JABATAN PELAJARAN NEGERI SABAH

SIJIL PELAJARAN MALAYSIA **1449/1**
EXCEL 2
MATHEMATICS
Paper 1
Sept 2009

1 Hour 15 Minutes One hour and fifteen minutes

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

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 **on**e 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 diagram in the questions provided are not drawn to scale unless stated.*
7. *A list of formulae is provided on pages 2 to 4.*
8. *A booklet of four-figure mathematical tables is provided.*
9. *You may use a non-programmable scientific calculator.*

This paper consists of 19 printed pages

MATHEMATICAL FORMULAE
RUMUS MATEMATIK

The following formulae may be helpful in answering the questions. The symbols given are the ones commonly used.
Rumus-rumus berikut boloeh membantu anda menjawab soalan. Simbol-simbol yang diberi adalah yang biasa digunaan.

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 Distance/ jarak

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

6 Midpoint/ Titik tengah

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

7 $Average\ speed = \frac{Distance\ travelled}{time\ taken}$

$Purata\ laju = \frac{jarak\ yang\ dilalu}{masa\ yang\ diambil}$

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

$Min = \frac{hasil\ tambah\ nilai\ data}{bilangan\ data}$

9 Mean = $\frac{\text{sum of (class mark} \times \text{frequency)}}{\text{sum of frequencie s}}$

$Min = \frac{hasil\ tambah\ (nilai\ titik\ tengah\ kelas\ x\ kekerapan)}{hasil\ tambah\ kekerapan}$

10 Pythagoras Theorem / Teorem Pithagoras

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

11 $P(A) = \frac{n(A)}{n(S)}$

12 $P(A') = 1 - P(A)$

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

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

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

SHAPES AND SPACE

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

Luas trapezium $= \frac{1}{2} \times$ *hasil tambah dua sisi selari* $\times$ *tinggi*

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

Lilitan bulatan $= \pi d = 2\pi j$

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

Luas bulatan $= \pi j^2$

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

Luas permukaan melengkung silinder $= 2\pi jt$

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

Luas permuaan sfera $= 4\pi j^2$

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

Isipadu prisma tegak = luas keratan rentas $\times$ *panjang*

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

Isipadu silinder $= \pi j^2 t$

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

Isipadu kon $= \frac{1}{3}\pi j^2 t$

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

Isipadu sfera $= \frac{4}{3}\pi r^3$

10 Volume of right pyramid $= \frac{1}{3} \times$ luas tapak $\times$ tinggi

Isipadu piramid tegak $= \frac{1}{3} \times$ *luas tapak* $\times$ *tinggi*

11 Sum of interior angles of a polygon

Hasil tambah sudut pedalaman poligon

$= (n-2) \times 180^\circ$

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

$$\frac{\textit{panjang lengkok}}{\textit{lilitan bulatan}} = \frac{\textit{sudut pusat}}{360^0}$$

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

$$\frac{\textit{luas sektor}}{\textit{luas bulatan}} = \frac{\textit{sudut pusat}}{360^0}$$

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

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

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

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

Answer **all** *question.*

1 Round off 80 715 correct to three significant figures.
Bundarkan 80 715 betul kepada tiga angka bererti.

A 80 700
B 80 710
C 80 720
D 80 800

2 Express 6.564×10^{-5} as a single number.
Ungkapkan 6.564×10^{-5} *sebagai satu nombor tunggal.*

A 0.06564
B 0.006564
C 0.0006564
D 0.00006564

3 $0.00013 + 7 \times 10^{-5}$
A 2×10^{-3}
B 2×10^{-4}
C 2×10^{-8}
D 2×10^{-9}

4 A rectangular floor with a length of 36 *m* and a width of 28 *m*.
Find the number of square tiles of side 30 *cm* that are required to cover the whole floor.
Lantai berbetuk segi empat tepat mempunyai panjang 36 m dan lebar 28 m.
Cari bilangan jubin segi empat sama dengan sisi 30 cm, yang diperlukan untuk menutupi seluruh lantai itu.
A 1.12×10^{4}
B 1.12×10^{5}
C 3.36×10^{4}
D 3.36×10^{5}

5 The value of digit 2, in base ten, in the number 1257_8, is
Nilai digit 2 bagi 1257_8*, dalam asas sepuluh ialah*
A 16
B 64
C 128
D 200

6 $10011_2 - 1110_2 =$

A 101_2
B 111_2
C 100_2
D 1010_2

7 In the diagram 1, PQRSTU is a regular hexagon TUV and RPV are straight lines. Find the value of *x.*
Dalam rajah 2, PQRSTU adalah sebuah heksagon, TUV dan RPV ialah garis lurus. Cari nilai x.

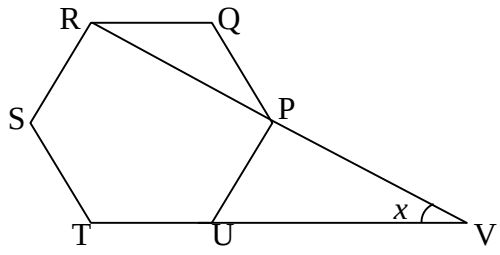


Diagram 1
Rajah 1

A 30°
B 50°
C 60°
D 70°

8 Diagram 2 shows a pentagon **PQRST**. Straight line **PQ** is parallel to straight line **UTS**
*Rajah 2 menunjukkan sebuah pentagon **PQRST**. Garis lurus **PQ** adalah selari dengan garis lurus **UTS***

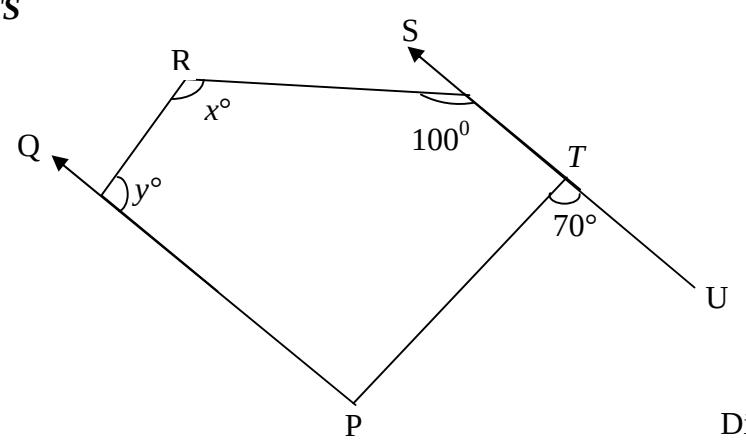


Diagram 2
Rajah 2

Find the value of $x + y$
Cari nilai bagi $x + y$

A 216^o
B 222^o
C 250^o
D 260^o

9 In diagram 3, **QRT** is a tangent to the circle with centre **O**, at **R**. **PUS**, **OPQ** and **OUR** are straight lines.
*Dalam Rajah 3, **QRT** ialah tangent kepada bulatan berpusat **O**, pada **R**, **PUS**, **OPQ** dan **OUR** ialah garis lurus.*

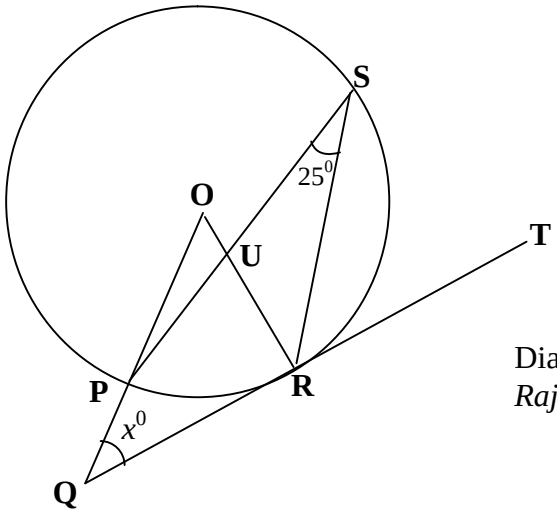


Diagram 3
Rajah 3

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

A 40
B 45
C 50
D 65

10 Diagram 4 shows point P on a cartesian plane
Rajah 4 menunjukkan titik P pada suatu satah cartesan

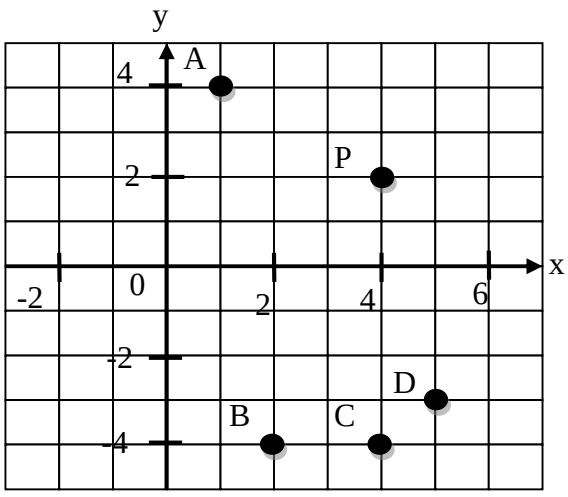


Diagram 4
Rajah 4

Which of the points labeled **A, B, C** and **D** is the image of point P under a 90° clockwise rotation about the centre (2,-1).
*Yang manakah antara tanda **A, B, C** dan **D** adalah imej bagi titik P di bawah satu putaran* 90° *arah jam pada pusat (2,-1).*

11 Diagram 5 shows two squares, **PQRS** and **KLMN** draw on square girds.
*Rajah 5 menunjukkan dua segiempat sama **PQRS** dan **KLMN**, dilukis pada grid segiempat sama.*

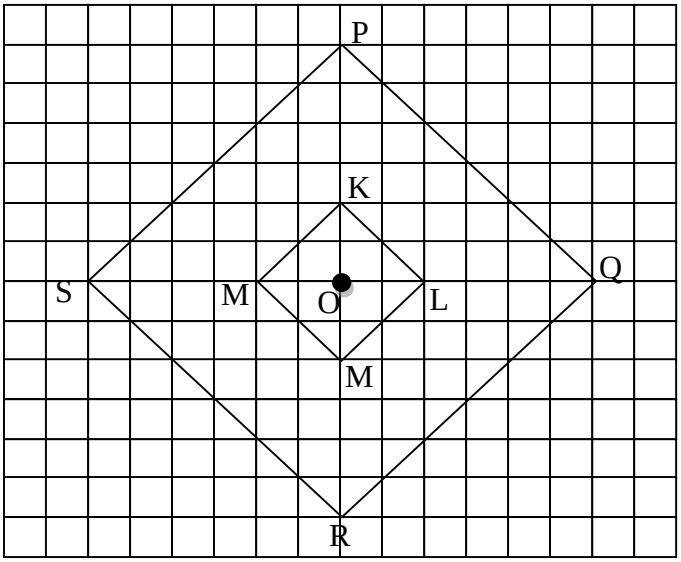


Diagram 5
Rajah 5

PQRS is the image of **KLMN** under an enlargement with centre **O**. Find the scale factor of the enlargement.
***PQRS** ialah imej bagi **KLMN** dibawah suatu pembesaran pada pusat **O**. Cari faktor skala pembesaran itu.*

A $\frac{1}{3}$
B $\frac{1}{2}$
C 2
D 3

12 In the Diagram 6, S is the midpoint of straight line QST.
Dalam Rajah 6, S ialah titik tengah bagi garis lurus QST.

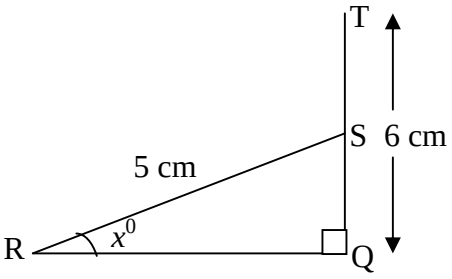


Diagram 6
Rajah 6

What is the value of cos x^0 ?
Apakah nilai kos x^0 ?

