

1449/1
Mathematics
Paper 1
August
2009

PERSIDANGAN KEBANGSAAN PENGETUA-PENGETUA

SEKOLAH MENENGAH MALAYSIA (PKPSM) CAWANGAN MELAKA



PEPERIKSAAN PERCUBAAN
SIJIL PELAJARAN MALAYSIA 2009
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 3 to 4.
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.*

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

RELATIONS

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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 $= \pi r^2$
- 4 Curved area of cylinder $= 2\pi r h$
- 5 Surface area of sphere $= 4\pi r^2$
- 6 Volume of right prism $= \text{cross section} \times \text{length}$
- 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
$$\frac{\text{arc length}}{\text{circumference of circle}} = \frac{\text{angle subtended at centre}}{360^\circ}$$
- 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 $= k^2 \times \text{area of object}$

Answer **all** questions.
Jawab **semua** soalan.

- 1 Round off 8 157 correct to three significant figures.
Bundarkan 8 157 betul kepada tiga angka bererti .

A 815
B 816
C 8 150
D 8 160

- 2 Express 0.00415 in standard form.
Ungkapkan 0.00415 dalam bentuk piawai .

A 4.15×10^{-2}
B 4.15×10^{-3}
C 4.15×10^2
D 4.15×10^3

- 3 $6.1 \times 10^5 - 1.2 \times 10^4 =$

A 4.90×10^4
B 5.98×10^4
C 4.90×10^5
D 5.98×10^5

- 4 Diagram 1 shows an empty tank, which is a cube with length 25 cm. A worker fills up 75 % of the tank with water.

Rajah 1 menunjukkan sebuah tangki kosong berbentuk kubus berukuran 25 cm. Seorang pekerja memasukkan air ke dalam tangki itu sehingga 75 % penuh.

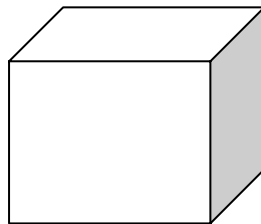


Diagram 1
Rajah 1

Calculate the volume , in cm^3 , of water in the tank.
Hitungkan isipadu , dalam cm^3 , air dalam tangki itu.

A 3.91×10^3
B 3.91×10^5
C 1.17×10^4
D 1.17×10^6

5 $10100_2 - 1111_2 =$

- A 101_2
- B 111_2
- C 1001_2
- D 1011_2

6 Convert 324_8 to a number in base five.

Ungkapkan 324_8 sebagai nombor dalam asas lima .

- A 231_5
- B 244_5
- C 1304_5
- D 1322_5

7 Diagram 2 shows a regular pentagon $PQRST$. PUT is a straight line. $VP = VU$.

Rajah 2 menunjukkan sebuah pentagon sekata $PQRST$. PUT ialah garis lurus . $VP = VU$.

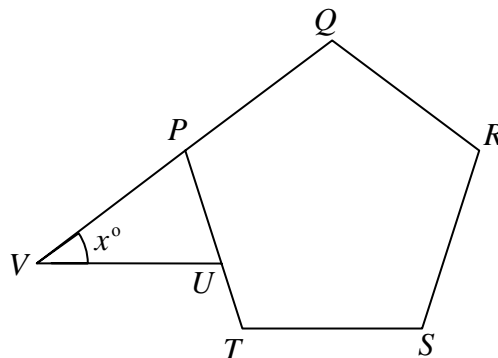


Diagram 2
Rajah 2

Find the value of x .

Cari nilai x .

- A 36
- B 54
- C 60
- D 72

- 8 In Diagram 3, URT is a tangent to the circle $PQRS$ at point R . PQR is an equilateral triangle and $\angle URS = 20^\circ$.

Dalam Rajah 3, URT ialah tangen kepada bulatan $PQRS$ di titik R . PQR ialah segitiga sama dan $\angle URS = 20^\circ$.

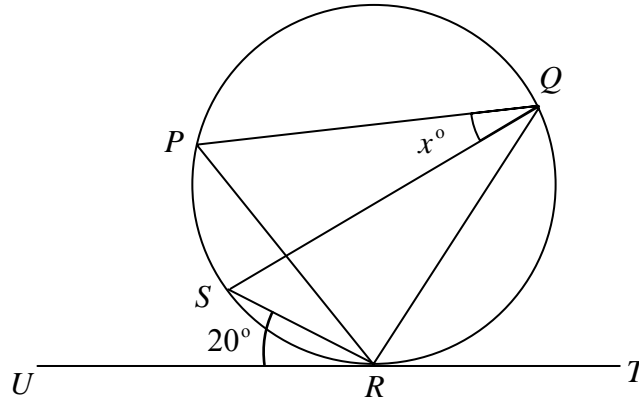


Diagram 3

Rajah 3

Find the value of x .

Cari nilai x .

- A 30
B 35
C 40
D 45
- 9 In Diagram 4, quadrilateral N is the image of quadrilateral M under a clockwise rotation of 90° .

Dalam Rajah 4, sisiempat N ialah imej bagi sisiempat M di bawah putaran 90° ikut arah jam.

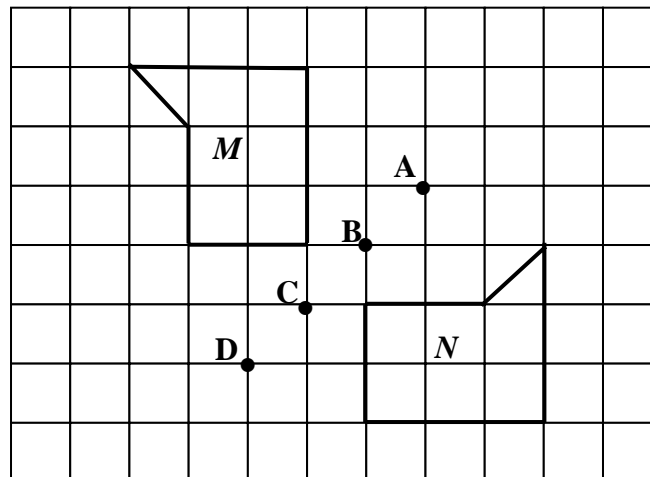


Diagram 4

Rajah 4

Which of the point **A**, **B**, **C** or **D**, is the center of the rotation?

Antara titik **A**, **B**, **C** atau **D**, yang manakah pusat putaran itu?

- 10 In Diagram 5, a square $PQRT$ is the image of a square $UWST$ under an enlargement .
 Dalam Rajah 5, segiempat sama $PQRT$ ialah imej bagi segiempat sama $UWST$ di bawah suatu pembesaran.

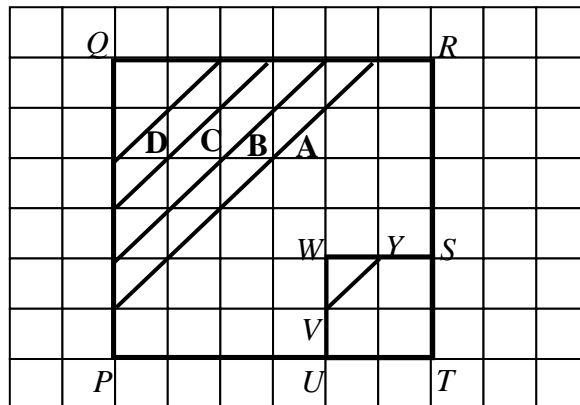


Diagram 5
Rajah 5

Which of the lines , A , B , C or D , is the image of the line VY under the same enlargement ?

Antara garis lurus , A , B , C atau D , yang manakah imej bagi garis lurus VY di bawah pembesaran yang sama ?

- 11 Diagram 6 shows a right-angled triangle RST .
 Rajah 6 menunjukkan segitiga bersudut tegak RST .

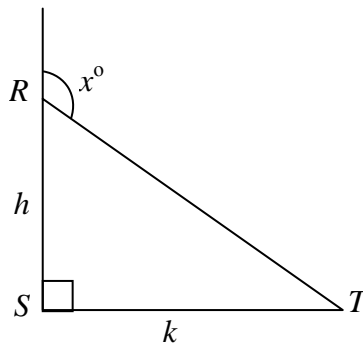


Diagram 6
Rajah 6

Given that $\cos x^\circ = -\frac{1}{2}$, express h in term of k .

Diberi $\cos x = -\frac{1}{2}$, nyatakan h dalam sebutan k .

- A $k \tan 60^\circ$
 B $\frac{k}{\tan 60^\circ}$
 C $k \sin 30^\circ$
 D $\frac{k}{\sin 30^\circ}$

- 12 Given that $\tan y^\circ = \frac{3}{4}$ where $180^\circ \leq y \leq 360^\circ$, find the value of $\sin y^\circ$.

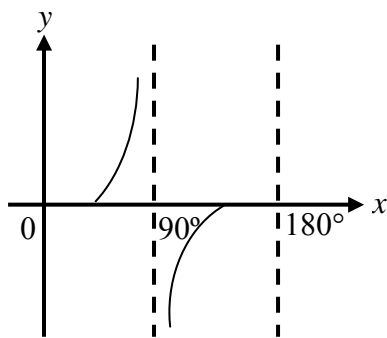
Diberi $\tan y^\circ = \frac{3}{4}$ dengan keadaan $180^\circ \leq y \leq 360^\circ$, cari nilai $\sin y^\circ$.

- A $-\frac{4}{5}$
 B $-\frac{3}{5}$
 C $\frac{3}{5}$
 D $\frac{4}{5}$

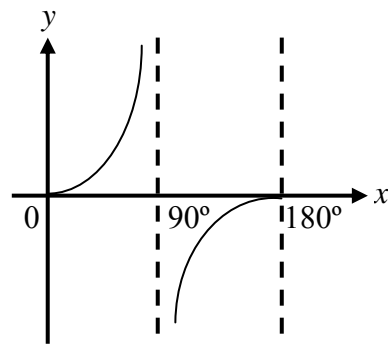
- 13 Which of the following represents the graph of $y = \tan x$ for $0^\circ \leq x \leq 180^\circ$?

Di antara berikut, yang manakah mewakili graf $y = \tan x$ untuk $0^\circ \leq x \leq 180^\circ$?

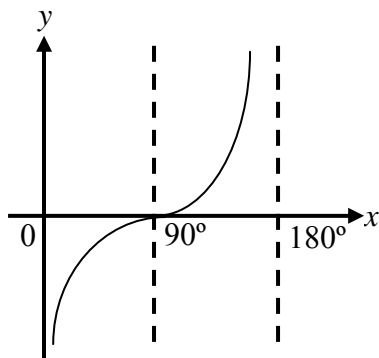
A



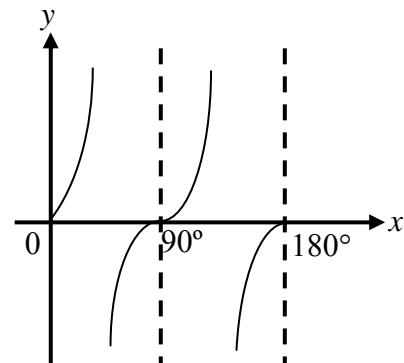
B



C



D



- 14 Diagram 7 shows a right prism with a horizontal base rectangle $ABCD$. P and Q are the midpoints of BC and AD respectively.
Rajah 7 menunjukkan prisma tegak dengan tapak segiempat tepat $ABCD$ yang mengufuk. P dan Q adalah titik tengah bagi BC dan AD masing-masing.

