1449/1
Mathematics
Paper 1
September
2008

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

PEPERIKSAAN PERCUBAAN
SIJIL PELAJARAN MALAYSIA 2008

MATHEMATICS

Paper 1
1 hour and fifteen minutes

DO NOT OPEN THIS QUESTION PAPER UNTIL YOU ARE TOLD TO DO SO

1. This question paper is bilingual.
2. Answer **all** questions.
3. Each question is followed by four choices of answers **A, B, C** and **D**.
4. For each question, choose **one** answer only.
5. The diagrams given are not drawn according to scale unless stated.
6. A list of formulae is given on pages 2 and 3.
7. Non programmable scientific calculator is allowed.

This question paper consists of 21 printed pages

INFORMATION FOR CANDIDATES

1. *This question paper consists of* **40** *questions.*

2. *Answer* **all** *questions.*

3. *Answer each question by blackening the correct space on the answer sheet .*

4. *Blacken only* **one** *space for each question.*

5. *If you wish to change your answer, erase the blackened mark that you have done. Then blacken the space for the new answer.*

6. *The diagrams in the questions provided are not drawn to scale unless stated .*

7. *A list of formulae is provided on pages 3 to 4.*

8. *A booklet of four-figure mathematical tables is provided.*

9. *You may use a non-programmable scientific calculator.*

MAKLUMAT UNTUK CALON

1. Kertas soalan ini mengandungi 40 soalan.

2. Jawab ***semua*** *soalan.*

3. Jawab dengan menghitamkan ruangan yang betul pada kertas jawapan.

4. Bagi setiap soalan hitamkan satu ruangan sahaja.

5. Sekiranya anda hendak menukar jawapan, padamkan tanda yang telah dibuat. Kemudian hitamkan jawapan yang baru.

6. Rajah yang mengiringi soalan tidak dilukiskan mengikut skala kecuali dinyatakan

7. Satu senarai rumus disediakan di halaman 3 hingga 4.

8. Sebuah buku sifir matematik empat angka disediakan.

9. Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogramkan.

MATHEMATICAL FORMULAE

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

RELATIONS

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

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

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

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

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

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

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

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

12 Pythagoras Theorem

$c^2 = a^2 + b^2$

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

14 $m = -\frac{\text{y-intercept}}{\text{x-intercept}}$

SHAPES AND SPACE

1 Area of trapezium $= \frac{1}{2} \times$ sum of parallel sides $\times$ height

2 Circumference $= \pi d = 2\pi r$

3 Area of circle $= \pi r^2$

4 Curved surface area of cylinder $= 2\pi rh$

5 Surface area of sphere $= 4\pi r^2$

6 Volume of right prism = cross sectional $\times$ length

7 Volume of cylinder $= \pi j^2 h$

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

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

10 Volume of right pyramid $= \frac{1}{3} \times$ base area $\times$ height

11 Sum of interior angles of a polygon $= (n - 2) \times 180^o$

12 $$\frac{\text{arc length}}{\text{circumference of circle}} = \frac{\text{angle subtended at centre}}{360^\circ}$$

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 $= k^2 \times$ area of object.

Answer **all** question

1 Round off 0.070256 correct to three significant figures .
Bundarkan 0.070256 betul kepada tiga angka bererti.

A 0.07
B 0.070
C 0.0703
D 0.07026

2 Express 4.052×10^5 as a single number
Ungkapkan 4.052×10^5 sebagai satu nombor tunggal.

A 4052
B 40520
C 405200
D 4052000

3 $6{\cdot}82 \times 10^4 + 2{\cdot}1 \times 10^3 =$

A $8{\cdot}92 \times 10^4$
B $7{\cdot}03 \times 10^4$
C $8{\cdot}92 \times 10^3$
D $7{\cdot}03 \times 10^3$

4 $10101_2 + 111_2 =$

A 10010_2
B 11010_2
C 11100_2
D 11111_2

5 Express 176_8 as a number in base five.
Ungkapkan 176_8 sebagai nombor asas lima.

A 101_5
B 126_5
C 231_5
D 1001_5

6 In Diagram 1 *PQRST* is five of vertices in sequence of regular octagon and *QRUVW* is a regular pentagon

Dalam Rajah 1, PQRST ialah lima bucu berturutan sebuah oktagon sekata. QRUVW ialah sebuah pentagon sekata.

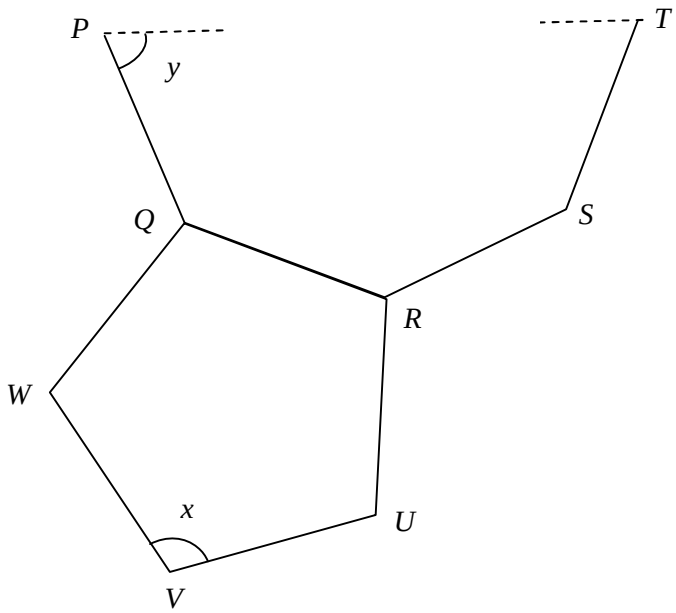


Diagram 1
Rajah 1

Find the value of $x + y$ in degree .

Cari nilai $x + y$ dalam darjah.

A 153

B 165.5

C 175.5

D 243

7 In Diagram 2, *ABCD* is a rhombus and *EAB* and *BDF* is a straight line
Dalam Rajah 2 ABCD ialah sebuah rombus. EAB dan BDF ialah garis lurus.

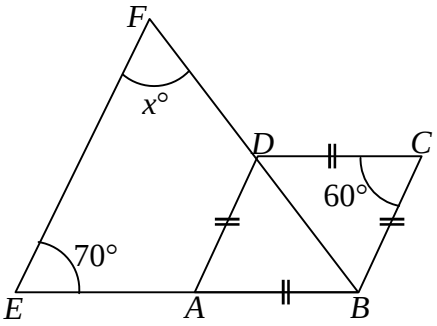


Diagram 2
Rajah 2

Find the value of *x*

Cari nilai x

A 40
B 50
C 55
D 60

8 Diagram 3 shows a circle *STQ* with centre *O* . Line *PQR* and *SR* is a tangent to the circle at *Q* and at S

Rajah 3 menunjukkan sebuah bulatan STQ berpusat O. Garis PQR dan SR ialah tangen kepada bulatan di Q dan di S.

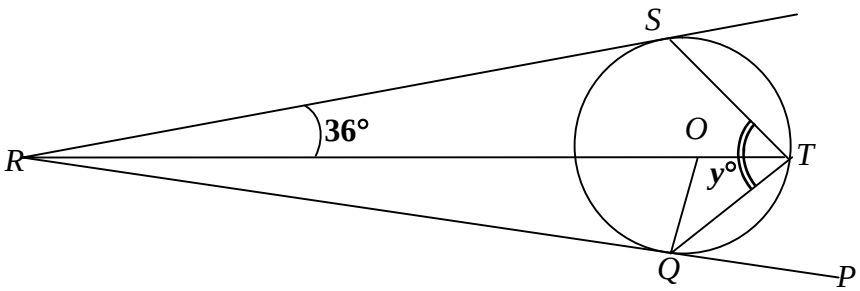


Diagram 3
Rajah 3

Find the value of *y*.
Cari nilai y.

A 27
B 36
C 54
D 72

9 Diagram 4 shows *S* ' is an image of *S* under a rotation.
Rajah 4 menunjukkan S' ialah imej bagi S di bawah satu putaran

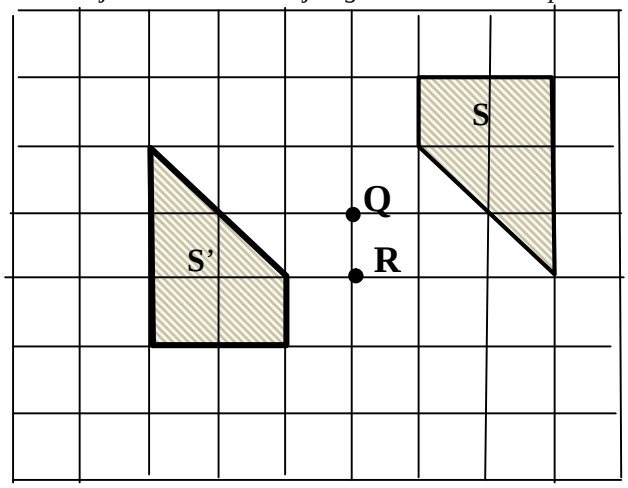


Diagram 4

Rajah 4

Which statement represent the rotation above?
Kenyataan yang manakah mewakili putaran di atas ?