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

13 Diagram 7 shows the graph of $y = \sin x^0$
Rajah 7 menunjukkan graf $y = \sin x^0$

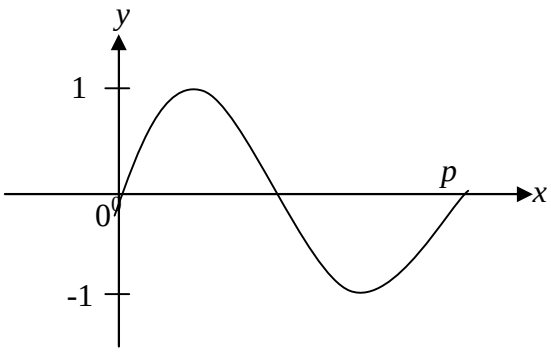


Diagram 7
Rajah 7

The value of p is
Nilai p ialah

A 90^0
B 180^0
C 270^0
D 360^0

14 It is given that cos θ = - 0.7721 and $180^0 \le \theta \le 360^0$. Find the value of θ.
Diberi bahawa kos θ = - 0.7721 dan $180^0 \le \theta \le 360^0$. Cari nilai θ.

A $140^0 32'$
B $219^0 27'$
C $230^0 33'$
D $309^0 27'$

15 Diagram 8 shows two vertical poles, PS and QR, on a horizontal plane. The angle of depression of vertex Q from vertex P is 42^0. Calculate the angle of elevation of vertex Q from S.
Rajah 8 menunjukkan dua batang tiang tegak, PS dan QR,yang terletak pada permukaan mengufuk. Sudut tunduk puncak Q dari puncak P ialah 42^0. Hitungkan sudut dongakan puncak Q dari S.

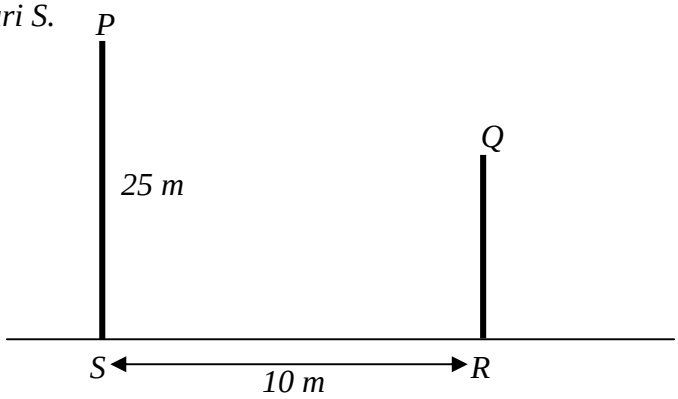


Diagram 8
Rajah 8

A 32^0
B 42^0
C 58^0
D 68^0

16 Diagram 9 shows a cuboid with a horizontal base PQRS . Name the angle between the plane RQVW and the plane QUR.
Rajah 9 menunjukkan sebuah kuboid dengan tapak mengufuk PQRS . Namakan sudut diantara satah RQVW dan satah QUR.

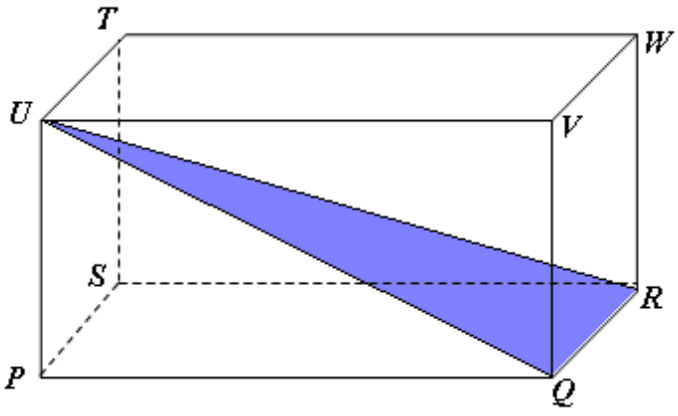


Diagram 9
Rajah 9

A $\angle VQR$
B $\angle VUQ$
C $\angle VRU$
D $\angle VQU$

17 In diagram 10 , NOS is the axis of the earth. PQ is the diameter of the earth.
Dalam rajah 10 , NOS ialah paksi bumi. PQ ialah diameter bumi.

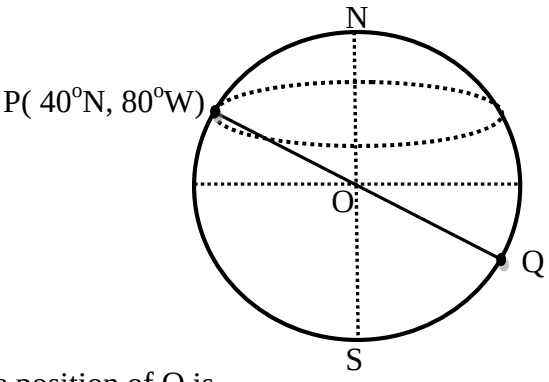


Diagram 10
Rajah 10

The position of Q is
Kedudukan Q ialah

A (40°S, 100°E)
B (50°S, 100°E)
C (40°S, 80°E)
D (50°S, 80°E)

18 Diagram 11 shows the position of point E and F.
Rajah menunjukkan kedudukan titik E dan F.

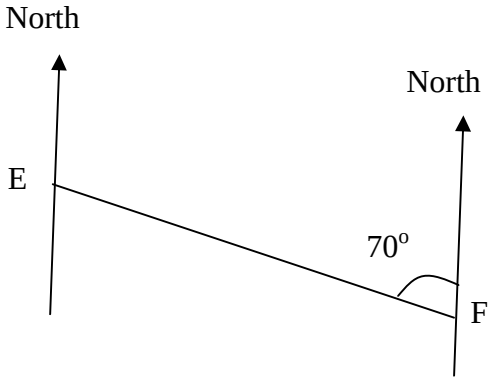


Diagram 11
Rajah 11

Find the bearing of F from E
Cari bearing F dari E

A 070°
B 110°
C 250°
D 290°

19 $5x - 2(1 - x) =$

A $3x - 3x^2$
B $3x - 2$
C $4x - 2$
D $7x - 2$

20 $\frac{1}{x} - \frac{2x-1}{6x} =$

A $\frac{7-2x}{6x}$

B $\frac{5-2x}{6x}$

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

D $\frac{7-x}{3x}$

21 Express $\frac{p}{3m} - \frac{1-p}{m}$ as a single fraction in its simplest form.

Ungkapkan $\frac{p}{3m} - \frac{1-p}{m}$ *sebagai satu pecahan tunggal dalam bentuk termudah.*

A $\frac{pm-3m-p}{3m^2}$

B $\frac{pm-3m+p}{3m^2}$

C $\frac{4p-3}{3m}$

D $\frac{-2p-3}{3m}$

22 Given that $\frac{1}{3}m + 2 = 5$ find the value of *m*.

Diberi $\frac{1}{3}m + 2 = 5$ *cari nilai m.*

A 1

B 6

C 9

D 13

23 $\frac{7}{3x^5}$ can be written as

$\frac{7}{3x^5}$ *boleh ditulis sebagai*

A $\frac{7}{3}x^{-5}$

B $\frac{7}{3}x^{5}$

C $21x^{-5}$

D $21x^{5}$

24 Simplify $\left(\frac{8^2 \times 7^{\frac{1}{3}}}{14^2}\right)^3$

Ringkaskan $\left(\frac{8^2 \times 7^{\frac{1}{3}}}{14^2}\right)^3$

A $2^4 \times 7^{-3}$
B $2^6 \times 7^{-2}$
C $2^{12} \times 7^{-5}$
D $2^{16} \times 7^{-1}$

25 List all the integers x which satisfy both the inequalities
Senaraikan semua integer x *yang memuaskan kedua-dua ketaksamaan*

$\frac{x}{3} - 1 \leq x$ and $\frac{1}{2}(x+4) > x$
$\frac{x}{3} - 1 \leq x$ dan $\frac{1}{2}(x+4) > x$

A -1, 0, 1, 2, 3
B 0, 1, 2, 3
C -1, 0, 1
D 0, 1

26

Gifts *Hadiah*	Flowers *Bunga*	Toys *Mainan*	Books *Buku*	Pens *Pen*
Frequency *Kekerapan*	18	10	5	x

Table 1/*Jadual 1*

Given that the mode of the gifts is flowers, find the maxsimum value of *x.*
Diberi mod hadiah ialah bunga, cari nilai maksimum bagi x.

A 16
B 17
C 18
D 19

27 Diagram 12 is a pictograph which shows the number of fruit trees in an orchard.
Rajah 12 ialah piktograf yang menunjukkan bilangan pokok buah-buahan dalam sebuah dusun.

Durian *Durian*	
Rambutan *Rambutan*	
Mangosteen *Manggis*	

Represent 25 tress
Mewakili 25 pokok

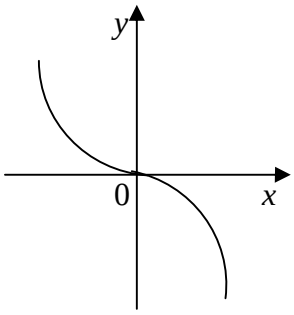
Diagram 12
Rajah 12

The ratio of rambutan trees to mangosteen trees is 3:2. Find the number of durian trees and maggosteen tress altogether.
Nisbah bilangan pokok rambutan kepada pokok manggis ialah 3:2. Carikan jumlah pokok durian dan pokok manggis.

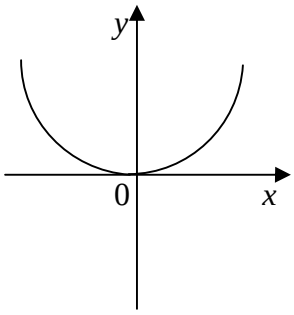
A 225
B 275
C 300
D 400

28 Which graph reperesents $y = -2x^3$
Graf manakah yang mewakili $y = -2x^3$

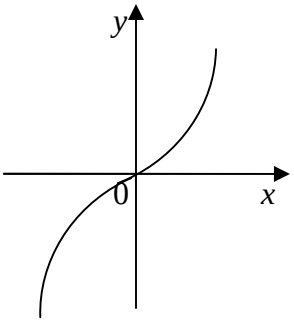
A



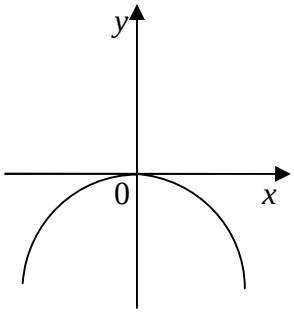
B



C



D



29 Diagram 13 is a Venn diagram which shows the element of set X, Y, Z.
Rajah 13 ialah gambar rajah Venn yang menunjukkan unsur-unsur bagi set X, set Y dan set Z.

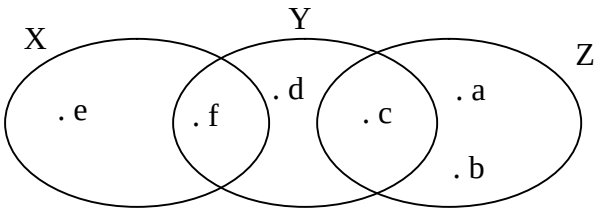


Diagram 13
Rajah 13

If the universal set $\xi = X \cup Y \cup Z$, then set Y' is
Jika set semesta $\xi = X \cup Y \cup Z$, *maka set Y' ialah*

A {a,b,e}
B {a,b,c,f}
C {a,b,e,f}
D {a,b,e,c}

30 List all the subsets of Set X = { m, n }
A {m},{n}
B {m},{n},{ }
C {m},{n}, { m, n }
D {m},{n}, { m, n }, { }

31 Diagram 14 is a Venn diagram shows the elements of set R, S and T.
Rajah 14 ialah gambar rajah Venn menunjukkan unsur-unsur bagi Set R , S dan T.