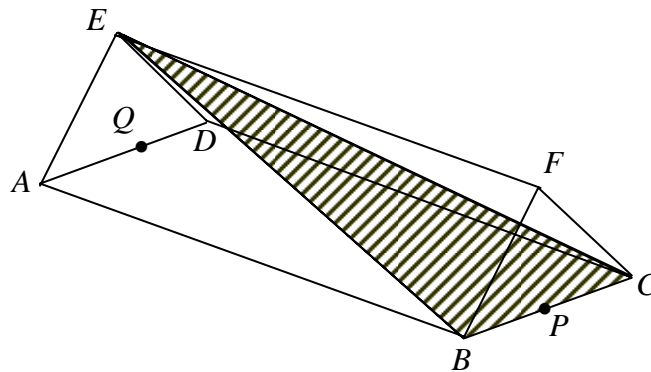


Diagram 7
Rajah 7

What is the angle between the plane BCE and the plane BCF ?
Apakah sudut di antara satah BCE dan satah BCF ?

- A $\angle PEF$
 B $\angle PEQ$
 C $\angle EPF$
 D $\angle EPQ$
- 15 Diagram 8 shows two vertical flagpoles on a horizontal plane. P , Q , R , S and T are five points on the poles such that $PQ = ST$.
Rajah 8 menunjukkan dua tiang bendera tegak di atas satah ufuk. P , Q , R , S dan T ialah lima titik pada tiang bendera dengan keadaan $PQ = ST$.

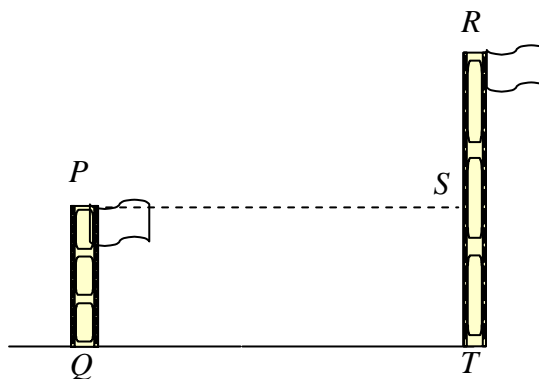


Diagram 8
Rajah 8

Name the angle of depression of point P from R .
Namakan sudut tunduk titik P dari R .

- A $\angle SRP$
 B $\angle SPR$
 C $\angle TPR$
 D $\angle TQR$

- 16 Diagram 9 shows a tower PQ . The points P , R and S lie on a horizontal plane.
Rajah 9 menunjukkan sebuah menara PQ . Titik-titik P , R dan S terletak di atas satah ufuk.

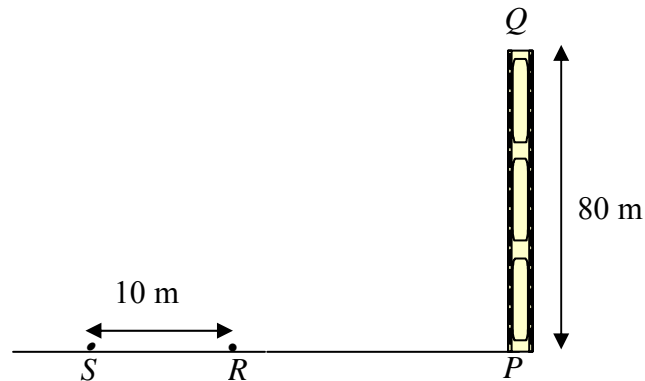


Diagram 9
Rajah 9

The angle of elevation of Q from R is 55° . Find the angle of depression S from Q .
Sudut dongak Q dari R ialah 55° . Cari sudut tunduk S dari Q .

- A $57^\circ 14'$
 B $32^\circ 47'$
 C $39^\circ 32'$
 D $50^\circ 28'$
- 17 Diagram 10 shows the position of points P , Q and R on a map. Given that bearing of R from P is 080° .
Rajah 10 menunjukkan kedudukan tiga titik P , Q dan R di atas peta. Diberi bahawa bering R dari P ialah 080° .

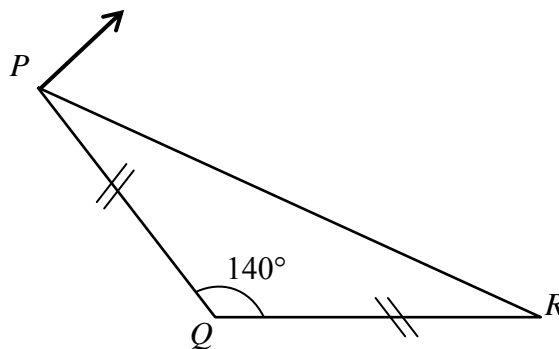


Diagram 10
Rajah 10

Find the bearing of Q from R .
Cari bering Q dari R .

- A 060°
 B 240°
 C 270°
 D 300°

- 18 In Diagram 11, N is the North Pole, S is the South Pole and NOS is the axis of the earth.
 Dalam Rajah 11, N ialah Kutub Utara, S ialah Kutub Selatan dan NOS ialah paksi bumi.

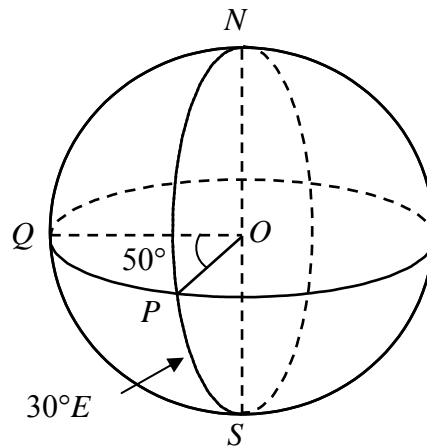


Diagram 11
 Rajah 11

Find the longitude of Q .
 Cari longitude bagi Q .

- A $20^\circ W$
 B $20^\circ E$
 C $80^\circ E$
 D $80^\circ W$
- 19 $x(x - 2y) - (y - x)^2 =$
 A $-y^2$
 B $2x^2 - y^2$
 C $2xy - y^2$
 D $-2xy - y^2$

- 20 Express $\frac{5+m}{5m} - \frac{m+n}{mn}$ as a single fraction in its simplest form.

Nyatakan $\frac{5+m}{5m} - \frac{m+n}{mn}$ sebagai pecahan tunggal dalam sebutan terendah.

- A $\frac{10n + mn - 5m}{5mn}$
 B $\frac{mn - 5m}{5mn}$
 C $\frac{1 - 5m}{5}$
 D $\frac{n - 5}{5n}$

- 21 Given that $2\sqrt{\frac{K+1}{N}} = \frac{M}{3}$, express N in the terms of K and M .

Diberi bahawa $2\sqrt{\frac{K+1}{N}} = \frac{M}{3}$, ungkapkan N dalam sebutan K dan M .

- A $N = \frac{M^2}{36(K+1)}$
B $N = \frac{36(K+1)}{M^2}$
C $N = \frac{M^2}{6(K+1)}$
D $N = \frac{6(K+1)}{M^2}$

- 22 Given that $h - 3 = \frac{4(h-2)}{5}$, calculate the value of h .

Diberi bahawa $h - 3 = \frac{4(h-2)}{5}$, hitungkan nilai h .

- A -23
B -5
C 1
D 7

- 23 Given that $m^n = \frac{1}{3^4}$, find the value of m and of n .

Diberi bahawa $m^n = \frac{1}{3^4}$, cari nilai m dan nilai n .

- A $m = 3, n = -4$
B $m = 3, n = 4$
C $m = -4, n = 3$
D $m = 4, n = 3$

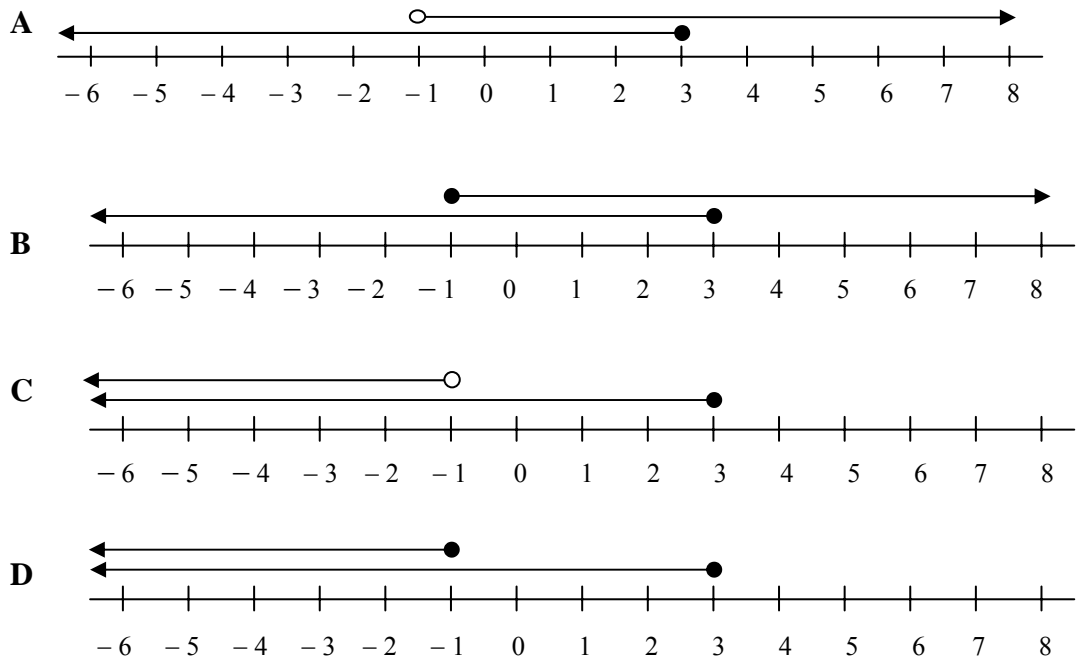
- 24 $\frac{\sqrt[3]{8p^6q^{12}}}{p^{-4}q^3} =$

- A $2p^2q$
B $8p^2q$
C $2p^6q$
D $8p^6q$

- 25 Which number line represents the solution of the simultaneous linear inequalities $4x - 3 \leq 9$ and $3x - 2 < 5x$?

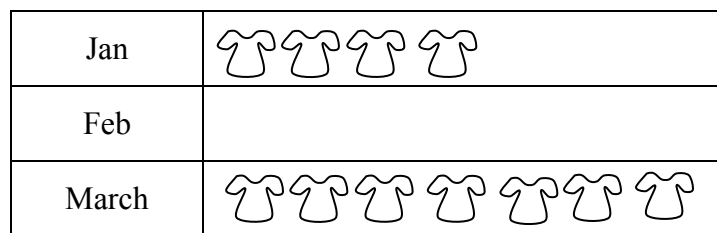
Garis nombor manakah yang mewakili penyelesaian bagi ketaksamaan linear serentak

$4x - 3 \leq 9$ dan $3x - 2 < 5x$?



- 26 Diagram 12 is a pictograph which shows the number of blouses sold by a company in the first quarter of the year 2009. The number of blouses sold in February is not shown.

Rajah 12 ialah piktograf yang menunjukkan bilangan baju blaus yang dijual oleh sebuah syarikat pada suku pertama tahun 2009. Bilangan baju blaus yang dijual dalam bulan Februari tidak dinyatakan.



Represents 20 blouses
Mewakili 20 blaus

Diagram 12
Rajah 12

Given that the number of blouses sold in January is 25 % of the total blouses sold in the first quarter of year. Find the number of blouses sold in February.

Diberi bahawa bilangan blaus yang dijual pada bulan Januari adalah 25% daripada jumlah blaus yang dijual pada suku tahun yang pertama. Cari bilangan blaus yang dijual dalam bulan Februari.