A Rotation 90^o clock wise at centre *R*
Putaran 90^o *ikut arah jam pada R*

B Rotation 90^o anti - clock wise at centre *Q*
Putaran 90^o *ikut arah lawan jam pada Q*

C Rotation 180^o at centre *R*
Putaran 180^o *pada R*

D Rotation 180^o at centre *Q*
Putaran 180^o *pada Q*

10 Diagram 5 shows point **A, B, C,D** and ***P*** in a Cartesian plane

Rajah 5 menunjukkan titik **A,B,C,D** *dan* ***P*** *pada satah Cartesan***.**

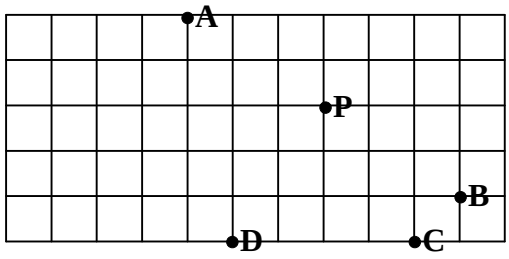


Diagram 5
Rajah5

Which of the point **A, B, C** or **D,** is image of point ***P*** under a translation $\begin{pmatrix} 2 \\ -3 \end{pmatrix}$

Antara titik **A, B, C** dan **D**, *yang manakah imej bagi titik* ***P*** *di bawah translasi* $\begin{pmatrix} 2 \\ -3 \end{pmatrix}$.

11 In Diagram 6, PQR ia straight line.
Dalam Rajah 6 , PQR ialah garis lurus.

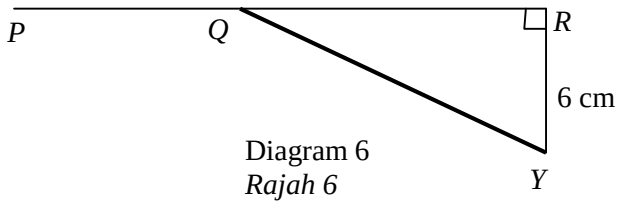


Diagram 6
Rajah 6

Given $\tan \angle RQY = \frac{3}{4}$. Find the value of $\cos \angle PQY$

Diberi $\tan \angle RQY = \frac{3}{4}$. *Cari nilai kos* $\angle PQY$

A $\frac{3}{5}$

B $\frac{4}{5}$

C $-\frac{3}{5}$

D $-\frac{4}{5}$

12 In diagram 7, O is a centre of a unit circle
Dalam Rajah 7 , O ialah pusat bulatan unit.

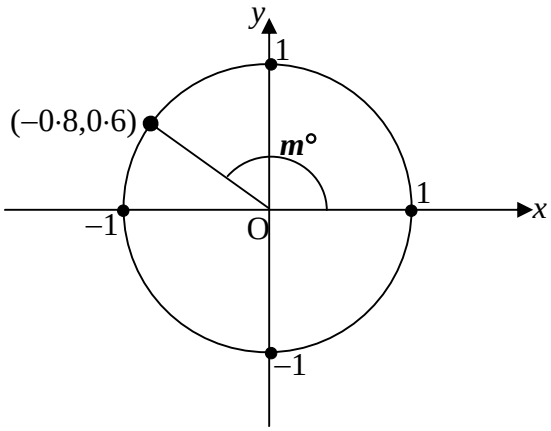


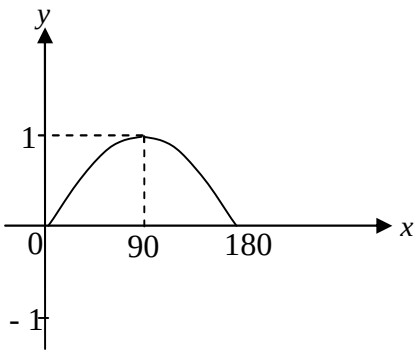
Diagram 7
Rajah 7

Find the value of $\cos m^o$
Carikan nilai kos $m°$.

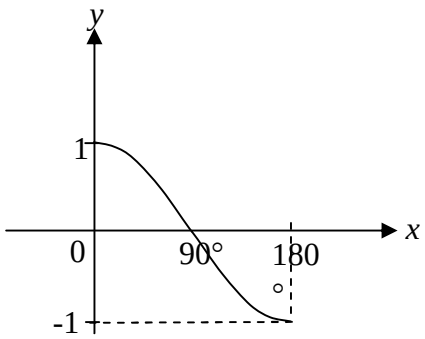
A 0·6
B –0·8
C –0·75
D –1·33

13 Which of the following graphs represent $y = \cos x^o$ for $0° \leq x \leq 180°$?
Antara berikut, yang manakah mewakili graf $y = kos\ x^o$ untuk $0° \leq x \leq 180°$?

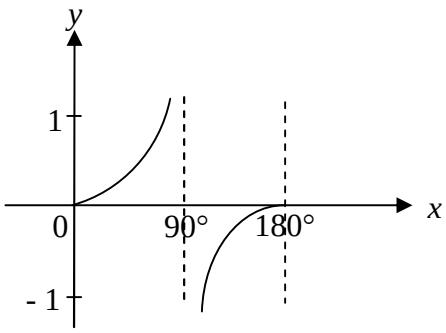
A



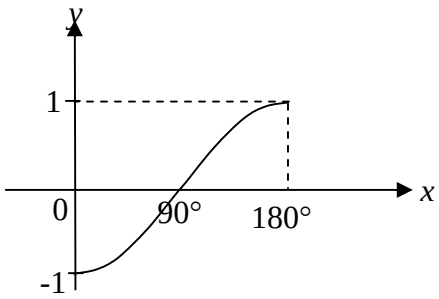
B



C



D



14 Diagram 8 shows a right prism with *ELKG* as a base.
Rajah 8 *menunjukkan sebuah prisma tegak dengan tapak ELKG*.

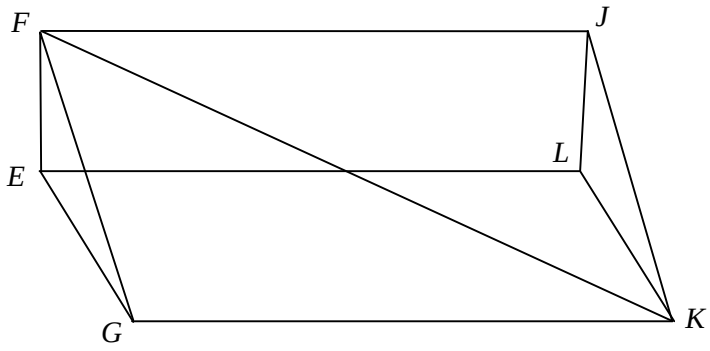


Diagram 8
Rajah 8

Name the angle between line *FK* and plane *ELKG*
Namakan sudut antara garis FK dan satah ELKG

A $\angle KFE$
B $\angle KEF$
C $\angle FKE$
D $\angle KGF$

15 Diagram 9 shows two vertical poles, *PQ* and *RS* , on a horizontal plane.
The angle of depression of vertex *R* from vertex *P* is 35^0 and *PQ* = 2 *RS*.
Rajah 9 menunjukkan dua batang tiang tegak, PQ dan RS, yang terletak pada permukaan mengufuk. Sudut tunduk puncak P dari puncak A ialah 35^0 *dan PQ = 2 RS.*

Diagram 9
Rajah 9

Find the distance of *QS*, in cm correct to one decimal places.
Cari panjang QS, dalam cm betul kepada satu tempat perpuluhan

A 1.2
B 1.4
C 1.6
D 2.0

16 Diagram 10 shows three points, *X*, *Y*, and *Z* on a horizontal plane.
Rajah 10 menunjukkan tiga titik X, Y, dan Z di atas tanah mengufuk.

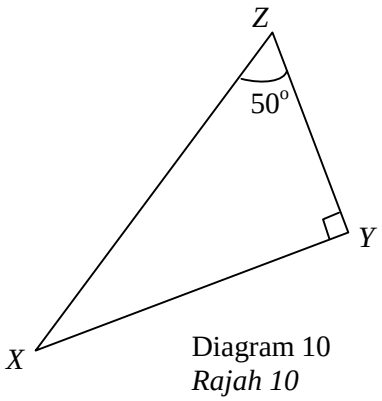


Diagram 10
Rajah 10

It is given that bearing *X* from *Y* is 235^o. Find the bearing *X* from *Z* .
Diberi bearing X dari Y ialah 235^o*. Cari bearing X dari Z.*

A 015^o
B 040^o
C 195^o
D 220^o

17 In Diagram 11 P and Q are two points on the surface of the earth
Dalam Rajah 11, P dan Q ialah dua titik di permukaan bumi.

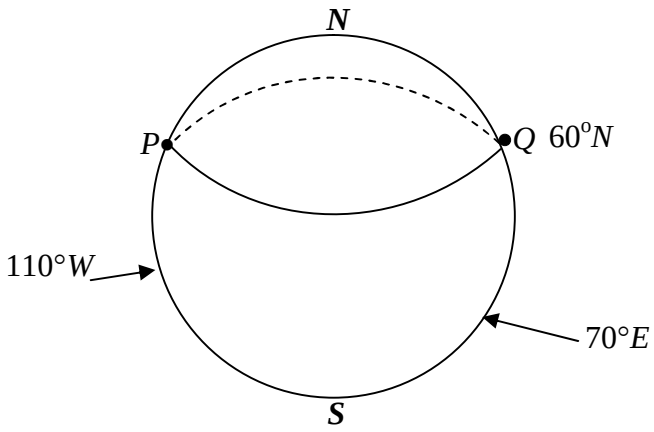


Diagram 11
Rajah 11

Calculate the shortest distance in nautical miles from P to Q
Hitung jarak terpendek, dalam batu nautika, dari P ke Q.

