

PERSIDANGAN KEBANGSAAN PENGETUA-PENGETUA
 SEKOLAH MENENGAH MALAYSIA (PKPSM) CAWANGAN MELAKA



PEPERIKSAAN PERCUBAAN
 SIJIL PELAJARAN MALAYSIA 2008



MATHEMATICS

Paper 2

Two hours and thirty minutes

DO NOT OPEN THIS QUESTION PAPER UNTIL YOU ARE TOLD TO DO SO
JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

- This question paper consist two section: **Section A** and **Section B**.
 Kertas soalan ini mengandungi dua bahagian : **Bahagian A** dan **Bahagian B**
- Answer all question in **Section A** and **four** questions from **Section B**.
- This question paper is bilingual.
- Write your answers in the spaces provided in the question paper.
- Working step must be written clearly.
- Diagram given is not according to scale unless stated.
- Marks for each question are given in bracket.
- A list of formulae is given in pages 2 and 3.
- Non programmable scientific calculator is allowed.
- This question paper must be hand up at the end of the exam.

Section	Question	Full mark	Marks obtained
A	1	3	
	2	4	
	3	4	
	4	3	
	5	5	
	6	5	
	7	6	
	8	5	
	9	6	
	10	7	
	11	4	
B	12	12	
	13	12	
	14	12	
	15	12	
	16	12	
Total			

This question paper consists of 28 printed pages.

MATHEMATICAL FORMULAE

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

RELATIONS

$$1 \quad a^m \times a^n = a^{m+n}$$

$$2 \quad a^m \div a^n = a^{m-n}$$

$$3 \quad (a^m)^n = a^{mn}$$

$$4 \quad A^{-1} = \frac{1}{ad-bc} \begin{pmatrix} d & -b \\ -c & a \end{pmatrix}$$

$$5 \quad P(A) = \frac{n(A)}{n(S)}$$

$$6 \quad P(A') = 1 - P(A)$$

$$7 \quad \text{Distance} = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$8 \quad \text{Midpoint } (x, y) = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

$$9 \quad \text{Average speed} = \frac{\text{distance travelled}}{\text{time taken}}$$

$$10 \quad \text{Mean} = \frac{\text{sum of data}}{\text{number of data}}$$

$$11 \quad \text{Mean} = \frac{\text{sum of(class mark} \times \text{frequency)}}{\text{sum of frequencies}}$$

$$12 \quad \text{Pythagoras Theorem} \\ c^2 = a^2 + b^2$$

$$13 \quad m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$14 \quad m = - \frac{y - \text{int ercept}}{x - \text{int ercept}}$$

SHAPES AND SPACE

- 1 Area of trapezium = $\frac{1}{2} \times \text{sum of parallel sides} \times \text{height}$
- 2 Circumference of circle = $\pi d = 2\pi r$
- 3 Area of circle = πr^2
- 4 Curved surface area of cylinder = $2\pi r h$
- 5 Surface area of sphere = $4\pi r^2$
- 6 Volume of right prism = cross sectional area \times length
- 7 Volume of cylinder = $\pi r^2 h$
- 8 Volume of cone = $\frac{1}{3} \pi r^2 h$
- 9 Volume of sphere = $\frac{4}{3} \pi r^3$
- 10 Volume of right pyramid = $\frac{1}{3} \times \text{base area} \times \text{height}$
- 11 Sum of interior angles of a polygon = $(n - 2) \times 180^\circ$
- 12
$$\frac{\text{arc length}}{\text{circumference of circle}} = \frac{\text{angle subtended at center}}{360^\circ}$$
- 13
$$\frac{\text{area of sector}}{\text{area of circle}} = \frac{\text{angle subtended at centre}}{360^\circ}$$
- 14 Scale factor, $k = \frac{PA'}{PA}$
- 15 Area of image = $k^2 \times \text{area of object}$

Section A

[52 marks]

Answer **all** questions in this section.

- 1 The Venn diagram in the answer space shows sets P , Q and R . Given the universal set $\xi = P \cup Q \cup R$.

Gambar rajah Venn di ruang jawapan menunjukkan set P , Q dan R . Diberi set semesta $\xi = P \cup Q \cup R$.

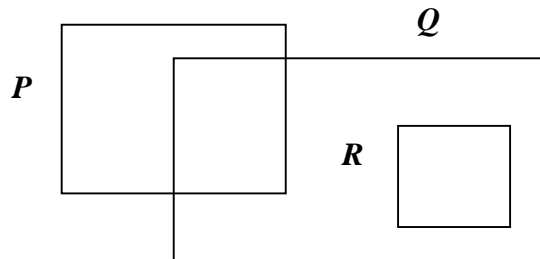
On the diagram provided in the answer spaces, shade
Pada rajah di ruang jawapan, lorekkan

- (a) the set $(Q \cup R)' \cap P$,
- b) the set $Q \cap (P \cup R)$.