- A 80
B 100
C 320
D 880

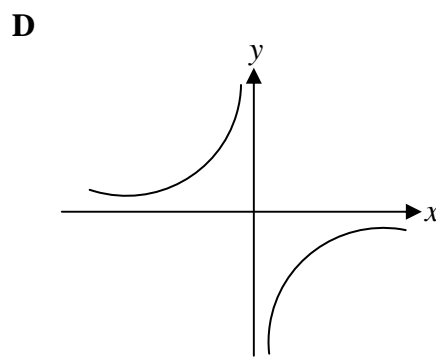
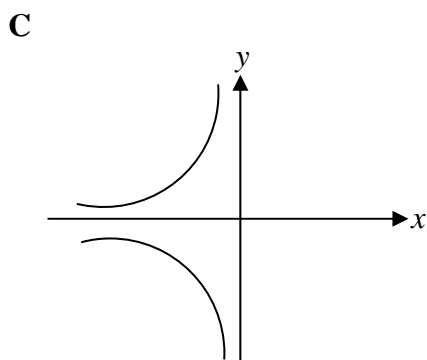
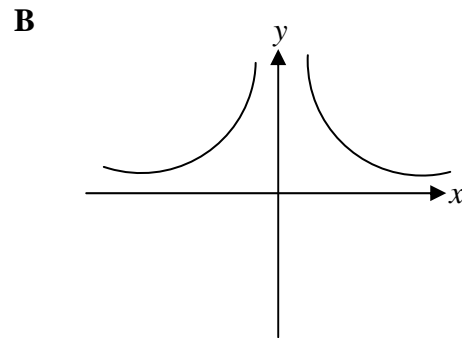
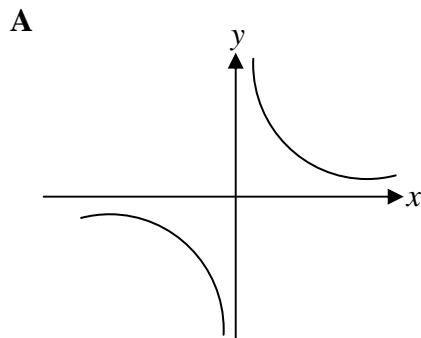
- 27 Table 1 is a frequency table which shows the mass of a group of students.
Jadual 1 ialah jadual kekerapan menunjukkan jisim sekumpulan pelajar.

Mass (kg) <i>Jisim (kg)</i>	Number of students <i>Bilangan pelajar</i>
35 – 39	3
40 – 44	7
45 – 49	11
50 – 54	5
55 – 59	4

Table 1
Jadual 1

Calculate , in kg, the mean mass of the group of students.
Hitung, dalam kg, min anggaran jisim bagi kumpulan pelajar itu.

- A 44.5
 B 47
 C 49
 D 49.5
- 28 Which graph represents $y = -\frac{2}{x}$?
Antara berikut, yang manakah graf $y = -\frac{2}{x}$?



- 29 Diagram 13 is a Venn diagram which shows the element of sets M , N and K .
Rajah 13 ialah gambarajah Venn yang menunjukkan unsur-unsur dalam set M , set N dan set K .

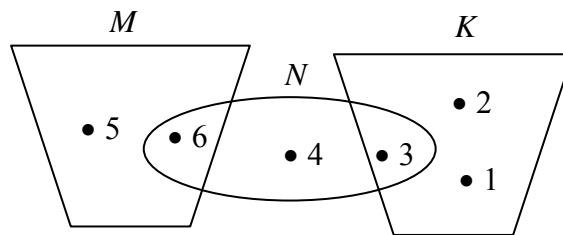


Diagram 13
Rajah 13

If the universal set $\xi = M \cup N \cup K$, then set N' is

Jika set semesta $\xi = M \cup N \cup K$, maka set N' ialah

- A {1, 2}
 B {3, 6}
 C {1, 2, 5}
 D {3, 4, 6}
- 30 Diagram 14 shows a Venn diagram with the universal set $\xi = \{\text{Form 6 students}\}$, set $P = \{\text{students who read Malay magazine}\}$, $Q = \{\text{students who read English magazine}\}$.
Rajah 14 menunjukkan gambarajah Venn dengan set semesta $\xi = \{\text{Pelajar tingkatan 6}\}$, set $P = \{\text{pelajar yang membaca majalah berbahasa Melayu}\}$, $Q = \{\text{pelajar yang membaca majalah berbahasa Inggeris}\}$.

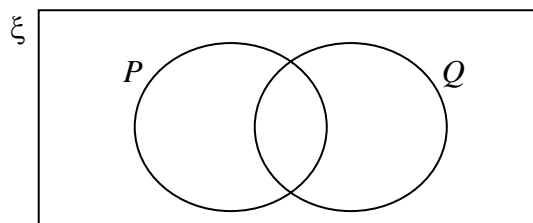


Diagram 14
Rajah 14

Given that $n(P) = 80$, $n(Q) = 104$, $n(P \cap Q) = 12$ and the number of students who do not read either magazine is 4. Find the total number of Form 6 students.

Diberi bahawa $n(P) = 80$, $n(Q) = 104$, $n(P \cap Q) = 12$ dan bilangan pelajar yang tidak membaca mana-mana majalah ialah 4 orang. Cari jumlah pelajar Tingkatan 6.

- A 172
 B 176
 C 196
 D 200

- 31 Diagram 15 is a Venn diagram showing the number of participants in sets K , M and G . It is given that

set $K = \{\text{participants in Chemistry quiz}\}$,
 set $M = \{\text{participants in Mathematics quiz}\}$,
 set $G = \{\text{participants in Geography quiz}\}$ and
 set $\xi = K \cup G \cup M$.

Rajah 15 ialah gambar rajah Venn yang menunjukkan bilangan peserta dalam set K , set M dan set G .
 Diberi bahawa

set $K = \{\text{peserta dalam kuiz Kimia}\}$,
 set $M = \{\text{peserta dalam kuiz Matematik}\}$
 set $G = \{\text{peserta dalam kuiz Geografi}\}$ dan
 set $\xi = K \cup G \cup M$.

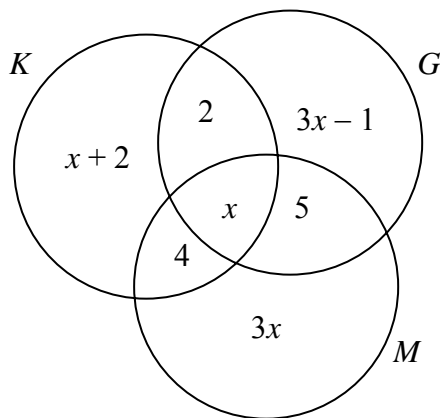


Diagram 15
 Rajah 15

If the number of participants in Chemistry quiz is 14, find the number of participants in Geography quiz or Mathematics quiz only.

Jika bilangan peserta kuiz Kimia ialah 14 orang, carikan bilangan peserta kuiz Geografi atau kuiz Matematik sahaja.

- A 17
- B 21
- C 22
- D 27

- 32 Find the y-intercept of the straight line $5x - 2y + 20 = 0$.

Carikan pintasan-y bagi garis lurus $5x - 2y + 20 = 0$.

- A -4
- B -10
- C 4
- D 10

- 33 Diagram 16 shows a straight line MN on a Cartesian plane.
Rajah 16 menunjukkan garis lurus MN pada satu satah Cartesian.

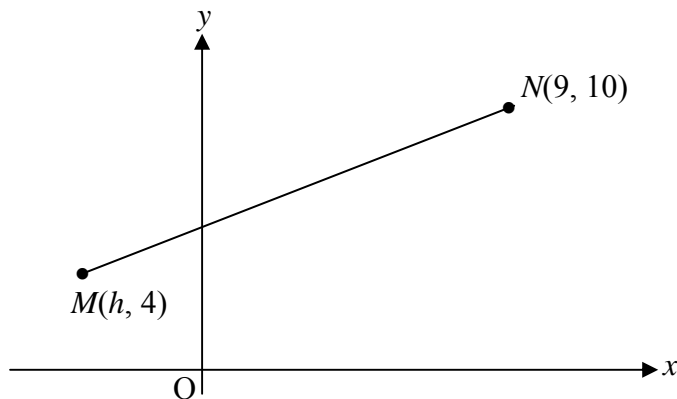


Diagram 16
Rajah 16

Given that the gradient of straight line MN is $\frac{2}{5}$. The value of h is

Diberi bahawa kecerunan garis lurus MN ialah $\frac{2}{5}$. Nilai h ialah

- A -3
- B -6
- C 3
- D 6

- 34 Danial has a box containing blue, orange and green balls. He asks his friend to draw a ball at random from the box. The probability of getting a blue ball is $\frac{1}{4}$ and the probability of getting a green ball is $\frac{4}{9}$. If there are 16 green balls in the box, calculate the number of orange balls in the box.

Danial mempunyai sebuah kotak yang mengandungi bola biru, bola jingga dan bola hijau. Dia meminta rakannya mengeluarkan sebiji bola secara rawak dari kotak itu. Kebarangkalian mendapat sebiji bola biru ialah $\frac{1}{4}$ dan kebarangkalian mendapat sebiji bola hijau ialah $\frac{4}{9}$. Jika terdapat 16 biji bola hijau dalam kotak itu, hitungkan bilangan bola jingga dalam kotak itu.

- A 9
- B 11
- C 16
- D 20

- 35** Table 2 shows the result of a survey carried out to find the occupation of 1960 residents who are 20 years and above, in Bandar Baru Saujana.

Jadual 2 menunjukkan hasil kaji selidik yang dijalankan mengenai pekerjaan bagi 1960 orang penduduk berumur 20 tahun dan ke atas di Bandar Baru Saujana.

Types of occupation <i>Jenis pekerjaan</i>	Male <i>Lelaki</i>	Female <i>Perempuan</i>
Government service <i>Penjawat awam</i>	420	320
Private sector <i>Sektor swasta</i>	620	420
Unemployed <i>Penganggur</i>	80	100

Table 2
Jadual 2

If a resident is chosen at random from the group, find the probability that the resident is a male working in the private sector.

Jika seorang penduduk dipilih secara rawak dari kumpulan itu, carikan kebarangkalian bahawa penduduk itu adalah seorang lelaki yang bekerja di sektor swasta.

- A $\frac{31}{52}$
 B $\frac{31}{56}$
 C $\frac{31}{93}$
 D $\frac{31}{98}$

- 36** Given that n varies inversely as the square of p . If $n = 3$ when $p = 4$, express n in terms of p .

Diberi bahawa n berubah secara songsang dengan kuasa dua p . Jika $n = 3$ apabila $p = 4$, ungkapkan n dalam sebutan p .

- A $n = \frac{3}{2}p^2$
 B $n = \frac{3}{16}p^2$
 C $n = \frac{6}{p^2}$
 D $n = \frac{48}{p^2}$

- 37** Table 3 shows some values of the variables F and G .
Jadual 3 menunjukkan beberapa nilai bagi pembolehubah F dan G .

G	9	m
F	12	$\frac{4}{9}$

Table 3
Jadual 3

Given that $F \propto \sqrt{G}$. Find the value of m .

Diberi bahawa $F \propto \sqrt{G}$. Carikan nilai m .

