

SULIT

1449/2

Matematik

Kertas 2

2014

$2\frac{1}{2}$  jam

1449/2

NAMA : \_\_\_\_\_

TINGKATAN : \_\_\_\_\_



MAJLIS PENGETUA SEKOLAH MENENGAH MALAYSIA  
CAWANGAN NEGERI SEMBILAN

PROGRAM PENINGKATAN AKADEMIK TINGKATAN LIMA  
SEKOLAH-SEKOLAH MENENGAH NEGERI SEMBILAN 2014

**MATEMATIK**

Kertas 2

Dua jam tiga puluh minit

**JANGAN BUKA KERTAS SOALAN INI  
SEHINGGA DIBERITAHU**

1. Tulis nama dan tingkatan anda pada ruang yang disediakan.
2. Kertas soalan ini adalah dalam dwibahasa.
3. Soalan dalam bahasa Inggeris mendahului soalan yang sepadan dalam bahasa Melayu.
4. Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam bahasa Inggeris atau bahasa Melayu.
5. Calon dikehendaki membaca maklumat di halaman belakang kertas soalan ini.

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

Kertas soalan ini mengandungi 36 halaman bercetak

**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 boleh membantu anda menjawab soalan. Simbol-simbol yang diberi adalah yang biasa digunakan.*

**RELATIONS**  
**PERKAITAN**

- |  |   |
|--|---|
| <p>1. <math>a^m \times a^n = a^{m+n}</math></p> <p>2. <math>a^m \div a^n = a^{m-n}</math></p> <p>3. <math>(a^m)^n = a^{mn}</math></p> <p>4. <math>A^{-1} = \frac{1}{ad-bc} \begin{pmatrix} d &amp; -b \\ -c &amp; a \end{pmatrix}</math></p> <p>5. Distance / Jarak<br/> <math>= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}</math></p> <p>6. Midpoint / Titik tengah<br/> <math>(x, y) = \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)</math></p> <p>7. Average speed = <math>\frac{\text{distance travelled}}{\text{time taken}}</math><br/> <i>Purata laju = <math>\frac{\text{jarak yang dilalui}}{\text{masa yang diambil}}</math></i></p> <p>8. Mean = <math>\frac{\text{sum of data}}{\text{number of data}}</math><br/> <i>Min = <math>\frac{\text{hasil tambah nilai data}}{\text{bilangan data}}</math></i></p> <p>9. Mean = <math>\frac{\text{sum of (classmark} \times \text{frequency)}}{\text{sum of frequencies}}</math><br/> <i>Min = <math>\frac{\text{hasil tambah (nilai titik tengah kelas} \times \text{kekerapan)}}{\text{hasil tambah kekerapan}}</math></i></p> | <p>10. Pythagoras Theorem<br/> <i>Teorem Pithagoras</i><br/> <math>c^2 = a^2 + b^2</math></p> <p>11. <math>P(A) = \frac{n(A)}{n(S)}</math></p> <p>12. <math>P(A') = 1 - P(A)</math></p> <p>13. <math>m = \frac{y_2 - y_1}{x_2 - x_1}</math></p> <p>14. <math>m = -\frac{y - \text{intercept}}{x - \text{intercept}}</math><br/> <math>m = -\frac{\text{pintasan} - y}{\text{pintasan} - x}</math></p> |
|--|---|

[Lihat halaman sebelah  
SULIT

**SHAPE AND SPACE**  
**BENTUK DAN RUANG**

1. Area of trapezium =  $\frac{1}{2} \times \text{sum of parallel sides} \times \text{height}$   
*Luas trapezium* =  $\frac{1}{2} \times \text{hasil tambah dua sisi selari} \times \text{tinggi}$
2. Circumference of circle =  $\pi d = 2\pi r$   
*Lilitan bulatan* =  $\pi d = 2\pi r$
3. Area of circle =  $\pi r^2$   
*Luas bulatan* =  $\pi r^2$
4. Curved surface area of cylinder =  $2\pi rh$   
*Luas permukaan melengkung silinder* =  $2\pi rt$
5. Surface area of sphere =  $4\pi r^2$   
*Luas permukaan sfera* =  $4\pi r^2$
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* =  $\pi r^2 t$
8. Volume of cone =  $\frac{1}{3} \pi r^2 h$   
*Isipadu kon* =  $\frac{1}{3} \pi r^2 t$
9. Volume of sphere =  $\frac{4}{3} \pi r^3$   
*Isipadu sfera* =  $\frac{4}{3} \pi r^3$
10. Volume of right pyramid =  $\frac{1}{3} \times \text{base area} \times \text{height}$   
*Isipadu piramid tegak* =  $\frac{1}{3} \times \text{luas tapak} \times \text{tinggi}$
11. Sum of interior angles of a polygon  
*Hasil tambah sudut pedalaman poligon*  
 =  $(n - 2) \times 180^\circ$

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

$$\frac{\text{panjang lengkok}}{\text{lilitan bulatan}} = \frac{\text{sudut pusat}}{360^\circ}$$

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

$$\frac{\text{luas sektor}}{\text{luas bulatan}} = \frac{\text{sudut pusat}}{360^\circ}$$

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

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

$$15. \text{Area of image} = k^2 \times \text{area of object}$$

$$\text{Luas imej} = k^2 \times \text{luas objek}$$



Section A  
Bahagian A

[52 marks]

[52 markah]

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

- 1 (a) The Venn diagram in the answer space shows set  $K$  and  $L$ , such that the universal set  $\xi = K \cup L$ .  
Shade the set  $K \cap L$ .

Gambar rajah Venn di ruang jawapan menunjukkan set  $K$  dan set  $L$  dengan keadaan set semesta,  $\xi = K \cup L$ .

Lorek set  $K \cap L$ .

- (b) The Venn diagram in the answer space shows set  $K$ ,  $L$  and  $M$  such that the universal set,  $\xi = K \cup L \cup M$ .  
Shade the set  $K \cap (M \cup L)'$ .

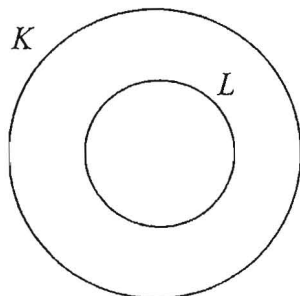
Gambar rajah Venn di ruang jawapan menunjukkan set  $K$ ,  $L$  dan  $M$  dengan keadaan set semesta,  $\xi = K \cup L \cup M$ .

Lorek set  $K \cap (M \cup L)'$ .

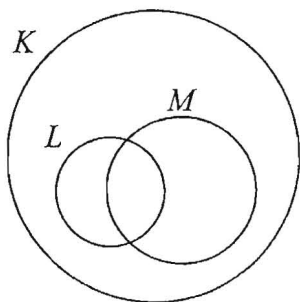
[3 marks]  
[3 markah]

Answer/Jawapan:

(a)



(b)



For  
Examiner's  
Use

2

Diagram 2 shows a cuboid with a rectangular base  $PQRS$  on a horizontal plane.

Rajah 2 menunjukkan sebuah kuboid dengan tapak segi empat tepat  $PQRS$  di atas satah mengufuk.

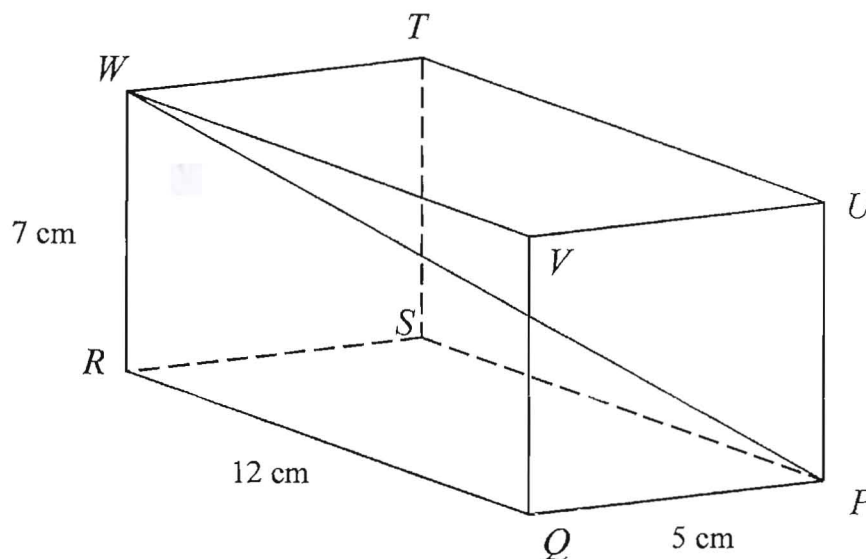


Diagram 2  
Rajah 2

(a) Name the angle between the line  $WP$  and the plane  $PQRS$ .