A 3600
B 7200
C 10800
D 5400

18 K and L are 2 points on the surface of the earth with KL as the diameter of the earth. Given $L(43^{o}\ S, 107^{0}\ E)$ The longitude of K is

K dan L ialah 2 titik di permukaan bumi dengan KL ialah diameter bumi
Diberi L (43^{0} S, 107^{0} T). Longitud K ialah

A 43^{0} N
B 137^{0} N
C 73^{0} W
D 107^{0} W

19 $2(m-3)^{2}+3-2m^{2}=$

A $21-12m$
B $11m-2$
C $12m-2$
D 21 – 8m

20 Given that $\frac{2}{\sqrt{p}} - 3 = 5$, find the value of p.

Diberi $\frac{2}{\sqrt{p}} - 3 = 5$, *cari nilai p*

A $\frac{1}{16}$

B $\frac{1}{8}$

C $\frac{1}{4}$

D $\frac{1}{2}$

21 $\frac{3}{5p} - \frac{p-5}{10p^2} =$

A $\frac{p-1}{2p^2}$

B $\frac{p+1}{2p^2}$

C $\frac{5p-1}{2p^2}$

D $\frac{5p+1}{2p^2}$

22 Given that $\frac{x+3}{2} + 1 = x - 4$, find the value of x.

Diberi bahawa $\frac{x+3}{2} + 1 = x - 4$, carikan nilai x.

A –12
B –13
C 12
D 13

23 If $(x^2)^{-4} = \frac{1}{x^{m+5}}$, then m =

Jika $(x^2)^{-4} = \frac{1}{x^{m+5}}$, maka m =

A –13
B –3
C 3
D 13

24 Simplify $(4e^{-2}f)^2 \div 8e^{-7}f^3$.

Permudahkan $(4e^{-2}f)^2 \div 8e^{-7}f^3$.

A $\frac{1}{2}e^{-9}f^{-1}$

B $\frac{1}{2}e^{5}f^{5}$

C $2e^{3}f^{-1}$

D $2e^{5}f^{5}$

25 List all the integers x that satisfy the inequalities $5 - x \geq 1$ and $x > 2 + \frac{x}{5}$.

Senaraikan semua integer x yang memuaskan ketaksamaan $5 - x \geq 1$ dan $x > 2 + \frac{x}{5}$.

A 3, 4
B 2, 3, 4
C 1, 2, 3, 4
D 3, 4, 5, 6

26 Diagram 12 is a bar chart showing the number of tourists who visited five different recreational centers, *P, Q, R, S* dan *T*.

Rajah 12 ialah sebuah carta palang yang menunjukkan bilangan pelancong yang melawat lima buah pusat rekreasi, *P, Q, R, S* dan *T*.

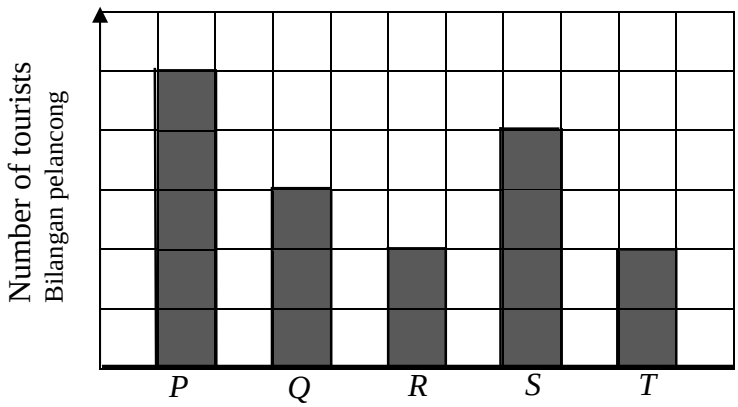


Diagram 12
Rajah 12

700 tourists visited the recreational center, *R*. Find the difference between the number of tourists who visited the recreational center, *P* and that of *S*.

Jika 700 orang pelancong melawat pusat rekreasi, *R*, carikan beza di antara bilangan pelancong yang melawat pusat rekreasi *P* dengan pusat rekreasi *S*.

A 300
B 350
C 400
D 450

27 Diagram 13 is a pictograph which shows the number of laptops sold in the first four months of a particular year by a computer shop. The number of laptops sold in March and April are not shown.

Rajah 13 ialah sebuah piktograf yang menunjukkan bilangan komputer riba yang dijual dalam empat bulan pertama bagi satu tahun tertentu oleh sebuah kedai komputer. Bilangan computer riba yang dijual dalam bulan Mac dan April tidak ditunjukkan.

January	💻 💻 💻 💻 💻
February	💻 💻 💻 💻
March	
April	

💻 represents 15 laptops
mewakili 15 komputer riba

Diagram 13
Rajah 13

The total of 225 laptops were sold in the four months.The number of laptops sold in March was twice the number sold in April.The number of laptops sold in April was

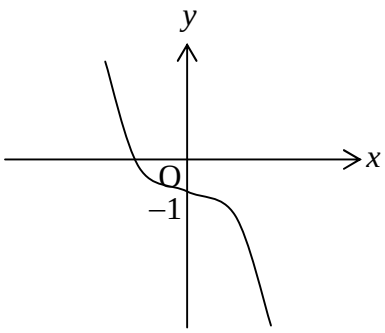
Sejumlah 225 komputer riba telah dijual dalam empat bulan tersebut. Bilangan komputer riba yang dijual dalam bulan Mac adalah dua kali ganda bilangan yang dijual dalam bulan April. Bilangan komputer riba yang dijual dalam bulan April ialah

A 30
B 40
C 60
D 90

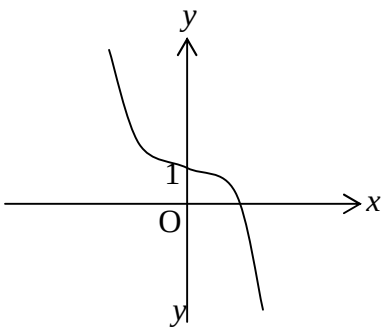
28 Which of the following represents $y = -x^3 + 1$?

Antara yang berikut, manakah mewakili graf bagi $y = -x^3 + 1$?

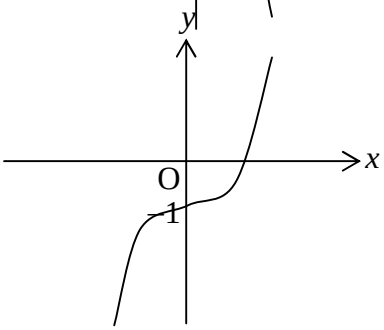
A



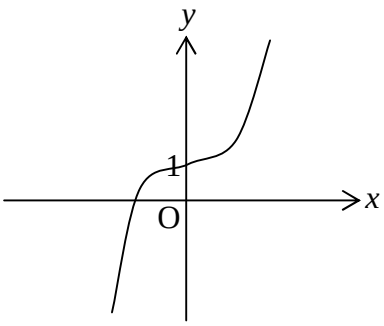
B



C



D



29 Given set $P = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$ and set $Q = \{\text{prime numbers less than } 10\}$. Find $n(P \cap Q)'$.

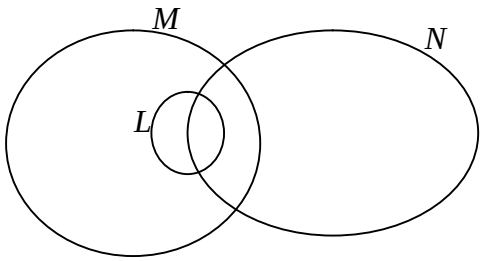
Diberi bahawa set P = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10} dan set Q = {nombor perdana kurang daripada 10}. Carikan n(P ∩ Q) ′.

A 4
B 5
C 6
D 7

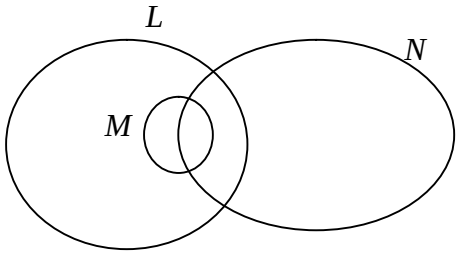
30 Given sets L, M and N where $L \cup M = L$ and $M \subset (L \cap N)$. Which of the following Venn diagrams represents the above conditions?

Diberi set A set M dan set N dengan keadaan $L \cup M = L$ dan $M \subset (L \cap N)$. Gambar rajah Venn manakah yang mewakili keadaan di atas?

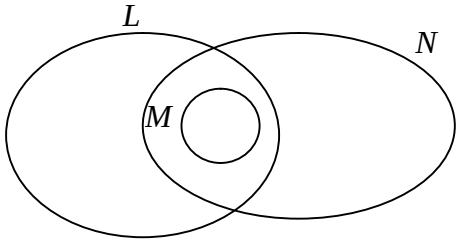
A



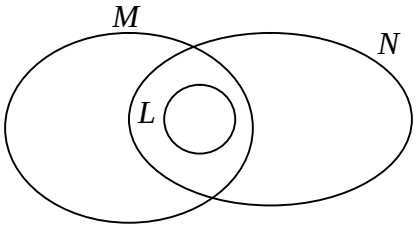
B



C



D



31 Given the universal set, $\xi = P \cup Q$, P = {10, 11, 12} and set Q = { 10,12,14,16}, find the value of n(ξ).
Diberi set semesta $\xi = P \cup Q$, P = {10, 11, 12} dan set Q = { 10,12,14,16}, carikan nilai n(ξ).