- A** $\frac{1}{3}$
B $\frac{1}{9}$
C $\frac{1}{81}$
D $\frac{3}{4}$

- 38** It is given that P varies inversely as the cube of Q and as the square root of R .
 Find the relation between P , Q and R .
*Diberi bahawa P berubah secara songsang dengan kuasa tiga Q dan punca kuasa dua R .
 Cari hubungan antara P , Q dan R .*

- A** $P = \frac{kQ^3}{R^2}$
B $P = \frac{k}{Q^3\sqrt{R}}$
C $P = \frac{k}{Q^3R^2}$
D $P = \frac{k\sqrt{R}}{Q^3}$

39 $3\begin{pmatrix} -5 \\ 2 \end{pmatrix} - 4\begin{pmatrix} -2 \\ 3 \end{pmatrix} =$

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

B $\begin{pmatrix} -7 \\ 5 \end{pmatrix}$

C $\begin{pmatrix} -7 \\ 18 \end{pmatrix}$

D $\begin{pmatrix} -23 \\ 18 \end{pmatrix}$

40 Given that $\begin{pmatrix} 3 & 2 \\ -1 & w \end{pmatrix} \begin{pmatrix} v & 0 \\ -1 & w \end{pmatrix} = \begin{pmatrix} v & 6 \end{pmatrix}$, find the value of v and of w .

A $v = 0, w = \frac{9}{2}$

B $v = -1, w = 3$

C $v = 1, w = \frac{3}{2}$

D $v = 1, w = 3$

END OF QUESTION PAPER

SULIT

<http://koleksisoalan.blogspot.com>

1449/2
Mathematics
Paper 2
August
2009

NAME :

FORM:

PERSIDANGAN KEBANGSAAN PENGETUA-PENGETUA

SEKOLAH MENENGAH MALAYSIA (PKPSM) CAWANGAN MELAKA



PEPERIKSAAN PERCUBAAN
SIJIL PELAJARAN MALAYSIA 2009



MATHEMATICS

Paper 2

Two hours and thirty minutes

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

- This question paper consists of two sections:
Section A and **Section B**. Answer all question in
Section A and any **four** questions from **Section B**.*
- This question paper is bilingual.*
- Write your answers in the spaces provided in the question paper.*
- Working steps must be written clearly.*
- Diagrams given are not according to scale unless stated*
- Marks allocated for each question are given in brackets.*
- A list of formulae is provided on pages 2 to 3.*
- Non programmable scientific calculators are allowed.*
- Hand in this question paper to the invigilator at the end of the examination.*

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

This question paper consists of 25 printed pages.

MATHEMATICAL FORMULAE

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

RELATIONS

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

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

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

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

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

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

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

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

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

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

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

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

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

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

SHAPES AND SPACE

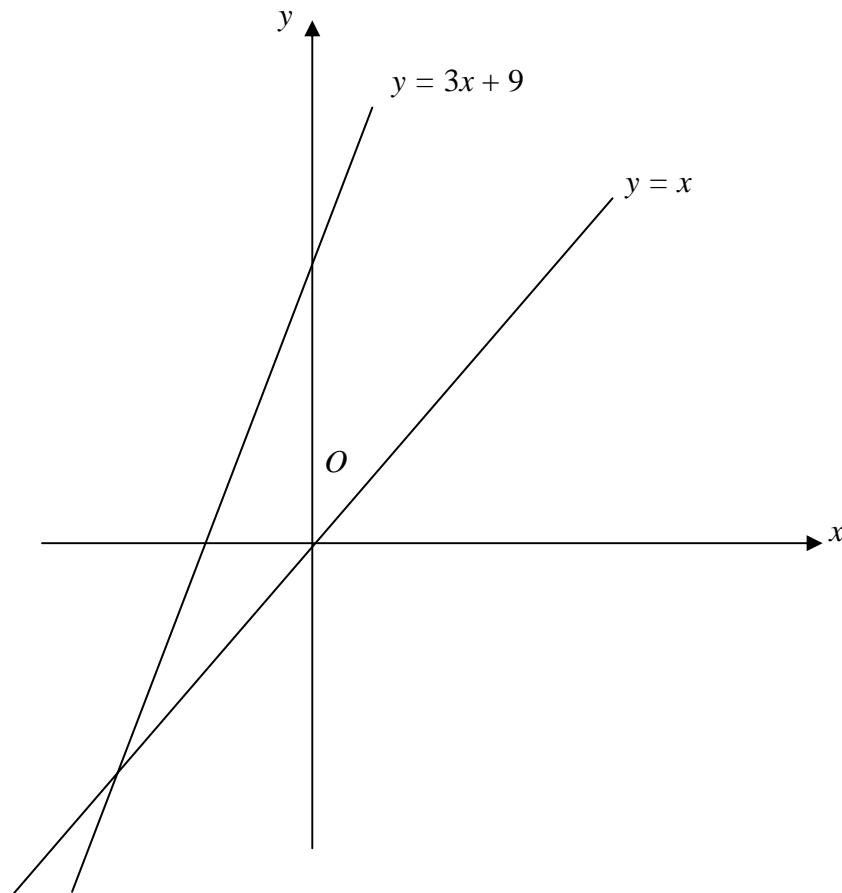
- 1 Area of trapezium = $\frac{1}{2} \times \text{sum of parallel sides} \times \text{height}$
- 2 Circumference of circle = $\pi d = 2\pi r$
- 3 Area of circle = πr^2
- 4 Curved surface area of cylinder = $2\pi rh$
- 5 Surface area of sphere = $4\pi r^2$
- 6 Volume of right prism = cross sectional area \times length
- 7 Volume of cylinder = $\pi r^2 h$
- 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** On the graph provided, shade the region which satisfies the three inequalities $y \leq 3x + 9$, $y \geq x$ and $y < 9$. [3 marks]
Pada graf di ruang jawapan, lorekkan rantau yang memuaskan ketiga – tiga ketaksamaan $y \leq 3x + 9$, $y \geq x$ dan $y < 9$. [3 markah]

Answer/ Jawapan :



- 2** Calculate the value of x and of y that satisfy the following simultaneous linear equations:
Hitungkan nilai x dan nilai y yang memuaskan persamaan linear serentak berikut:

$$x - \frac{2}{3}y = 4$$
$$3x + 4y = -6$$

[4 marks]
[4 markah]

Answer /Jawapan :

- 3** Using factorisation, solve the following quadratic equation:
Menggunakan pemfaktoran, selesaikan persamaan kuadratik berikut:

$$3p^2 = 2(p - 1) + 7$$

[4 marks]
[4 markah]

Answer /Jawapan :

- 4 Diagram 4 shows a solid in the shape of a right prism with $JKLM$ as its horizontal base. $PQRS$ is a square and trapezium $JKQP$ is the uniform cross-section of the prism. A cylinder with diameter 7 cm is bored and removed from the solid.
- Rajah 4 menunjukkan sebuah prisma tegak dengan $JKLM$ sebagai tapak mengufuknya. $PQRS$ ialah sebuah segiempat sama dan trapezium $JKQP$ ialah keratan rentas seragam bagi prisma itu. Sebuah silinder dengan diameter 7 cm dikorek dan dikeluarkan dari pepejal itu.

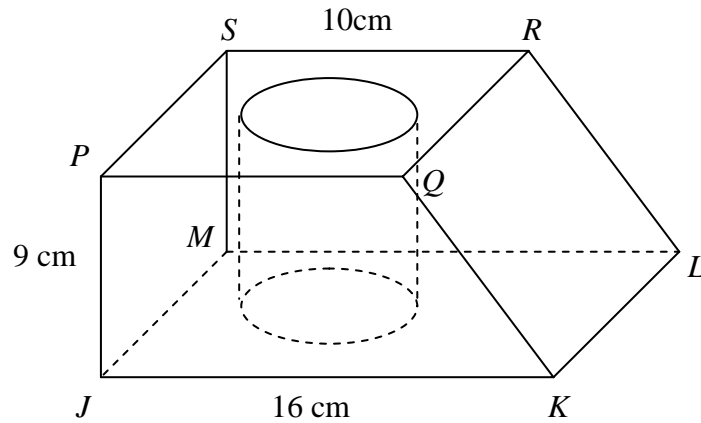


Diagram 4
Rajah 4

Using $\pi = \frac{22}{7}$, calculate the volume, in cm^3 of the remaining solid. [4 marks]

Menggunakan $\pi = \frac{22}{7}$, hitungkan isipadu, dalam cm^3 pepejal yang tinggal. [4 markah]

Answer / Jawapan :

- 5 (a) Combine the two statements below to form a **false** statement.
Gabungkan dua pernyataan di bawah untuk membentuk satu pernyataan yang palsu.

Statement 1 : All prime numbers are odd numbers.
 Pernyataan 1 : Semua nombor perdana adalah nombor ganjil.

Statement 2 : A regular hexagon has an interior angle of 120° .
 Pernyataan 2 : Sebuah heksagon sekata mempunyai sudut pedalaman 120° .

(b)

If $p < 7$, then $p < 10$.

Write the converse of the above implication. Hence, state whether the converse is true or false.

Tuliskan akas bagi implikasi di atas. Seterusnya, nyatakan sama ada akas tersebut benar atau palsu.

- (c) It is given that 0, 5, 14, 27, has the following pattern.
Diberi bahawa 0, 5, 14, 27, mengikuti pola berikut

$$0 = 2(1)^2 - 2$$

$$5 = 2(2)^2 - 3$$

$$14 = 2(3)^2 - 4$$

$$27 = 2(4)^2 - 5$$

. . .
 . . .

Make one conclusion by induction for the numerical sequence given above.

Buat satu kesimpulan secara induksi untuk turutan nombor di atas.

[5marks]

[5 markah]

Answer / Jawapan :

(a)

.....

(b)

(c)

- 6 In Diagram 6, PQ , QR and RS are straight lines. P lies on y -axis. OP is parallel to QR and PQ is parallel to RS .
 Dalam Rajah 6, PQ , QR dan RS adalah garis lurus. P terletak pada paksi- y . OP adalah selari dengan QR dan PQ adalah selari dengan RS .

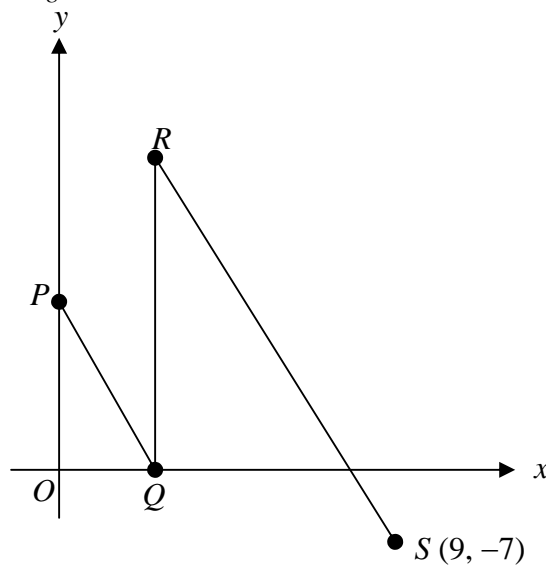


Diagram 6
Rajah 6

The equation of the straight line PQ is $3x + 2y = 9$.
 Persamaan PQ adalah $3x + 2y = 9$.

- (a) State the equation of the straight line QR .
 Nyatakan persamaan garis lurus QR .
- (b) Find the equation of the straight line RS and hence, state the x – intercept of straight line RS . [5 marks]
 Cari persamaan garis lurus RS dan seterusnya, nyatakan pintasan – x bagi persamaan garis lurus RS . [5 markah]

Answer /Jawapan :

(a)

(b)

- 7 Diagram 7 shows two sectors $OBCE$ and BCF , with centre O and B respectively. $OBCL$ is a semicircle with centre B . OBC is a straight line and $OC = 2OB$. $OC = 14$ cm and $\angle FBO = \angle COE = 120^\circ$.
Rajah 7 menunjukkan dua sektor $OBCE$ dan BCF , berpusat di O dan B masing-masing. $OBCL$ ialah separuh bulatan berpusat di B . OBC ialah garis lurus dan $OC = 2OB$. $OC = 14$ cm dan $\angle FBO = \angle COE = 120^\circ$.