Namakan sudut di antara garis  $WP$  dengan satah  $PQRS$ .

(b) Calculate the angle between the line  $WP$  and the plane  $PQRS$ .

Hitung sudut di antara garis  $WP$  dengan satah  $PQRS$ .

[3 marks]  
[3 markah]

Answer/ Jawapan:

(a)

(b)

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For  
Examiner's  
Use

- 3 Solve the following quadratic equation :  
*Selesaikan persamaan kuadratik berikut :*

$$\frac{3x(x+6)}{5} = x - 2.$$

[4 marks]  
[4 markah]

Answer / Jawapan:

- 4 Calculate the value of  $x$  and of  $y$  that satisfy the following simultaneous linear equations:

*Hitung nilai  $x$  dan nilai  $y$  yang memuaskan persamaan linear serentak berikut:*

$$\begin{aligned}x - 4y &= 4 \\ 3x - 8y &= 10\end{aligned}$$

[4 marks]  
[4 markah]

Answer/Jawapan:

For  
Examiner's  
Use

5

Diagram 5 shows a plastic pool in the form of a solid right cylinder. Normah fills in the water into the pool so that her children can swim in it. After her children finished swimming, the remaining water in the plastic pool is 70% of the original volume of water.

Rajah 5 menunjukkan sebuah kolam plastik, berbentuk pepejal silinder tegak. Normah mengisi air ke dalam kolam itu agar anak-anaknya boleh berenang di dalamnya. Selepas anak-anaknya selesai berenang, baki air yang tinggal dalam kolam tersebut ialah 70% daripada isipadu air asal.

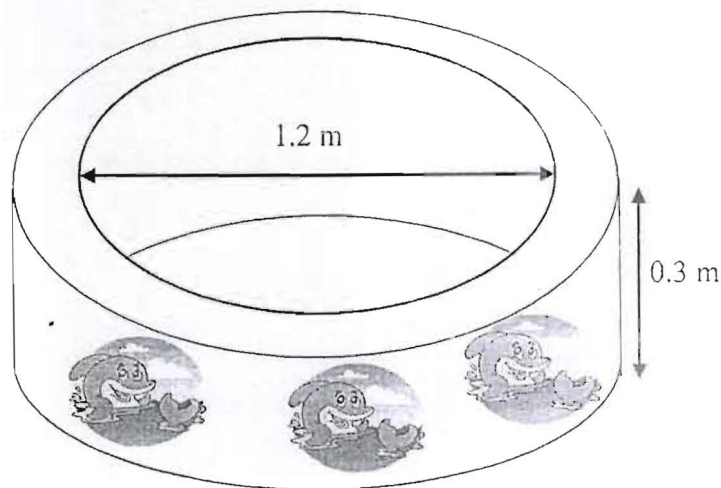


Diagram 5  
Rajah 5

Calculate the volume, in  $\text{m}^3$ , of water that was spilling out of the pool.

Hitungkan isipadu, dalam  $\text{m}^3$ , air yang telah melimpah keluar daripada kolam itu.

[4 marks]

[4 markah]

Answer / *Jawapan*:

*For  
Examiner's  
Use*



For  
Examiner's  
Use

6

- (a) State whether the following compound statement is true or false.  
*Nyatakan sama ada pernyataan majmuk berikut adalah benar atau palsu.*

$\frac{1}{64^3} = 16 \text{ and } (-4) \times (-3) = 12$ $\frac{1}{64^3} = 16 \text{ dan } (-4) \times (-3) = 12$
---

- (b) Write down two implications based on the following compound statement:  
*Tulis dua implikasi berdasarkan pernyataan majmuk berikut:*

$$"q^3 = -27 \text{ if and only if } q = -3".$$

$$"q^3 = -27 \text{ jika dan hanya jika } q = -3".$$

- (c) It is given that the sum of the interior angles of a polygon of  $n$  sides is  $(n-2) \times 180^\circ$ .  
Make **one** conclusion by deduction for the sum of the interior angles of a heptagon.

*Diberi bahawa jumlah sudut pedalaman sebuah poligon dengan  $n$  sisi ialah  $(n-2) \times 180^\circ$ .*

*Buat **satu** kesimpulan secara deduksi untuk jumlah sudut pedalaman sebuah heptagon.*

[5 marks]

[5 markah]

Answer / Jawapan:

(a) .....

(b) Implication I / Implikasi I .....

.....

Implication II / Implikasi II .....

.....

(c) .....

[Lihat halaman sebelah  
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- 7 In Diagram 7,  $OPQR$  is a trapezium drawn on a Cartesian plane.  $O$  is the origin.  $QR$  is parallel to the  $x$ -axis and  $OR$  is parallel to  $PQ$ . The equation of the straight line  $OR$  is  $y = \frac{2}{3}x$ .

For  
Examiner's  
Use

Dalam Rajah 7,  $OPQR$  ialah sebuah trapezium yang dilukis pada suatu satah Cartesian.  $O$  ialah asalan.  $QR$  adalah selari dengan paksi- $x$  dan  $OR$  adalah selari dengan  $PQ$ . Persamaan garis lurus  $OR$  ialah  $y = \frac{2}{3}x$ .

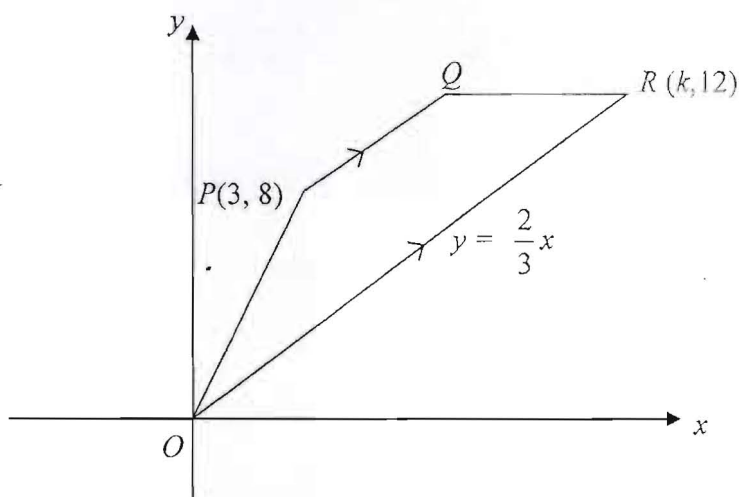


Diagram 7  
Rajah 7

- (a) Find the value of  $k$ ,  
Cari nilai  $k$ ,
- (b) Find the equation of the straight line  $PQ$ , hence find the  $x$ -intercept of  $PQ$ .  
Cari persamaan garis lurus  $PQ$ , seterusnya cari pintasan- $x$  bagi  $PQ$ .

[6 marks]  
[6 markah]

Answer / Jawapan:

(a)

(b)

For  
Examiner's  
Use

8

Diagram 8 shows a speed-time graph for the movement of a particle for a period of 50 seconds.

Rajah 8 menunjukkan graf laju-masa bagi pergerakan suatu zarah dalam tempoh 50 saat.

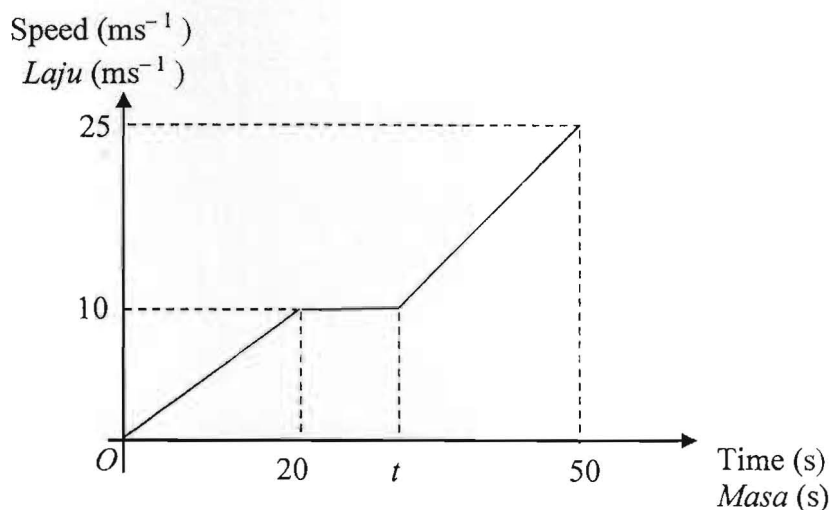


Diagram 8  
Rajah 8

Given that the distance travelled by the particle with uniform speed is 120 m.  
Diberi jarak yang dilalui oleh zarah itu dengan laju seragam ialah 120 m.