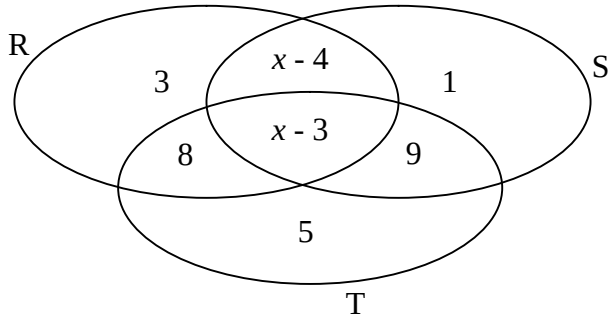


Diagram 14
Rajah 14

It is given that the universal set $\xi = R \cup S \cup T$ and $n(S') = n(S \cap T)$. Find the value of *x*.
Diberi set semesta $\xi = R \cup S \cup T$ dan $n(S') = n(S \cap T)$.. *Cari nilai x.*

A 5
B 6
C 10
D 11

32 In Diagram 15, PQ is a straight line.
Dalam Rajah 15, PQ ialah garis lurus.

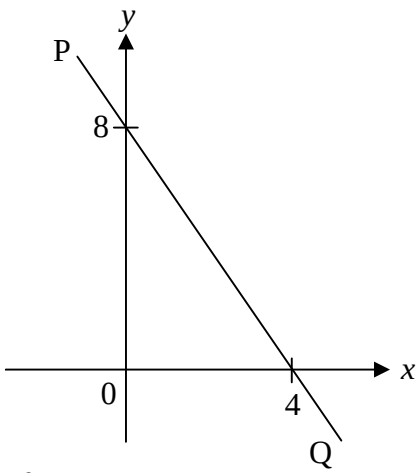


Diagram 15
Rajah 15

What is the gradient of PQ?
Apakah kecerunan PQ?

A -2
B $-\frac{1}{2}$
C $\frac{1}{2}$
D 2

33 State the y-intercept of the straight line $3x = 4y - 24$.
Carikan pintasan-y bagi garis lurus $3x = y - 24$
A -8
B -6
C 6
D 8

34 Diagram 16 shows 20 identical rectangular cards, red, blue and green.
Rajah 16 menunjukkan 20 keping kad yang serupa berwarna merah, biru dan hijau.

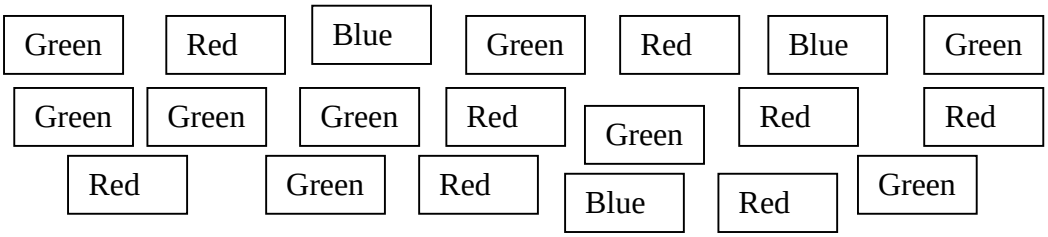


Diagram 16 / *Rajah 16*

A card is chosen at random, State the probability that the card chosen is blue or green.
Sekeping kad dipilih secara rawak. Nyataan kebarangkalian bahawa kad yang dipilih itu berwarna biru atau hijau.

A $\frac{2}{5}$
B $\frac{3}{5}$
C $\frac{3}{20}$
D $\frac{9}{20}$

35 Table 2 shows the distribution of boys and girls in class 4 Arif and 4 Bijak.
Jadual menenujukkan taburan pelajar lelaki dan pelajar perempuan dalam kelas 4 Arif dan 4 Bijak.

	4 Arif	4 Bijak
Boy	12	20
Girl	22	*k*

Table 2
Jadual 2

The probability that a girl is chosen from the 2 classes of students is $\frac{5}{9}$. Find the value of *k*.
Kebarangkalian seorang pelajar perempuan dipilih daripada kedua-dua kelas ialah $\frac{5}{9}$ *.Cari nilai k*

A 10
B 16
C 18
D 24

36 Table 3 shows two sets of values of variables X and Y.
Jadual 3 menunjukkan dua set nilai bagi pembolehubah X dan Y.

Y	1	$\frac{1}{3}$
X	2	*p*

Table 3
Jadual 3

It is given that Y varies inversely as X. Find the value of *p*.
Diberi bahawa Y berubah secara songsang dengan X. Cari nilai p

A 4
B 6
C 8
D 9

37 Given that *P* varies directly as the square of *t* , and that *P* = 24 when *t* = 4. Express *P* in terms of *t*
Diberi P brubah secara langsung dengan kuasa dua t , dan P=24 apabila t = 4. Cari hubungan antara P dan t.

A $P = \frac{3}{2t^2}$

B $P = \frac{6}{t^2}$

C $P = \frac{3}{2}t^2$

D $P = \frac{1}{6}t^2$

38 Given that $T \propto p$ and $T \propto \frac{1}{q^2}$ and $T = \frac{4}{3}$ when *p = 4 and q = 3*. Calculate the value of *T* when *p = 1 and q* = $\frac{1}{2}$

A 18
B 24
C 36
D 72

39 $\begin{pmatrix} 4 \\ -5 \\ 1 \end{pmatrix} + 2\begin{pmatrix} -1 \\ 2 \\ 0 \end{pmatrix} =$

A $\begin{pmatrix} 3 \\ -3 \\ 3 \end{pmatrix}$

B $\begin{pmatrix} 2 \\ -3 \\ 0 \end{pmatrix}$

C $\begin{pmatrix} 2 \\ -1 \\ 1 \end{pmatrix}$

D $\begin{pmatrix} 3 \\ -1 \\ 1 \end{pmatrix}$

40 Given that P = $\begin{pmatrix} 2 \\ -3 \end{pmatrix}$ and Q = $\begin{pmatrix} 4 & 1 \end{pmatrix}$, then PQ is

Diberi P = $\begin{pmatrix} 2 \\ -3 \end{pmatrix}$ *dan Q=* $\begin{pmatrix} 4 & 1 \end{pmatrix}$*, maka PQ ialah*

A $\begin{pmatrix} 5 \end{pmatrix}$

B $\begin{pmatrix} 8 \\ -3 \end{pmatrix}$

C $\begin{pmatrix} 8 & -3 \end{pmatrix}$

D $\begin{pmatrix} 8 & 2 \\ -12 & -3 \end{pmatrix}$

END OF QUESTION PAPER

JAWAPAN KERTAS 1 Matematik EXCEL 2 SPM 2009

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

NAMA : _____

KELAS : _____

JABATAN PELAJARAN NEGERI SABAH

SIJIL PELAJARAN MALAYSIA **1449/2**
EXCEL 2
MATHEMATICS
Paper 2
Sept 2009

2 Hours 15 Minutes Two hours and thirty minutes

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Tulis* **nombor kad pengenalan** *dan* **angka giliran** *anda pada ruangan yang disediakan.*
2. *Kertas soalan ini adalah Bahasa Ingerís.*
3. *Calon dikehendaki membaca maklumat di halaman 2.*

Kod Pemeriksa			
Bahagian	Soalan	Markah Penuh	Markah Diperolehi
A	1	3	
	2	4	
	3	4	
	4	4	
	5	5	
	6	5	
	7	3	
	8	7	
	9	6	
	10	5	
	11	6	
B	12	12	
	13	12	
	14	12	
	15	12	
	16	12	
Jumlah			

Kertas soalan ini mengandungi 30 halaman bercetak.

INFORMATION FOR CANDIDATES

1. *This question paper consists of two sections :* ***Section A*** *and* ***Section B****.*

2. *Answer* ***all*** *questions in* ***Section A*** *and four questions from* ***Section B****.*

3. *Write your answers clearly in the space provided in the question paper.*

4. *Show your working. It may help you to get marks.*

5. *If you wish to change your answer, neatly cross out the answer that you have done. Then write down the new answer.*

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

7. *The marks allocated for each question and sub-part of a question are shown in brackets.*

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

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

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

11. *This question paper must be handed in at the end of the examination.*

MATHEMATICAL FORMULAE
RUMUS MATEMATIK

The following formulae may be helpful in answering the questions. The symbols given are the ones commonly used.
Rumus-rumus berikut boloeh membantu anda menjawab soalan. Simbol-simbol yang diberi adalah yang biasa digunaan.

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 Distance/ jarak

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

6 Midpoint/ Titik tengah

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

7 $Average\ speed = \frac{Distance\ travelled}{time\ taken}$

$Purata\ laju = \frac{jarak\ yang\ dilalu}{masa\ yang\ diambil}$

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

$Min = \frac{hasil\ tambah\ nilai\ data}{bilangan\ data}$

9 Mean = $\frac{\text{sum of (class mark} \times \text{frequency)}}{\text{sum of frequencie s}}$

$Min = \frac{hasil\ tambah\ (nilai\ titik\ tengah\ kelas\ x\ kekerapan)}{hasil\ tambah\ kekerapan}$

10 Pythagoras Theorem /
Teorem Pithagoras
$c^2 = a^2 + b^2$

11 $P(A) = \frac{n(A)}{n(S)}$

12 $P(A') = 1 - P(A)$

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

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

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

SHAPES AND SPACE

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

Luas trapezium $= \frac{1}{2} \times hasil\ tambah\ dua\ sisi\ selari \times tinggi$

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

Lilitan bulatan $= \pi d = 2\pi j$

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

Luas bulatan $= \pi j^2$

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

Luas permukaan melengkung silinder $= 2\pi jt$

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

Luas permuaan sfera $= 4\pi j^2$

6 Volume of right prism = cross sectional area × length

Isipadu prisma tegak = luas keratan rentas × panjang

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

Isipadu silinder $= \pi j^2 t$

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

Isipadu kon $= \frac{1}{3}\pi j^2 t$

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

Isipadu sfera $= \frac{4}{3}\pi r^3$

10 Volume of right pyramid $= \frac{1}{3} \times$ luas tapak × tinggi

Isipadu piramid tegak $= \frac{1}{3} \times luas\ tapak \times tinggi$

11 Sum of interior angles of a polygon

Hasil tambah sudut pedalaman poligon

$= (n-2) \times 180^\circ$

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

$\dfrac{\textit{panjang lengkok}}{\textit{lilitan bulatan}} = \dfrac{\textit{sudut pusat}}{360^o}$

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

$\dfrac{\textit{luas sektor}}{\textit{luas bulatan}} = \dfrac{\textit{sudut pusat}}{360^o}$

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

Faktor skala, $k = \dfrac{PA'}{PA}$

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

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

Section A

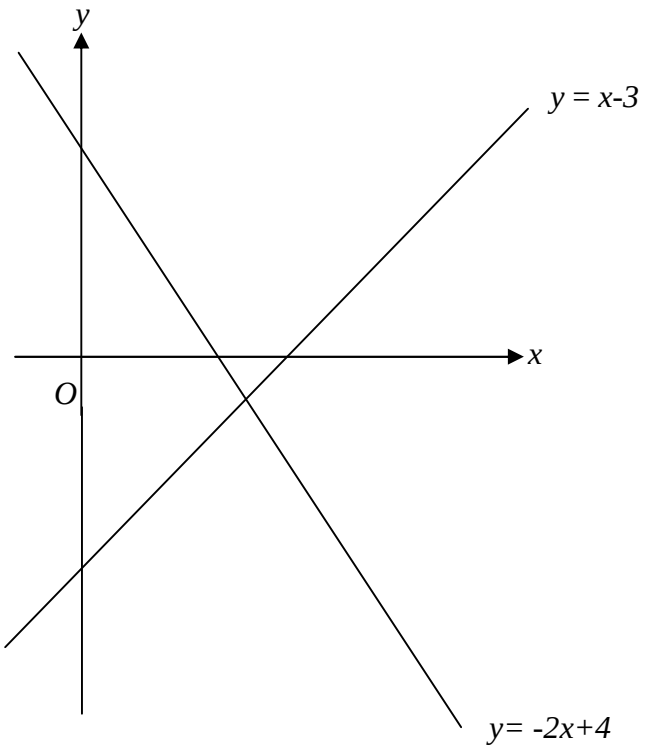
[52 *marks*]

