

SECTION A

[52 marks]

Answer all question in this section

1. The Venn Diagram shows set P, Q and R. On the diagrams provided, shade the following related region:

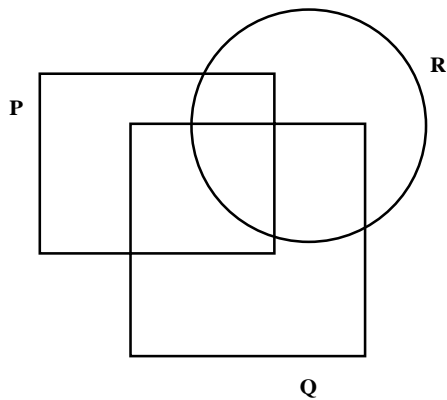
(a) $P \cap Q$

(b) $(P \cup Q)' \cap R$

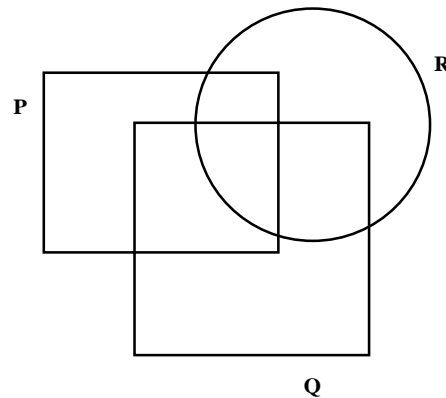
[3 marks]

Answer :

(a)



(b)



2. Solve the equation $(y - 4)^2 = 2y - 5$

[4 marks]

3. Calculate the values of x and y that satisfy the following simultaneous linear equations :

$$x + 2y = 6$$

$$\frac{3}{2}x - y = -7$$

[4 marks]

4. Diagram 1 shows two sector of circle ORQ and OPS with centre O .

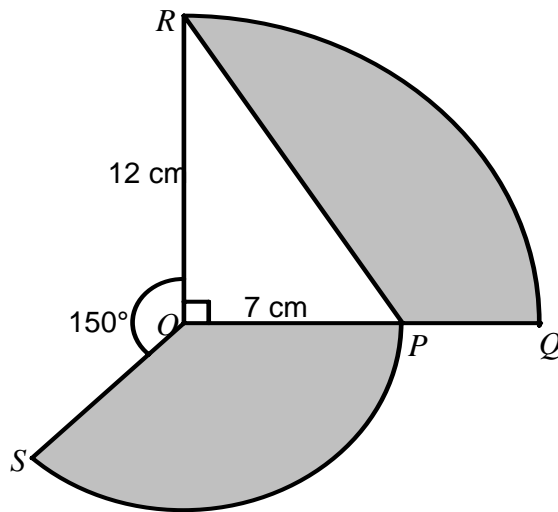


DIAGRAM 1

By using $\pi = \frac{22}{7}$, calculate

- (a) the perimeter for the whole diagram in cm,
- (b) area of the shaded region in cm^2 .

[6 marks]

5. . Diagram 2 shows a cuboid with $EH = 5 \text{ cm}$, $CH = 6 \text{ cm}$ and $BC = 12 \text{ cm}$.

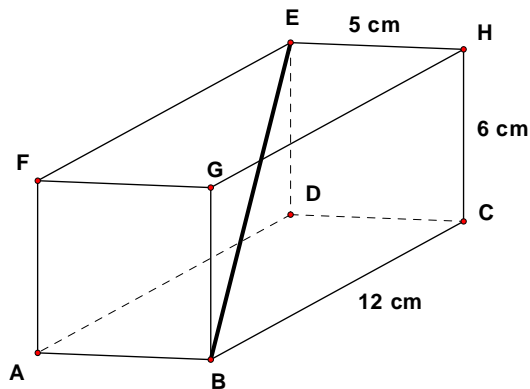


Diagram 2

Calculate the angle between the line BE and the base $ABCD$.

[4 marks]

6. a) Write two implications from the compound statements

$$y = x + 1 \text{ if and only if } x = y - 1$$

- b) Complete the following arguments

Premise 1: If p is an even number, then p is divisible by 2

Premise 2: 52 is an even number

Conclusion :

- c) Make a conclusion based on the number sequence below

Given a numerical sequence is 1, 4, 7, 10, ... and

$$1 = 1 + 3(0)$$

$$4 = 1 + 3(1)$$

$$7 = 1 + 3(2)$$

$$10 = 1 + 3(3)$$

[5 marks]

7. In Diagram 3, the graph shows that PQ, QR and the RS are straight lines. P is on the y-axis .
OP is parallel to QR and PQ is parallel to RS.