- (a) Calculate the value of  $t$ .  
Hitungkan nilai  $t$ .
- (b) Calculate the rate of change of speed, in  $\text{ms}^{-2}$ , of the particle in the first 20 seconds.  
Hitung kadar perubahan laju, dalam  $\text{ms}^{-2}$ , zarah itu dalam 20 saat yang pertama.
- (c) Calculate in m, the distance travelled by the particle for the period of 50 seconds.  
Hitung dalam m, jarak yang dilalui oleh zarah itu dalam tempoh 50 saat.

[6 marks]  
[6 markah]

Answer / Jawapan:

(a)

(b)

(c)

For  
Examiner's  
Use

9

Diagram 9 shows two sectors  $OAB$  and  $OCDE$ , with common centre  $O$ .  $OFE$  is a semicircle with centre  $G$  and  $OE = 2AO$ .  $AOE$  and  $OBC$  are straight lines.

Rajah 9 menunjukkan dua sektor bulatan  $OAB$  dan  $OCDE$ , dengan pusat sepunya  $O$ .  $OFE$  ialah semibulatan berpusat  $G$  dan  $OE = 2AO$ .  $AOE$  dan  $OBC$  ialah garis lurus.

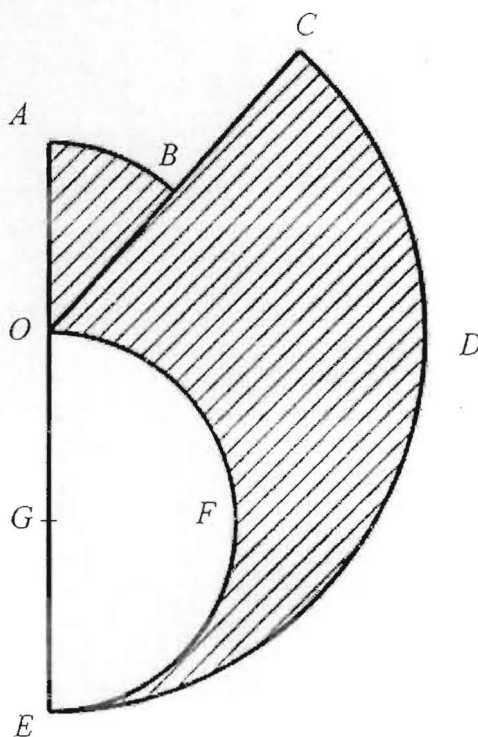


Diagram 9  
Rajah 9

$AO = 7$  cm and  $\angle AOB = 42^\circ$ .

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

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

- the perimeter, in cm, of the whole diagram,  
perimeter, dalam cm, seluruh rajah itu,
- the area, in  $\text{cm}^2$ , of the shaded region.  
luas, dalam  $\text{cm}^2$ , kawasan yang berlorek.

[6 marks]  
[6 markah]



Answer / Jawapan:

For  
Examiner's  
Use

(a)

(b)

For  
Examiner's  
Use

10

Diagram 10 shows five cards labelled with numbers.

*Rajah 10 menunjukkan lima kad yang berlabel dengan nombor.*



Diagram 10

*Rajah 10*

All these cards are put into a box. A number is to be formed by using any two of these cards. Two cards are picked at random, one after another, without replacement.

*Kesemua kad itu dimasukkan ke dalam sebuah kotak. Suatu nombor hendak dibentuk menggunakan mana-mana dua daripada kad ini. Dua kad dipilih secara rawak, satu persatu, tanpa dikembalikan.*

(a) List the sample space.

*Senaraikan ruang sampel.*

(b) List all the outcomes of the events and find the probability that

*Senaraikan semua kesudahan peristiwa dan cari kebarangkalian bahawa*

(i) the sum of two numbers drawn are odd numbers.

*hasil tambah dua nombor dipilih adalah nombor ganjil.*

(ii) the combined of a two numbers are formed with a number digit tens greater than digit units or perfect square number.

*gabungan dua nombor dibentuk dengan nombor digit puluh lebih besar dari digit sa atau nombor kuasa dua sempurna.*

[5 marks]

[5 markah]

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Answer / Jawapan:

For  
Examiner's  
Use

(a)

(b) (i)

(ii)

For  
Examiner's  
Use

11

- (a) Given  $\frac{1}{t} \begin{pmatrix} 2 & 4 \\ s & 3 \end{pmatrix} \begin{pmatrix} 3 & -4 \\ -1 & 2 \end{pmatrix} = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$ , find the value of  $s$  and of  $t$ .

Diberi  $\frac{1}{t} \begin{pmatrix} 2 & 4 \\ s & 3 \end{pmatrix} \begin{pmatrix} 3 & -4 \\ -1 & 2 \end{pmatrix} = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$ , cari nilai  $s$  dan nilai  $t$ .

- (b) Write the following simultaneous linear equation as a matrix form:  
*Tulis persamaan linear serentak berikut dalam bentuk matriks:*

$$5x - 2y = 4$$

$$6x - 3y = 3$$

Hence, using matrix method, calculate the value of  $x$  and of  $y$ .

*Seterusnya, menggunakan kaedah matrik, hitung nilai  $x$  dan nilai  $y$ .*

[6 marks]

[6 markah]

Answer / Jawapan:

(a)

(b)

[Lihat halaman sebelah  
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Section B  
Bahagian B

[48 marks]

[48 markah]

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

- 12 (a) Complete Table 1 in the answer space for the equation  $y = -x^3 + 1$ , by writing down the values of  $y$  when  $x = -2$ ,  $x = 0.5$  and  $x = 2$

Lengkapkan Jadual 1 di ruang jawapan bagi persamaan  $y = -x^3 + 1$ , dengan menulis nilai-nilai  $y$  apabila  $x = -2$ ,  $x = 0.5$  dan  $x = 2$

[3 marks]

[3 markah]

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

Untuk ceraihan soalan ini, gunakan kertas graf yang disediakan.  
Anda boleh menggunakan pembaris fleksibel.

By using a scale of 2 cm to 1 unit on the  $x$ -axis and 2 cm to 5 units on the  $y$ -axis, draw the graph of  $y = -x^3 + 1$  for  $-3 \leq x \leq 3$ .

Dengan menggunakan skala 2 cm kepada 1 unit pada paksi- $x$  dan 2 cm kepada 5 unit pada paksi- $y$ , lukiskan graf  $y = -x^3 + 1$  bagi  $-3 \leq x \leq 3$ .

[4 marks]

[4 markah]

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

- (i) the value of  $y$  when  $x = -1.5$ ,  
nilai  $y$  apabila  $x = -1.5$ ,

- (ii) the value of  $x$  when  $y = 13$ ,  
nilai  $x$  apabila  $y = 13$ ,

[2 marks]

[2 markah]

- (d) On the graph in 12(b), draw a straight line  $y = -5x$  and shade the region which satisfy the two inequalities  $y \leq -x^3 + 1$  and  $y > -5x$ .

Pada graph di 12(b), lukis garis lurus  $y = -5x$  dan lorekkan rantau yang memuaskan kedua-dua ketaksamaan  $y \leq -x^3 + 1$  dan  $y > -5x$ .

[3 marks]

[3 markah]



For  
Examiner's  
Use

Answer/Jawapan:

(a)  $y = -x^3 + 1$

$x$	-3	-2	-1	0	0.5	1	$2\frac{1}{2}$	3
$y$	28		2	1		0		-26

Table 1 / Jadual 1

(b) Refer graph on page 21 .