Answer **all** *questions in this section.*

1 On the graph in the answer space, shade the region which satisfies the three inequalities $y \le x - 3$, $y \le -2x + 4$ and $y > -3$. [3 *marks*]

Pada graf di ruang jawapan, lorekkan rantau yang memuaskan ketiga-tiga ketaksamaan $y \le x - 3$, $y \le -2x + 4$ *dan* $y > -3$. [3 *markah*]

Answer / *Jawapan*:



2 Calculate the value of p and of q that satisfy the following simultaneous linear equations:

Hitung nilai p dan nilai q yang memuaskan persamaan linear serentak berikut:

$$-p + 2q = -10$$
$$6p - 5q = 39$$

[4 *marks*]
[4 *markah*]

Answer/*Jawapan* :

3 Using factorization, solve the following quadratic equation.
Menggunakan pemfaktoran, selesaikan persamaan kuadratik berikut.

$$6x^2 - 5x = 4$$

[4 *marks*]
[4 *markah*]

*A*nswer/*Jawapan*:

4 Diagram 1 shows a combined solid, formed by joining a cone to a hemisphere at the base *AEC*. The diameter of the hemisphere is 14cm and B is vertically above the base AEC. The vertical height of the cone is 30*cm*.
Rajah 1 menunjukkan suatu pepejal yang terdiri daripada cantuman sebuah kon kepada sebuah hemisfera pada tapak AEC. Diameter hemisfera tersebut ialah 14cm dan B terletak tegak di atas tapak AEC. Tinggi tegak kon tersebut ialah 30cm.

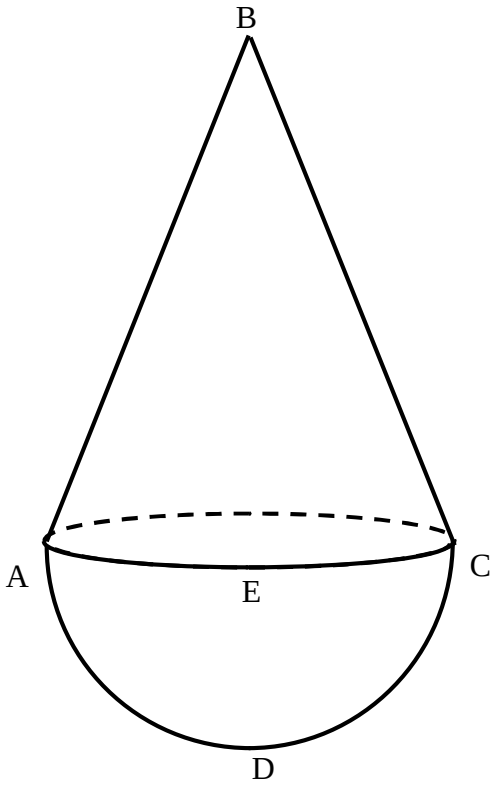


Diagram 1
Rajah 1

Calculate the volume, in cm^3, of the solid.
Hitung isipadu, dalam cm^3 *, pepejal itu.*
[Use /Guna $\pi = \frac{22}{7}$] [4 *marks*]

[4 *markah*]

Answer/*Jawapan* :

5 (a) Determine whether the following statement is true or false.

Some prime number can be divided by 2

Tentukan pernyataan berikut betul atau palsu.

Sebilangan nombor perdana boleh dibahagikan dengan 2.

(b) State the **converse** of the following statement and hence determine whether its converse is true or false.
*Nyatakan **akas** bagi pernyataan berikut dan seterusnya tentukan sama ada akas itu benar atau palsu.*

If $P = -2$, then $P^2 = 4$

(c) Make a general conclusion by induction for the sequence of number 5, -2, -9…….which follows the following pattern.
Buat satu kesimpulan umum secara aruhan bagi urutan nombor 5, -2, -9…..yang mengikut pola berikut.

5 = 12-7(1) -2 = 12-7(2) -9 = 12-7(3) …=……

[5 *marks*]
[5 *markah*]

Answer/*Jawapan* :

(a) …….

(b) ……

…….

(c) ……

6 In diagram 2, O is the origin. Straight line *MN* is parallel to straight *PQ* and straight line *NP* is parallel to x-axis. The equation of the straight line *MN* is $2x-3y=-12$.
Dalam Rajah 2, O ialah asalan. Garis lurus MN adalah selari dengan garis lurus PQ dan garis lurus NP adalah selari dengan paksi-x. Persamaan garis lurus MN ialah $2x-3y=-12$.

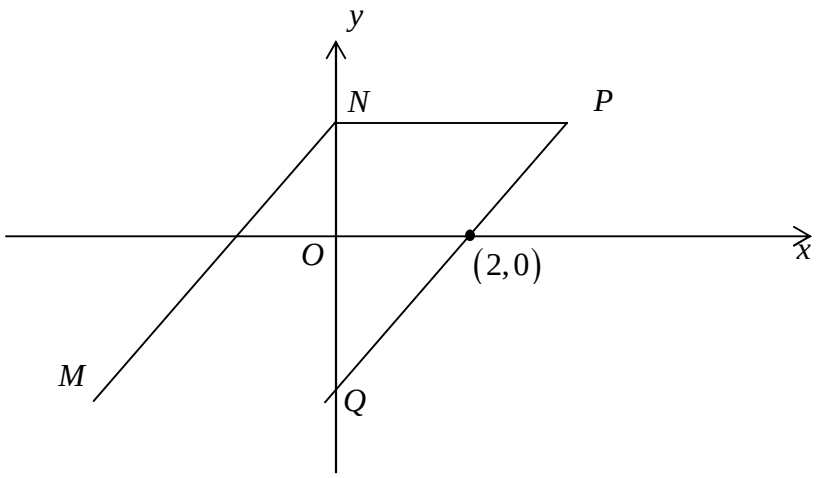


Diagram 2
Rajah 2

Find
Cari

(a) the gradient of straight line *MN*
kecerunan garis lurus MN

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

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

[5 *marks/markah*]

Answer/*Jawapan* :

(a)

(b)

(c)

7 Diagram 3 shows a cuboid. The base *ABCD* is a horizontal rectangle.
Rajah 3 *menunjukkan sebuah kuboid. Tapak segiempat tepat ABCD adalah mengufuk.*

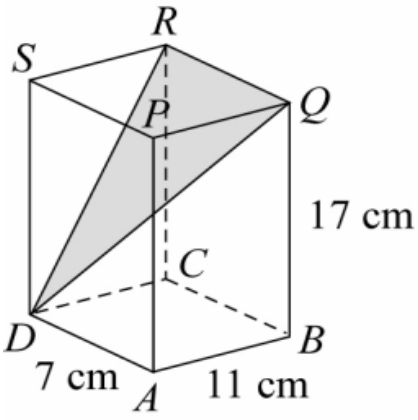


Diagram 3
Rajah 3

Identify and calculate the angle between the plane *DQR* and the plane *BCRQ*.
Kenal pasti dan hitung sudut di antara satah DQR dengan satah BCRQ.

[3 *marks*]
[3 *markah*]

Answer/*Jawapan* :

8 The inverse of $\begin{pmatrix} 4 & -3 \\ 8 & -5 \end{pmatrix}$ is $\frac{1}{k}\begin{pmatrix} -5 & 3 \\ m & 4 \end{pmatrix}$.

Matriks songsang bagi $\begin{pmatrix} 4 & -3 \\ 8 & -5 \end{pmatrix}$ *ialah* $\frac{1}{k}\begin{pmatrix} -5 & 3 \\ m & 4 \end{pmatrix}$.

(a) Find the value of m and of k.
Cari nilai m dan nilai k.

(b) Using matrices, calculate the value of x and of y that satisfy the following matrix equation:
Menggunakan kaedah matriks, hitung nilai x dan nilai y yang memuaskan persamaan matriks berikut:

$$\begin{pmatrix} 4 & -3 \\ 8 & -5 \end{pmatrix}\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} -7 \\ -11 \end{pmatrix}$$

[7 *marks*]
[7 *markah*]

Answer / *Jawapan*:

(a)

(b)

9 Diagram 4 shows the speed-time graph of a particle for a period of 20 seconds.
Rajah 4 *menunjukkan graf laju-masa bagi pergerakan satu zarah untuk tempoh* 20 *saat.*

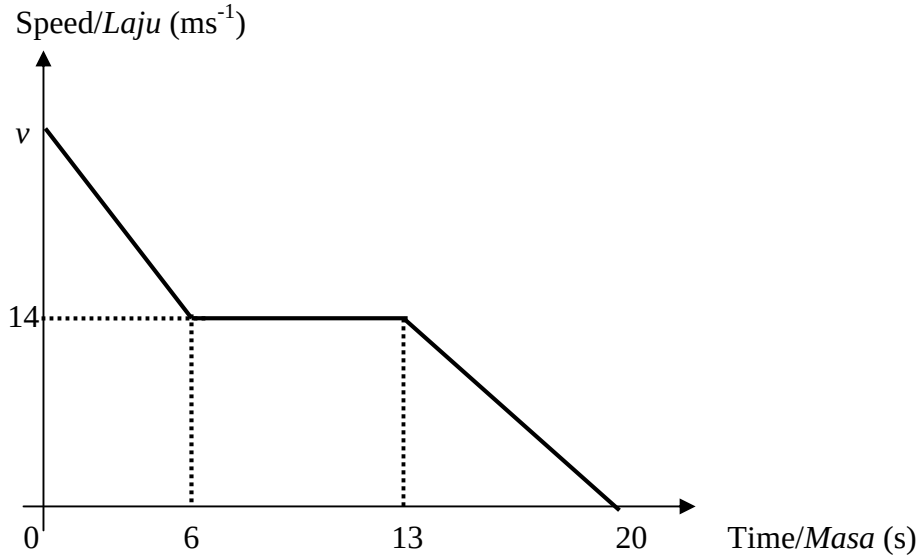


Diagram 4
Rajah 4

(a) State the length of time, in seconds, that the particle moves with uniform speed.
Nyatakan tempoh masa, dalam saat, zarah bergerak dengan laju seragam.

(b) Calculate the rate of change of speed, in ms^{-2}, in the last 7 seconds.
Hitungkan kadar perubahan laju, dalam ms^{-2}, dalam tempoh 7 saat yang terakhir.

(c) Calculate the value of *v* , if the total distance travelled in the first 13 s is 221 m.
Hitung nilai v, jika jumlah jarak yang dilalui dalam tempoh 13 *saat yang pertama ialah* 221 m.