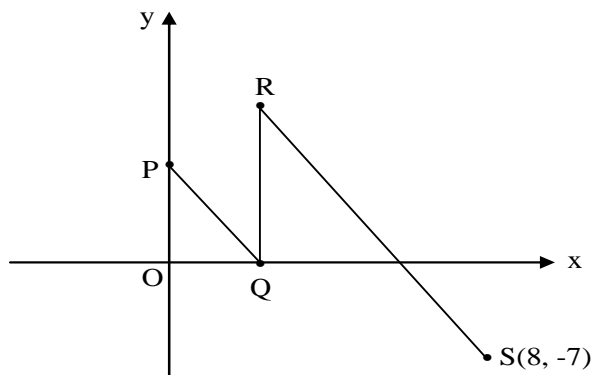


Diagram 3

The equation of PQ is $2x + y = 5$.

- a) State the equation of the straight line QR.
b) Find the equation of the straight line RS and hence, state its y-intercept. [5 marks]

8. Diagram 4 shows a solid formed by combining a right prism with a half cylinder on the rectangular plane DEFG.

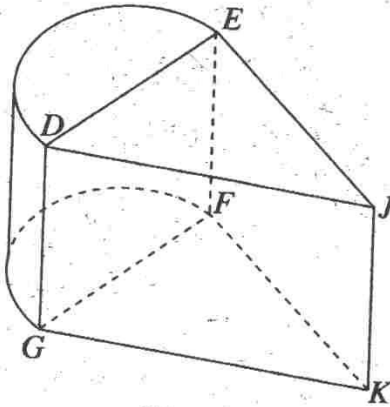


DIAGRAM 4

$DE = 14$ cm, $EJ = 8$ cm, $\angle DEJ = 90^\circ$ and the height of the prism is 6 cm. Calculate the volume, in cm^3 , of the solid. (Use $\pi = \frac{22}{7}$) [4 marks]

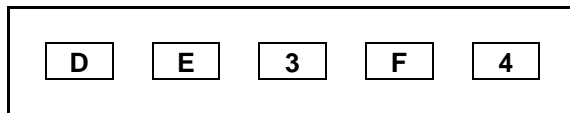
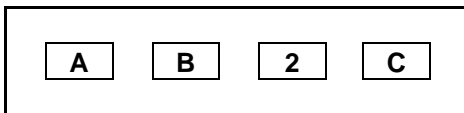
9. It is given that the matrix $P = \begin{pmatrix} 9 & -5 \\ -4 & 2 \end{pmatrix}$ and matrix $Q = \frac{1}{k} \begin{pmatrix} h & 5 \\ 4 & 9 \end{pmatrix}$ such that $PQ = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$

- (a) Find the value of k and of h .
- (b) Using matrices, calculate the value of x and y that satisfy the following simultaneous linear equations:

$$\begin{aligned} 9x - 5y &= -6 \\ -4x + 2y &= 2 \end{aligned}$$

[6 marks]

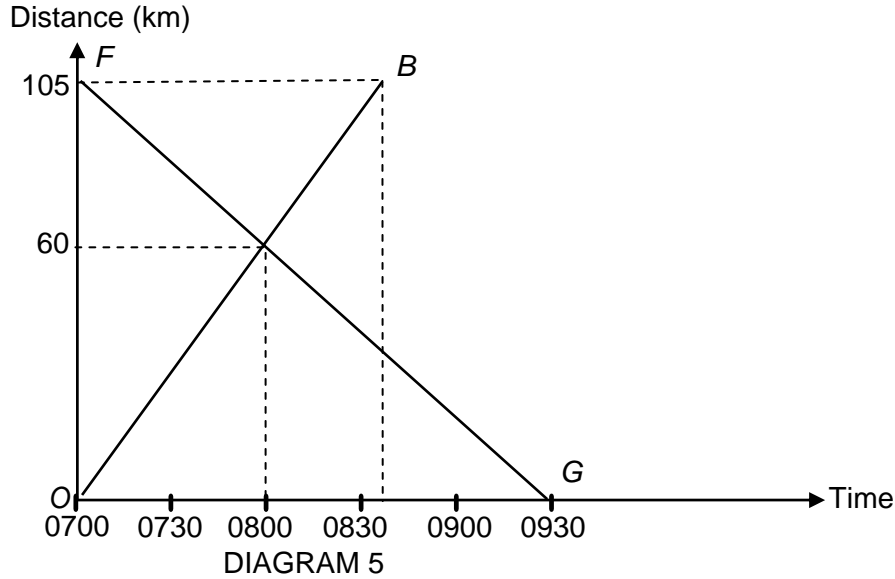
10. The diagram shows nine labelled cards in two boxes.