A 4
B 5
C 6
D 7

32 The gradient of the straight line $3x + 2y = 12$ is
Kecerunan bgai garis lurus 3 x + 2 y = 12 ialah

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

33 In Diagram 14 , the gradient of straight line PQ is $\frac{3}{4}$.

Dalam Rajah 14 ,kecerunan garis lurus PQ ialah $\frac{3}{4}$.

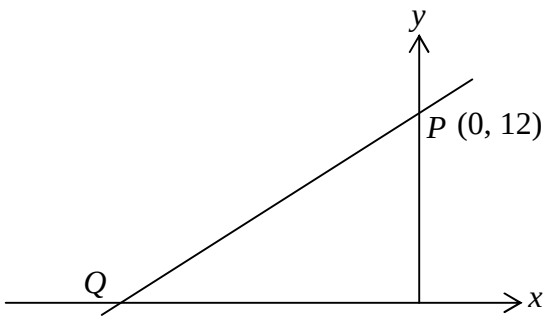


Diagram 14
Rajah 14

Determine the x – intercept of the straight line PQ.
Carikan pintasan x bagi garis lurus PQ.

A – 16
B – 6
C – 12
D – 18

34 In class Cemerlang there are 8 school prefects and 24 students are not prefect. In February, another 4 new school prefects transfer to the class. A student is chosen from the class. What is the probability that the student chosen is a school prefect?
Di dalam kelas Cemerlang , 8 orang pelajar adalah pengawas sekolah dan 24 bukan pengawas Pada bulan Februari, 4 orang pangawas lagi dipindahkan ke kelas tersebut. Seorang pelajar dipilih secara rawak dari kelas itu.Apakah kebarangkalian bahawa pelajar yang terpilih adalah pengawas?.

A $\frac{1}{4}$

B $\frac{1}{3}$

C $\frac{2}{3}$

D $\frac{3}{4}$

35 A box contains 24 blue marbles and several red marbles. The probability that chosen a red marbles is $\frac{1}{3}$. How many red marbles inside the box?
Sebuah kotak mengandungi 24 biji guli biru dan beberapa biji guli merah . Kebarangkalian guli berwarna merah dipilih ialah $\frac{1}{3}$. Hitungkan bilangan guli merah yang terdapat dalam kotak itu.

A 6
B 8
C 12
D 72

36 Table 1 shows some values of the variables *M* and *N*.
Jadual 1 menunjukkan sebahagian daripada nilai – nilai pembolehubah M dan N.

M	12	*p*
N	4	7

Table 1
Jadual 1

It is given that *M* varies directly as *N*. Calculate the value of *p* when N = 7
Diberi bahawa M berubah secara langsung dengan N. Hitungkan nilai p apabila N = 7

A 21
B 28
C 48
D 84

37 M varies inversely as square roots of L. Given that the constant is k, find the relation between M and L.
Diberi M berubah secara songsang dengan punca kuasa dua L. Diberi k ialah pemalar , cari hubungan antara M dan L.

A $M = kL^{\frac{1}{2}}$

B $M = \dfrac{k}{L^{\frac{1}{2}}}$

C $M = kL^2$

D $M = \dfrac{k}{L^2}$

38 Table 2 shows the relation between the variables R, Q and S is $R \propto Q^2S$
Jadual 2 menunjukkan hubungan antara tiga pembolehubah, R, Q dan S ialah $R \propto Q^2S$

R	8	12
Q	4	m
S	2	3

Table 2
Jadual 2

Calculate the value of m.
Hitungkan nilai m.

A 1

B 4

C 16

D 32

39 $\begin{pmatrix} 5 & 3 \\ 2 & 1 \end{pmatrix}\begin{pmatrix} 2 & 1 \\ -3 & 0 \end{pmatrix} =$

A $\begin{pmatrix} 7 & 6 \\ -1 & 1 \end{pmatrix}$

B $\begin{pmatrix} 1 & 5 \\ -7 & 2 \end{pmatrix}$

C $\begin{pmatrix} 1 & 5 \\ 1 & 2 \end{pmatrix}$

D $\begin{pmatrix} 10 & 3 \\ -6 & 0 \end{pmatrix}$

40 Given that $\begin{pmatrix} 8 \\ 4 \end{pmatrix} - 2\begin{pmatrix} 6 \\ 2n \end{pmatrix} = \begin{pmatrix} -4 \\ 4n \end{pmatrix}$. Find the value of n.

Diberi bahawa $\begin{pmatrix} 8 \\ 4 \end{pmatrix} - 2\begin{pmatrix} 6 \\ 2n \end{pmatrix} = \begin{pmatrix} -4 \\ 4n \end{pmatrix}$. *Cari nilai* n

A $\frac{1}{3}$

B $\frac{1}{2}$

C $\frac{3}{4}$

D $\frac{4}{3}$

END OF QUESTION PAPER

1449/2
Mathematics
Paper 2
September
2008

NAME :……..

FORM: ……

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

1. *This question paper consist two section:* **Section A** *and* **Section B**
   Kertas soalan ini mengandungi dua bahagian : ***Bahagian A dan Bahagian B***
2. *Answer all question in* **Section A** *and* ***four*** *questions from* **Section B.**
2. *This question paper is bilingual.*
3. *Write your answers in the spaces provided in the question paper.*
4. *Working step must be written clearly.*
5. *Diagram given is not according to scale unless stated.*
6. *Marks for each question are given in bracket.*
7. *A list of formulae is given in pages 2 and 3.*
8. *Non programmable scientific calculator is allowed.*
9. *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 $a^m \times a^n = a^{m+n}$

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

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

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

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

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

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

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

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

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

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

12 Pythagoras Theorem
$c^2 = a^2 + b^2$

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

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

 [Lihat sebelah

SHAPES AND SPACE

1 Area of trapezium $= \frac{1}{2} \times$ sum of parallel sides $\times$ height

2 Circumference of circle $= \pi d = 2\pi r$

3 Area of circle $= \pi r^2$

4 Curved surface area of cylinder $= 2\pi rh$

5 Surface area of sphere $= 4\pi r^2$

6 Volume of right prism = cross sectional area $\times$ length

7 Volume of cylinder $= \pi j^2 h$

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 $= \frac{1}{3} \times$ base area $\times$ height

11 Sum of interior angles of a polygon $= (n - 2) \times 180^o$

12 $$\frac{\text{arc length}}{\text{circumference of circle}} = \frac{\text{angle subtended at center}}{360^o}$$

13 $$\frac{\text{area of sector}}{\text{area of circle}} = \frac{\text{angle subtended at centre}}{360^o}$$

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

15 Area of image $= k^2 \times$ 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 $\xi = P \cup Q \cup R$.

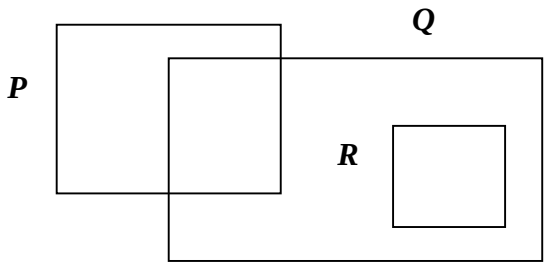
On the diagram provided in the answer spaces, shade
Pada rajah di ruang jawapan, lorekkan

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

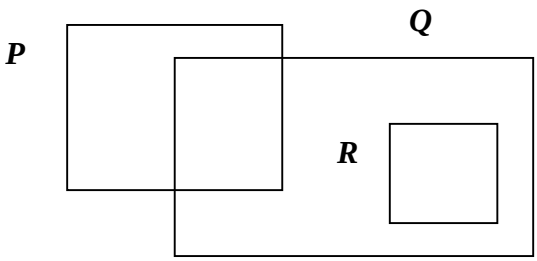
[3 *marks*]

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 kuadratik 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.

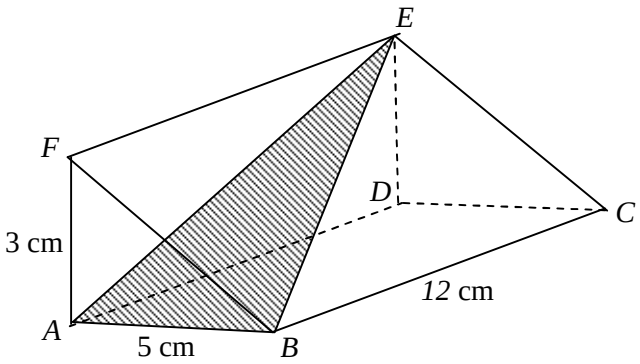


Diagram 1

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*

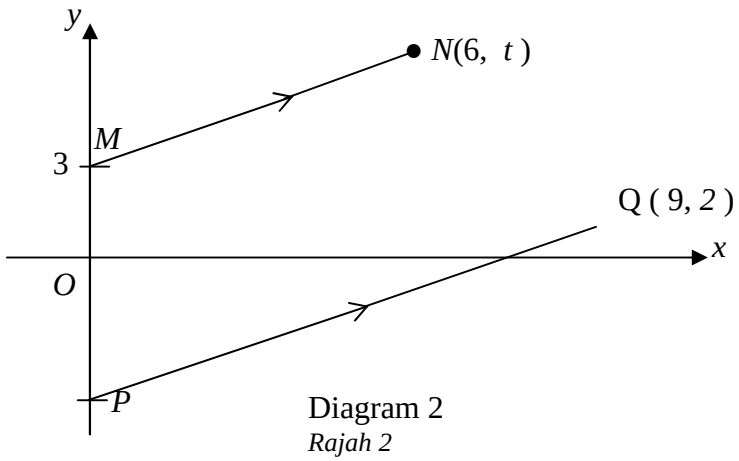


Diagram 2
Rajah 2

Find
Cari

(a) the value of *t*
nilai t

(b) the equation of straight line *PQ*
persamaan bagi garis lurus PQ

(c) 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* .