[6 marks]
[6 markah]

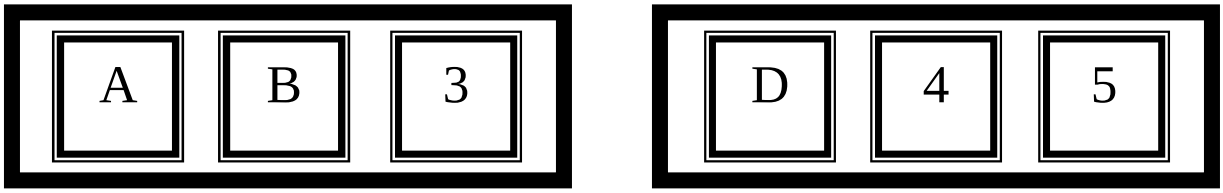
Answer/*Jawapan*:

(a)

(b)

(c)

10 Diagram 5 shows six labeled cards in two boxes.
Rajah 5 *menunjukkan enam kad yang berlabel di dalam dua kotak.*



Box P
***Kotak* P**

Box Q
***Kotak* Q**

Diagram 5
Rajah 5

A card is picked at random from each of the boxes.
Sekeping kad dipilih secara rawak daripada setiap kotak itu.

By listing all the possible outcomes of the event, find the probability that
Dengan menyenaraikan kesudahan peristiwa yang mungkin, cari kebarangkalian

(a) both cards are labeled with an odd number,
kedua-dua kad di label dengan nombor ganjil.

(b) a card is labelled with letter A or the card with an even number is picked.
satu kad dilabel dengan huruf A atau kad berlabel nombor genap dipilih.

[5 *marks*]
[5 markah]

Answer/*Jawapan* :
(a)

(b)

11 Diagram 6 shows an arc *LMN* of a circle with centre *O*. *OQN* is a semicircle with diameter *ON*.

Rajah 6 *menunjukkan lengkok LMN suatu bulatan berpusat O. OQN ialah semibulatan dengan ON sebagai diameter.*

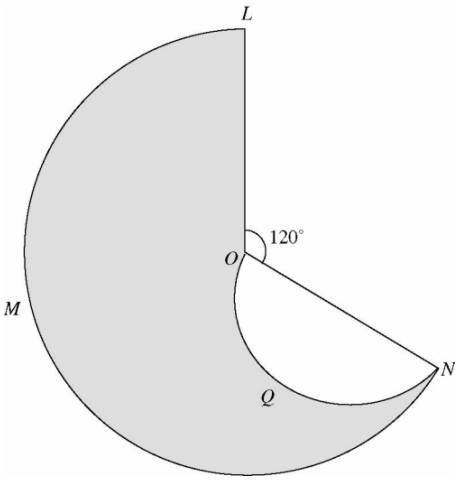


Diagram 6
Rajah 6

$ON = 7$ cm and $\angle LON = 120°$.

$ON = 7$ cm dan $\angle LON = 120°$.

$\left[\text{Use/}\textit{Guna}\ \pi = \frac{22}{7}\right]$

Calculate
Hitung

(a) the perimeter, in cm, of the shaded region,
perimeter, dalam cm, *kawasan yang berlorek,*

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

[6 *marks*]
[6 *markah*]

Answer/*Jawapan* :
(a)

(b)

Section B
Bahagian B
[48 marks/markah]
Answer any tour questions from this section.
Jawab mana-mana empat soalan daripada bahagian ini.

12 (*a*) Complete Table 1 in the answer space for the equation $y = -3x^2 + 11x + 12$ by writing down the values of y when $x = -1$ and $x = 2.5$. [2 *marks*]
Lengkapkan Jadual 1 *di ruang jawapan bagi persamaan* $y = -3x^2 + 11x + 12$ *dengan menulis nilai-nilai y apabila* $x = -1$ *dan* $x = 2.5$. [2 *markah*]

(*b*) For this part of question, use the graph paper provided on page 19.
You may use a flexible curve rule.
Untuk ceraian soalan ini, guna kertas graf pada halaman 19.
Anda boleh guna pembaris flesible.
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 $y = -3x^2 + 11x + 12$ for $-2 \le x \le 5$. [4 *marks*]
Menggunakan skala 2 cm *kepada* 1 unit *pada paksi-x dan* 2 cm *kepada* 5 unit *pada paksi-y, lukis graf* $y = -3x^2 + 11x + 12$ *untuk* $-2 \le x \le 5$. [4 *markah*]

(*c*) From the graph in **12**(*b*), find
Dari graf di **12**(*b*), *cari*
(i) the value of y when $x = 3.2$,
nilai y apabila $x = 3.2$,
(ii) the value of x when $y = -13$.
nilai x apabila $y = -13$. [2 *marks*]
[2 *markah*]

(*d*) Draw a suitable straight line on the graph in **12**(*b*) to find the values of x which satisfy the equation $x^2 = 4x - 2$ for $-2 \le x \le 5$.
State the values of x. [4 *marks*]
Lukis satu garis lurus yang sesuai pada graf di **12**(*b*) *untuk mencari nilai-nilai x yang memuaskan persamaan* $x^2 = 4x - 2$ *untuk* $-2 \le x \le 5$.
Nyatakan nilai-nilai x ini. [4 *markah*]

Answer / Jawapan :

(*a*)

x	–2	–1	0	1	1.5	2.5	4	5
y	–22		12	20	21.75		8	–8

Table 1
Jadual 1

(*b*) Refer graph on page 19.
Rujuk graf di halaman 19.

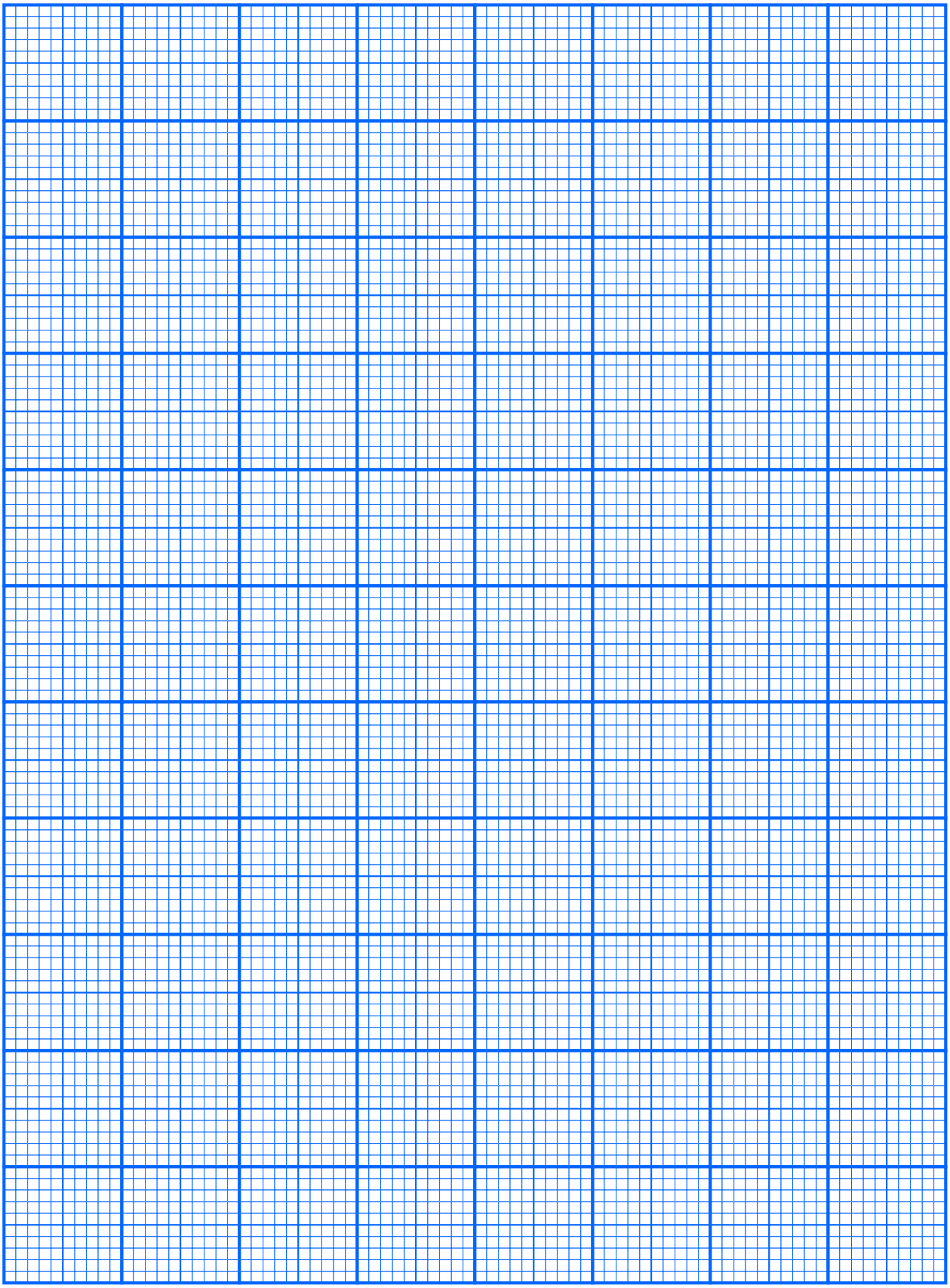
(*c*) (i) y = …….

(iii) x = …….

(*d*) x = …….

x = …….

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



13 (*a*) Transformation **L** is a reflection in the line $y = m$.
Transformation **R** is an clockwise rotation of 90^0 about the centre (3, 0).
Transformation **T** is a translation $\begin{pmatrix} -5 \\ 4 \end{pmatrix}$.

Penjelmaan **L** *ialah pantulan pada garis lurus* $y = m$.
Penjelmaan **R** *ialah putaran* 90^0 *ikut arah jam pada pusat* (3, 0).
Penjelmaan **T** *ialah translasi* $\begin{pmatrix} -5 \\ 4 \end{pmatrix}$.

(i) The point (6, 5) is the image of the point (6, –3) under the transformation **L**. State the value of *m*.
Titik (6, 5) *adalah imej bagi titik* (6, –3) *di bawah penjelmaan* **L**. *Nyatakan nilai bagi m.*

(ii) Find the coordinates of the image of point (7, –2) under the following combined transformations :
Cari koordinat imej bagi titik (7, –2) *di bawah gabungan penjelmaan berikut* :
(a) $\mathbf{T}^2$,
(b) **TR**.

[4 *marks*]
[4 *markah*]

(*b*) Diagram 7 shows three quadrilaterals, ***ABCD***, ***EFGH*** and ***MNPQ***, drawn on a Cartesian plane.
Rajah 7 *menunjukkan tiga segi empat*, ***ABCD***, ***EFGH*** *dan* ***MNPQ***, *dilukis pada suatu satah Cartesan.*

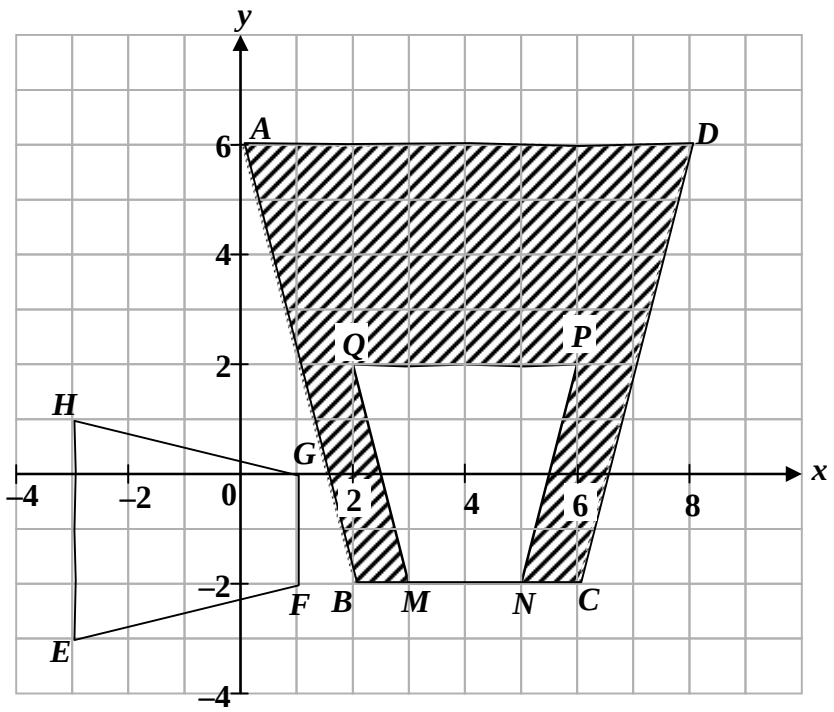


Diagram 7
Rajah 7

(i) ***EFGH*** is the image of ***ABCD*** under a combined transformation **WV**.
EFGH *ialah imej bagi* ***ABCD*** *di bawah gabungan penjelmaan* **WV**.
Describe in full the transformation
Huraikan selengkapnya penjelmaan
(a) **V**,
(b) **W**.