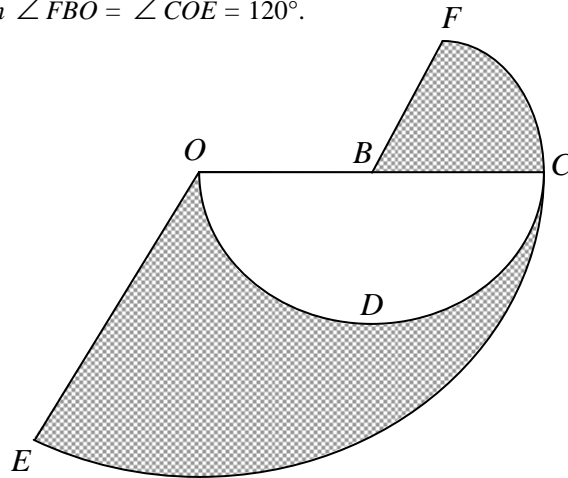


Diagram 7
Rajah 7

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

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

- the perimeter, in cm, of the whole diagram,
perimeter, dalam cm, seluruh rajah,
- the area, in cm^2 , of the shaded region.
luas, dalam cm^2 , bagi rantau berlorek.

[6 marks]
[6 markah]

Answer /Jawapan :

(a)

(b)

- 8 (a) It is given that M is a 2×2 matrix such that $\begin{pmatrix} 3 & -2 \\ -5 & 4 \end{pmatrix} M = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$.

Find the matrix M .

Diberi bahawa M ialah matriks 2×2 dengan keadaan $\begin{pmatrix} 3 & -2 \\ -5 & 4 \end{pmatrix} M = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$.

Carikan matriks M .

- (b) Write the following simultaneous linear equations as matrix equation.

Tuliskan persamaan linear serentak berikut dalam persamaan matriks:

$$3u - 2w = 4$$

$$-5u + 4w = -7$$

Hence, using matrix method, calculate the value of u and of w .

Seterusnya, menggunakan kaedah matriks, hitungkan nilai u dan nilai w .

[6 marks]

[6 markah]

Answer /Jawapan :

(a)

(b)

- 9 Diagram 9 shows the speed-time graph for the movement of a particle for a period of T seconds .

Rajah 9 menunjukkan graf laju-masa bagi pergerakan suatu zarah dalam tempoh T saat .

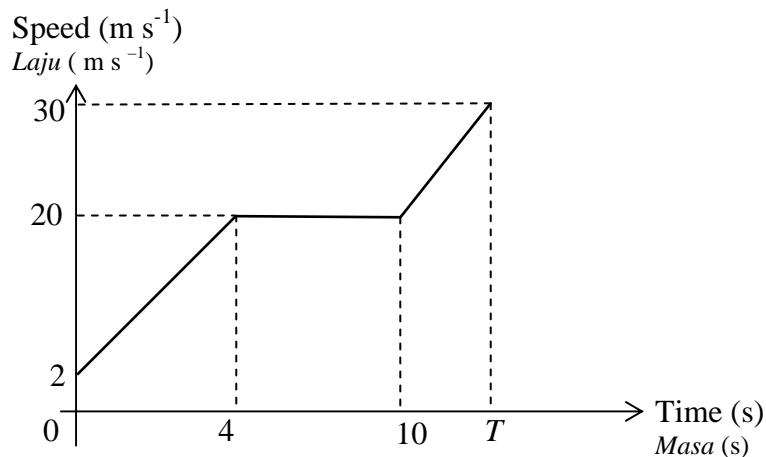


Diagram 9
Rajah 9

- (a) State the length of time, in s, that the particle moves with uniform speed.
Nyatakan tempoh masa, dalam s, zarah itu bergerak dengan laju seragam .
- (b) Calculate the rate of change of speed , in ms^{-2} , of the particle in the first 4 seconds .
Hitung kadar perubahan laju , dalam ms^{-2} , zarah itu dalam 4 saat pertama .
- (c) The total distance travelled in T seconds is 239 metres . Calculate the value of T .
Jumlah jarak yang dilalui dalam T saat ialah 239 meter . Hitung nilai T .

[6 marks]
[6 markah]

Answer/ Jawapan :

- (a)
- (b)
- (c)

- 10 Diagram 10 shows eight labelled cards in two boxes.
Rajah 10 menunjukkan lapan kad yang berlabel di dalam dua kotak.

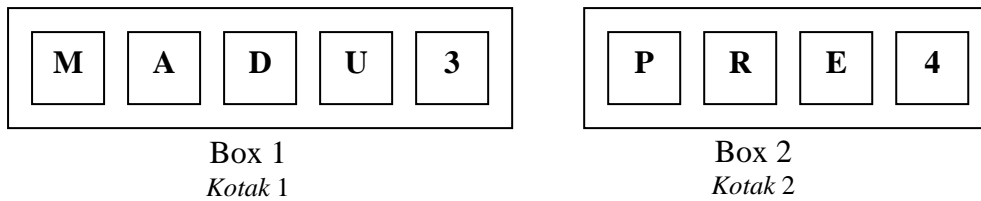


Diagram 10
Rajah 10

A card is picked at random from Box 1 and then a card is picked at random from Box 2.
Sekeping kad dipilih secara rawak dari Kotak 1 dan kemudian sekeping kad dipilih secara rawak dari Kotak 2.

By listing the all the possible outcomes, find the probability that
Dengan menyenaraikan semua kesudahan yang mungkin, cari kebarangkalian bahawa

- (a) two cards with consonants are picked
kedua-dua kad berlabel dengan huruf konsonan.
- (b) a card with a vowel and a card with a number are picked.
satu kad berhuruf vokal dan satu kad bernombor dipilih.

[5 marks]
[5 markah]

Answer /Jawapan :

(a)

(b)

- 11 Diagram 11 shows a right prism. The base $PQRS$ is a horizontal rectangle. The right angle triangle UPQ is the uniform cross section of the prism. M is the midpoint of QR .
Rajah 11 menunjukkan sebuah prisma tegak. Tapak $PQRS$ ialah sebuah segiempat tepat yang mengufuk. Segitiga bersudut tegak UPQ ialah keratan rentas seragam prisma itu. M ialah titik tengah bagi garis QR .

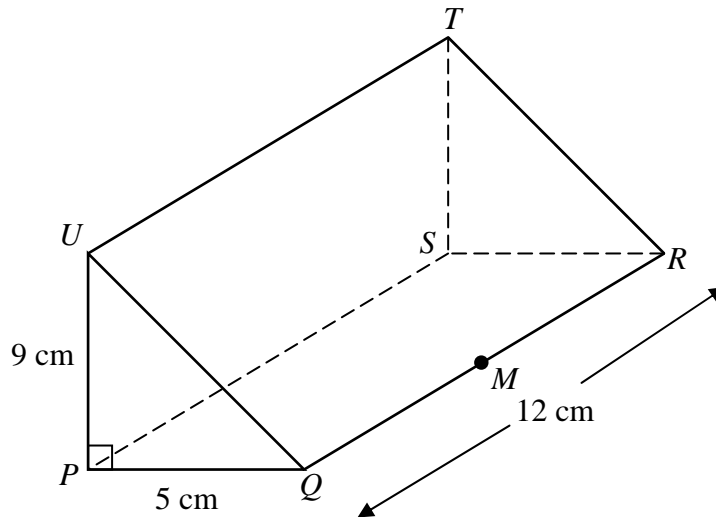


Diagram 11
Rajah 11

- (a) Name the angle between the line MU and the base $PQRS$.
Namakan sudut di antara garis MU dan tapak $PQRS$.
- (b) Calculate the angle between the line MU and the base $PQRS$.
Hitungkan sudut di antara garis MU dengan tapak $PQRS$.

[4 marks]
 [4 markah]

Answer /Jawapan :

(a)

(b)

Section B

[48 marks]

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

- 12 (a) Complete Table 12 in the answer space for the equation $y = 5 + 2x - 3x^2$ by writing down the values of y when $x = -2.5$ and $x = 4$. [2 marks]

Lengkapkan Jadual 12 di ruang jawapan bagi persamaan $y = 5 + 2x - 3x^2$ dengan menulis nilai-nilai y apabila $x = -2.5$ dan $x = 4$. [2 markah]

- (b) For this part of the question, use the graph paper provided on page 16. You may use a flexible curve rule.

Untuk ceraian soalan ini, gunakan kertas graf yang disediakan pada halaman 16. Anda boleh menggunakan pembaris fleksibel.

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 $y = 5 + 2x - 3x^2$ for $-3 \leq x \leq 4.5$. [4 marks]

Menggunakan skala 2 cm kepada 1 unit di paksi- x dan 2 cm kepada 5 unit pada paksi- y , lukis graf bagi $y = 5 + 2x - 3x^2$ untuk $-3 \leq x \leq 4.5$. [4 markah]

- (c) From the graph in 12(b), find

Dari graf 12(b), cari

- (i) the value of y when $x = 2.5$
nilai y apabila $x = 2.5$

- (ii) the values of x when $y = -18$
nilai-nilai x apabila $y = -18$

[2 marks]

[2 markah]

- (d) Draw a suitable straight line on the graph in 12(b) to find all the values of x which satisfy the equation $20 - x - 3x^2 = 0$ for $-3 \leq x \leq 4.5$. State these values of x .

[4 marks]

Lukis satu garis lurus yang sesuai pada graf di 12(b) untuk mencari semua nilai x yang memuaskan persamaan $20 - x - 3x^2 = 0$ untuk $-3 \leq x \leq 4.5$. Nyatakan nilai-nilai x itu.

