minutes *on the horizontal axis and* 2 cm *to* 4 patients *on the vertical axis, draw an ogive for the data.*

[4 markah/*marks*]

(iii) Berdasarkan ogif yang dilukis di b(ii), nyatakan median dan julat antara kuartil.
Based on the ogive drawn in b(ii), *state the median and interquartile range.*

[3 markah/*marks*]

Jawapan/A*nswers*:

(b) (i)

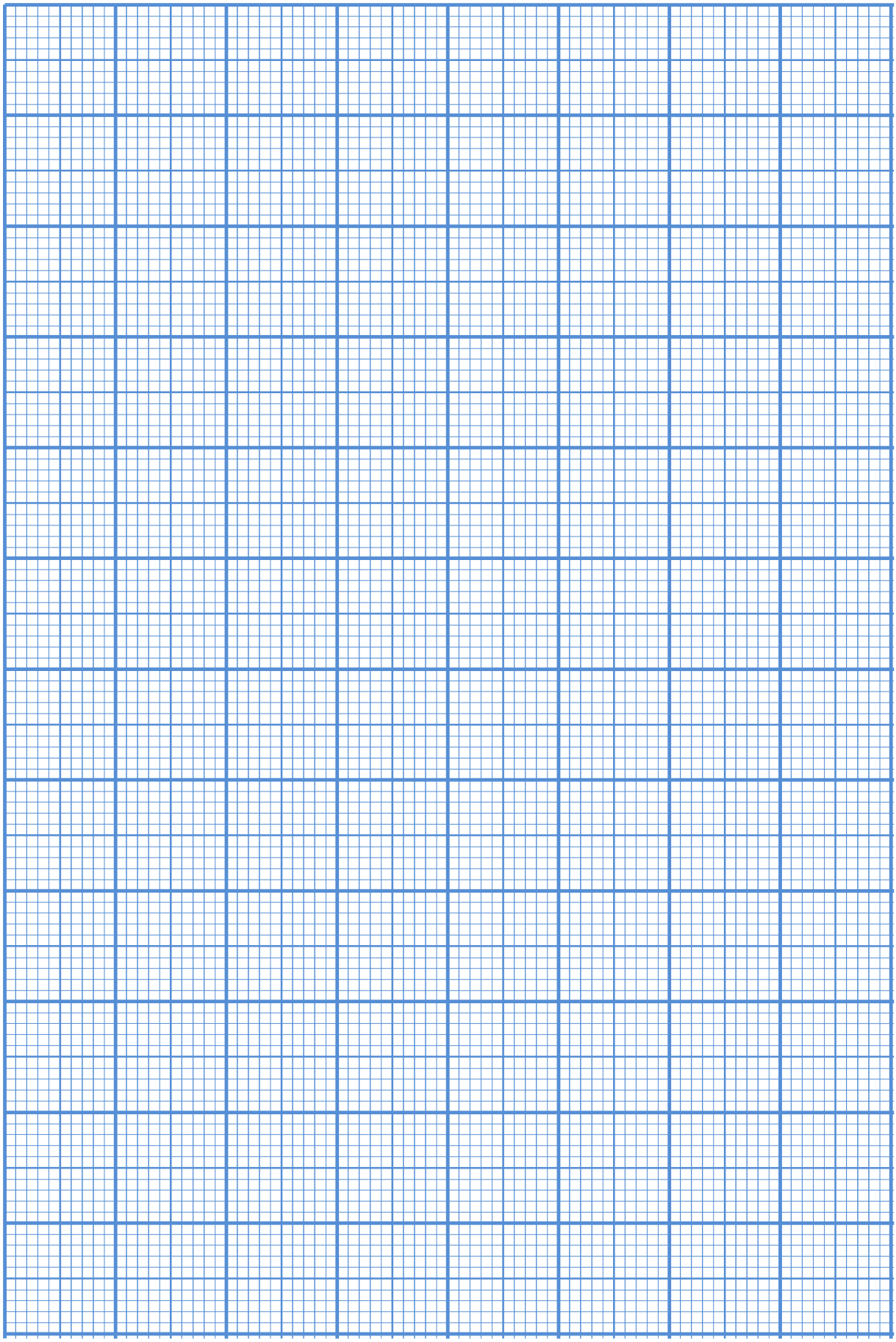
Masa (minit) *Time (minute)*	Kekerapan *Frequency*	Sempadan atas *Upper boundary*	Kekerapan longgokan *Cumulative frequency*
1 – 4	1		
5 – 8	3		
9 – 12	5		
13 – 16	10		
17 – 20	9		
21 – 24	6		
25 – 28	4		
29 - 32	2		

Jadual/*Table* 8

(ii) Rujuk graf untuk soalan 16 / *Refer graph for question 16*

(iii)

Graf untuk Soalan **16**
Graph for Question **16**



17 Puan Manisah telah menghidangkan empat bungkus nasi kerabu (*K*) dan enam bungkus mee goreng (*M*) di atas dulang. Dua bungkus makanan dipilih secara rawak dari dulang itu, satu demi satu tanpa pengembalian.
Puan Manisah has served four packs of kerabu rice (K) and six packs of fried noodles (M) on a tray. Two pack of foods are chosen at random from the tray, one after another, without replacement.