(ii) It is given that the shaded region ***ABMQPNCD*** represents a region of area 43.5 m^2.
Calculate the area, in m^2, of the region represented by the heptagon ***EFGH***.
Diberi bahawa kawasan yang berlorek ***ABMQPNCD*** *mewakili luas* 43.5 m^2.
Hitung luas, dalam m^2, *kawasan yang diwakili oleh heptagon* ***EFGH***.

[8 *marks*]
[8 *markah*]

Answer / *Jawapan* :

(*a*) (i)

(ii) (*a*)

(*b*)

(*b*) (i) (*a*) **V** :

(*b*) **W** :

(ii)

14 The data below shows the payment for telephone bills, in RM, of 40 families in a month.

Data di bawah menunjukkan bayaran bil telefon, dalam RM, *oleh* 40 *keluarga dalam sebulan.*

89	76	65	72	83	68	63	62
80	80	67	73	69	68	70	90
78	88	67	64	93	75	69	69
87	80	77	73	85	71	61	65
79	83	71	60	94	72	73	82

(*a*) Based on the data, complete Table 2 in the answer space. [5 *marks*]
Berdasarkan data itu, lengkapkan jadual 2 *pada ruang jawapan.* [5 *markah*]

(*b*) Based on Table 2 in **14**(*a*), calculate the estimated mean of the telephone bills paid by a family. [3 *marks*]
Berdasarkan jadual 2 *di* **14**(*a*), *hitungkan min anggaran bil telefon bagi satu keluarga.* [3 *markah*]

(*c*) For this part of the question, use the graph paper provided on page 24.
Untuk ceraian soalan ini, gunakan kertas graf yang disediakan di halaman 24.

By using the scale of 2 cm to RM5 on the horizontal axis and 2 cm to 1 family on the vertical axis, draw a histogram for the data. [3 *marks*]
Dengan menggunakan skala 2 cm *kepada* RM5 *pada paksi mengufuk dan* 2 cm *kepada* 1 *keluarga pada paksi mencancang, lukiskan satu histogram bagi data itu.* [3 *markah*]

(*d*) Based on the histogram in **14**(*c*), state the number of families that paid less than RM75 for the telephone bills. [1 *mark*]
Berdasarkan histogram di **14**(*c*), *nyatakan bilangan keluarga yang membuat bayaran bil telefon kurang daripada* RM75. [1 *markah*]

Answer / *Jawapan* :

(*a*)

Class interval ***Selang kelas***	**Midpoint** ***Titik tengah***	**Frequency** ***Kekerapan***	**Upper boundary** ***Sempadan atas***
60 – 64	62		

Table 2
Jadual 2

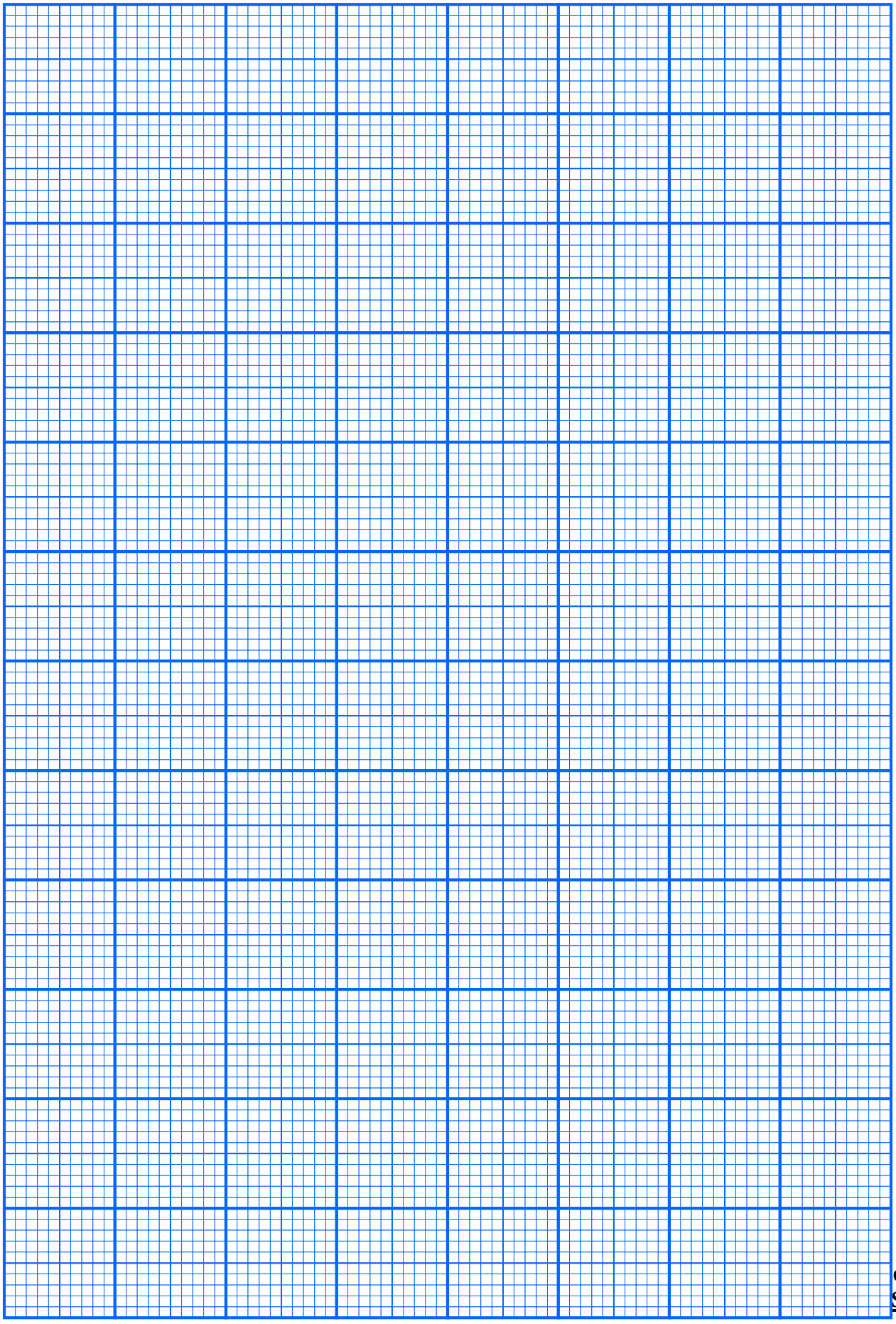
(*b*)

(*c*) Refer graph on page 24.
Rujuk graf di halaman 24.

(*d*)

Graph for Question 14

***Graf untuk Soalan* 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 8(i) shows a solid right prism with square base *ABGF* on a horizontal plane. The surface *ABCDE* is the uniform cross-section of the prism. *AE* and *BC* are vertical edges. Rectangle *EJID* and *CHID* is an inclined plane.

Rajah 8(i) *menunjukkan sebuah pepejal berbentuk prisma tegak dengan tapak segiempat sama ABGF terletak di atas tapak mengufuk. Permukaan ABCDE ialah keratin rentas seragamnya. Tepi AE dan BC adalah tegak. Segiempat tepat EJID dan CHID ialah satah condong.*

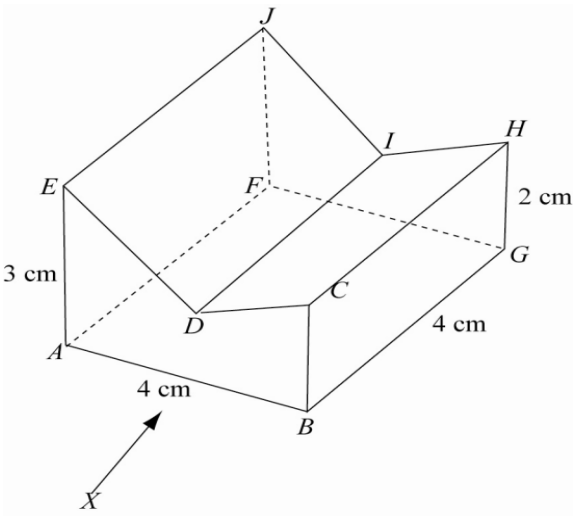


Diagram 8(i)
Rajah 8(i)

Edge *DI* is 1 cm vertically above the midpoints of *AB* and *FG*. *CD* = *HI* and *DE* = *IJ*.
Sisi DI ialah 1 cm *di atas titik tengah AB dan FG. CD =HI dan DE =IJ*.

Draw full scale, the elevation of the solid on a vertical plane parallel to *AB* as viewed from *X*.
Lukis dengan skala penuh, dongakan pepejal itu pada satah mencancang yang selari dengan AB sebagaimana dilihat dari X.

[3 *marks*]
[3 *markah*]

Answer/*Jawapan* :
(*a*)

(*b*) A solid cuboid is joined to the prism in Diagram 8(i) on the vertical plane *FGHIJ*. The combined solid is shown in Diagram 8(ii).

Sebuah pepejal berbentuk kuboid dicantumkamkan kepada prisma pada Rajah 8(i) *pada satah mencancang FGHIJ. Gabungan pepejal adalah seperti ditunjukkan pada Rajah* 8(ii).

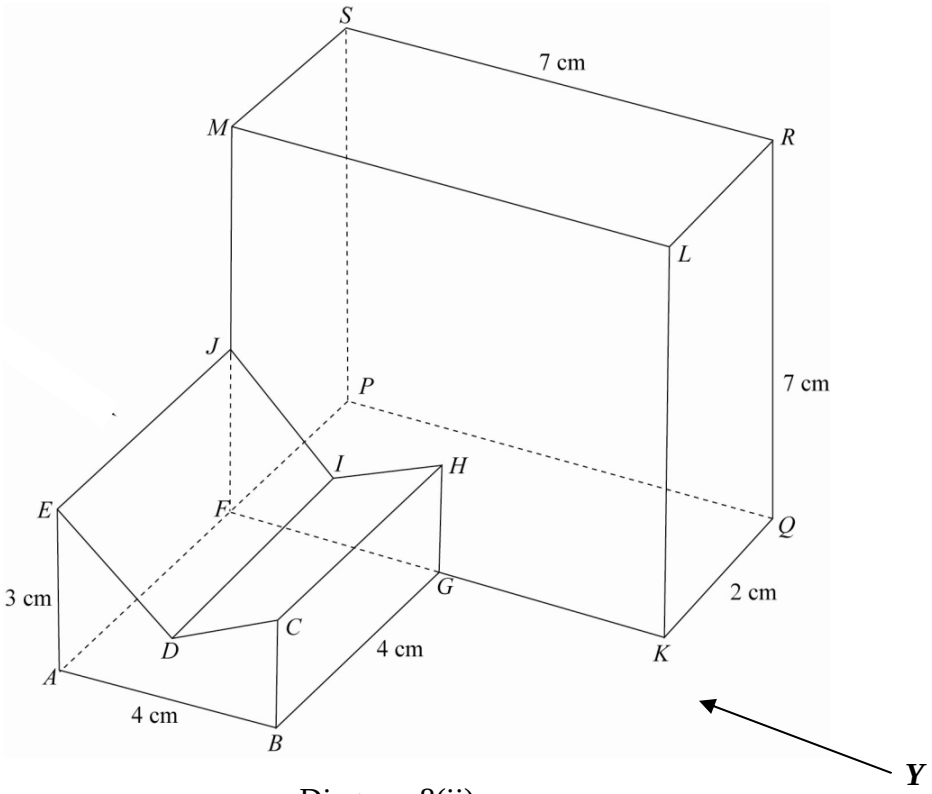


Diagram 8(ii)
Rajah 8(ii)

Draw full scale,
Lukis dengan skala penuh,

(i) the plan of the combined solid,
pelan gabungan pepejal itu,

[4 *marks*]
[4 *markah*]

(ii) the elevation of the combined solid on a vertical plane parallel to *BG* as viewed from *Y*.
dongakan gabungan pepejal itu pada satah mencancang yang selari dengan BG sebagaimana dilihat dari Y.