[4 markah]

Answer / Jawapan :

(a)

x	-3	-2.5	-1	0	1	2	3	4	4.5
y	-28		0	5	4	-3	-16		-46.75

Table 12
Jadual 12

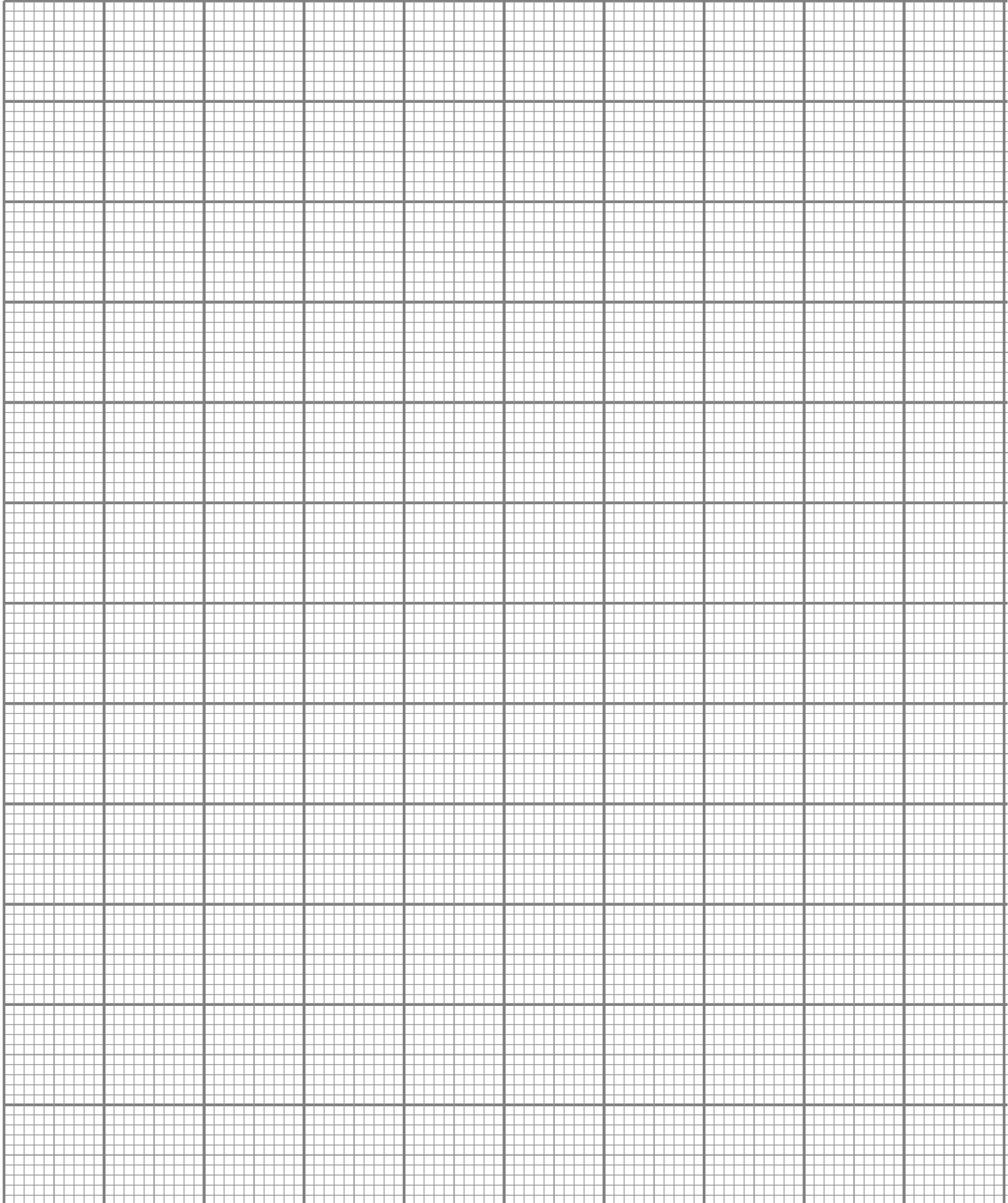
(b) Refer graph on page 16.
Rujuk graf pada halaman 16.

(c) (i) $y =$

(ii) $x =$

(d) $x =$,

Graph for Question 12



- 13 (a) Transformation **T** is a translation $\begin{pmatrix} -2 \\ 3 \end{pmatrix}$.

Transformation **P** is a reflection in the line $y = k$.

Transformation **R** is a clockwise rotation of 90° about the centre $(2, 2)$.

Penjelmaan **T** ialah translasi $\begin{pmatrix} -2 \\ 3 \end{pmatrix}$.

Penjelmaan **P** ialah pantulan pada garis lurus $y = k$.

Penjelmaan **R** ialah putaran 90° ikut arah jam pada pusat $(2, 2)$.

- (i) Point $(6, 8)$ is the image of point $(6, 0)$ under the transformation **P**. State the value of k .
 Titik $(6, 8)$ adalah imej bagi titik $(6, 0)$ di bawah penjelmaan **P**. Nyatakan nilai bagi k .
- (ii) Find the coordinates of the image of point $(4, -2)$ under the combined transformation:
 Cari koordinat imej bagi titik $(4, -2)$ di bawah gabungan penjelmaan berikut :

- (a) T^2
 (b) **TR**

[5 marks]

[5 markah]

- (b) Diagram 13 shows three quadrilaterals, **DEFG**, **PQRS** and **PKMN**, drawn on a Cartesian plane.
 Rajah 13 menunjukkan tiga sisiempat **DEFG**, **PQRS** dan **PKMN**, dilukis pada suatu satah Cartesian.

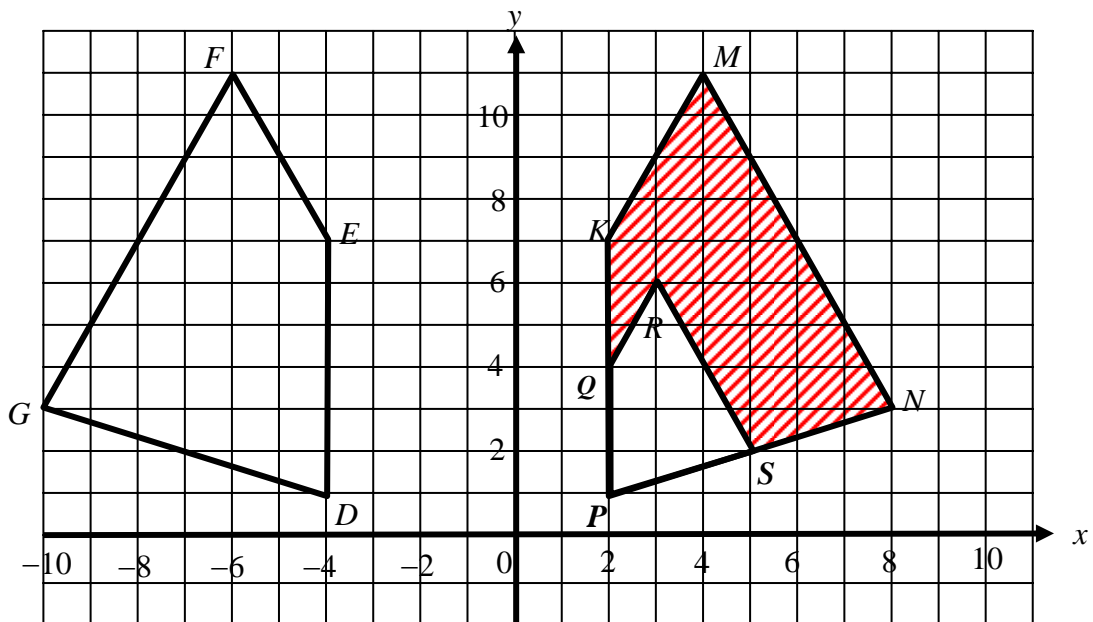


Diagram 13
 Rajah 13

- (i) $PQRS$ is the image of $DEFG$ under a combined transformation VU .
 $PQRS$ ialah imej bagi $DEFG$ di bawah gabungan penjelmaan VU .

Describe in full the transformation
Huraikan selengkapnya penjelmaan

- (a) U ,
- (b) V .
- (ii) It is given that quadrilateral $PQRS$ represents a region of area 16 m^2 .
 Calculate the area, in m^2 , of the region represented by the shaded region.
Diberi bahawa sisi empat $PQRS$ mewakili luas 16 m^2 . Hitung luas, dalam m^2 , bagi kawasan yang berlorek.

[7 marks]

[7 markah]

Answer/ Jawapan :

(a) (i)

(ii)(a)

(b)

(b) (i) (a) U :

.....

(b) V :

.....

(ii)

- 14** The data below shows the number of phone calls made by 40 students in a month.
Data di bawah menunjukkan bilangan panggilan telefon yang dibuat oleh 40 orang pelajar dalam sebulan.

28	22	34	26	22	37	35	38
23	20	22	33	39	17	43	28
21	39	35	14	38	24	27	35
19	34	31	26	40	32	28	44
30	32	29	27	32	37	33	30

- (a) Based on the data, complete Table 14 in the answer space. [4 marks]
Berdasarkan data tersebut, lengkapkan Jadual 14 di ruangan jawapan . [4 markah]
- (b) Calculate the estimated mean of phone calls made by the students. [3 marks]
Hitungkan min panggilan telefon yang dibuat oleh pelajar-pelajar itu. [3 markah]
- (c) *For this part of the question, use the graph paper provided on page 21.*
Untuk soalan ini gunakan kertas graf yang dibekalkan di mukasurat 21.

By using a scale of 2 cm to 5 phone calls on the horizontal axis and 2 cm to 1 student on the vertical axis, draw a histogram for the data. [4 marks]
Dengan menggunakan skala 2 cm kepada 5 panggilan telefon pada paksi ufuk dan 2 cm kepada 1 orang pelajar pada paksi tegak, lukiskan histogram bagi data itu. [4 markah]

- (d) Based on the histogram in 14(c), state the number of students who made more than 30 phone calls. [1 mark]
Berdasarkan kepada histogram dalam 14(c), nyatakan bilangan pelajar yang membuat lebih daripada 30 panggilan telefon. [1 markah]

Answer / Jawapan :

(a)

Number of phone calls <i>Bilangan panggilan telefon</i>	Midpoint <i>Titik tengah</i>	Frequency <i>Kekerapan</i>
10 – 14		

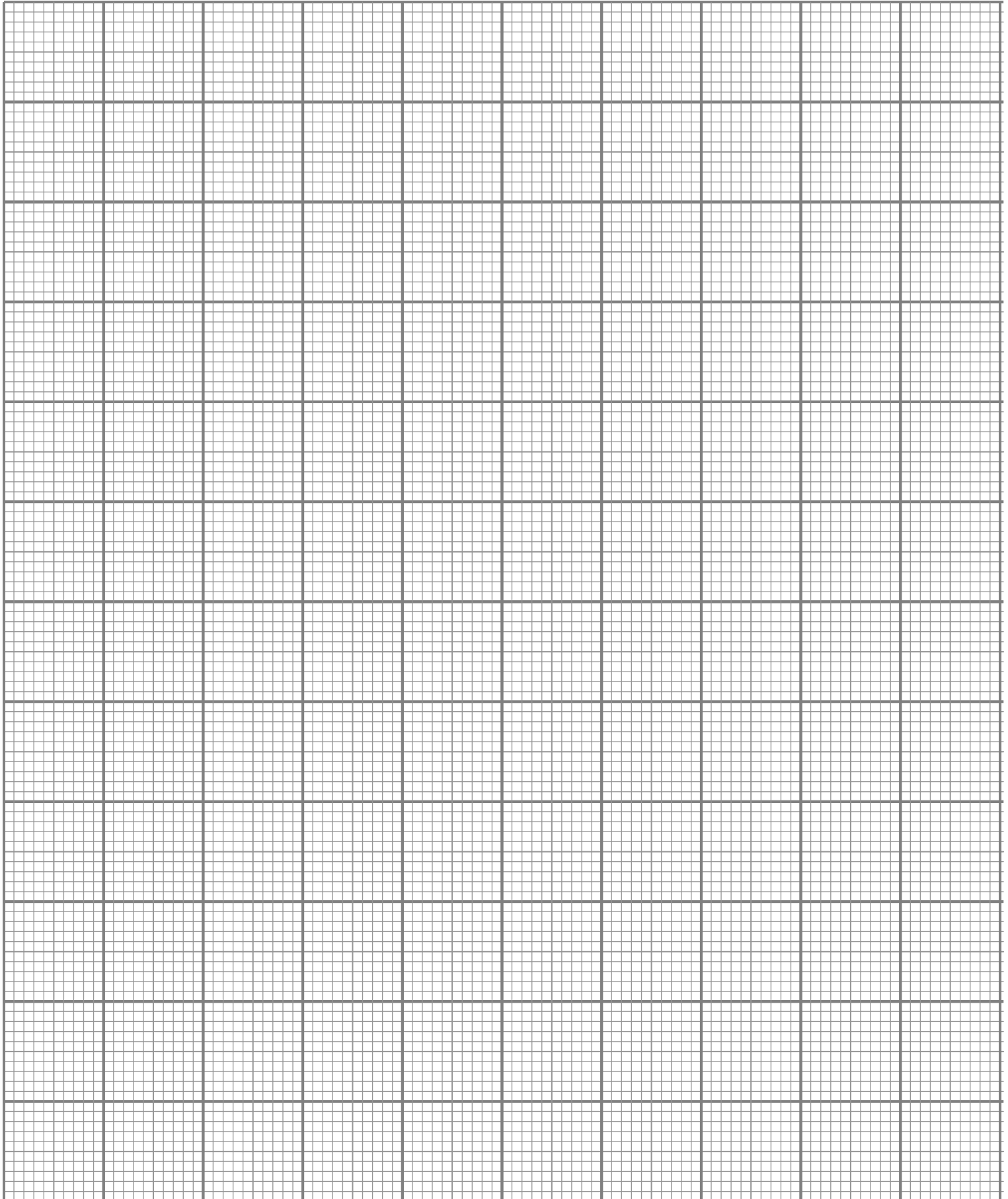
Table 14
Jadual 14

(b)

(c) *Refer graph on page 21*
Rujuk graf di mukasurat 21

(d)

Graph for Question 14



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

- (a) Diagram 9(i) shows a right prism with uniform cross section $KLPQT$. The base $JKLM$ is a rectangle on a horizontal plane. The rectangle $PQRN$ is an inclined plane.