A card is picked at random from each of the of the boxes. By listing the outcomes, find the probability that

- (a) both cards are labelled with a number
- (b) one card is labelled with a number and the other card is labelled with a letter. [5 marks]

11. Diagram 5 shows the distance-time graph of the journeys taken by Ali and Fuad.



The straight line OB represents Ali's journey from town X to town Y, while the straight line FG represents Fuad's journey from town Y to town X. Ali and Fuad uses the same route.

- (a) State the distance, in km, of town Y from town X.
- (b) Find the time Ali and Fuad meet each other during their journey.
- (c) Find the distance when they meet from town Y.
- (d) Calculate Fuad's speed.

[6 marks]

SECTION B
[48 marks]

12. Complete Table 1 for the equation $y = 3 + 3x - 2x^2$. [2 marks]

x	- 3	- 2	- 1	0	1	2	2.5	3	4
Y	- 24	- 11		3	4		- 2	- 6	- 17

TABLE 1

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

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

(c) From your graph, find

<http://exammy.com/>
<http://edu.joshuatly.com/>

- (i) the value of y when $x = 1.5$
- (ii) the value of x when $y = -20$ [2 marks]

(d) Draw a suitable straight line on your graph to find all the values of x which satisfy the equation $2x^2 - 2x - 15 = 0$ for $-3 \leq x \leq 4$. [4 marks]

13. (a) Diagram 6 shows the point K on a Cartesian plane.

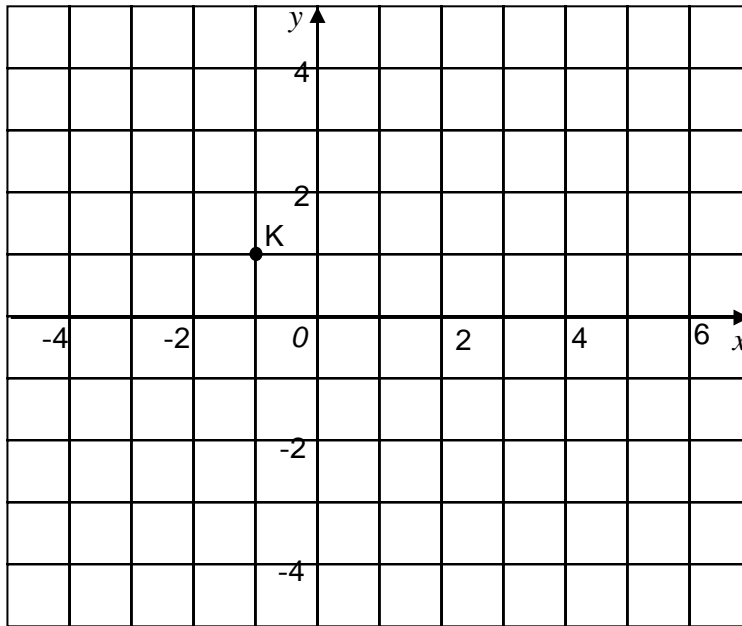


DIAGRAM 6

The transformation R represents a 90° anticlockwise rotation about the center $(3, 2)$. The transformation T represents a translation $\begin{pmatrix} 2 \\ 3 \end{pmatrix}$. State the coordinates of the image of the point K under the following transformations.

(i) R

(ii) RT

[3 marks]

(b) Diagram 7 shows three quadrilateral $EFGH$, $ABCD$ and $OFJK$ on a Cartesian plane. $EFGH$ is the image of $ABCD$ under the transformation U and $OFJK$ is the image of $EFGH$ under the transformation V .