*Rujuk graf di halaman 21 .*

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

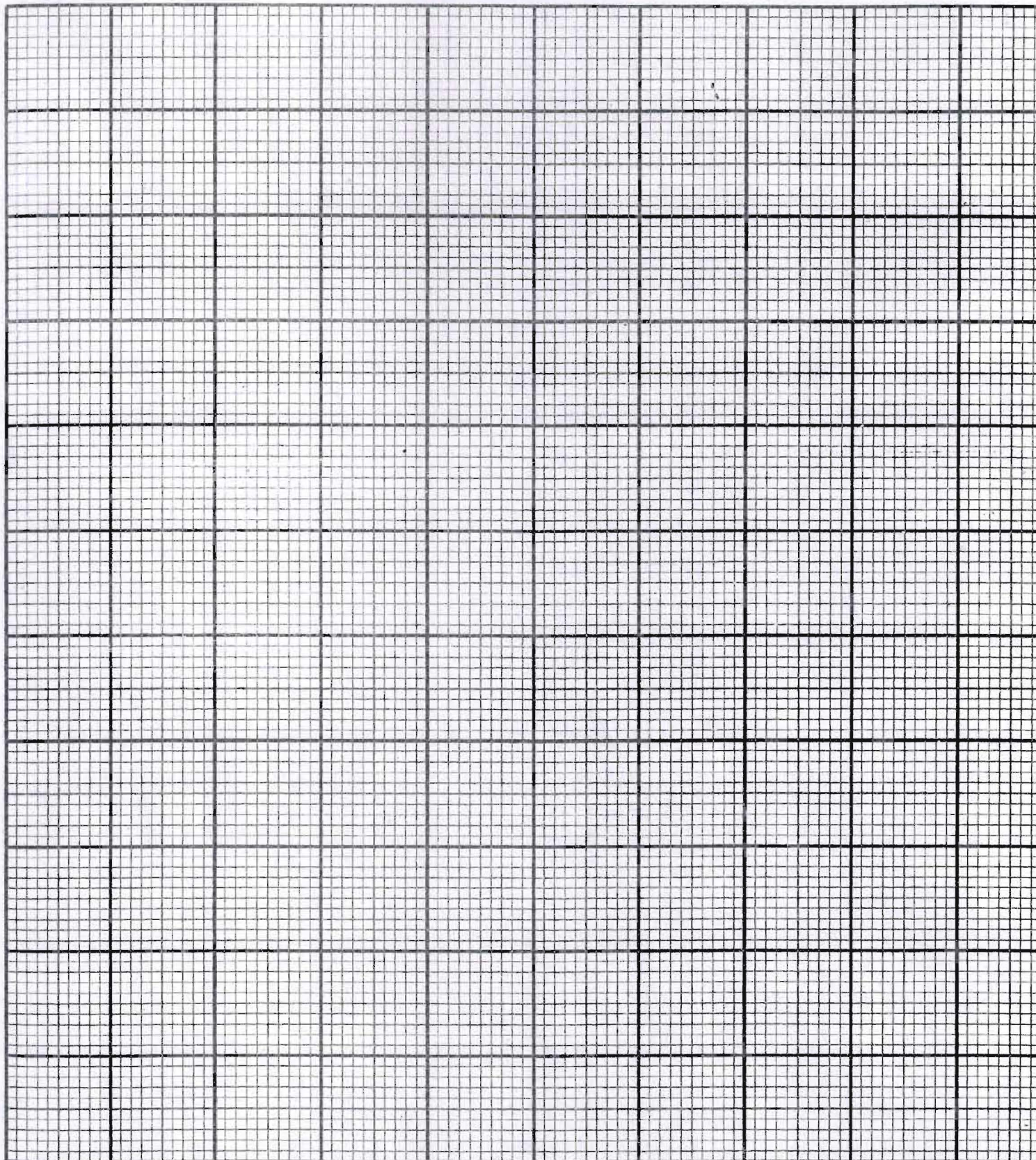
(ii)  $x = \dots\dots\dots$

(d) Refer graph on page 21 .

*Rujuk graf di halaman 21 .*



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





For  
Examiner's  
Use

- 13 Diagram 13.1 shows the point  $K(7, 5)$  drawn on a Cartesian plane.

Rajah 13.1 menunjukkan titik  $K(7, 5)$  dilukis pada suatu satah Cartesan.

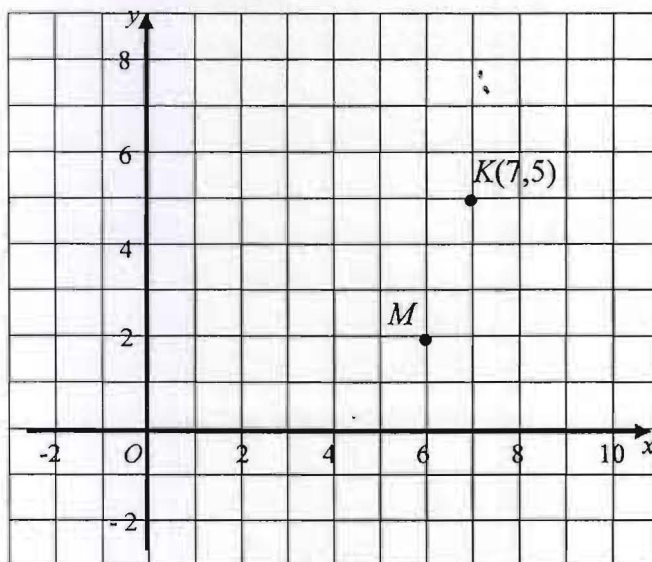


Diagram 13.1

Rajah 13.1

- (a) Transformation **T** is a translation  $\begin{pmatrix} -5 \\ -2 \end{pmatrix}$ .

Transformation **R** is a clockwise rotation of  $90^\circ$  about the centre  $M$ .  
State the coordinates of the image of point  $K(7, 5)$  under the following transformations :

Penjelmaan **T** ialah translasi  $\begin{pmatrix} -5 \\ -2 \end{pmatrix}$ .

Penjelmaan **R** ialah satu putaran  $90^\circ$  ikut arah jam pada pusat  $M$ .

Nyatakan koordinat imej bagi titik  $K(7, 5)$  di bawah penjelmaan berikut :

(i)  $T^2$ ,

(ii)  $TR$ .

[4 marks]  
[4 markah]

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Answer/ jawapan:

For  
Examiner's  
Use

(a) (i)

(ii)

For  
Examiner's  
Use

- (b) Diagram 13.2 shows two pentagons,  $ABCDE$  and  $PQRST$  drawn on square grids.

Rajah 13.2 menunjukkan dua pentagon,  $ABCDE$  dan  $PQRST$  dilukis pada grid segi empat sama.

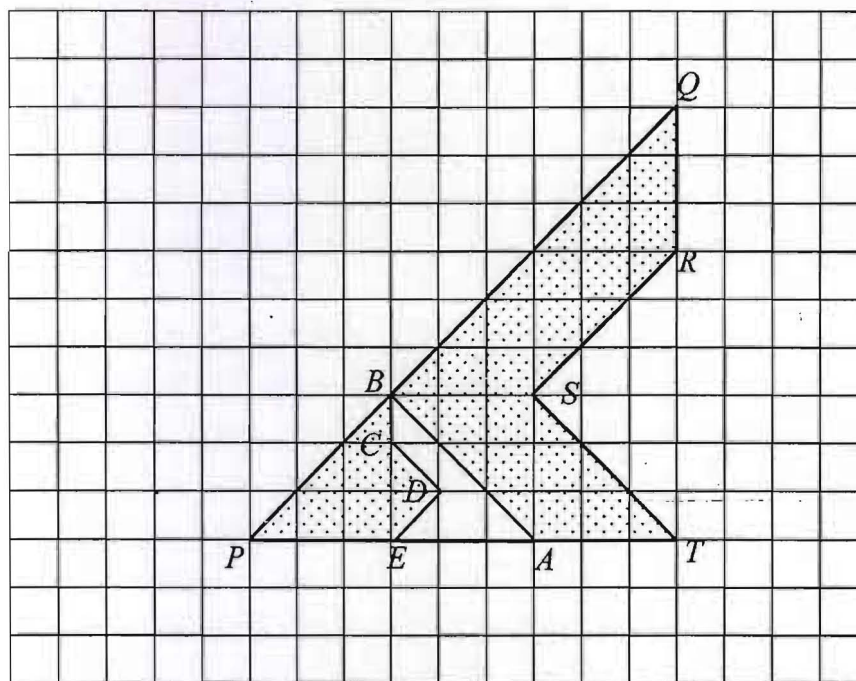


Diagram 13.2

Rajah 13.2

- (i)  $PQRST$  is the image of  $ABCDE$  under the combined transformation  $WV$ .  
 $PQRST$  ialah imej bagi  $ABCDE$  di bawah gabungan penjelmaan  $WV$ .

Describe in full, the transformation :

Huraikan selengkapnya penjelmaan :

- (a)  $V$   
(b)  $W$

- (ii) It is given that pentagon  $ABCDE$  represents a region of area  $35\text{m}^2$ .  
Calculate the area, in  $\text{m}^2$ , of the shaded region.

Diberi bahawa pentagon  $ABCDE$  mewakili suatu kawasan yang mempunyai luas  $35\text{ m}^2$ .

Hitung luas, dalam  $\text{m}^2$ , kawasan yang berlorek.

[8 marks]

[8 markah]

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Answer / Jawapan:

For  
Examiner's  
Use

(b) (i) (a)  $V$  : .....

.....

(b)  $W$  : .....

.....