(a) (i) Lengkapkan situasi di atas dengan gambar rajah pokok di ruang jawapan.
Complete the situation above with tree diagram in the answer space.

(ii) Cari kebarangkalian bahawa
Find the probability that

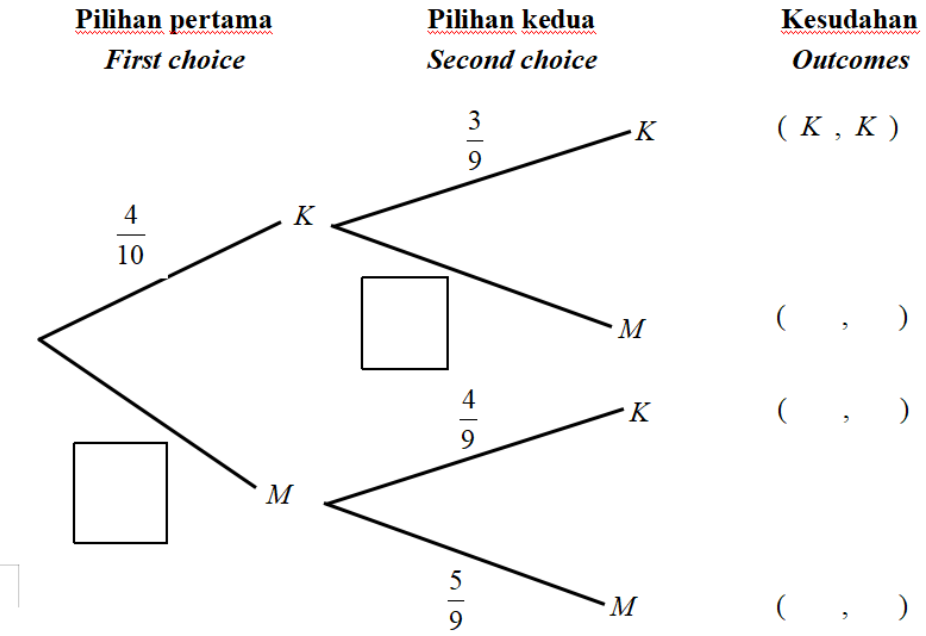
(a) kedua-dua makanan yang dipilih ialah nasi kerabu.
both foods chosen are nasi kerabu.

(b) sekurang-kurangnya satu nasi kerabu dipilih.
at least one nasi kerabu is chosen.

[7 markah/*marks*]

Jawapan/A*nswers*:

(a) (i)



(ii) (a)

(b)

17 (b) Puan Manisah telah menyediakan 80 bungkus makanan yang terdiri daripada nasi kerabu (*K*), mee goreng (*M*) dan nasi lemak (*L*) untuk jamuan makan di tempat kerjanya. Seramai 32 orang memilih nasi lemak, 28 orang memilih mee goreng, 23 orang memilih nasi kerabu, 9 orang memilih kedua-dua nasi lemak dan mee goreng sahaja, 6 orang memilih kedua-dua mee goreng dan nasi kerabu sahaja, 5 orang memilih kedua-dua nasi lemak dan nasi kerabu sahaja dan 2 orang memilih ketiga-tiga makanan tersebut.

Puan Manisah prepared 80 *packets of food consisting of Nasi Kerabu (K), Fried Noodle (M) and Nasi Lemak (L) for a meal at her workplace. A total of* 32 *people chose Nasi Lemak,* 28 *people chose Fried Noodle,* 23 *people chose Nasi Kerabu,* 9 *people chose both Nasi Lemak and Fried Noodle only,* 6 *people chose both Fried Noodle and Nasi Kerabu only,* 5 *people chose both two Nasi Lemak and Nasi Kerabu only and* 2 *people choose all three foods.*

(i) Hitung bilangan orang yang memilih nasi lemak sahaja.
Calculate the number of people who choose nasi lemak only.

(ii) Berapakah bilangan orang yang tidak memilih sebarang makanan?
How many people did not choose any food?

(iii) Lengkapkan gambar rajah Venn di ruang jawapan.
Complete the Venn diagram in the answer space.

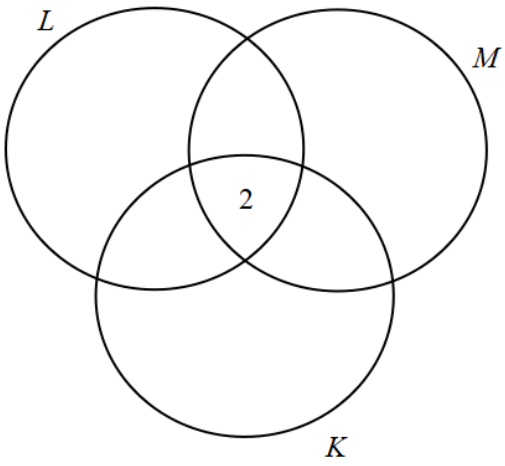
[8 markah/*marks*]

Jawapan/A*nswers*:

(b) (i)

(ii)

(iii)



KERTAS PEPERIKSAAN TAMAT
END OF QUESTION PAPER