Rajah 9(i) menunjukkan sebuah pepejal berbentuk prisma dengan keratan rentas seragam $KLPQT$. Tapak $JKLM$ ialah segiempat tepat terletak pada satah mengufuk. Segiempat tepat $PQRN$ ialah satah condong.

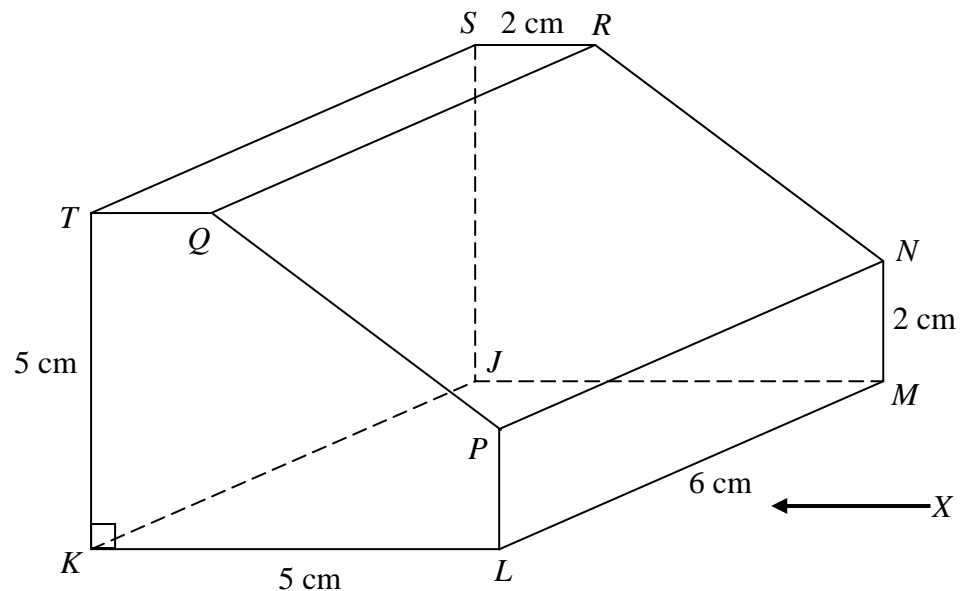


Diagram 9(i)
Rajah 9(i)

Draw to full scale, the elevation of the solid on a vertical plane parallel to LM as viewed from X . [3 marks]

Lukis dengan skala penuh, dongakan pepejal itu pada satah mencancang yang selari dengan LM sebagaimana dilihat dari X . [3 markah]

Answer / Jawapan :

- Sebuah separuh silinder berdiameter 2 cm dengan DEF sebagai keratan rentas seragamnya telah dikeluarkan daripada pepejal dalam Rajah 9(i) seperti yang ditunjukkan dalam Rajah 9(ii).*



Diberi QD = FR = 2 cm.

Lukis dengan skala penuh,

- dongakan pepejal yang tinggal itu pada satah mencancang yang selari dengan KL sebagaimana dilihat dari Y.* [5 markah]

Answer/ Jawapan :

(b) (i), (ii)

- 16** $P(50^\circ N, 40^\circ W)$, Q , R and S are four points on the surface of the earth. PS is the diameter of the earth.

$P(50^\circ U, 40^\circ B)$, Q , R dan S adalah empat titik di atas permukaan bumi. PS adalah diameter bumi.

- (a) Find the location of S . [2 marks]
Nyatakan kedudukan titik S . [2 markah]
- (b) Q lies 4052.86 nautical miles due east of P . Find the longitude of Q . [4 marks]
 Q terletak 4052.86 batu nautika ke timur P . Carikan longitud Q . [4 markah]
- (c) Given that RS is the diameter of the parallel of latitude. Find the shortest distance, in nautical miles, from R to S . [2 marks]
Diberi bahawa RS ialah diameter selarian latitud. Carikan, jarak terdekat, dalam batu nautika, di antara R dan S . [2 markah]
- (d) An aeroplane took off from R to P at 1100 hours and continued its flight due east to Q . The average speed of the flight was 900 knots.
Sebuah kapal terbang berlepas dari R ke P pada jam 1100 dan meneruskan penerbangannya ke timur menuju ke Q . Purata laju bagi keseluruhan penerbangan itu ialah 900 knot.
- Calculate the time, in 24 hours system, the aeroplane arrived at Q . [4 marks]
Hitungkan masa, dalam sistem 24 jam, kapal terbang itu tiba ke Q . [4 markah]

Answer /Jawapan :

(a)

(b)

(c)

(d)

END OF QUESTION PAPER



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

**PEPERIKSAAN PERCUBAAN
SIJIL PELAJARAN MALAYSIA 2009**

**JAWAPAN
MATHEMATICS 1
1449/1**

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

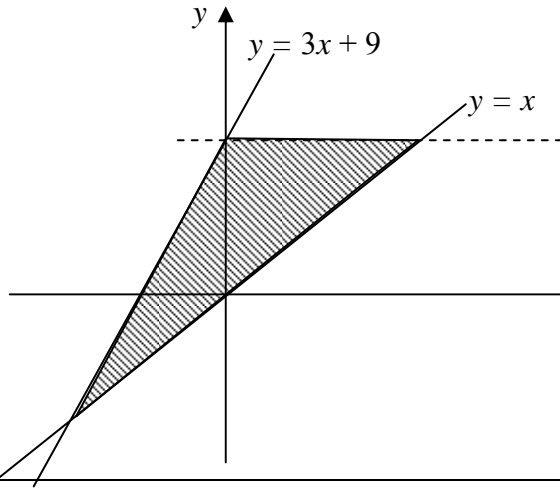


**PERSIDANGAN KEBANGSAAN PENGETUA-PENGETUA
SEKOLAH MENENGAH MALAYSIA (PKPSM) CAWANGAN MELAKA**

**PEPERIKSAAN PERCUBAAN
SIJIL PELAJARAN MALAYSIA 2009**

**JAWAPAN
MATHEMATICS 2
1449 / 2**

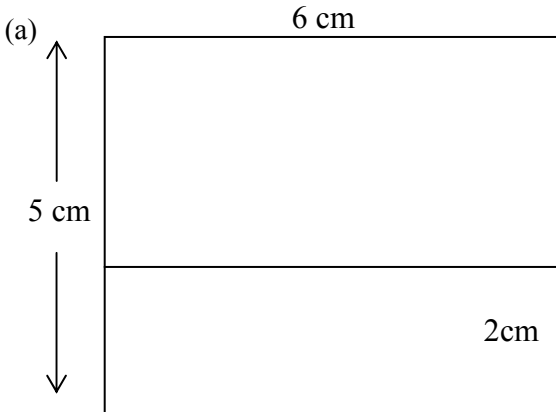
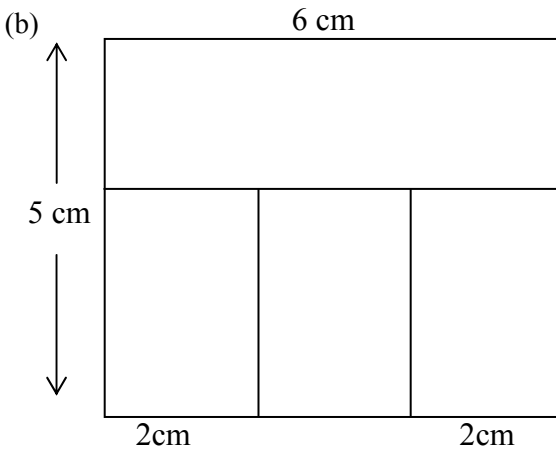
MARKAH MAKSIMUM BAGI KERTAS INI : 100 MARKAH

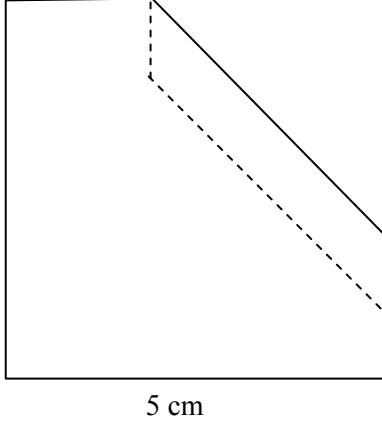
No	Peraturan Pemarkahan	Markah	
1	 <p>Line $y = 9$ (solid or dashed) Region correctly shaded Note: Any 2 vertex shaded correctly award 1 mark</p>	1 2	3
2	$3x - 2y = 12$ @equivalent $6y = -18$ @ equivalent $y = -3$ $x = 2$	1 1 1 1	4
3	$3p^2 - 2p - 5 = 0$ $(3p - 5)(p + 1) = 0$ $p = \frac{5}{3}, p = -1$	1 1 1,1	4
4	$\frac{1}{2} \times (10 + 16) \times 9 \times 10$ $\frac{22}{7} \times \left(\frac{7}{2}\right)^2 \times 9$ $\frac{1}{2} \times (10 + 16) \times 9 \times 10 - \frac{22}{7} \times \left(\frac{7}{2}\right)^2 \times 9$ $\frac{1647}{2}$ @ $823\frac{1}{2}$ @ 823.5	1 1 1 1	4
5	(a) All prime numbers are odd numbers and a regular hexagon has an interior angle of 120° (b) If $p < 10$, then $p < 7$ False (c) $2n^2 - (n + 1); n = 1, 2, 3, 4, \dots$ Note : $2n^2 - (n + 1), n = 1, 2, 3, 4$ only @ $2n^2 - (n + 1)$ award 1 mark	1 1 1 2	5