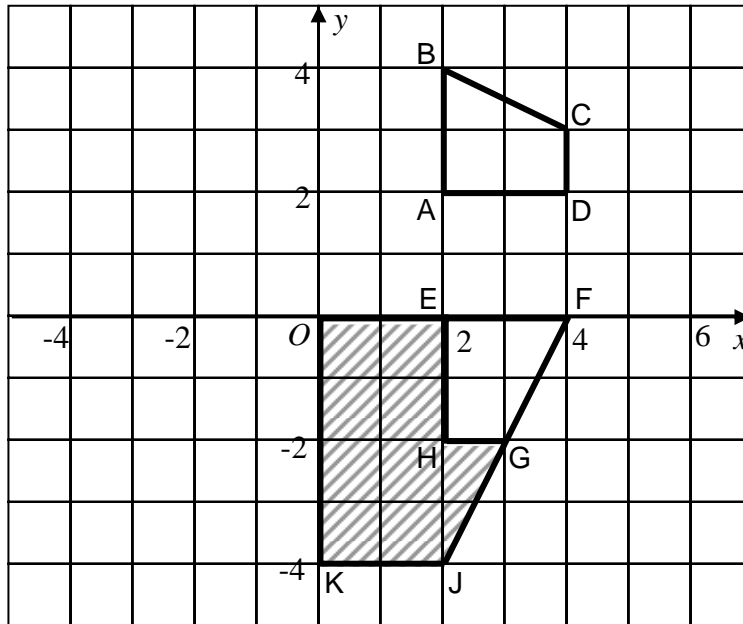


DIAGRAM 7

(i) Describe completely the transformation,

- (a) U ,
- (b) V .

[6 marks]

(ii) Given that the shaded area is 120 unit^2 , find the area of $ABCD$.

[3 marks]

14. The data in Diagram 8 shows the marks for a Mathematics monthly test for 40 pupils.

28	35	22	40	29	30	32	23
19	27	32	32	37	33	35	40
35	39	34	38	45	21	34	30
44	14	22	39	33	31	28	27
28	38	26	22	17	26	24	20

a) Based on the data in Diagram 8 and using a class interval of 5 marks, complete Table 2 in the answer space. [3 marks]

b) For this part of the question, use the graph paper provided. By using a scale of 2 cm to 5 marks on the horizontal axis and 2 cm to 5 pupils on the vertical axis, draw an ogive for the data. [4 marks]

c) From the ogive,
i) find the upper quartile.

<http://exammy.com/>
<http://edu.joshuatly.com/>

ii) hence, explain briefly the meaning of the upper quartile.

[5 marks]

Answer:

a)

Marks	Frequency	Cumulative frequency
11-15		
16-20		

Table 2

15. (a) Diagram 9(i) shows a solid right prism.
 Trapezium ABCD is its uniform cross section.
 The base ADEF is on a horizontal plane.

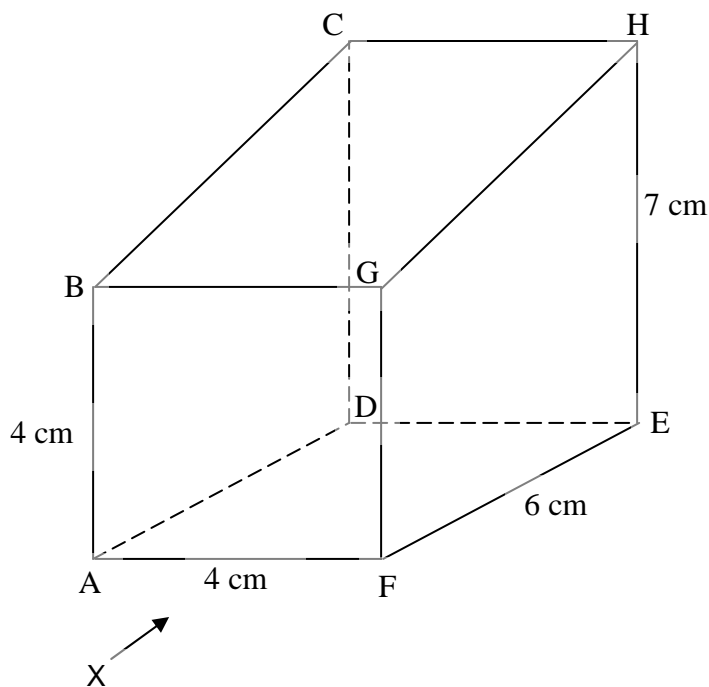


DIAGRAM 9(i)

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

(b) A half-cylinder with radius 3 cm and height 6 cm is joined to the solid in Diagram 3(i) at a vertical plane ABLKD to form a combined solid as shown in Diagram 3(ii).