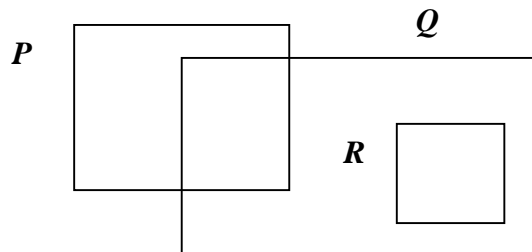
[3 marks]

Answer :

a)



(b)



- 2** Calculate the value of x and the value of y that satisfy the following simultaneous linear equations

Hitung nilai x dan nilai y yang memuaskan persamaan linear serentak berikut

$$2x + 3y = 9$$

$$\frac{1}{3}x - y = 2$$

[4 marks]

Answer :

-
- 3** Using factorization, solve the following quadratic equation :

Dengan menggunakan pemfaktoran, selesaikan persamaan kuadrat berikut:

$$p^2 = \frac{1}{2}(3 - 5p)$$

[4 marks]

- 4 Diagram 1 shows a right prism. The base $ABCD$ is a horizontal rectangle. Right-angled triangle FAB is the uniform cross-section of the prism. The rectangular surface $BCEF$ is an inclined plane.

Rajah 1 menunjukkan sebuah prisma tegak. Tapak segiempat tepat $ABCD$ adalah mengufuk. Segitiga FAB adalah keratan rentas seragam prisma itu. Segiempat tepat $BCEF$ ialah satah condong.

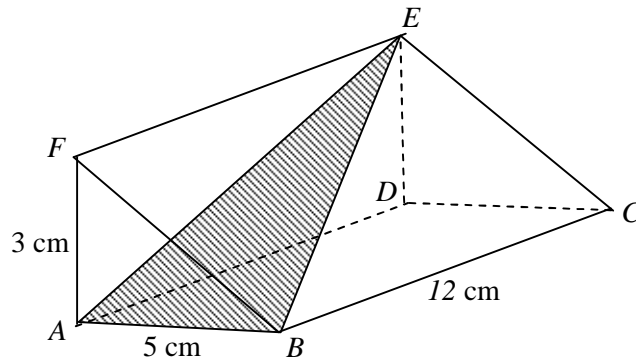


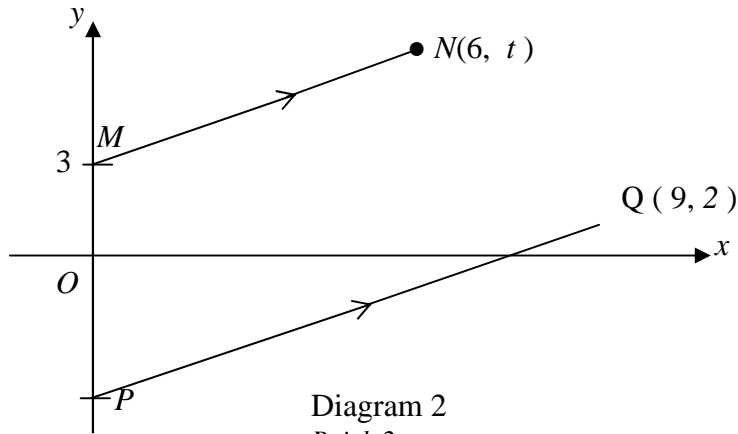
Diagram 1

Identify and calculate the angle between the plane ABE and the plane $ABCD$.
Kenalpasti dan hitung sudut di antara satah ABE dengan satah $ABCD$

[3 marks]

Answer :

- 5 In Diagram 2, O is the origin. The gradient of the straight line MN is $\frac{2}{3}$. Given that straight line PQ is parallel to straight line MN
- Dalam Rajah 2, O ialah asalan. Kecerunan garis lurus MN ialah $\frac{2}{3}$. Diberi bahawa garislurus PQ adalah selari dengan garis lurus MN



Find
Cari

- the value of t
nilai t
- the equation of straight line PQ
persamaan bagi garis lurus PQ
- the y-intercept of the straight line PQ .
pintasan-y bagi garis lurus PQ

[5 marks]

Answer :

(a)

(b)

(c)

- 6 Diagram 3 shows a circle PQR with center O and three semicircles .
Given that $\angle POQ = \angle QOR = \angle ROP$ and $OP = OQ = OR = 28$ cm .

Rajah 3 menunjukkan sebuah bulatan berpusat di O dan tiga buah separuh bulatan.
Diberi bahawa $\angle POQ = \angle QOR = \angle ROP$ and $OP = OQ = OR = 28$ cm .