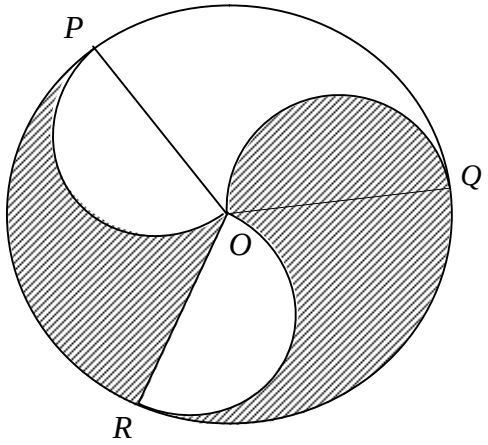


Diagram 3

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 pergerakkan sebuah zarah dalam masa 35 saat.

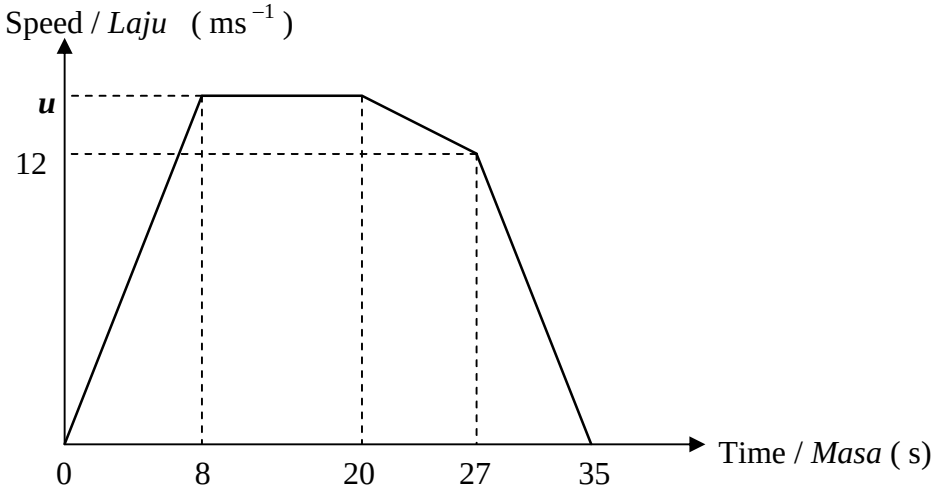


Diagram 4

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

(a) the value of *u*
nilai u

(b) 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

(c) the average speed , in ms^{-1} , of the particle for the whole journey.
laju purata, dalam ms^{-1},seluruh pergerakkan 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 berjejari 8 cm. Sebuah kon yang berjejari 6 cm dikeluarkan daripada pepejal itu.

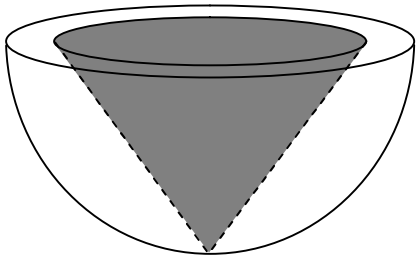


Diagram 5

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 ceraian 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 $-4 \le x \le 4$.

D*engan 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* $-4 \le x \le 4$. .

[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 $-4 \le x \le 4$.
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* $-4 \le x \le 4$.
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

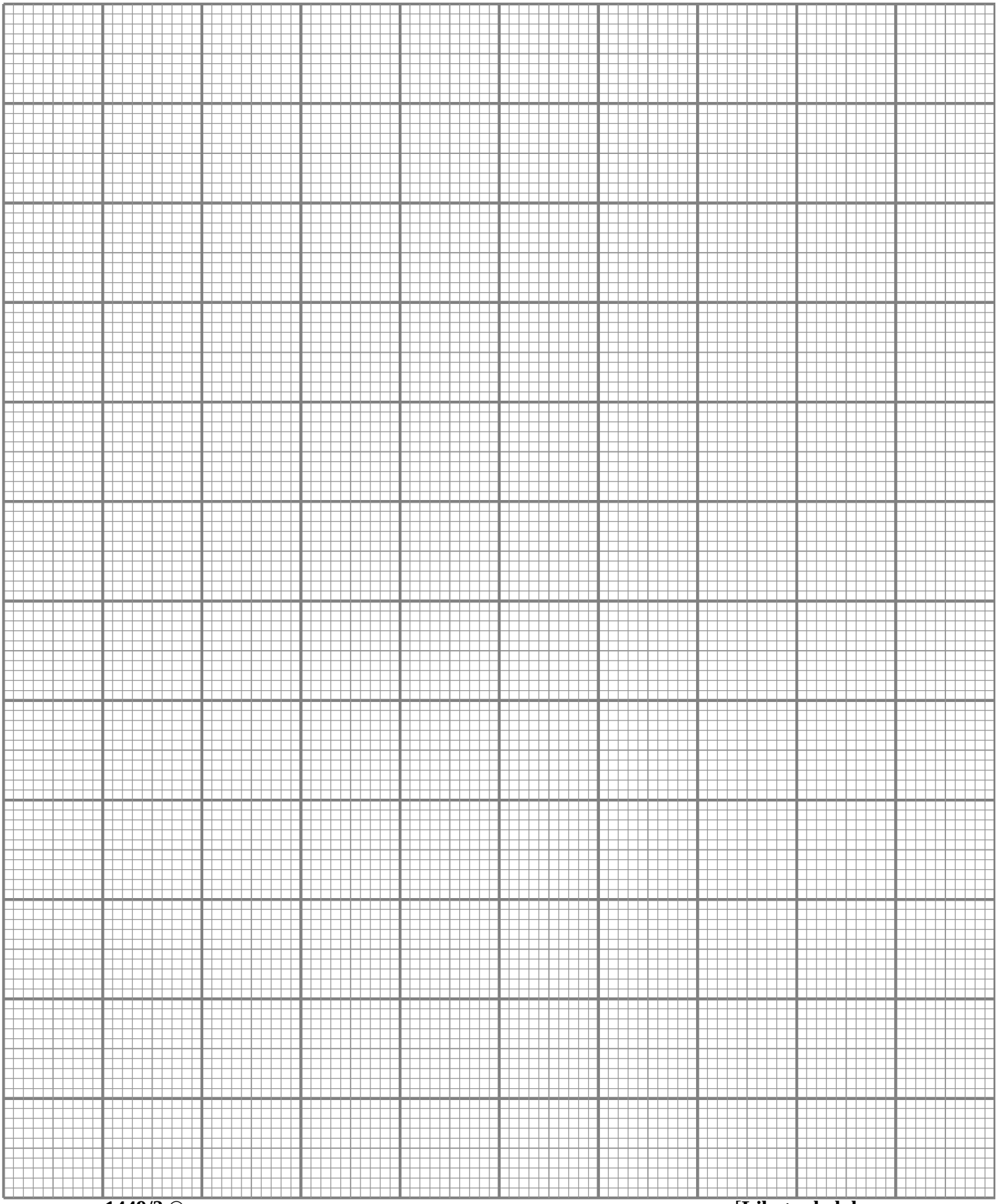
(b) Refer graph on page 18.
Rujuk graf pada halaman 18.

(c) (i) y = …….

(i) x = ……..

(d)
x = …….
x = …….

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.

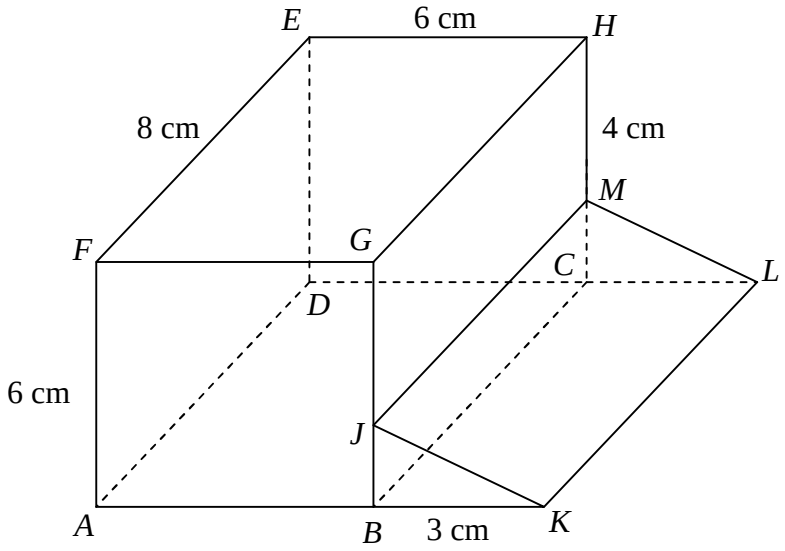


Diagram 6(i)