(ii)

For  
Examiner's  
Use

- 14 Diagram 14 shows the age distribution, in year of 40 outpatients visiting the specialist doctor in a hospital.  
*Rajah 14 menunjukkan taburan umur, dalam tahun bagi 40 pesakit luar yang berjumpa doktor pakar di sebuah hospital.*

84	66	25	74	36	67	34	60
55	63	81	21	45	51	65	45
28	68	51	49	53	41	74	37
62	46	32	71	52	38	71	83
54	76	43	59	72	58	86	61

Diagram 14  
*Rajah 14*

- (a) Based on the data in diagram 14, complete Table 14 in the answer space.  
[4 marks]  
*Berdasarkan data dalam Rajah 14, lengkapkan Jadual 14 di ruang jawapan.*  
[4 markah]
- (b) Based on Table 14, calculate the estimated mean for the age of an outpatient.  
[3 marks]  
*Berdasarkan Jadual 14, hitung min anggaran umur bagi seorang pesakit luar.*  
[3 markah]
- (c) For this part of the question, use the graph paper provided on page 29.  
*Untuk ceraian soalan ini, gunakan kertas graf yang disediakan di halaman 29.*  
By using the scale of 2 cm to 10 years of age on the horizontal axis and 2 cm to 1 outpatient on the vertical axis, draw a histogram for the data.  
[4 marks]  
*Dengan menggunakan skala 2 cm kepada umur 10 tahun pada paksi mengufuk dan 2 cm kepada 1 pesakit luar pada paksi mencancang, lukis satu histogram bagi data tersebut.*  
[4 markah]
- (d) Medication is given at a 20% discount price by the hospital to outpatients above 60 years of age. Using the histogram in 14 (c), state the number of outpatients who received medication at a discounted price from the hospital.  
[1 mark]  
*Rawatan dengan potongan harga 20% diberi oleh sebuah hospital kepada pesakit luar yang berumur 60 tahun ke atas. Menggunakan histogram di 14 (c), nyatakan bilangan pesakit luar yang menerima rawatan dengan potongan harga daripada pihak hospital.*  
[1 markah]

[Lihat halaman sebelah  
SULIT

Answer / Jawapan:

For  
Examiner's  
Use

(a)

Age (year) <i>Umur (tahun)</i>	Frequency <i>Kekerapan</i>	Midpoint <i>Titik tengah</i>
21 – 30		

Table 14  
*Jadual 14*

(b)

(c) Refer graph on page 29.

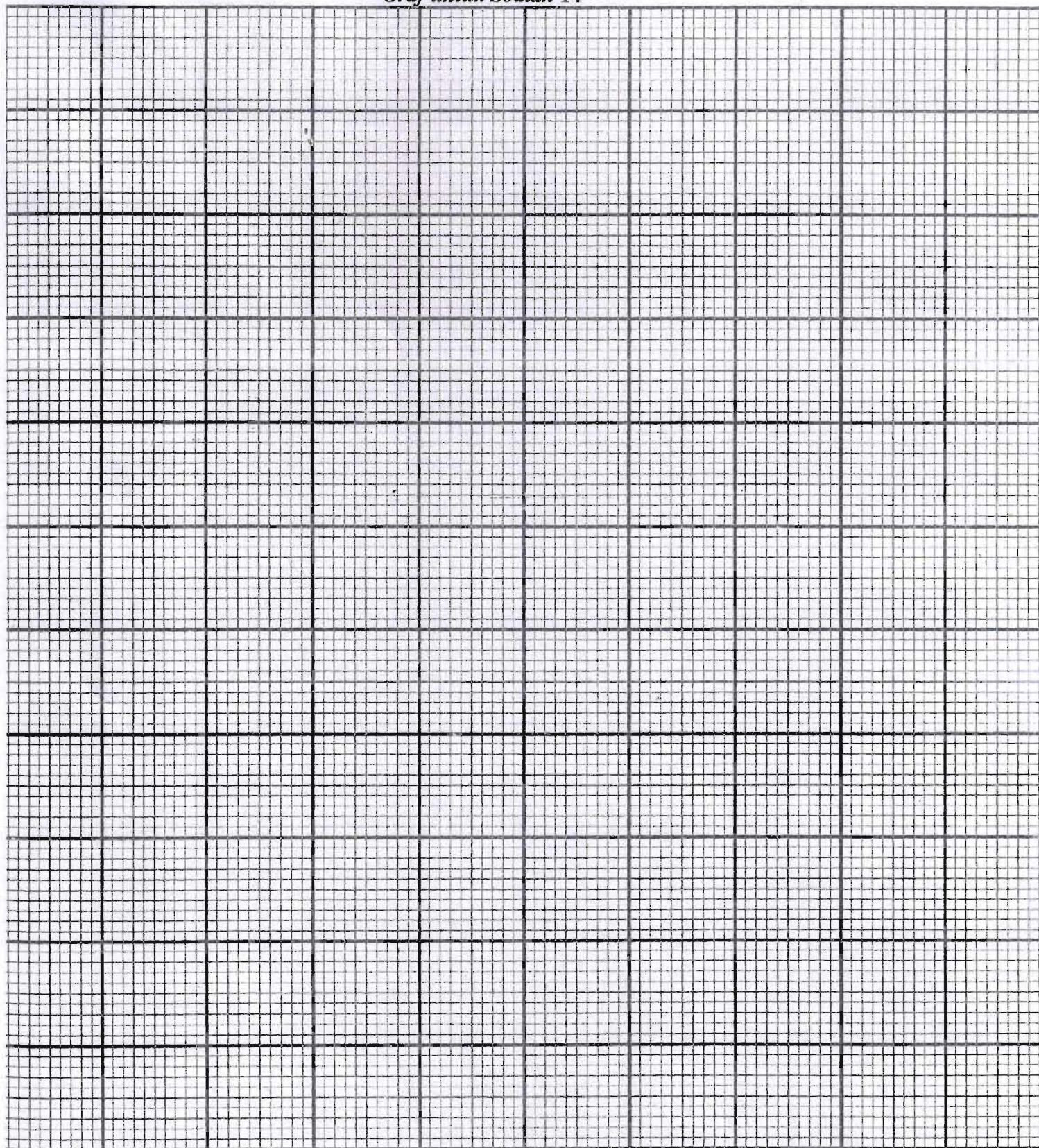
*Rujuk graf di halaman 29.*

(d)

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***HALAMAN KOSONG***



**Graph for Question 14**  
*Graf untuk Soalan 14*





For  
Examiner's  
Use

- 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 15.1 shows a solid right prism with a rectangular base  $KLMN$  on a horizontal plane. The plane  $PSMN$  is the uniform cross-section of the prism.  $PN$  and  $SM$  are vertical edges. Rectangular  $PQRS$  is an inclined plane.  $SM = 6$  cm.

*Rajah 15.1 menunjukkan sebuah pepejal berbentuk prisma tegak dengan tapak segi empat tepat  $KLMN$  terletak di atas satah mengufuk. Satah  $PSMN$  ialah keratan rentas seragam prisma itu. Tepi  $PN$  dan  $SM$  adalah sisi tegak. Segi empat tepat  $PQRS$  ialah satah condong.  $SM = 6$  cm.*

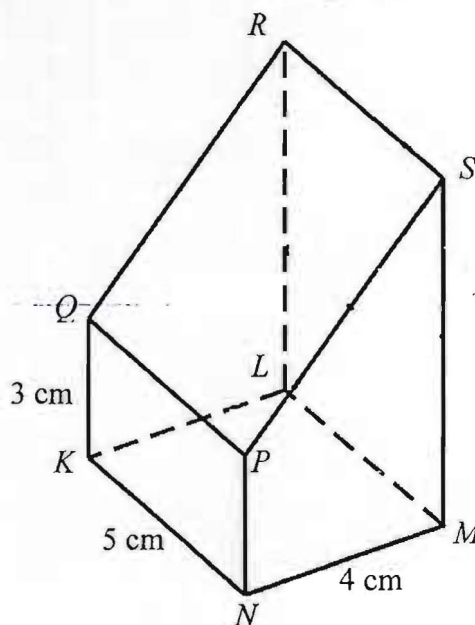


Diagram 15.1  
Rajah 15.1

- (a) Draw to full scale, the plan of the solid.

*Lukis dengan skala penuh, pelan pepejal itu.*

[3 marks]  
[3 markah]

[Lihat halaman sebelah  
SULIT

Answer / Jawapan :

(a)



For  
Examiner's  
Use

- (b) Another solid right prism with right angled triangle  $AMB$  as the uniform cross-section is joined to the prism in Diagram 15.1 at the vertical plane  $MLCB$ . The composite solid is shown in Diagram 15.2. The base  $KLDAMN$  is on a horizontal plane and rectangle  $ABCD$  is an inclined plane.  $MB = 4$  cm.