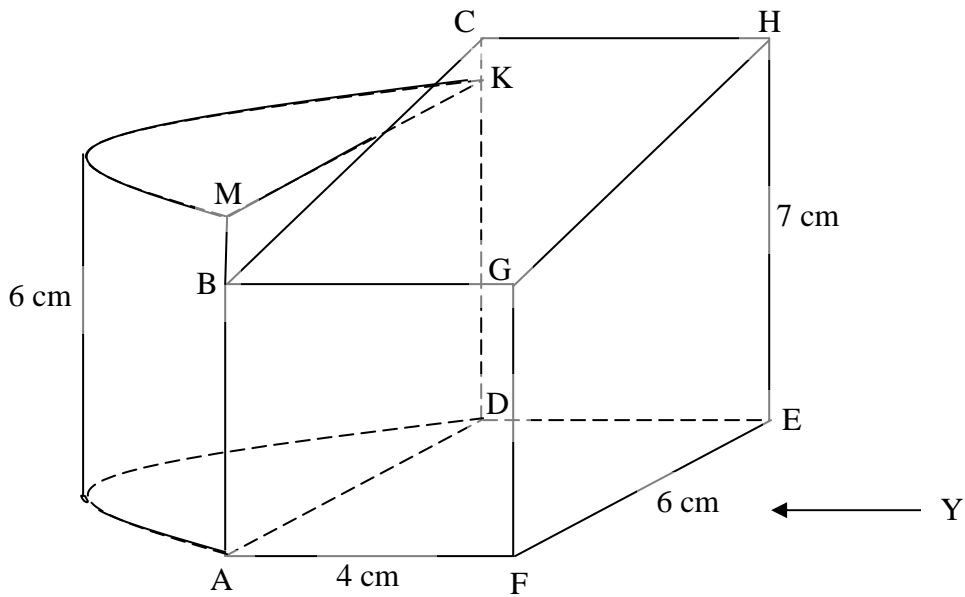


DIAGRAM 9(ii)

Draw in full scale,

- (i) the plan of the combined solid, [4 marks]
- (ii) the elevation of the combined solid on a vertical plane to EF as viewed from Y. [5 marks]

16. G (60°S , 20°W) and H are two points on the surface of the earth where GH is a diameter of the common parallel of latitude.

- (a) Find the latitude of H. [2 marks]
- (b) Given GL is a diameter of the earth. On the diagram in the answer space, mark the locations of H and L. Hence, state the location of L. [3marks]
- (c) Calculate the shortest distance, in nautical miles, from H to the South Pole. [2 marks]
- (d) An aeroplane took off from G and flew due east along the common parallel of latitude at an average speed of 450 knots. The aeroplane took 8 hours to reach a point P. Calculate
 - (i) the distance, in nautical miles, from G to P,
 - (ii) the longitude of P. [3 marks]

SECTION A

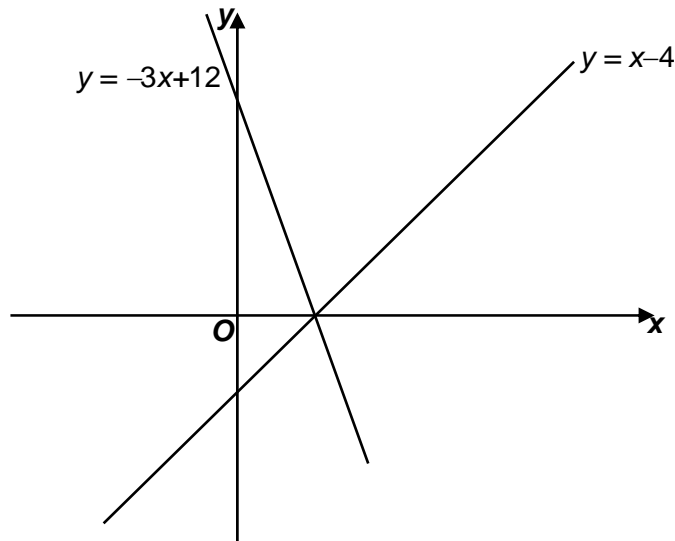
[52 marks]

Answer all question in this section

1. On the graph provided, shade the region which satisfies the three inequalities $y \leq -3x+12$, $y > -4$ and $y \leq x-4$.