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

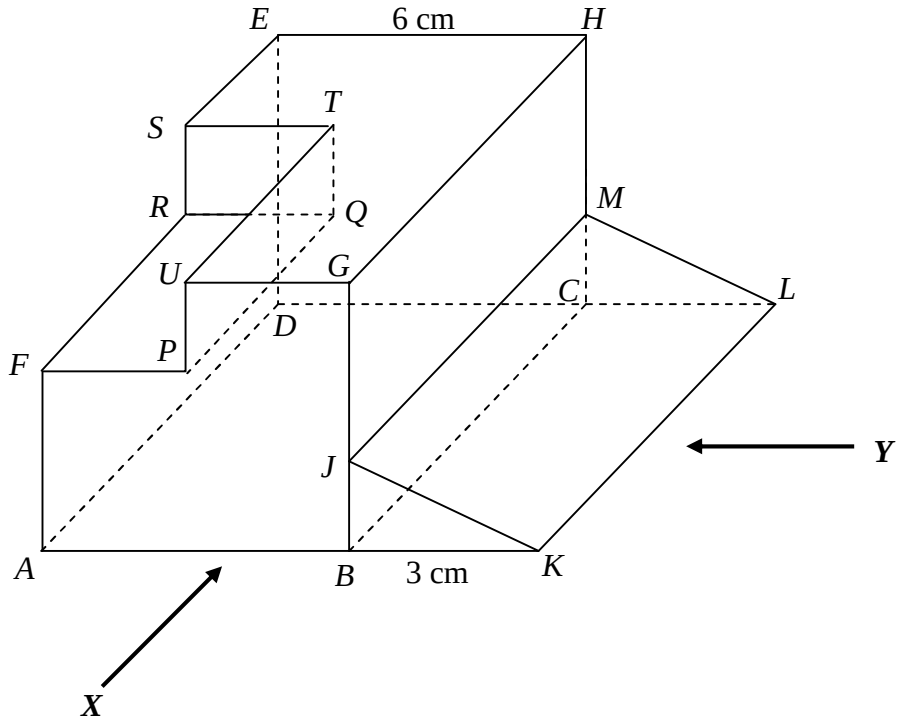


Diagram 6 (ii)

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 ^{0} N , 120 ^{0} W) , Q (45 ^{0} N , 15 ^{0} W) , F and H are four points on the surface of the earth and PF is the diameter of the earth .

P (45 ^{0} U , 120 ^{0} B) , Q (45 ^{0} U , 15 ^{0} 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 Cartesan.

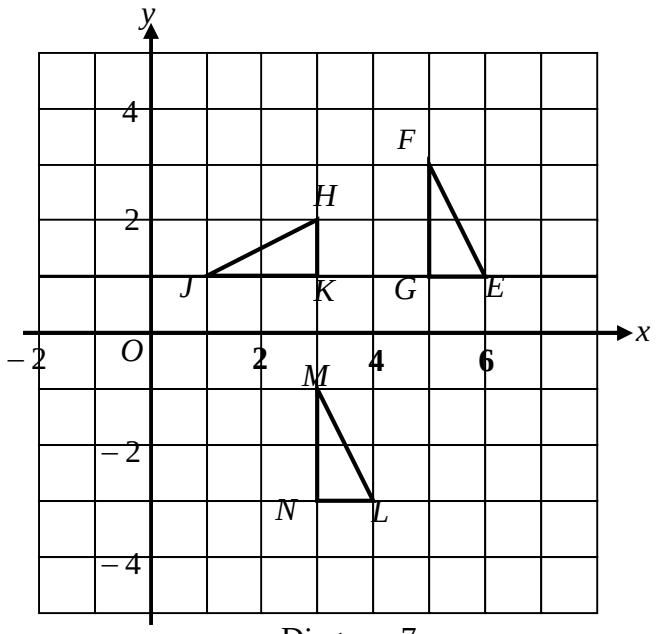


Diagram 7
Rajah 7

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.
Nyatakan kelas mod bagi data yang diberi dalan Jadual 3.
[1 *mark*]

(iii) Calculate the estimated mean marks of the group of the students.
Hitungkan min anggaran markah bagi kumpulan murid itu.
[3 *marks*]

(b) For this part of the question, use the graph paper provided on page 28.
Untuk ceraian 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.
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.
[4 *marks*]

(ii) Based on the histogram in (b)(i), state one piece of information about the marks.
Berdasarkan histogram di (b)(i), nyatakan satu maklumat tentang markah tersebut.
[2 *marks*]

(c) On the same graph, draw a frequency polygon for the above data.
Di atas graf yang sama, lukiskan sebuah poligon kekerapan.
[1 *mark*]

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) ……..

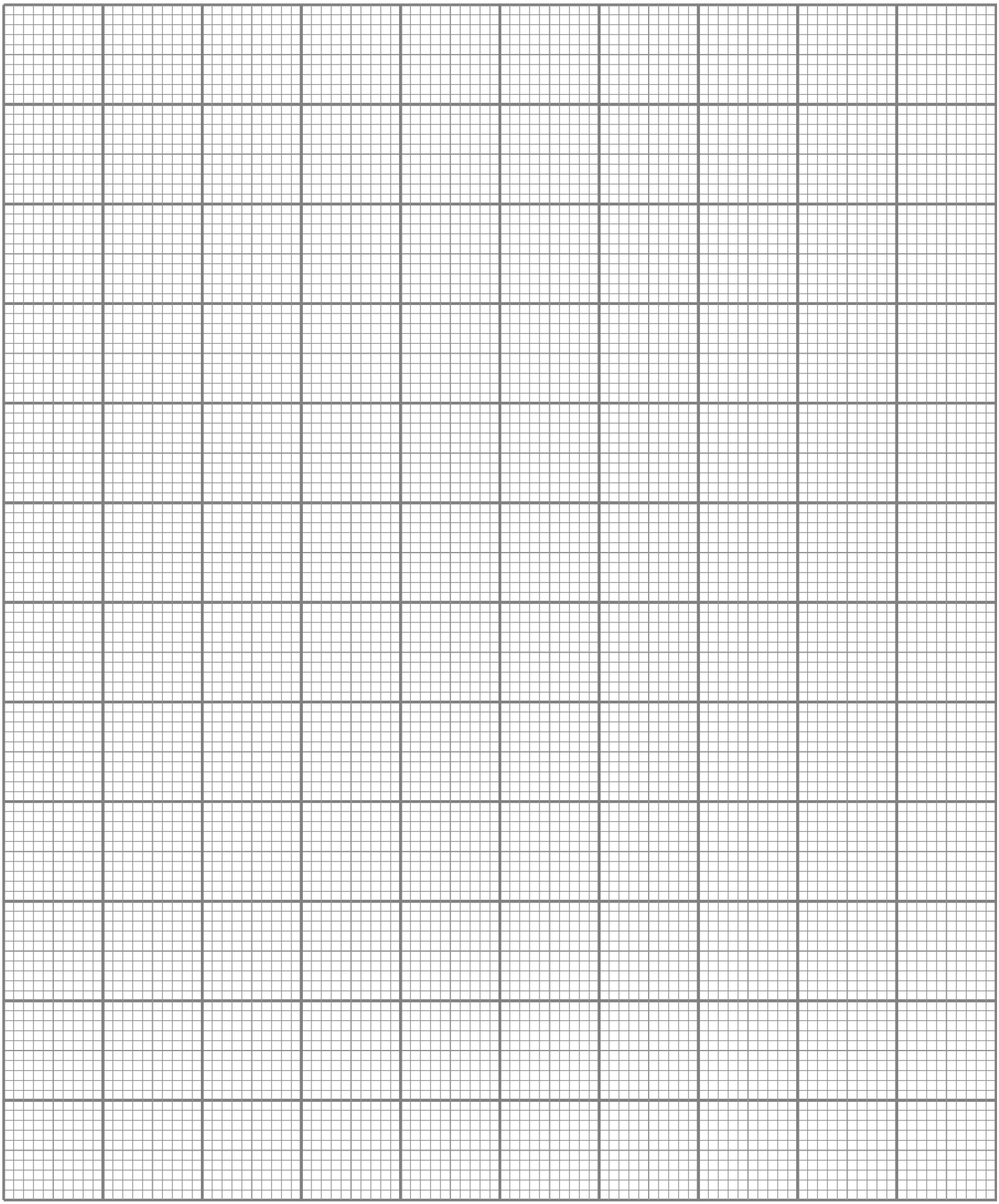
……..

……..