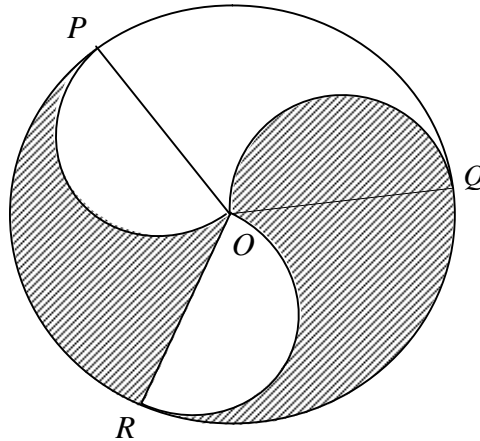


Diagram 3

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

Dengan menggunakan $\pi = \frac{22}{7}$, hitung

- (a) the length of arc PQR
panjang lengkok PQR
- (b) the area of the shaded regions
luas kawasan berlorek

[5 marks]

Answer :

(a)

(b)

7 (a) Combine the following statements using “and “ or “or” to form a **true** compound statement.

Statement 1 : A regular hexagon has six equal sides.

Statement 2 : $\sqrt[3]{100} = 10$.

Gabungkan pernyataan-pernyataan berikut dengan menggunakan “dan” atau “atau” untuk membentuk satu pernyataan baru yang benar.

Pernyataan 1 : Sebuah heksagon sekata mempunyai enam sisi yang sama panjang.

Pernyataan 2 : $\sqrt[3]{100} = 10$.

(b) Write down the conclusion to complete the following argument.

Premise 1 : If m is a negative number, then $-2m$ is a positive number.

Premise 2 : $-2m$ is not a positive number.

Conclusion :

Tulis Kesimpulan untuk melengkapkan hujah berikut :

Premis 1 : Jika m ialah nombor negatif, maka $-2m$ ialah nombor positif.

Premis 2 : $-2m$ bukan nombor positif.

Kesimpulan :

(c) State the **converse** of the following statement and hence determine whether the converse is true or false.

If $x < 5$, then $x < 7$.

Nyatakan akas bagi pernyataan berikut dan nyatakan sama ada akas itu adalah benar atau palsu.

Jika. $x < 5$, maka $x < 7$

(d) Write down two implications based on the following statements :

“ $L \subset K$ if and only if $L \cap K = L$.”

Tulis dua implikasi berdasarkan pernyataan berikut :

“ $L \subset K$ jika dan hanya jika $L \cap K = L$.”

[6 marks]

Answer :

(a)
.....

(b) Conclusion / Kesimpulan :
.....

(c)
.....

(d) Implication 1 / Implikasi 1 :
.....

Implication 2 / Implikasi 2 :
.....

- 8 Table 1 shows the probability of SMK Dato Onn winning a game in district tournament .

Jadual 1 menunjukkan kebarangkalian SMK Dato Onn memenangi pertandingan di peringkat kawasan dalam beberapa pertandingan .

Players	Games		
	Volleyball	Hockey	Softball
Girls	$\frac{3}{10}$	$\frac{1}{5}$	$\frac{1}{2}$
Boys	$\frac{5}{12}$	$\frac{1}{3}$	$\frac{1}{4}$

Table 1

Find the probability that
Cari kebarangkalian bahawa

- a) both boys and girls win the hockey game.
kedua – dua murid lelaki dan perempuan memenangi hoki
- b) both boys and girls win the same game.
kedua – dua murid lelaki dan perempuan memenangi permainan yang sama

[5 marks]

Answer :

(a)

(b)

- 9 (a) Find the inverse matrix of $\begin{pmatrix} 1 & -2 \\ 5 & -8 \end{pmatrix}$.

Carikan matriks songsang bagi matriks $\begin{pmatrix} 1 & -2 \\ 5 & -8 \end{pmatrix}$.

- (b) Using matrices, calculate the value of k and the value of m which satisfy the following simultaneous linear equations :

Menggunakan kaedah matriks, hitung nilai k dan nilai m yang memuaskan persamaan linear serentak berikut :

$$k - 2m = 1$$

$$5k - 8m = 11$$

[6 marks]

Answer :

(a)

(b)

- 10 Diagram 4 shows the speed-time graph of the movement of a particle for a period of 35 seconds.

Rajah 4 menunjukkan graf laju – masa pergerakan sebuah zarah dalam masa 35 saat.