Sebuah pepejal lain berbentuk prisma tegak dengan segi tiga bersudut tegak  $AMB$  sebagai keratan rentas seragamnya dicantumkan kepada prisma dalam Rajah 15.1 pada satah mencancang  $MLCB$ . Gabungan pepejal adalah seperti yang ditunjukkan dalam Rajah 15.2. Tapak  $KLDAMN$  terletak di atas satah mengufuk dan segi empat tepat  $ABCD$  ialah satah condong.  $MB = 4$  cm.

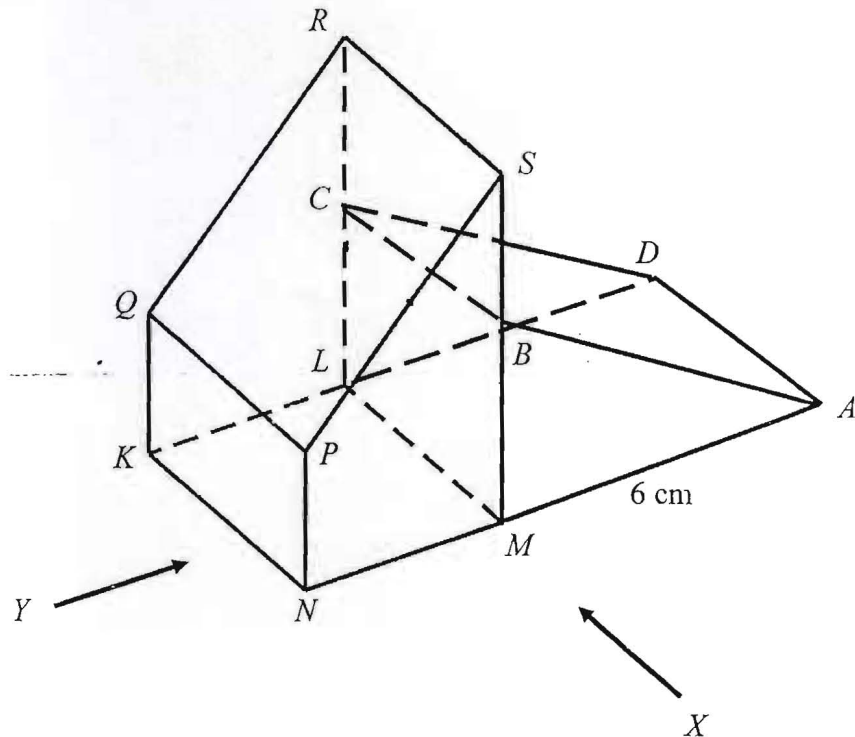


Diagram 15.2  
Rajah 15.2

Draw to full scale,

Lukiskan dengan skala penuh,

- (i) the elevation of the combined solid on a vertical plane parallel to  $NMA$  as viewed from  $X$ .

dongakan gabungan pepejal itu pada satah mencancang yang selari dengan  $NMA$  sebagaimana dilihat dari  $X$ .

[4 marks]

[4 markah]

- (ii) the elevation of the combined solid on a vertical plane parallel to  $KN$  as viewed from  $Y$ .

dongakan gabungan pepejal itu pada satah mencancang yang selari dengan  $KN$  sebagaimana dilihat dari  $Y$ .

[5 marks]

[5 markah]

[Lihat halaman sebelah  
SULIT

Answer / Jawapan :

(b) (i)

(ii)

For  
Examiner's  
Use

- 16 (a)  $A$  ( $55^\circ \text{N}$ ,  $115^\circ \text{W}$ ),  $C$  ( $55^\circ \text{N}$ ,  $85^\circ \text{W}$ ),  $D$  and  $P$  are four points on the surface of the earth.  $AD$  is the diameter of the parallel of latitude  $55^\circ \text{N}$ .

$A$  ( $55^\circ \text{U}$ ,  $115^\circ \text{B}$ ),  $C$  ( $55^\circ \text{U}$ ,  $85^\circ \text{B}$ ),  $D$  dan  $P$  ialah empat titik pada permukaan bumi.  $AD$  ialah diameter selarian latitud  $55^\circ \text{U}$ .

- (i) State the location of point  $D$ . [2 marks]

Nyatakan kedudukan bagi titik  $D$ . [2 markah]

- (ii) Calculate the shortest distance, in nautical miles, from  $A$  to  $D$  measured along the surface of the earth. [2 marks]

Hitung jarak terpendek, dalam batu nautika, dari  $A$  ke  $D$  diukur sepanjang permukaan bumi. [2 markah]

- (b)  $P$  lies to the south of  $C$  and the distance of  $PC$  measured along the surface of the earth is 6 000 nautical miles. Calculate the latitude of  $P$ . [3 marks]

$P$  terletak ke selatan  $C$  dan jarak  $PC$  diukur sepanjang permukaan bumi ialah 6 000 batu nautika. Hitung latitud  $P$ . [3 markah]

- (c) An aeroplane took off from  $A$  and flew due east to  $C$  and then due south to  $P$ . The average speed for the whole journey was 690 knots.

Sebuah kapal terbang berlepas dari  $A$  dan terbang arah timur ke  $C$  dan kemudian terbang arah selatan ke  $P$ . Purata laju seluruh penerbangan ialah 690 knot.

Calculate  
Hitungkan

- (i) the distance, in nautical miles, travelled by the aeroplane from  $A$  to  $C$  measured along the common parallel of latitude.

jarak, dalam batu nautika, yang dilalui oleh kapal terbang itu dari  $A$  ke  $C$  diukur sepanjang selarian latitud sepunya. [5 marks]

- (ii) the time taken, in hour, for the whole flight.

masa, dalam jam, yang diambil bagi seluruh penerbangan itu.

[5 markah]

[Lihat halaman sebelah  
SULIT

Answer / Jawapan:

(a) (i)

(ii)

(b)

(c) (i)

(ii)

For  
Examiner's  
Use

**END OF QUESTION PAPER**  
**KERTAS SOALAN TAMAT**

**INFORMATION FOR CANDIDATES**  
**MAKLUMAT UNTUK CALON**

1. This question paper consists of two sections: **Section A** and **Section B**.  
*Kertas soalan ini mengandungi dua bahagian: **Bahagian A** dan **Bahagian B**.*
2. Answer **all** questions in **Section A** and **four** questions from **Section B**.  
*Jawab **semua** soalan dalam **Bahagian A** dan **empat** soalan daripada **Bahagian B**.*
3. Write your answers clearly in the spaces provided in the question paper.  
*Jawapan anda hendaklah ditulis pada ruang yang disediakan dalam kertas soalan ini.*
4. Show your working. It may help you to get marks.  
*Tunjukkan kerja mengira anda. Ini boleh membantu anda untuk mendapatkan markah.*
5. If you wish to change your answer, neatly cross out the answer that you have done. Then write down the new answer.  
*Jika anda hendak menukar jawapan, batalkan jawapan yang telah dibuat. Kemudian tulis jawapan yang baru.*
6. The diagrams in the questions provided are not drawn to scale unless stated.  
*Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.*
7. The marks allocated for each question and sub-part of a question are shown in brackets.  
*Markah yang diperuntukkan bagi setiap soalan dan ceraian soalan ditunjukkan dalam kurungan.*
8. A list of formulae is provided on pages 2 to 4.  
*Satu senarai rumus disediakan di halaman 2 hingga 4.*
9. You may use a non-programmable scientific calculator.  
*Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogramkan.*
10. Hand in this question paper to the invigilator at the end of the examination.  
*Serahkan kertas soalan ini kepada pengawas peperiksaan pada akhir peperiksaan.*



1449/2  
Matematik  
Kertas 2  
2014



**MAJLIS PENGETUA SEKOLAH MENENGAH MALAYSIA  
CAWANGAN NEGERI SEMBILAN**

**PROGRAM PENINGKATAN AKADEMIK TINGKATAN LIMA  
SEKOLAH-SEKOLAH MENENGAH NEGERI SEMBILAN 2014**

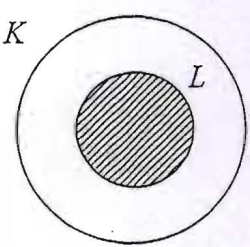
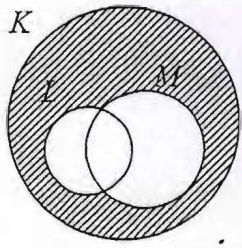
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**MATEMATIK**

Kertas 2

---

**PERATURAN PEMARKAHAN**

No	Marking Scheme	Marks
1 (a)		P1
(b)		P2
		3
2 (a)	$\angle WPR$ or $\angle RPW$	P1
(b)	$\tan \theta = \frac{7}{13}$ or equivalent $\theta = 28.30^\circ$ or $28^\circ 18'$	K1
		N1
		3
3	$3x^2 + 13x + 10 = 0$ $(3x + 10)(x + 1) = 0$ $x = \frac{-10}{3}, x = -1$	K1
		K1
		N1 N1
		4
4	$3x - 12y = 12$ or $2x - 8y = 8$ $4y = -2$ or $-\frac{1}{2}x = 2$ $x = 2$ $y = \frac{-1}{2}$	K1
		K1
		N1
		N1
		4