[5 *marks*]
[5 *markah*]

Answer/*Jawapan* :
(*b*) (i), (ii)

16 *L*(47° *S*, 80° *W*), *M*, *P* and *Q* are four points on the surface of the earth. *LM* is the diameter of the earth.
L(47° *S*, 80° *T*), *M*, *P dan Q adalah empat titik pada permukaan bumi*. *LM ialah diameter bumi*.

(*a*) State the longitude of *M*.
Nyatakan longitud bagi M.

[2 *marks*]
[2 *markah*]

(*b*) *P* lies 6 138 nautical mile due east of *L* and *Q* lies 4 560 nautical mile due north of *L*.
P terletak 6 138 *batu nautika ke timur L dan Q terletak* 4 560 *batu nautika ke utara L*.

Calculate
Hitung

(i) the longitude of *P*.
longitud bagi P.

(ii) the latitude of *Q*.
latitude bagi Q.

[6 *marks*]
[6 *markah*]

(*c*) Calculate the shortest distance, in nautical mile, from *Q* to *M* measured along the surface of the earth.

Hitung jarak terpendek, dalam batu nautika, dari Q ke M diukur sepanjang permukaan bumi.

[2 *marks*]
[2 *markah*]

(*d*) An aeroplane took off from *P* and flew due west to *L* and then flew due north to *M*. The average speed for the whole flight was 900 knots. Calculate the total time, in hours, taken for the whole flight.

Sebuah kapal terbang berlepas dari P arah ke barat ke L dan kemudian terbang arah ke utara ke M. *Purata laju seluruh penerbagan kapal terbang itu ialah* 900 *knot*.

[2 *marks*]
[2 *markah*]

Answer /*Jawapan*:

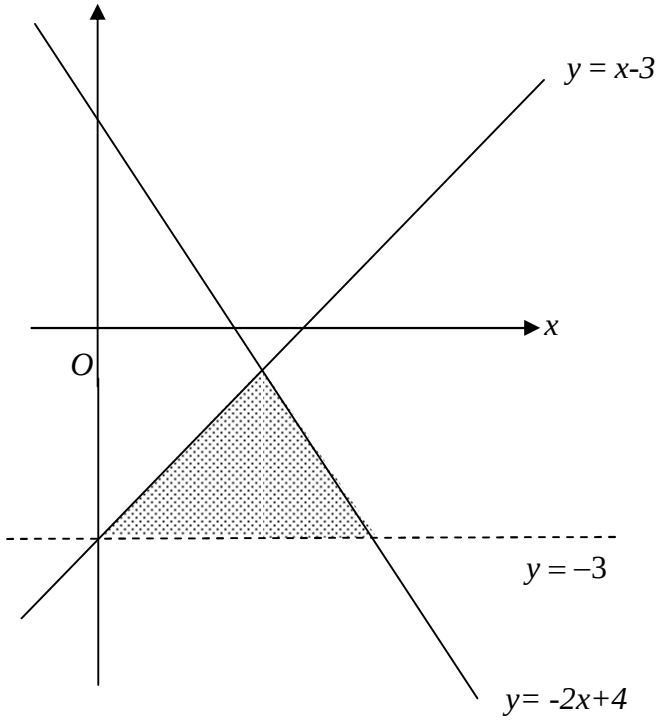
(*a*)

(*b*)(i)

(*b*)(ii)

(*c*)

(*d*)

Question	Solution and Mark Scheme	Marks	
1	 The line $y = -3$ correctly drawn (doesn't matter dotted or solid). The region correctly shaded (line must be dotted). Note : Award P1 to shaded region bounded by 2 correct lines (Check one vertex from any two correct lines)	K1 P2	**3**
2	-6p+12q = -60 or -5p+10q= -50 *or* 12p-10q =78 or equivalent Note : Attempt to equate the coefficient of one of the unknowns, award K1 7q= -21 *or* $6p = 24$ *or* equivalent **OR**	K1 K1	

2	P =2q+10 *or* $q=\frac{1}{2}p-5$ *or* $p=\frac{39}{6}+\frac{5}{6}q$ *or* $q=\frac{6}{5}p-\frac{39}{5}$ *or* equivalent	K1	
	Attempt to make one of the unknowns as the subject, award K1		
	7q= -21 *or* $6p=24$ *or* equivalent	K1	
	OR		
	$\begin{pmatrix} p \\ q \end{pmatrix}=\frac{1}{(-1)(-5)-(6)(2)}\begin{pmatrix} -5 & -2 \\ -6 & -1 \end{pmatrix}\begin{pmatrix} -10 \\ 39 \end{pmatrix}$	K2	
	Note :		
	Award K1 if		
	1. $\begin{pmatrix} p \\ q \end{pmatrix}=\begin{pmatrix} inverse \\ matrix \end{pmatrix}^{*}\begin{pmatrix} -10 \\ 39 \end{pmatrix}$ *or* $\begin{pmatrix} -1 & 2 \\ 6 & -5 \end{pmatrix}\begin{pmatrix} p \\ q \end{pmatrix}=\begin{pmatrix} -10 \\ 39 \end{pmatrix}$		
	2. Do not accept $\begin{pmatrix} inverse \\ matrix \end{pmatrix}^{*}=\begin{pmatrix} -1 & 2 \\ 6 & -5 \end{pmatrix}$ *or* $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$		
	$p=4$	N1	
	$q=-3$	N1	
	Note :		
	$\begin{pmatrix} p \\ q \end{pmatrix}=\begin{pmatrix} 4 \\ -3 \end{pmatrix}$ as final answer, award N1		
			4

3	$6x^2-5x-4=0$ $(2x+1)(3x-4)=0$ *or* equivalent $x = -0.5$ *or* $-\frac{1}{2}$ $x = \frac{4}{3}$ Note : 1. Accept without "=0" 2. Accept three terms on the same side, in any order 3. Do not accept solutions solved not using factorization	K1 K1 N1 N1	**4**
4	$\frac{1}{3}\times\frac{22}{7}\times 7^2\times 30$ $\frac{1}{2}\times\frac{4}{3}\times\frac{22}{7}\times 7^3$ $\frac{1}{3}\times\frac{22}{7}\times 7^2\times 30 \quad + \quad \frac{1}{2}\times\frac{4}{3}\times\frac{22}{7}\times 7^3$ $2258\frac{2}{3}\,\text{cm}^3$	K1 K1 K1 N1	**4**

5(a)	True // Benar	P1	
(b)	If $x^2 = 4$, then $p = -2$ // Jika $x^2 = 4$, maka $p = -2$	P1	
	False // Palsu	P1	
(c)	$12\text{-}7n^2$, $n = 1, 2, 3.....$ Note : $12\text{-}7n^2$ seen, award K1	K2	
			5
6(a)	$M_{MN} = \frac{2}{3}$	P1	
(b)	$y = 4$	N1	
(c)	$M_{PQ} = M_{MN} = \frac{2}{3}$	P1	
	$\frac{y-0}{x-2} = M_{PQ}$ * <u>or</u> $o = \left(M_{PQ}\right)(2) + c$ <u>or</u> equivalent	K1	
	$y = \frac{2}{3}x - \frac{4}{3}$ <u>or</u> equivalent	N1	
			5
7	Identify $\angle DRC$ or $\angle CRD$	P1	
	$\tan \angle DRC = \frac{11}{17}$ or equivalent	K1	
	32.91° or 32°54’	N1	
			3

Question	Solution and Mark Scheme	Marks	
8	(a) m = -8	**P1**	
	k = 4(-5) – 8(-3) k = 4	**P2**	
	(b) $\begin{pmatrix} x \\ y \end{pmatrix} = \frac{1}{4(-5)-8(-3)}\begin{pmatrix} -5 & 3 \\ -8 & 4 \end{pmatrix}\begin{pmatrix} -7 \\ 11 \end{pmatrix}$	**K2**	
	$\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} \frac{1}{2} \\ 3 \end{pmatrix}$		
	$x = \frac{1}{2}$	**N1**	
	$y = 3$	**N1**	**7**
	Note: 1. $\begin{pmatrix} x \\ y \end{pmatrix} = {}^{*}\begin{pmatrix} inverse \\ matrix \end{pmatrix}\begin{pmatrix} 7 \\ -11 \end{pmatrix}$ or $\frac{1}{4(-5)-8(-3)}\begin{pmatrix} -5 & 3 \\ -8 & 4 \end{pmatrix}$ seen, award K1. 2. Do not accept ${}^{*}\begin{pmatrix} inverse \\ matrix \end{pmatrix} = \begin{pmatrix} 4 & -3 \\ 8 & -5 \end{pmatrix}$ or ${}^{*}\begin{pmatrix} inverse \\ matrix \end{pmatrix} = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$. 3. $\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} \frac{1}{2} \\ 3 \end{pmatrix}$ as final answer, award N1 4. Do not accept any solutions solve not using matrices.		