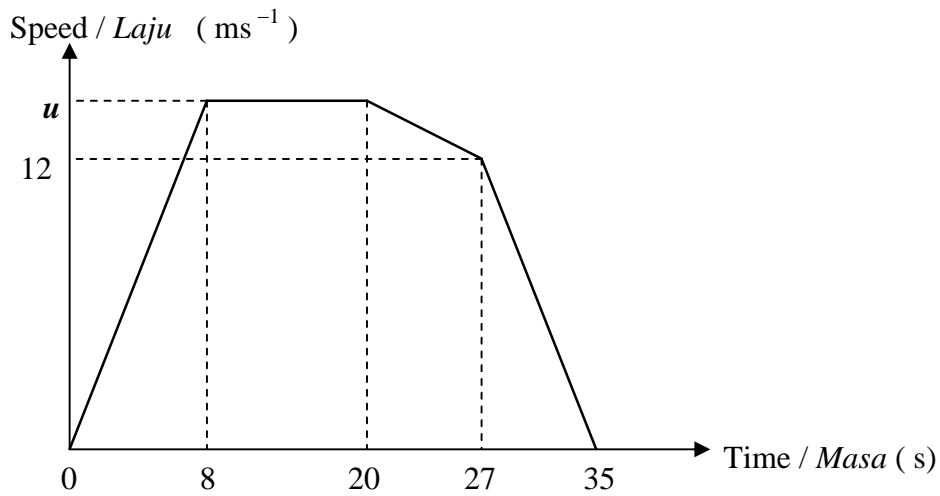


Diagram 4

Given the distance travelled in the first eight seconds is 72 meter.

Diberi jarak yang dilalui dalam 8 saat pertama ialah 72 meter .

Calculate

Hitung

- the value of u
nilai u
- the rate of change in speed , in ms^{-2} , of the particle in the last eight seconds.
kadar perubahan laju, dalam ms^{-2} , zarah itu dalam masa lapan saat terakhir
- the average speed , in ms^{-1} , of the particle for the whole journey.
laju purata, dalam ms^{-1} ,seluruh pergerakan zarah itu

[7 marks]

Answer :

(a)

(b)

(c)

- 11 Diagram 5 shows a solid hemisphere with a radius of 8 cm. A cone with a radius of 6 cm is taken out from the solid.

Rajah 5 menunjukkan sebuah pepejal berbentuk hemisfera yang berjajari 8 cm. Sebuah kon yang berjajari 6 cm dikeluarkan daripada pepejal itu.

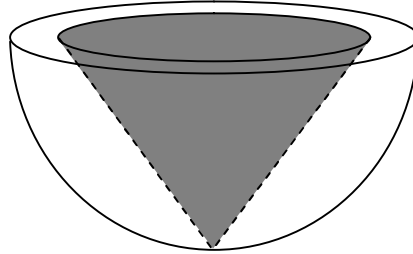


Diagram 5

Calculate the volume, in cm^3 , of the remaining solid. (Use $\pi = 3.142$).
Hitungkan isipadu, dalam cm^3 , pepejal yang tinggal. (Gunakan $\pi = 3.142$).

[4 marks]

Answer :

Section B

[48 marks]

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

- 12 (a) Complete Table 2 in the answer space for the equation $y = -\frac{5}{x}$ by writing down the values of y when $x = -2$, $x = 0.5$ and $x = 2.5$.

Lengkapkan Jadual 2 pada ruang jawapan untuk nilai y bagi $y = -\frac{5}{x}$ dengan menulis nilai – nilai y apabila $x = -2$, $x = 0.5$ dan $x = 2.5$

x	-4	-2.5	-2	-1	0.5	1	2	2.5	4
y	1.25	2		5		-5	-2.5		-1.25

Table 2

[3 marks]

- (b) *For this part of question, use the graph paper provided on page 18. You may use a flexible curve rule.*
Untuk ceraihan soalan ini, gunakan kertas graf yang disediakan pada halaman 18. Anda boleh menggunakan pembaris fleksibel.

By using a scale of 2 cm to 1 unit on the x – axis and 2 cm to 2 unit on

y –axis, draw the graph the graph of $y = -\frac{5}{x}$ for $-4 \leq x \leq 4$.

Dengan menggunakan skala 2 cm kepada 1 unit pada paksi-x dan 2 cm kepada 2 unit pada paksi-y, lukiskan graf $y = -\frac{5}{x}$ bagi nilai x dalam julat $-4 \leq x \leq 4$.

[4 marks]

- (c) From your graph, find
Dari graf anda, carikan
- (i) the value of y when $x = -1.8$
nilai y apabila $x = -1.8$
- (ii) the value of x when $y = 1.5$
nilai x apabila $y = 1.5$

[2 marks]

- (d) Draw suitable straight line on your graph to find values of x which satisfies the equation $x^2 - 5 = 0$ for $-4 \leq x \leq 4$.

State the values of x .

*Lukiskan satu garis lurus yang sesuai pada graf anda untuk mencari satu nilai x yang memuaskan persamaan $x^2 - 5 = 0$ bagi $-4 \leq x \leq 4$.
 Nyatakan nilai-nilai x itu.*

[3 marks]

Answer :

(a)

x	-4	-2.5	-2	-1	0.5	1	2	2.5	4
y	1.25	2		5		-5	-2.5		-1.25

Table 2

(b) Refer graph on page 18.
Rujuk graf pada halaman 18.