5	$\frac{22}{7} \times 0.6 \times 0.6 \times 0.3$	K1
	$\frac{70}{100} \times \frac{22}{7} \times 0.6 \times 0.6 \times 0.3$	K1
	$(\frac{22}{7} \times 0.6 \times 0.6 \times 0.3) - (\frac{70}{100} \times \frac{22}{7} \times 0.6 \times 0.6 \times 0.3)$	K1
	0.10	N1
		4
6 (a)	False	P1
(b)	If $q^3 = -27$ then $q = -3$ If $q = -3$ then $q^3 = -27$	K1 K1
(c)	$(7 - 2) \times 180^\circ$  $900^\circ$	K1 N1
		5
7 (a)	$k = 18$	K1
(b)	$8 = \frac{2}{3} \times 3 + c \quad \text{or} \quad c = 6$  $y = \frac{2}{3}x + 6$  $0 = \frac{2}{3}x + 6 \quad \text{or} \quad \frac{-2}{3}x = 6$  $x\text{-intercept} = -9$	K1K1  N1  K1  N1
		6

8	(a)	$10(t - 20) = 120$ $t = 32 \text{ s}$	K1 N1
	(b)	$\frac{10 - 0}{20 - 0}$ $\frac{1}{2} \text{ ms}^{-1}$	K1 N1
	(c)	$(\frac{1}{2} \times 10 \times 20) + 120 + \frac{1}{2}(10 + 25)18$ $535 \text{ m}$	K1 N1
			6
9	(a)	$\frac{138^\circ}{360^\circ} \times 2 \times \frac{22}{7} \times 14 \quad \text{or} \quad \frac{42^\circ}{360^\circ} \times 2 \times \frac{22}{7} \times 7$ $\frac{138^\circ}{360^\circ} \times 2 \times \frac{22}{7} \times 14 + (\frac{42^\circ}{360^\circ} \times 2 \times \frac{22}{7} \times 7) + 7 + 14 + 7$ $66\frac{13}{15}$	K1 K1 N1
	(b)	$\frac{138^\circ}{360^\circ} \times \frac{22}{7} \times 14 \times 14 \quad \text{or} \quad \frac{42^\circ}{360^\circ} \times \frac{22}{7} \times 7 \times 7$ $\frac{138^\circ}{360^\circ} \times \frac{22}{7} \times 14 \times 14 - (\frac{180}{360} \times \frac{22}{7} \times 7 \times 7) + \frac{42}{360} \times \frac{22}{7} \times 7 \times 7$ $177\frac{1}{10} \quad \text{or} \quad 177.099$	K1 K1 N1
			6

10 (a)	<table><tr><td></td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr><tr><td>1</td><td></td><td>1,2</td><td>1,3</td><td>1,4</td><td>1,5</td></tr><tr><td>2</td><td>2,1</td><td></td><td>2,3</td><td>2,4</td><td>2,5</td></tr><tr><td>3</td><td>3,1</td><td>3,2</td><td></td><td>3,4</td><td>3,5</td></tr><tr><td>4</td><td>4,1</td><td>4,2</td><td>4,3</td><td></td><td>4,5</td></tr><tr><td>5</td><td>5,1</td><td>5,2</td><td>5,3</td><td>5,4</td><td></td></tr></table> <p><math>S = \{ 12, 13, 14, 15, 21, 23, 24, 25, 31, 32, 34, 35, 41, 42, 43, 45, 51, 52, 53, 54 \}</math></p>		1	2	3	4	5	1		1,2	1,3	1,4	1,5	2	2,1		2,3	2,4	2,5	3	3,1	3,2		3,4	3,5	4	4,1	4,2	4,3		4,5	5	5,1	5,2	5,3	5,4		P1
	1	2	3	4	5																																	
1		1,2	1,3	1,4	1,5																																	
2	2,1		2,3	2,4	2,5																																	
3	3,1	3,2		3,4	3,5																																	
4	4,1	4,2	4,3		4,5																																	
5	5,1	5,2	5,3	5,4																																		
(b) (i)	<p><math>\{12, 14, 21, 23, 25, 32, 34, 41, 43, 45, 52, 54\}</math></p> <p><math>\frac{12}{20} = \frac{3}{5}</math></p>	K1																																				
(ii)	<p><math>\{ 21, 25, 31, 32, 41, 42, 43, 51, 52, 53, 54 \}</math></p> <p><math>\frac{11}{20}</math></p>	N1																																				
		K1																																				
		N1																																				
		5																																				
11 (a)	<p><math>s = 1</math> <math>t = 2</math></p>	P1 P1																																				
(b)	<p><math>\begin{pmatrix} 5 &amp; -2 \\ 6 &amp; -3 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 4 \\ 3 \end{pmatrix}</math></p> <p><math>\begin{pmatrix} x \\ y \end{pmatrix} = \frac{1}{5 \times (-3) - (-2 \times 6)} \begin{pmatrix} -3 &amp; 2 \\ -6 &amp; 5 \end{pmatrix} \begin{pmatrix} 4 \\ 3 \end{pmatrix}</math></p> <p><math>x = 2</math></p> <p><math>y = 3</math></p>	P1																																				
		K1																																				
		N1																																				
		N1																																				
		6																																				

12 (a)	<table><tr><td>x</td><td>-2</td><td>0.5</td><td>2</td></tr><tr><td>y</td><td>9</td><td>0.875</td><td>-7</td></tr></table>	x	-2	0.5	2	y	9	0.875	-7	K1K1K1
x	-2	0.5	2							
y	9	0.875	-7							
(b)	<p><b><u>Graph</u></b> ( Refer graph on Lampiran 1 )</p> <p>Axes drawn in the correct directions with uniform scales for <math>-3 \leq x \leq 3</math> and <math>-26 \leq y \leq 28</math></p> <p>All 8 points and *2 points correctly plotted <i>or</i> curve passes through all the points for <math>-3 \leq x \leq 3</math> and <math>-26 \leq y \leq 28</math></p> <p>A smooth and continuous curve without any straight line and passes through all 10 correct points using the given scale for <math>-3 \leq x \leq 3</math> and <math>-26 \leq y \leq 28</math></p> <p><u>Notes:</u></p> <ol style="list-style-type: none"><li>8 or 9 points correctly plotted, award K1</li><li>Ignore curve out of range</li></ol>	<p>P1</p> <p>K2</p> <p>N1</p>								
(c) (i)	$y = 4.4 \pm 0.1$	P1								
(ii)	$x = -2.3 \pm 0.1$	P1								
(d)	<p>Draw the straight line <math>y = -5x</math></p> <p>Shaded region correctly</p>	<p>K1</p> <p>N2</p>								
12										

13 (a)		
(i)	$(7,5) \xrightarrow{T} (2,3) \xrightarrow{T} (-3,1)$	P2
(ii)	$(7,5) \xrightarrow{R} (9,1) \xrightarrow{T} (4,-1)$	P2
(b) (i)	(a) V : Reflection in the line BE	P2
	(b) W : Enlargement of scale factor 3 with centre P	P3
(ii)	<i>Area of an image</i> $= 3^2 \times 35$	K1
	<i>Area Of The Shaded Region</i> $= (3^2 \times 35) - 35$	K1
	280	N1
		12



14 (a)

Class interval <i>Selang kelas (umur)</i>	Frequency <i>Kekerapan</i>	Midpoint <i>Titik tengah</i>
21 – 30	3	25.5
31 – 40	5	35.5
41 – 50	6	45.5
51 – 60	9	55.5
61 – 70	7	65.5
71 – 80	6	75.5
81 – 90	4	85.5

P1P2P1

Note:

Allow two mistakes in frequency for P1

(b)

$$\frac{*3 \times 25.5 + *5 \times 35.5 + *6 \times 45.5 + *9 \times 55.5 + *7 \times 65.5 + *6 \times 75.5 + *4 \times 85.5}{*3 + *5 + *6 + *9 + *7 + *6 + *4}$$

K2

$$\text{or } \frac{2280}{40}$$

57 year

N1

(c)

Histogram (Refer graph on Lampiran 2)

Axes are drawn in the correct direction , uniform scale for  $20.5 \leq x \leq 90.5$  and  $0 \leq y \leq 10$

P1

Horizontal axis is labelled using midpoint/ upper boundary and  
\*7 bars drawn correctly using mid point/upper boundry.