No	Peraturan Pemarkahan	Markah	
6	(a) $x = 3$	1	5
	(b) $-7 = -\frac{3}{2}(9) + c$	1	
	$y = -\frac{3}{2}x + \frac{13}{2}$	1	
	$0 = -\frac{3}{2}x + \frac{13}{2}$	1	
	$x = \frac{13}{3}$	1	
7	(a) $\frac{120}{360} \times 2 \times \frac{22}{7} \times 14 @ \frac{60}{360} \times 2 \times \frac{22}{7} \times 7 @ \text{equivalent}$	1	6
	$\frac{120}{360} \times 2 \times \frac{22}{7} \times 14 + \frac{60}{360} \times 2 \times \frac{22}{7} \times 7 + 14 + 7 + 7$	1	
	$\frac{194}{3} @ 64\frac{2}{3} @ 64.67$	1	
	(b) $\frac{120}{360} \times \frac{22}{7} \times 14^2 \text{ atau } \frac{180}{360} \times \frac{22}{7} \times 7^2 @ \frac{60}{360} \times \frac{22}{7} \times 7^2 @ \text{equivalent}$	1	
	$\frac{120}{360} \times \frac{22}{7} \times 14^2 - \frac{180}{360} \times \frac{22}{7} \times 7^2 + \frac{60}{360} \times \frac{22}{7} \times 7^2 @ \text{equivalent}$ 154	1	
8	(a) $\begin{pmatrix} 2 & 1 \\ 5 & 3 \\ 2 & 2 \end{pmatrix}$	2	6
	Note : $\frac{1}{2} \begin{pmatrix} 4 & 2 \\ 5 & 3 \end{pmatrix} @ \frac{1}{1 \times (-1) - 2 \times 3} \begin{pmatrix} -1 & -2 \\ -3 & 1 \end{pmatrix} \text{ award 1 mark}$		
	(b) $\begin{pmatrix} 3 & -2 \\ -5 & 3 \end{pmatrix} \begin{pmatrix} u \\ v \end{pmatrix} = \begin{pmatrix} 4 \\ -7 \end{pmatrix}$		
	$\begin{pmatrix} u \\ v \end{pmatrix} = \frac{1}{2} \begin{pmatrix} 4 & 2 \\ 4 & 3 \end{pmatrix} \begin{pmatrix} 4 \\ -7 \end{pmatrix}$		
	$u = 1$ $v = -\frac{1}{2}$		

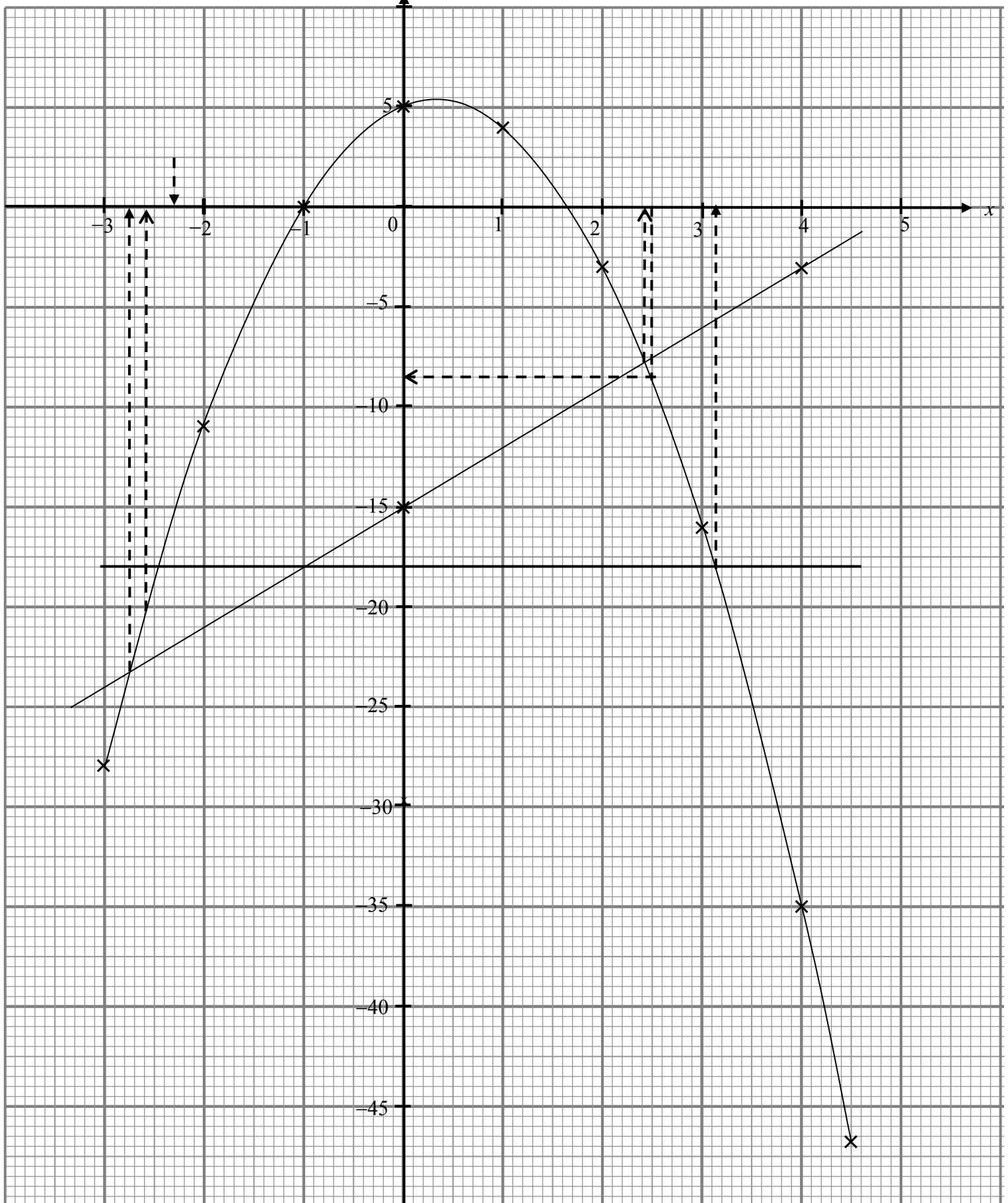
No	Peraturan Pemarkahan	Markah	
9	(a) 6 saat	1	
	(b) $\frac{20-2}{4-0}$ $\frac{9}{2}$	1	
	(c) $\frac{1}{2} \times (2+20) \times 4 + (10-4) \times 20 + \frac{1}{2} \times (20+30) \times (t-10) = 239$ Note : $\frac{1}{2} \times (2+20) \times 4 @ (10-4) \times 20 @ \frac{1}{2} \times (20+30) \times (t-10)$ (1 mark) $t = 13$ saat	2	
		1	6
10	$\{(M,P), (M,R), (M,E), (M,4), (A,P), (A,R), (A,E), (A,4), (D,P), (D,R), (D,E), (D,4), (U,P), (U,R), (U,E), (U,4), 3,P), (3,R), (3,E), (3,4)\}$	1	
	(a) $\{(M,P), (M,R), (D,P), (D,R)\}$ ATAU $\frac{2}{5} \times \frac{2}{4}$ $\frac{4}{20} @ \frac{1}{5}$	1	
	(b) $\{(A,4), (U,4), (3,E)\}$ ATAU $\frac{2}{5} \times \frac{1}{4} + \frac{1}{5} \times \frac{1}{4}$ $\frac{3}{20}$	1	
		1	5
11	(a) $\angle UMP$	1	
	(b) $\tan \theta = \frac{9}{\sqrt{61}}$ or equivalent $\theta = 49.05^\circ @ 49^\circ 3'$	2	
		1	4
12	(a) $-18.75, -35$	1, 1	
	(b) <i>Refer to graph</i> Uniform scale and correct axis Plot all points correctly Smooth curve	1 2 1	
	(c) (i) $-9.0 \leq y \leq -8.0$ (ii) $-2.5 \leq x \leq -2.4, 3.1 \leq x \leq 3.2$	1 1	
	(d) $y = 3x - 15$ Draw line $y = 3x - 15$ $-2.8 \leq x \leq -2.7, 2.4 \leq x \leq 2.5$	1 1 1, 1	
			12

No	Peraturan Pemarkahan	Markah																									
13	(a) (i) 4	1																									
	(ii) (0, 4)	1																									
	(iii) (-4, 3)	2																									
	(b) (i) (a) U : Reflection in the line x = -1 Note : 1. Reflection only award 1 mark	2																									
	(b) V : Enlargement with scale factor = $\frac{1}{2}$ at centre P	3																									
	(ii) $\frac{16}{\left(\frac{1}{2}\right)^2}$	1																									
	$\frac{16}{\left(\frac{1}{2}\right)^2} - 16$	1																									
	48	1	12																								
14	(a)																										
	<table><tr><th>Number of telephone calls</th><th>Midpoint</th><th>Frequency</th></tr><tr><td>10 - 14</td><td>12</td><td>1</td></tr><tr><td>15 - 19</td><td>17</td><td>2</td></tr><tr><td>20 - 24</td><td>22</td><td>7</td></tr><tr><td>25 - 29</td><td>27</td><td>8</td></tr><tr><td>30 - 34</td><td>32</td><td>10</td></tr><tr><td>35 - 39</td><td>37</td><td>9</td></tr><tr><td>40 - 44</td><td>42</td><td>3</td></tr></table>	Number of telephone calls	Midpoint	Frequency	10 - 14	12	1	15 - 19	17	2	20 - 24	22	7	25 - 29	27	8	30 - 34	32	10	35 - 39	37	9	40 - 44	42	3		
	Number of telephone calls	Midpoint	Frequency																								
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	20 - 24	22	7																								
	25 - 29	27	8																								
	30 - 34	32	10																								
	35 - 39	37	9																								
	40 - 44	42	3																								
Column I (all class interval correct)	1																										
Column II (all midpoint correct)	1																										
Column III (all frequency correct)	2																										
Note : Allow two mistakes in column III for 1 mark																											
(b)		2																									
$\frac{(12 \times 1) + (17 \times 2) + (22 \times 7) + (27 \times 8) + (32 \times 10) + (37 \times 9) + (42 \times 3)}{40}$		1																									
= 29.88																											

No	Peraturan Pemarkahan	Markah	
	<p>(c) <i>Refer to graph</i> Uniform scale and correct axis $9.5 \leq x \leq 44.5$ and $0 \leq y \leq 10$ 7 Bars drawn correctly Using boundaries or midpoint or class interval as x – axis correctly</p> <p><u>Notes</u> : 5 or 6 bars drawn correctly, award K1 Other scale being used, deduct 1 mark</p> <p>(d) 22</p>	1 2 1	
			12
15	<p>(a) </p> <p>(b) </p>	<p>• Correct shape • Correct measurements • Accurate angle $\pm 0.1^\circ$ and size ± 0.2 cm Note: Deduct 1 marks for double line or small gap or extension</p> <p>1 1 1</p> <p>• Correct shape • Correct measurements • Accurate angle $\pm 0.1^\circ$ and size ± 0.2 cm Note: Deduct 1 marks for double line or small gap or extension</p> <p>1 1 2</p>	

No	Peraturan Pemarkahan	Markah	
	<p>(c)</p>  <ul style="list-style-type: none"> • Correct shape • Dashed line • Correct measurements • Accurate angle $\pm 0.1^\circ$ and size ± 0.2 cm <p>Note : Deduct 1 marks for double line or small gap or extension</p>	1 1 1 2	
			12
16	<p>(a) $(50^\circ \text{ S } , 140^\circ \text{ E})$ Note : 50° S or 140° E only award 1 mark</p> <p>(b) $\frac{4052..86}{60 \cos 50^\circ}$ Note : using $\cos 60$ correctly award 1 mark</p> <p>$105.1 - 40$ 65.1° E</p> <p>(c) $(180 - 50 - 50) \times 60$ or 80×60 4800</p> <p>(d) $(50 + 50) \times 60$ $\frac{(50 + 50) \times 60 + 4052.86}{900}$ $11.17 + 11$ 2217 hours</p>	2 2 1 1 1 1 1 1 1	
			12

Graph for Question 12



Graph for Question 14