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

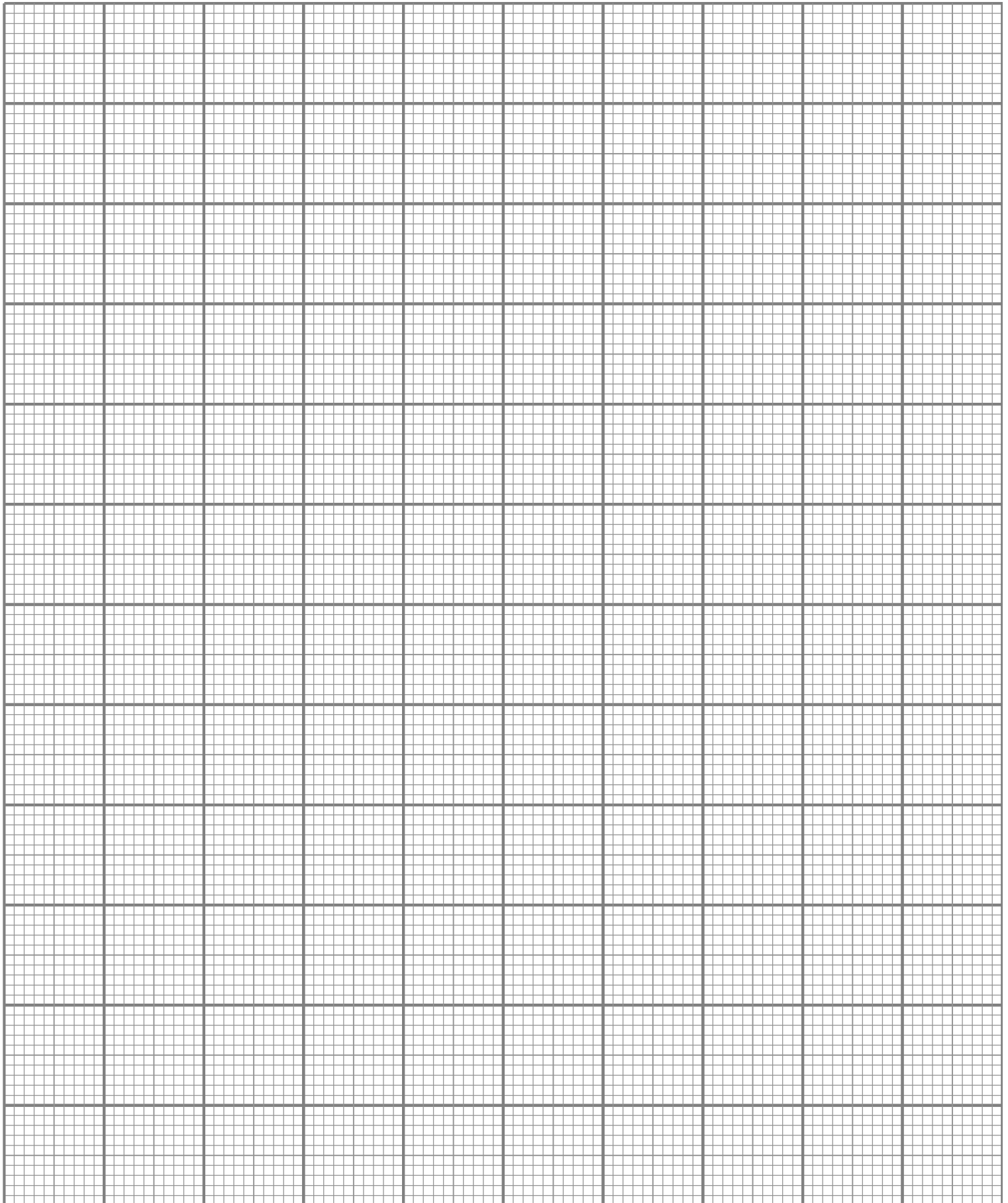
(i) $x = \dots\dots\dots$

(d)

$x = \dots\dots\dots$

$x = \dots\dots\dots$

Graph For Question 12
Graf untuk soalan 12



- 13 (a) Diagram 6 (i) shows a solid consisting of two prisms which are joined at the plane $BCMJ$. Its base consists of rectangles $ABCD$ and $BCLK$ which are on a horizontal plane. AF, BG, CH and DE are vertical edges. $JKLM$ is an inclined plane.

Given that $AB = EH = 6$ cm, $EF = JM = KL = 8$ cm, $BK = 3$ cm and $HM = 4$ cm.

Rajah 6 (i) menunjukkan sebuah pepejal yang terdiri daripada dua buah prisma yang dicantum pada satah $BCMJ$. Tapaknya terdiri daripada segiempat tepat $ABCD$ dan $BCLK$ yang terletak di atas permukaan mengufuk. AF, BG, CH dan DE adalah sisi-sisi mencancang. $JKLM$ adalah satah condong.

Diberi bahawa $AB = EH = 6$ cm, $EF = JM = KL = 8$ cm, $BK = 3$ cm dan $HM = 4$ cm.