[3 marks]

Answer:



2, Solve the equation $\frac{2m^2 + 5m}{m+1} = 2$

[4 marks]

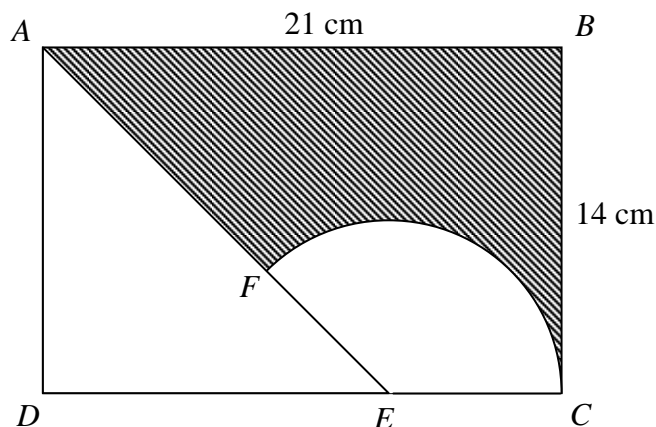
3. Calculate the values of p and q that satisfy the simultaneous linear equations:

$$\frac{1}{2}p - 2q = 13$$

$$3p + 4q = -2$$

[4 marks]

4. In diagram 1, ABCD is a rectangle.



CF is an arc of a circle with center E where E is a point on the line DC with $EC = 7$ cm.

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

- the length, in cm, of arc CF
- the area, in cm^2 , of the shaded region

[6 marks]

- 5 Diagram 2 shows a cuboid $PQRSDEFG$ with a horizontal square base $PQRS$.

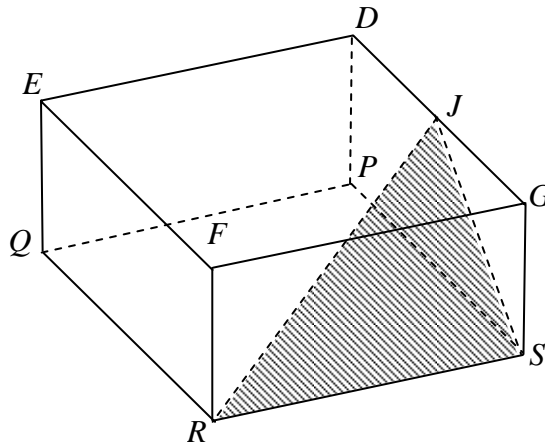


DIAGRAM 2

J is the midpoint of DG . $QR = RS = 12$ cm and $FR = 8$ cm.

Calculate the angle between the plane JRS and the plane $RSGF$.

[4 marks]

6. (a) State whether each of the following statements is true or false.

(i) $2^3 = 6$ or $\frac{7}{2} = 3.5$

(ii) $(-4) \times (-5) = 20$ and $-4 > -2$

- (b) Complete the premise in the following argument:
 Premise 1 : If the determinant of a matrix = 0, then the matrix does not have an inverse.

Premise 2 : _____

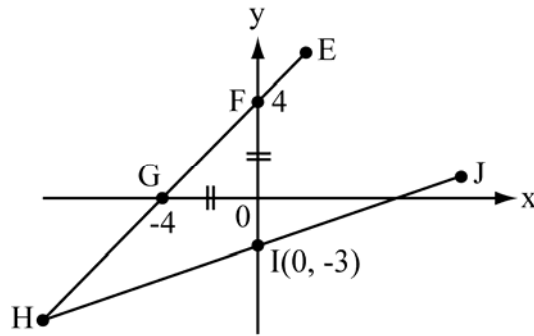
Conclusion : Matrix A does not have an inverse.

- (c) Write down two implications based on the following sentence.

$$\mathbf{A \subset B \text{ if and only if } A \cap B = A'}$$

[5 marks]

7. The diagram below shows that EFGH and HIJ are straight lines.



- state the gradient of EFGH.
- if the gradient of HIJ is 5, find the x - intercept.
- find the equation of HIJ.

[5 marks]

8. Diagram 3 shows a solid formed by joining a cone and a cylinder.

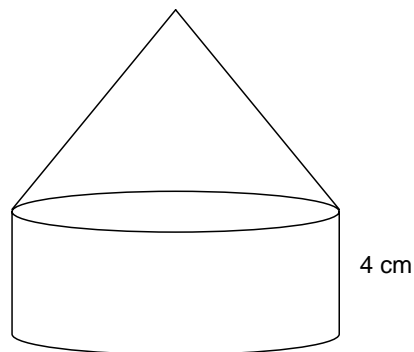


DIAGRAM 3

The diameter of the cylinder and the diameter of the base of the cone are both 7 cm. The volume of the solid is 231 cm^3 . By using $\pi = \frac{22}{7}$, calculate the height, in cm, of the cone.