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

Graph for Question 16

Graf untuk soalan 16



END OF QUESTION PAPER

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

PEPERIKSAAN PERCUBAAN

SIJIL PELAJARAN MALAYSIA 2008

MARKING SCHEME

MATHEMATICS
PAPER 1 1449/1

PEPERIKSAAN PERCUBAAN

SIJIL PELAJARAN MALAYSIA 2008

MATHEMATICS
PAPER 1 1449/1

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

MOZ@C

PERSIDANGAN KEBANGSAAN PENGETUA-PENGETUA

SEKOLAH MENENGAH MALAYSIA (PKPSM) CAWANGAN MELAKA

PEPERIKSAAN PERCUBAAN 2008

MARKING SCHEME

MATHEMATICS
PAPER 2 1449/2

SM SAINS MUZAFFAR SYAH , MELAKA

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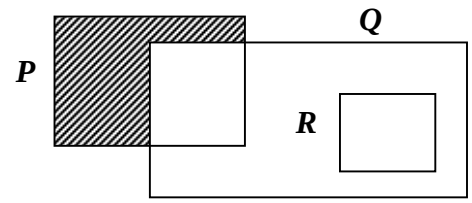
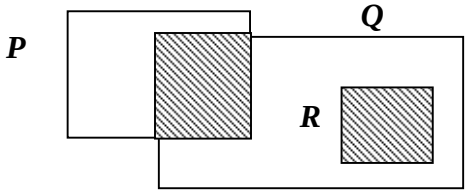
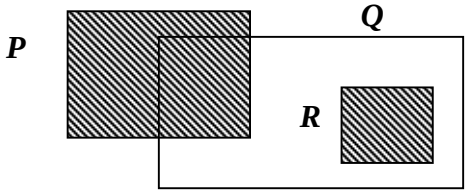
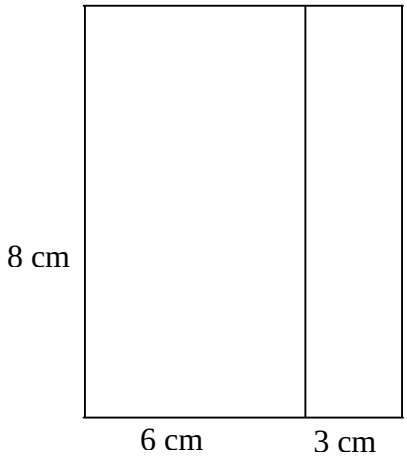
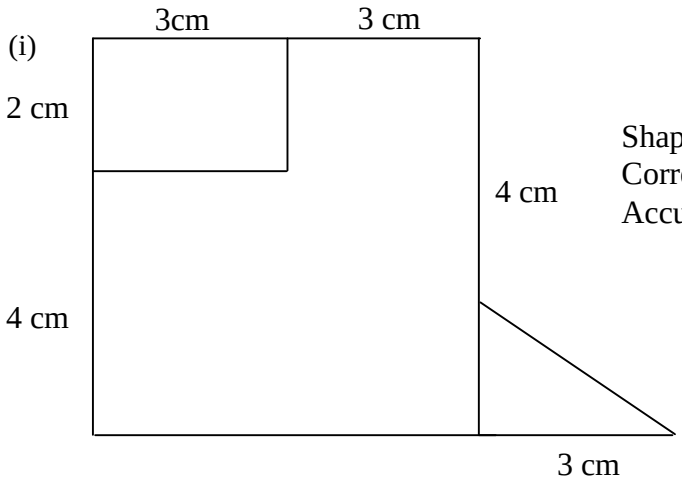
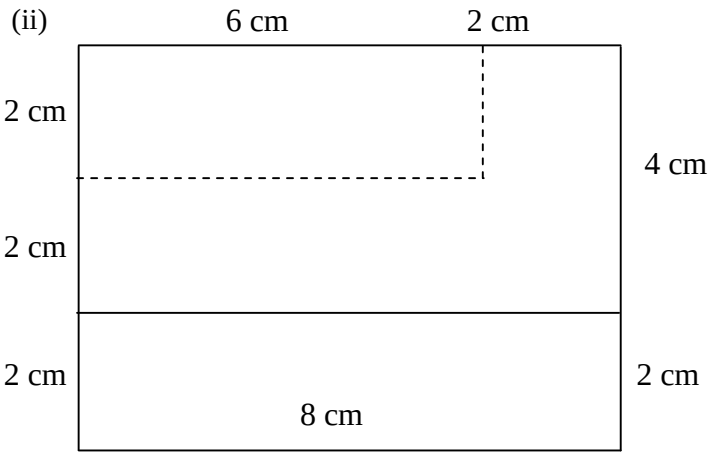
MARKAH MAKSIMUM BAGI KERTAS INI : 100 MARKAH

No	MARKING SCHEME	Mark	
1	(a) 	1	
	(b) 	2	
	Notes :  1 mark		**3**
2	$2x - 6y = 12$ or $x - 3y = 6$ or $x = \frac{9 - 3y}{2}$ or $y = \frac{1}{3}x - 2$ or equivalent $9y = -3$ or $3x = 15$ $x = 5$, $y = -\frac{1}{3}$	1 1 1, 1	
	OR $\begin{pmatrix} 2 & 3 \\ \frac{1}{3} & -1 \end{pmatrix}\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 9 \\ 2 \end{pmatrix}$ 1 $\begin{pmatrix} x \\ y \end{pmatrix} = \frac{1}{-2-1}\begin{pmatrix} -1 & -3 \\ -\frac{1}{3} & 2 \end{pmatrix}\begin{pmatrix} 9 \\ 2 \end{pmatrix}$ 1 $x = 5$ 1 $y = -\frac{1}{3}$ 1 *Note* : If $\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 5 \\ -\frac{1}{3} \end{pmatrix}$ only give 1 mark		**4**

3	$2p^2 + 5p - 3 = 0$ $(2p - 1)(p + 3) = 0$ $p = \frac{1}{2}, \quad p = -3$	1 1 1,1	**4**
4	Identify $\angle EAD$ $\tan \angle EAD$ or $\tan \theta = \frac{3}{12}$ $\angle EAD = 14^o\, 2'$ or 14.04^o	1 1 1	**3**
5(a)	$\frac{t-3}{6-0} = \frac{2}{3}$ $t = 7$	1 1	
5(b)	$2 = \frac{2}{3}(9) + c = 2$ or $y - 2 = \frac{2}{3}(x - 9)$ $y = \frac{2}{3}x - 4$	1 1	
5(c)	-4	1	**5**
6 (a)	$\frac{240}{360} \times 2 \times \frac{22}{7} \times 28$ $117\frac{1}{3}$ or 117.33	1 1	
6(b)	$\frac{120}{360} \times \frac{22}{7} \times 28^2$ or $\frac{180}{360} \times \frac{22}{7} \times 14^2$ or $\frac{240}{360} \times \frac{22}{7} \times 28^2$ $\frac{240}{360} \times \frac{22}{7} \times 28^2$ - $\frac{180}{360} \times \frac{22}{7} \times 14^2$ or equivalent $1334\frac{2}{3}$ or 1334.67	1 1 1	**5**

7(a)	A regular hexagon has six equal sides **or** $\sqrt[3]{100} = 10$.	1	
7(b)	m is not a negative number.	1	
7(c)	If $x < 7$ then $x < 5$. False.	1 1	
7(d)	Imp. 1 : If $L \subset K$ then $L \cap K = L$. Imp. 2 : If $L \cap K = L$ then $L \subset K$.	1 1	**6**
8(a)	$\frac{1}{5} \times \frac{1}{3}$ $\frac{1}{15}$	1 1	
8(b)	$\frac{3}{10} \times \frac{5}{12} + \frac{1}{5} \times \frac{1}{3} + \frac{1}{2} \times \frac{1}{4}$ $\frac{23}{120}$	2 1	**5**
9(a)	$\begin{pmatrix} -4 & 1 \\ -\frac{5}{2} & \frac{1}{2} \end{pmatrix}$ Notes : 1. Accept $\frac{1}{2}\begin{pmatrix} -8 & 2 \\ -5 & 1 \end{pmatrix}$ for 2 marks 2. $\frac{1}{-8-(-10)}\begin{pmatrix} -8 & 2 \\ -5 & 1 \end{pmatrix}$ 1 mark	2	
9(b)	$\begin{pmatrix} 1 & -2 \\ 5 & -8 \end{pmatrix}\begin{pmatrix} k \\ m \end{pmatrix} = \begin{pmatrix} 1 \\ 11 \end{pmatrix}$ $\begin{pmatrix} k \\ m \end{pmatrix} = \frac{1}{2}\begin{pmatrix} -8 & 2 \\ -5 & 1 \end{pmatrix}\begin{pmatrix} 1 \\ 11 \end{pmatrix}$ $k = 7$ $m = 3$ *Note* : If $\begin{pmatrix} k \\ m \end{pmatrix} = \begin{pmatrix} 7 \\ 3 \end{pmatrix}$ only give 1 mark	1 1 1 1	**6**

10(a)	$\frac{1}{2} \times 8 \times u = 72$ $u = 18$	1 1	
10(b)	$\frac{0-12}{35-27}$ $-\frac{3}{2}$	1 1	
10(c)	$72 + 12(18) + \frac{1}{2}(7)(18+12) + \frac{1}{2}(12)(8)$ $\frac{72 + 12(18) + \frac{1}{2}(7)(18+12) + \frac{1}{2}(12)(8)}{35}$ 12.6	1 1 1	**7**
11	$V_{cone} = \frac{1}{3}(3.142)(6)^2(8)$ $V_{h/sphere} = \frac{1}{2} \times \frac{4}{3}(3.142)(8)^3$ $V_{solid} = \frac{1}{2} \times \frac{4}{3}(3.142)(8)^3 - \frac{1}{3}(3.142)(6)^2(8)$ 770.84	1 1 1 1	**4**
12(a)	2.5, -10, -2	1,1,1	
12(b)	Both axes with uniform scales and in the right directions All points correctly plotted Smooth curves	1 2 1	
12(c)	(i) $2.75 \leq y \leq 2.85$ (ii) $-3.4 \leq x \leq -3.3$	1 1	
12(d)	$y = -x$ Draw line y = -x X = -1.5± 0.1 , 1.5 ± 0.1 both correct	1 1 1	**12**

13 (a)	 Shape Correct dimensions Accuracy (± 2 mm, ± 1°)	1 1 1	
13(b)	(i)  Shape Correct dimensions Accuracy (± 2 mm, ± 1°)	1 1 2	
	(ii)  Shape Dashed lines Dimensions correct Accuracy (± 2 mm, ± 1°)	1 1 1 2	**12**