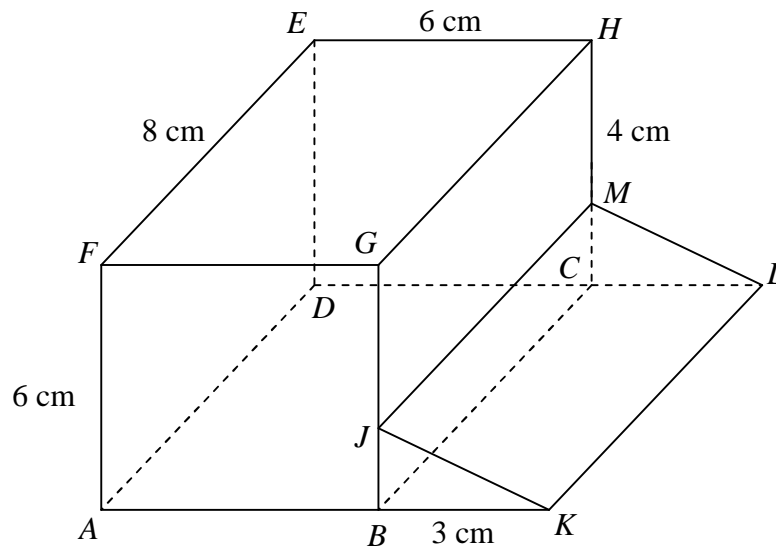


Diagram 6(i)

Draw to full scale the plan of the solid.

Lukis dengan skala penuh pelan pepejal itu.

[3 marks]

Answer :

(a)

- (b) A cuboid is removed from the solid in Diagram 6 (i). The remaining solid is as shown in Diagram 6(ii). Rectangle $FPQR$ is a horizontal plane.
 $RS = ES = 2$ cm and $ST = 3$ cm.
Sebuah kuboid dikeluarkan dari pepejal dari Rajah 6(i). Pepejal yang tinggal adalah seperti dalam Rajah 6(ii). Segiempat $FPQR$ ialah satah mengufuk. $RS = ES = 2$ cm dan $ST = 3$ cm

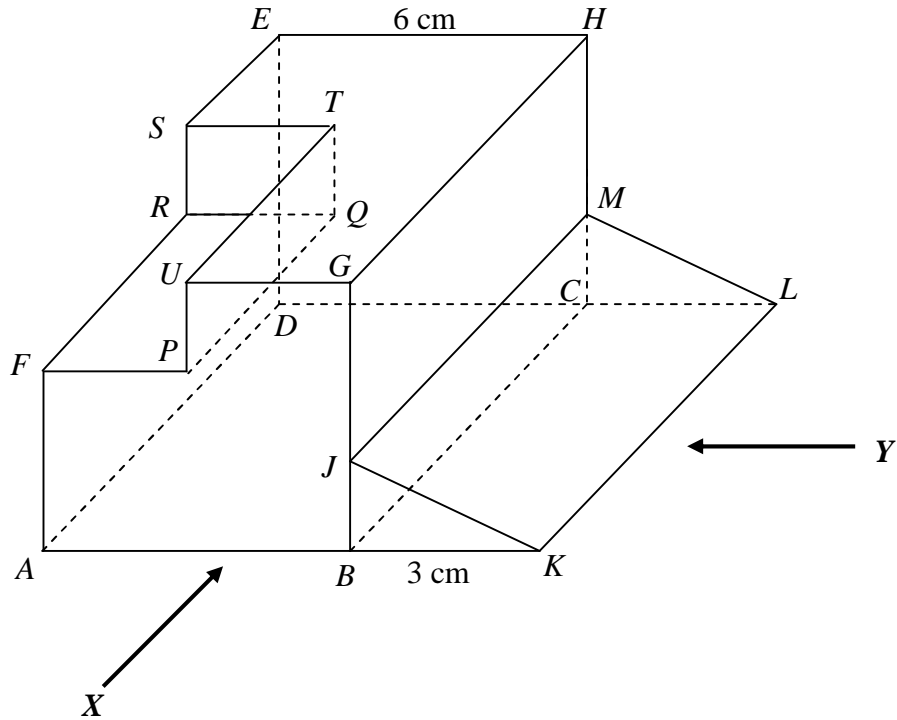


Diagram 6 (ii)

Draw to full scale,
Lukis dengan skala penuh,

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

Answer :

(b) (i), (ii)

- 14** $P (45^{\circ} N , 120^{\circ} W) , Q (45^{\circ} N , 15^{\circ} W) , F$ and H are four points on the surface of the earth and PF is the diameter of the earth .

$P (45^{\circ} U , 120^{\circ} B) , Q (45^{\circ} U , 15^{\circ} B) , F$ dan H adalah empat titik pada permukaan bumi dan PF ialah diameter bumi .