[4 marks]

9. Two members of a Mathematics Club are chosen to participate in a quiz. They are chosen from a group of 3 boys and 2 girls. By listing the sample of all the possible outcomes of the events, find the probability that

- two boys are chosen
- at least one girl is chosen.

[5 marks]

10. (a) Given matrix $M = \begin{pmatrix} k & 6 \\ -4 & 2 \end{pmatrix}$ find the value of k if matrix M has no inverse.

(b) Given the matrix equations

$$\begin{pmatrix} 7 & -6 \\ -5 & 8 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} -4 \\ 1 \end{pmatrix} \quad \text{and} \quad \begin{pmatrix} x \\ y \end{pmatrix} = \frac{1}{h} \begin{pmatrix} 8 & 6 \\ 5 & 7 \end{pmatrix} \begin{pmatrix} -4 \\ 1 \end{pmatrix}$$

(i) Find the value of h

(ii) Hence, find the value of x and y .

[6 marks]

11. Diagram 4 shows the speed-time graph of a particle for a period of 15 s.

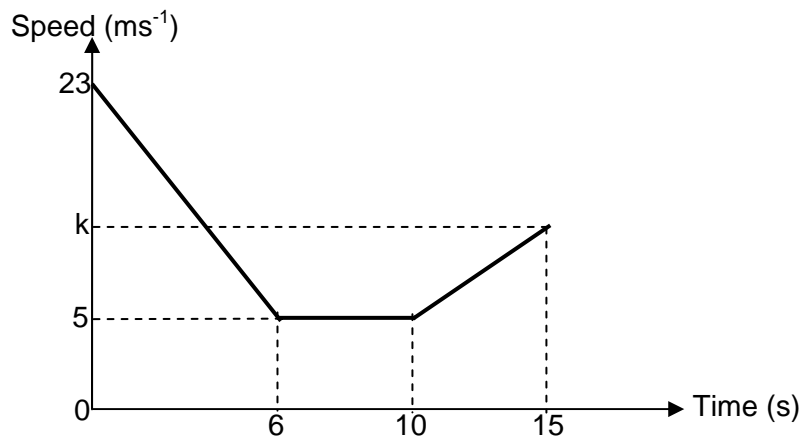


DIAGRAM 4

(a) State the distance, in m, the particle moves with constant speed.

(b) Calculate the rate of change of speed, in ms^{-2} , in the first 6 s.

(c) Calculate the value of k , if the total distance travelled in the first 15 s is

139m.

[6 marks]

SECTION B

[48 marks]

12. a) Complete Table 1 in the answer space for the equation $y = \frac{2}{x}$

[2 marks]

b) For this part, use a graph paper.

By using a scale 2 cm to 1 unit on the x -axis and 2 cm to 1 units on the y -axis,

draw the graph of $y = \frac{2}{x}$ for $-4 \leq x \leq 4$.

[4 marks]

c) From your graph, find

a. the value of y when $x = -1.5$,

b. the value of x when $y = 1.2$.

[2 marks]

d) Draw a suitable straight line on your graph to find all the values of x which

<http://exammy.com>
<http://edu.joshuatly.com/>

satisfy the equation $\frac{2}{x} = \frac{3}{4}x - 2$ for $-4 \leq x \leq 4$.

State these values of x .

[4 marks]

Answer:

a)

X	-4	-2.5	-2	-1	-0.5	0.5	1	2	2.5	4
Y	-0.5	-0.8		-2	-4	4	2	1		0.5

Table 1

13. (a) Diagram 5 shows the point K on a Cartesian plane.