14(a)	60^o E Note : 60^o or θ^o E give 1 mark	2	
14(b)	$120^o - 15^o$ or 105^o $105 \times 60 \times \cos 45^o$ Note : using $\cos 45^o$ give 1 mark 4454.77 n.m.	1 2 1	
14(c)	$\theta = \frac{4200}{60} = 70^o$ $70^o - 45° = 25^o$ 25^o S	1 1 1	
14(d)	110×60 $\frac{110 \times 60}{900}$ 7.33 hrs	1 1 1	**12**
15(a)	(i) (–2, 6) (ii) (4, –7) (iii) (–2, –4)	1 1 2	
15(b)	(i) $\boldsymbol{V}$: Rotation 90^o anticlockwise about (4, 0) (ii) $\boldsymbol{W}$: Rotation 90^o clockwise about (1, –1)	1 1 1 1 1 1	
15(c)	Translation $\begin{pmatrix} -2 \\ -4 \end{pmatrix}$	1, 1	**12**

16(a) (i)

Marks	Frequency	Midpoint
20 – 29	2	24.5
30 – 39	6	34.5
40 – 49	8	44.5
50 – 59	10	54.5
60 – 69	7	64.5
70 – 79	5	74.5
80 – 89	3	84.5
90 – 99	4	94.5

1

16(b) (ii) 50 – 59 1

(iii)

$$\frac{2(24.5)+6(34.5)+8(44.5)+10(54.5)+7(64.5)+5(74.5)+3(84.5)+4(94.5)}{45}$$ 2

$$\frac{2612.5}{45}$$

58.06 1

(i) *Refer graph*

Both axes with correct uniform scales and directions 1

Using upper boundaries or midpoint or class intervals 1

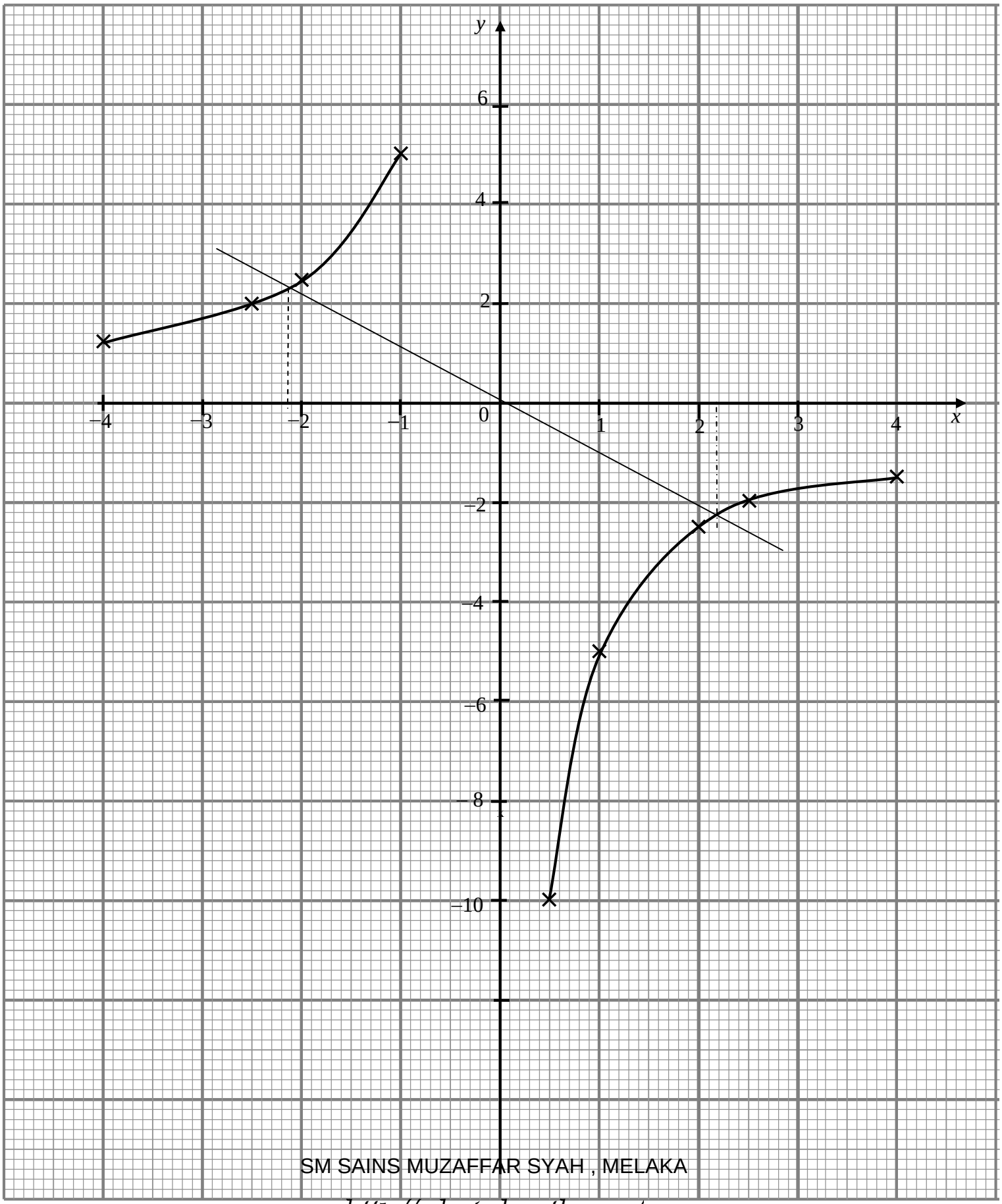
All bars correct 2

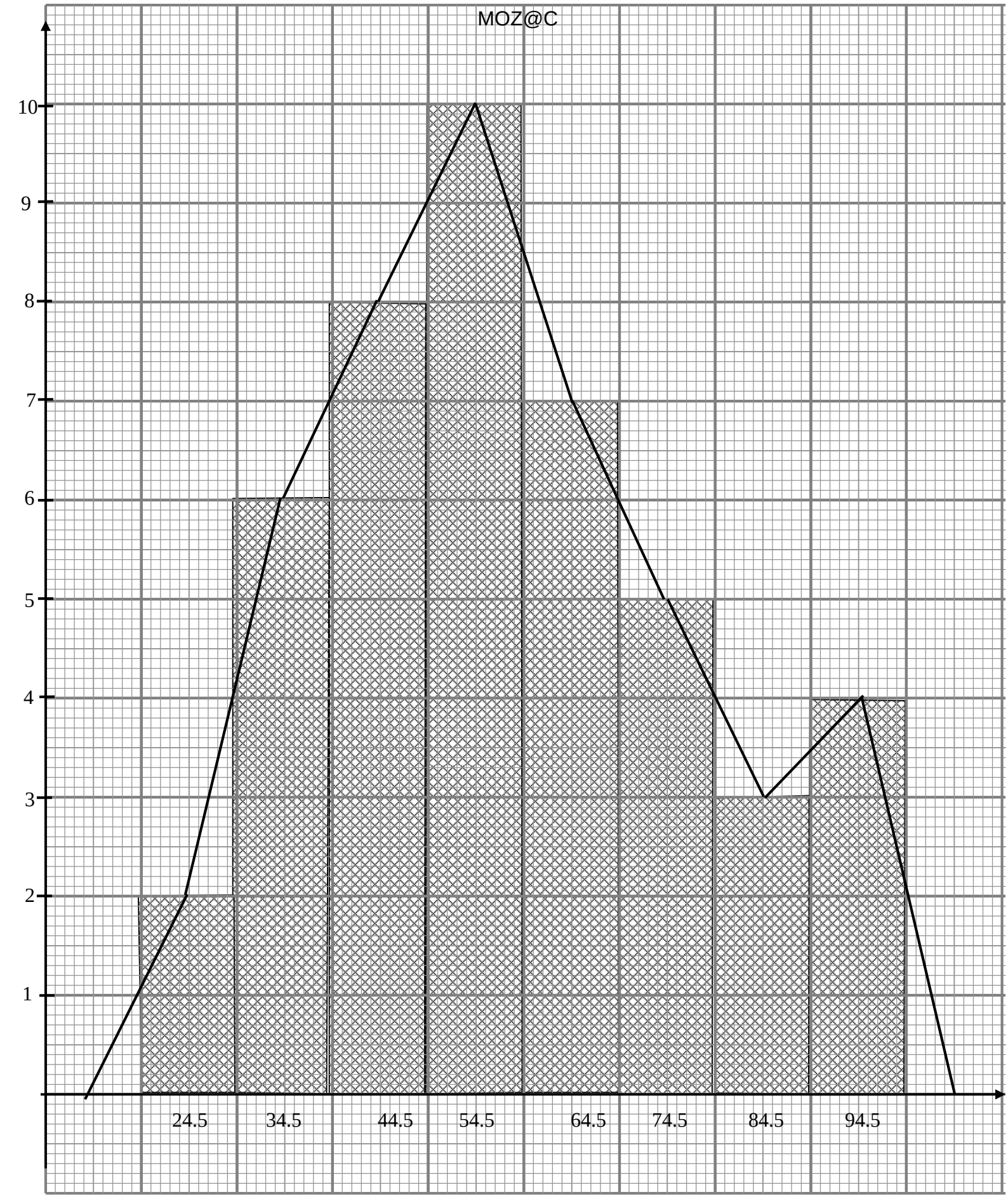
(ii) Any correct information from histogram. 2

16(c) Polygon frequency drawn correctly 1

12

Graph for Question 13




10
9
8
7
6
5
4
3
2
1
24.5
34.5
44.5
54.5
64.5
74.5
84.5
94.5