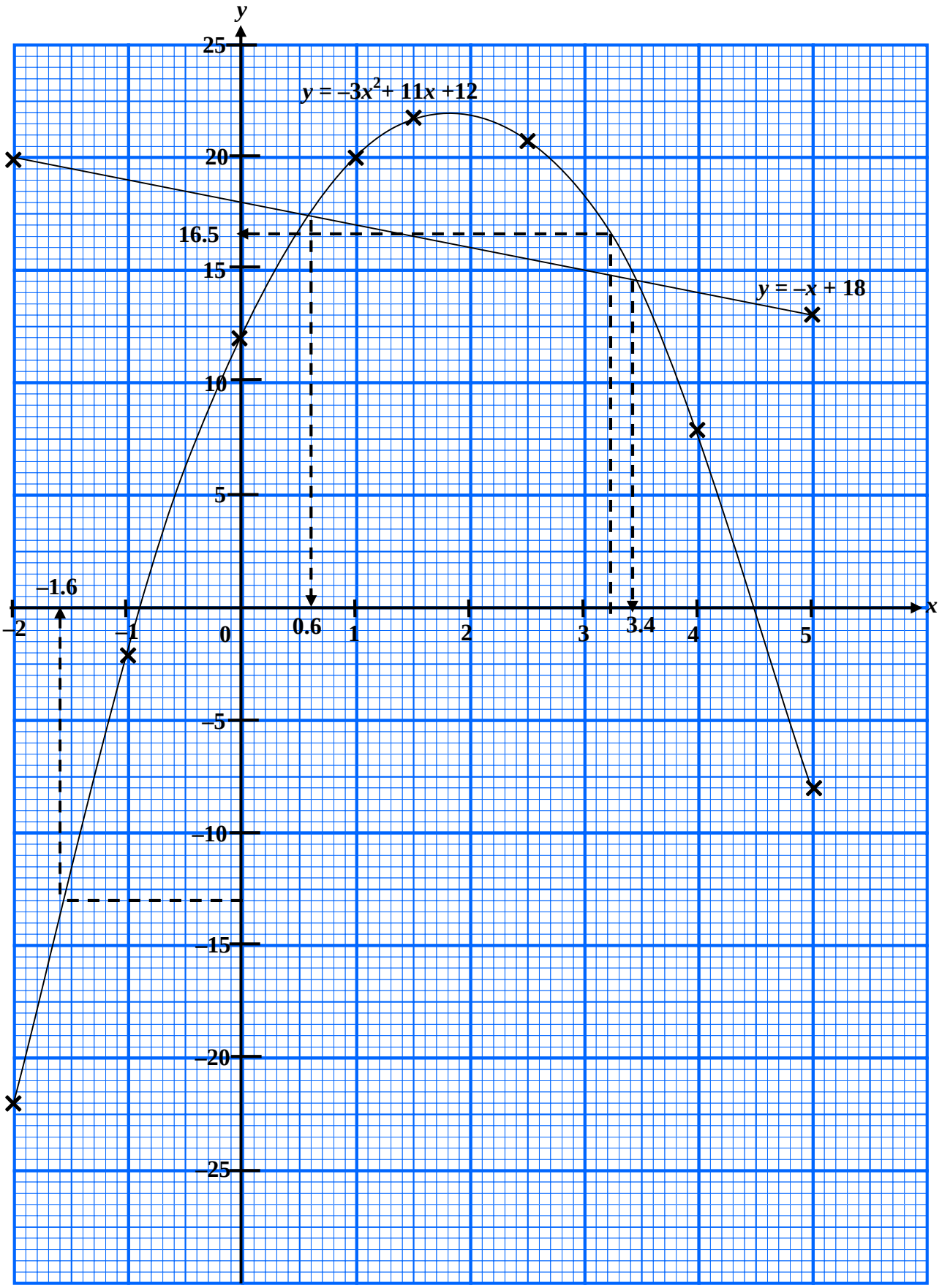
Question	Solution and Mark Scheme	Marks	
9	(a) 13 - 6 = 7	**P1**	
	(b) $\frac{0-14}{20-13}=\frac{-14}{7}$	**K1**	
	$= -2$	**N1**	
	Note: Accept answer without working for K1N1.		
	(c) $\frac{1}{2}(v+14)(6)+(14\times 7)=221$ or equivalent method	**K2**	
	Note: $\frac{1}{2}(v+14)(6)+(14\times 7)$, award K1		
	v = 27	**N1**	**6**
10	$\{(A,D),(A,4),(A,5),(B,D),(B,4),(B,5),(3,D),(3,4),(3,5)\}$	**P1**	
	(a) $\{(3,5)\}$	**K1**	
	$\frac{1}{9}$	**N1**	
	(b) $\{(A,D),(A,4),(A,5),(B,4),(3,4)\}$	**K1**	
	$\frac{5}{9}$	**N1**	**5**
	Note: Accept answer without working for K1N1		

11	(a) $\frac{240}{360}\times 2\times\frac{22}{7}\times 7$ or $\frac{180}{360}\times 2\times\frac{22}{7}\times\frac{7}{2}$	K1	
	$7 + \frac{240}{360}\times 2\times\frac{22}{7}\times 7 + \frac{180}{360}\times 2\times\frac{22}{7}\times\frac{7}{2}$	K1	
	$47\frac{1}{3}$ cm or $\frac{142}{3}$ cm or 47.33 cm	N1	
	(b) $\frac{180}{360}\times\frac{22}{7}\times\left(\frac{7}{2}\right)^2$ or $\frac{240}{360}\times\frac{22}{7}\times 7^2$	K1	
	$\frac{240}{360}\times\frac{22}{7}\times 7^2 - \frac{180}{360}\times\frac{22}{7}\times\left(\frac{7}{2}\right)^2$	K1	
	$\frac{1001}{12}$ or $83\frac{5}{12}$ or 83.42 cm^2	N1	**6**
	Note: 1. Accept π for K mark. 2. Correct answer from incomplete working, award KK2		

Question	Solution and Mark Scheme	Marks	
12 *(a)*			
	x | –1 | 2.5	K1	
	y | –2 | 20.75	K1	2
(b)	(i) Axes drawn in correct direction with uniform scales in $-2 \le x \le 5$ and $-25 \le y \le 25$,	P1	
	(ii) 6 points and 2 points* correctly plotted or curve passes through these points for $-2 \le x \le 5$.	K2	
	Note: 1. 6 or 7 points correctly plotted, award K1		
	(iii) Smooth and continuous curve without any straight line passes through all 8 correct points using the given scale for $-2 \le x \le 5$	N1	4
(c) (i)	$16 \le y \le 17$	P1	
	$-1.65 \le y \le -1.55$	P1	2
(ii) *(d)*	Identify equation $y = -x + 18$ <u>or</u> $-3x^2 + 11x + 12 = -x + 18$	K1	
	Straight line $y = -x + 18$ correctly drawn	K1	
	Values of x :		
	$0.55 \le x \le 0.65$	N1	
	$3.35 \le x \le 3.45$	N1	4
	Note: 1. Allow P mark or N mark if values of y and x shown on graph 2. Values of y and x obtained by computations, award P0 or N0.		
			12

Graph For Question 12

Graf untuk Soalan 12

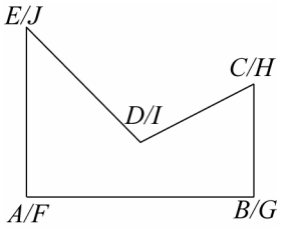
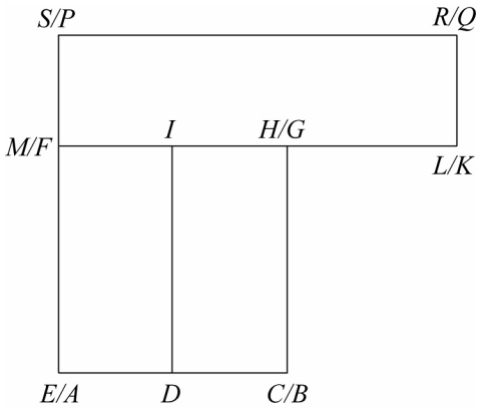


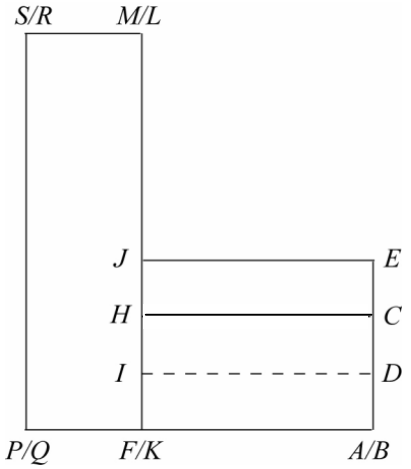
Question	Solution and Mark Scheme	Marks	
13 *(a)* (i)	$m = 1$	P1	
(ii)	(–3, 6)	P1	
(a)	(–4, 0)	P2	4
(b)	Note: 1. Point (–4, 0) marked on diagram, award P1.		
(b) (i) (a)	Enlargement centre (4, –2). with scale factor $\frac{1}{2}$ *or* Pembesaran pusat (4, –2) dan faktor skala $\frac{1}{2}$. Note: 1. P2 : Enlargement centre (4, –2) *or* Enlargement scale factor $\frac{1}{2}$ *or* Pembesaran pusat (4, –2) *or* Pembesaran faktor skala $\frac{1}{2}$. . 2. P1 : Enlargement *or* Pembesaran	P3	
(b)	Rotation 90^0 anticlockwise at centre (2, –3) *or* Putaran 90^0 lawan arah jam pada pusat (2, –3). Note: 1. P2 : Rotation 90^0 anticlockwise *or* Rotation at centre (2, –3) *or* Putaran 90^0 lawan arah jam *or* Putaran pada pusat (2, –3). 2. P2 : Rotation *or* Putaran.	P3	
(ii)	$\left[1-\left(\frac{1}{2}\right)^2\right]\times$ Area ABCD *or* 43.5 ÷ 3 *or* area of EFGH = $\left(\frac{1}{2}\right)^2 \times$ area of heptagon *ABCD* 14.5	K1 N1	8
			12

Question	Solution and Mark Scheme	Marks	
14 *(a)*			

Class interval *Selang kelas*	Midpoint *Titik tengah*	Frequency Kekerapan	Upper boundary *Sempadan atas*
60 – 64	62	5	64.5
65 – 69	67	9	69.5
70 – 74	72	8	74.5
75 – 79	77	5	79.5
80 – 84	82	6	84.5
85 – 89	87	4	89.5
90 – 94	92	3	94.5

	Class interval : all the answers are correct Midpoint : all the answers are correct Frequency : all the answers are correct Upper boundary : all the answers are correct	P1 P1 P2 P1	5
(b)	$\frac{5\times 62+9\times 67+8\times 72+5\times 77+6\times 82+4\times 87+3\times 92}{40}$	K2	
	74.75 *or* $74\frac{3}{4}$	N1	3
	Note: 1. Allow two mistakes for K1. i.e. mid point wrongly copied or wrong multiplication 2. Incomplete working followed by correct answer, award KK2 i.e. $\frac{2990}{40} = 74.75$		
(c) (i)	Axes drawn in correct direction with uniform scales for $59.5 \le x \le 94.5$ and $0 \le y \le 9$ and axis x labeled correctly with either midpoints or lower and upper boundaries	P1	
(ii)	7 bars* drawn correctly according to the values in the table	K2	3
(d)	22	P1	1
			12

15(*a*)	 Correct shape with pentagon *ABCDE*. All solid lines. *AB* > *AE* > *ED* > *DC* > *CB* Measurements correct to ± 0.2 cm (one way) and angles at vertices *A* and *B* of pentagon are $90° \pm 1°$.	K1 K1 dep K1 N1 dep K1K1	3
15(*b*)(*i*)	 Correct shape with rectangles *LMSR*, *CDIH* and *EDJI*. All solid lines. *LM* > *CH* > *LR* = *ED* = *DC*. Measurements correct to ± 0.2 cm (one way) and $\angle C, \angle D, \angle E, \angle H, \angle I, \angle M, \angle L, \angle R$ and $\angle S = 90° \pm 1°$	K1 K1 dep K1 N2 dep K1K1	4

15(*b*)(*ii*)			
	Correct shape with rectangles *FPSM* and *AFJE*. All solid lines. Note : Ignore *CH* and *DI*.	K1	
	C and *H* joined with a solid line and *D* and *I* joined with dotted line, to form rectangle *CHJE* and *DIFA*.	K1 dep K1	
	$PS > AF > AE > PF > AD = DC = CE,\ PF = AC$.	K1 dep K1K1	
	Measurements correct to ± 0.2 cm (one way) and All angles at the vertices of rectangles = $90° \pm 1°$	N2 dep K1K1K1	5
			12

Question	Solution and Mark Scheme	Marks	
16(*a*)	$100°E$ or $100°T$ Note : $100°$ or E or T award P1	P2	2
16(*b*)(*i*)	$6138 = x \times \cos 47°$ or $\frac{6138}{\cos 47°}$ or 9000 $\frac{9000}{60} - 80$ $70°E$ or $70°T$ Note : If $70°$ without E or T N0	K1 K1 N1	3
16(*b*)(*ii*)	$\frac{4560}{60}$ or 76 $\frac{4560}{60} - 47$ $29°N$ or $29°U$ Note: If $29°$ without N or U N0	K1 K1 N1	3
16(*c*)	$(180 - 29 - 47) \times 60$ 6240	K1 N1	2
16(*d*)	$\frac{6138 + 4560 + *c}{900}$ 18.82 Accept : 18 hours 49 minutes or 18.8 for N1	K1 N1	2
			12