- (a) State the longitude of F .
Nyatakan longitude bagi F . [2 marks]
- (b) Calculate the distance , in nautical miles , of PQ measured along the common parallel of latitude .
Hitung jarak PQ dalam batu nautika diukur disepanjang selarian latitud sepunya . [4 marks]
- (c) Given that H is situated 4200 nautical miles due south of P . Find the latitude of H .
Diberi H terletak 4200 batu nautika kearah selatan P . Cari latitud H . [3 marks]
- (d) An aeroplane took off from H and flew to F via the South Pole with an average speed of 900 knots . Calculate the shortest time taken for the flight .
Sebuah kapal terbang berlepas dari H dan terbang ke arah F melalui Kutub Selatan dengan purata laju 900 knot . Hitung masa terpantas yang diambil oleh kapal terbang itu. [3 marks]

Answer :

(a)

(b)

(c)

(d)

- 15 (a) Transformation P is a reflection in the straight line $y = -2$.

Transformation T is a translation $\begin{pmatrix} -6 \\ 3 \end{pmatrix}$.

Penjelmaan P ialah satu pantulan pada garis lurus $y = -2$,

Penjelmaan T ialah satu translasi $\begin{pmatrix} -6 \\ 3 \end{pmatrix}$

State the coordinates of the image of point $(4, 3)$ under each of the following transformations:

Nyatakan koordinat imej bagi titik $(4, 3)$ dibawah penjelmaan yang berikut.

- (i) T ,
 (ii) P ,
 (iii) TP .

[4 marks]

- (b) Diagram 7 shows a triangle EFG , HJK and LMN drawn on a Cartesian plane.
 Rajah 7 menunjukkan segitiga EFG , HJK dan LMN yang dilukis pada satah Cartesian.

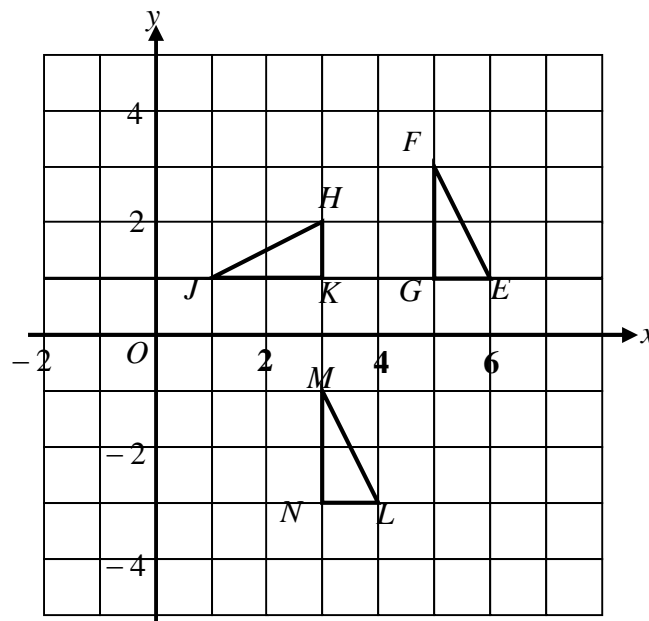


Diagram 7

Rajah 7

Triangle HJK is the image of triangle EFG under transformation V and triangle LMN is the image of triangle HJK under transformation W .

Segitiga HJK ialah imej bagi segitiga EFG dibawah penjelmaan V dan segitiga LMN ialah imej bagi segitiga HJK dibawah penjelmaan W .

Describe in full

Huraikan selengkapnya

- (i) transformation V ,
 penjelmaan V ,
 (ii) transformation W ,
 penjelmaan W ,

- (iii) the single transformation that is equivalent to the combined transformation **WV**.
satu penjelmaan tunggal yang setara dengan gabungan penjelmaan WV

[8 marks]

Answer :

(a) (i)

(ii)

(iii)

(b) (i)

.....

(ii)

.....

(iii)

- 16 Table 3 shows the distribution of the Mathematics marks of 45 students .
Jadual 3 menunjukkan taburan kekerapan markah Matematik bagi 45 orang murid..

Marks	Frequency	Midpoint
20 – 29	2	
30 – 39	6	
40 – 49	8	
50 – 59	10	
60 – 69	7	
70 – 79	5	
80 – 89	3	
90 – 99	4	

Table 3

- (a) (i) Complete Table 3 on the answer space provided. [1 mark]
Lengkapkan Jadual 3 pada ruang jawapan yang disediakan.
- (ii) State the modal class for the data in the Table 3. [1 mark]
Nyatakan kelas mod bagi data yang diberi dalam Jadual 3.
- (iii) Calculate the estimated mean marks of the group of the students. [3 marks]
Hitungkan min anggaran markah bagi kumpulan murid itu.
- (b) For this part of the question, use the graph paper provided on page 28.
Untuk ceraihan soalan ini, gunakan kertas graf yang disediakan di halaman 28.
- (i) Using a scale of 2 cm to 10 cm on the x -axis and 2 cm to 2 students on the y -axis, draw a histogram for the above data. [4 marks]
Dengan menggunakan skala 2 cm kepada 10 unit pada paksi $-x$ dan 2 cm kepada 2 orang murid pada paksi- y , lukiskan satu histogram bagi data di atas.
- (ii) Based on the histogram in (b)(i), state one piece of information about the marks. [2 marks]
Berdasarkan histogram di (b)(i), nyatakan satu maklumat tentang markah tersebut.
- (c) On the same graph, draw a frequency polygon for the above data. [1 mark]
Di atas graf yang sama, lukiskan sebuah poligon kekerapan.