K2

Note : \*5 or \*6 bars drawn correctly, award K1

Correct histogram using the given scale for  $20.5 \leq x \leq 90.5$

N1

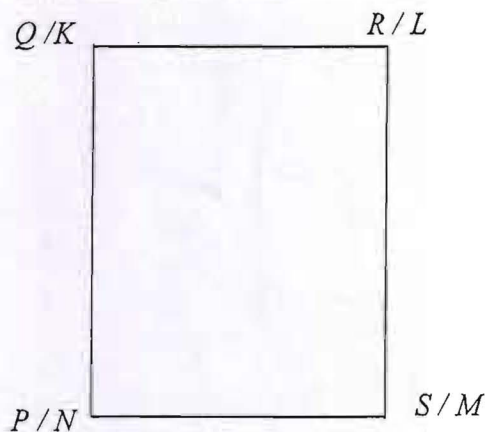
(d)

17 outpatients

N1

12

15 (a)



Correct shape with a rectangle  $NMLK$ .

$$NK = ML > KL = NM$$

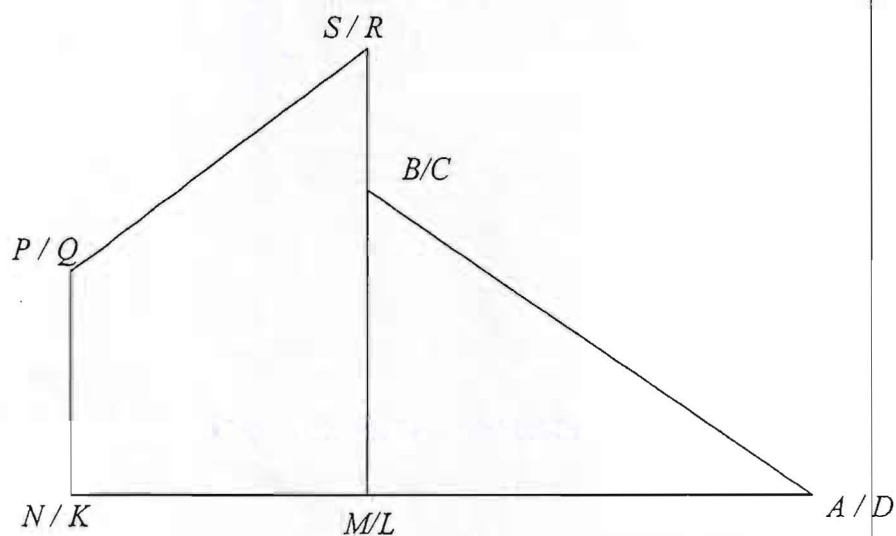
The measurement is accurate to  $\pm 0.2$  cm (one way ) and the angles at all vertices of the rectangles are  $90^\circ \pm 1^\circ$ .

K1

K1

N1

(b)(i)



Correct shape with trapeziums  $PSMN$  and triangle  $BAM$ .  
All solid lines

$$MS = MA > MB > NP$$

Measurements correct to  $\pm 0.2$  cm (one way ) and  
 $\angle N, \angle M = 90^\circ \pm 1^\circ$

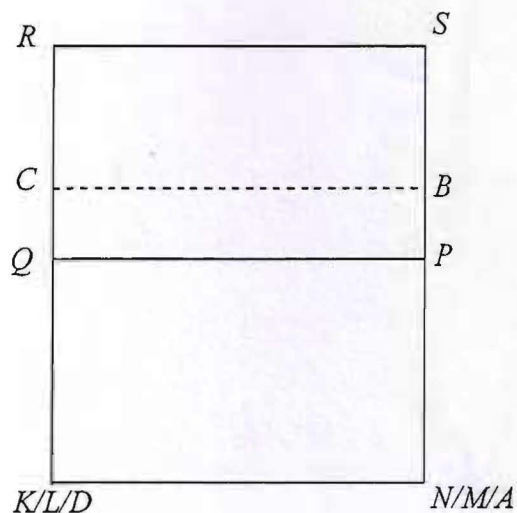
K1

K1

N2



15(b) (ii)



Correct shape two rectangles *KLPS* and *SPQR*

K1

Note:

*CB* joined with dotted line.

K1

$RL = SM > CB > CL = BM > QD = PN$

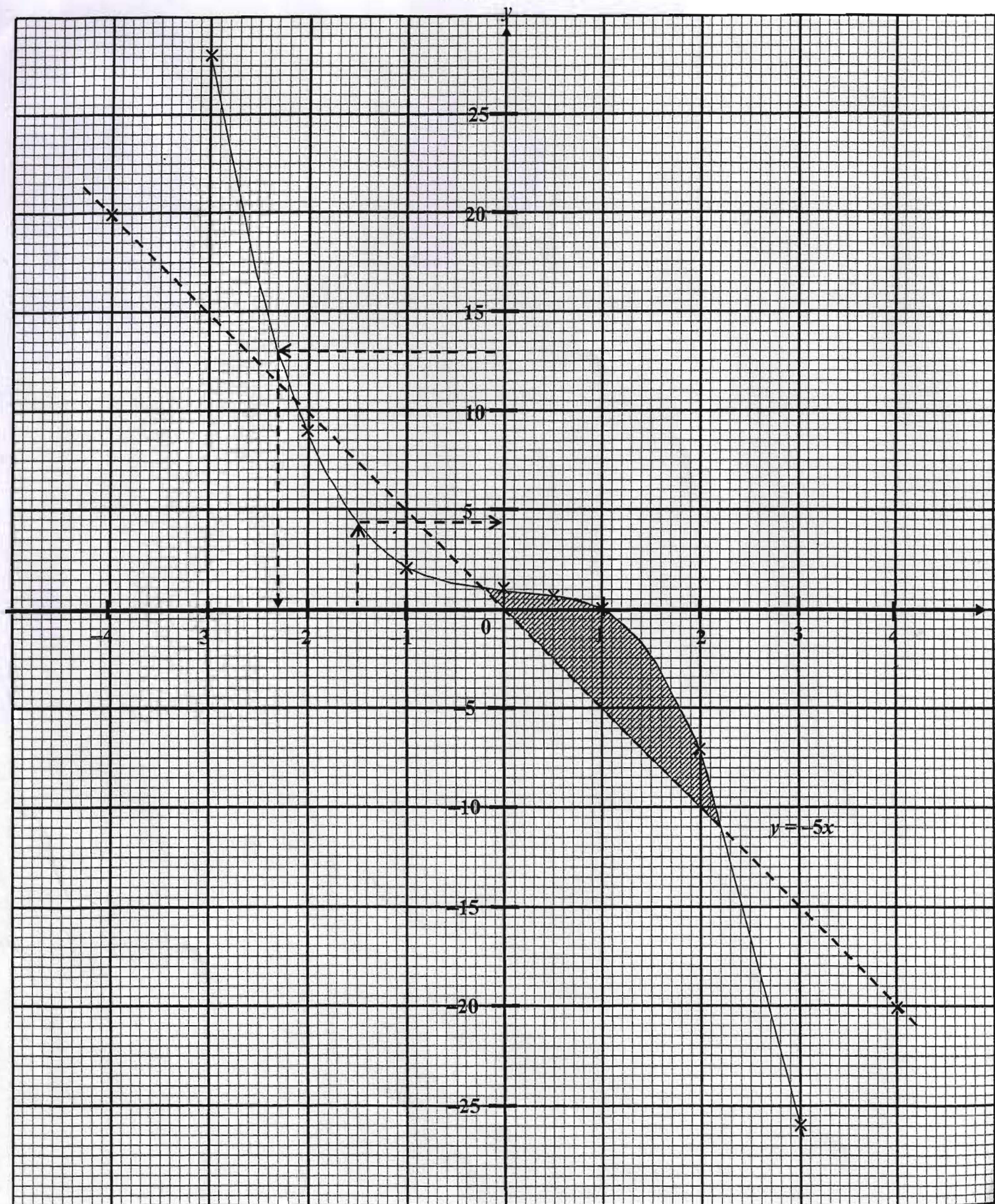
K1

Measurement correct to  $\pm 0.2$  cm. (one way ) and all angles at vertices of rectangles is  $90^\circ \pm 1^\circ$ .

N2

16		
(a) (i)	(55° N, 65° E)	P1P1
(ii)	70 × 60	K1
	4200 nautical miles	N1
(b)	$\theta \times 60 = 6000$	K1
	100 – 55	K1
	45 °S.	N1
(c) (i)	115° – 85°	K1
	$(115^\circ - 85^\circ) \times 60 \cos 55^\circ$	K1
	1032.44 nautical miles	N1
(ii)	$690 = \frac{1032.44 + 6000}{t} \quad \text{or} \quad \frac{1032.44 + 6000}{690}$	K1
	10.19 hours	N1
		12







Graph for Question 14