Answer :

(a) (i)

Marks	Frequency	Midpoint
20 – 29	2	
30 – 39	6	
40 – 49	8	
50 – 59	10	
60 – 69	7	
70 – 79	5	
80 – 89	3	
90 – 99	4	

Table 3

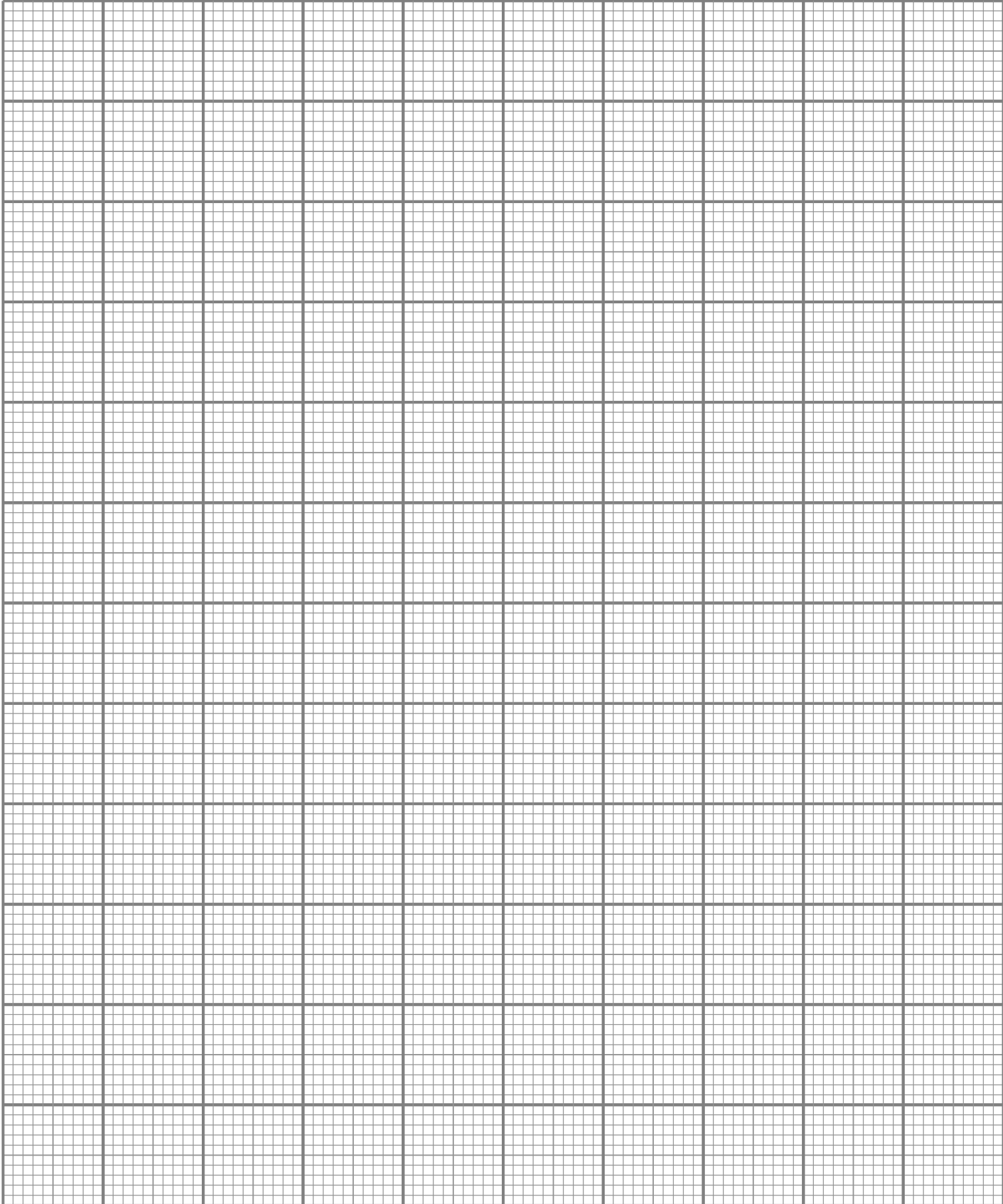
(ii)

(iii)

(b) (i) Refer graph on page 28.
Rujuk graf di halaman 28.

(ii)
.....
.....

(c) Refer graph on page 28.
Rujuk graf di halaman 28.



END OF QUESTION PAPER