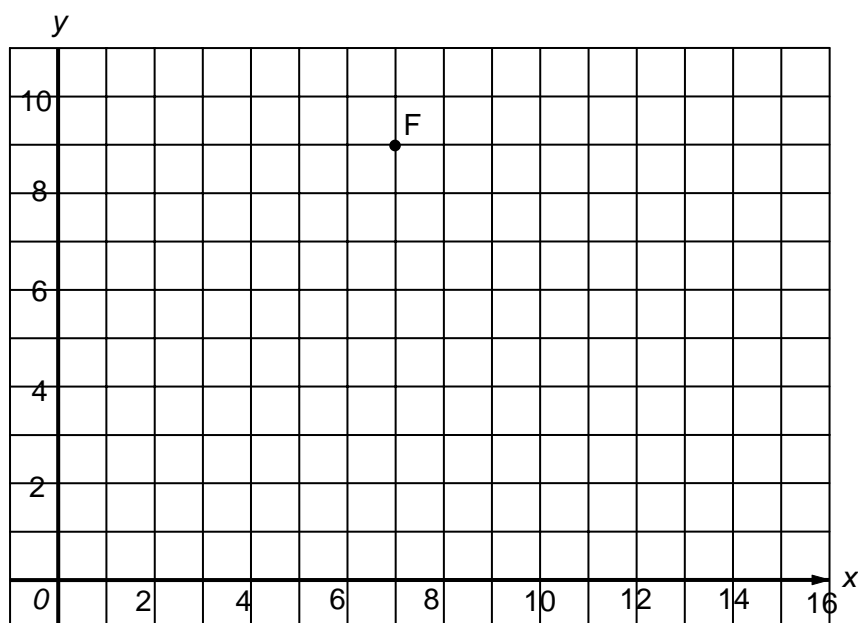


DIAGRAM 5

Transformation \mathbf{S} is a translation $\begin{pmatrix} 5 \\ -2 \end{pmatrix}$.

Transformation \mathbf{T} is a reflection in the $x = 9$.

(i) State the coordinates of the image of point F under transformation \mathbf{S} .

(ii) State the coordinates of image of point F under transformation \mathbf{TS} . [3 marks]

(b) Diagram 6 shows three triangle PQR , ACG and EFG on a Cartesian plane.

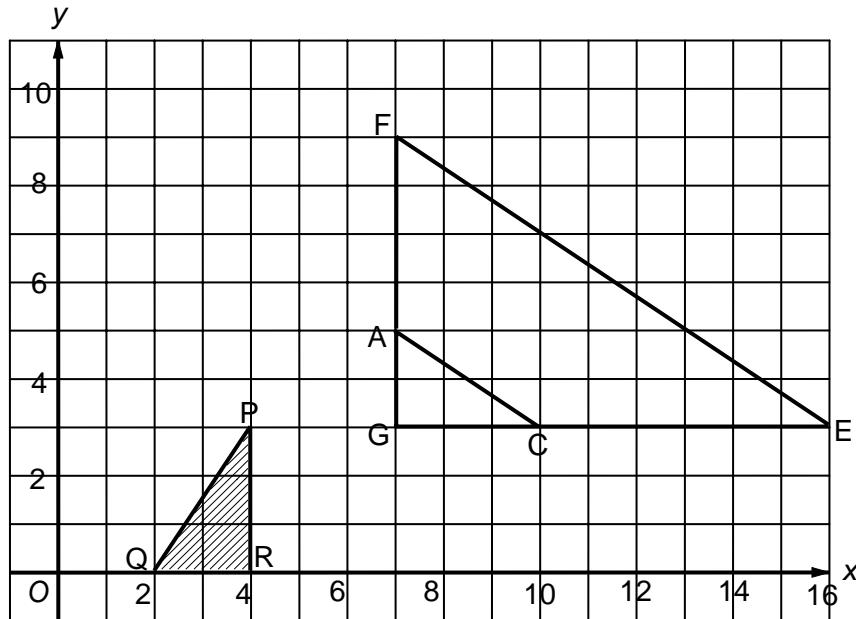


DIAGRAM 6

Triangle ACG is the image of triangle PQR under transformation V .
Trapezium EFG is the image of triangle ACG under transformation W .

(i) Describe in full transformation :

- (a) V
- (b) W

[6 marks]

(ii) Given that the area of triangle EFG represents a region of area 72 unit^2 .
Calculate the area, in unit^2 , of the region represented by triangle PQR .

[3 marks]

14. The data in Diagram 7 shows the ages of members of a golf club.

45	53	48	54	46	53	55	43	47	52
63	57	50	40	52	45	49	61	54	56
51	41	56	51	61	50	53	48	51	44
57	53	47	55	46	54	42	57	58	63
42	64	50	49	52	47	55	52	45	51

- a) Based on the data in Diagram 6 and using a class interval of 5 years, complete Table 2 in the answer space. [4 marks]
- b) Based on the table in a), calculate the estimated mean age of the members of the golf club. [2 marks]
- c) By using a scale of 2 cm to 5 years on the x-axis and 2 cm to 2 persons on the y-axis, draw a histogram based on the data. [4 marks]
- a) State one piece of information obtained based on the histogram in c). [2 marks]

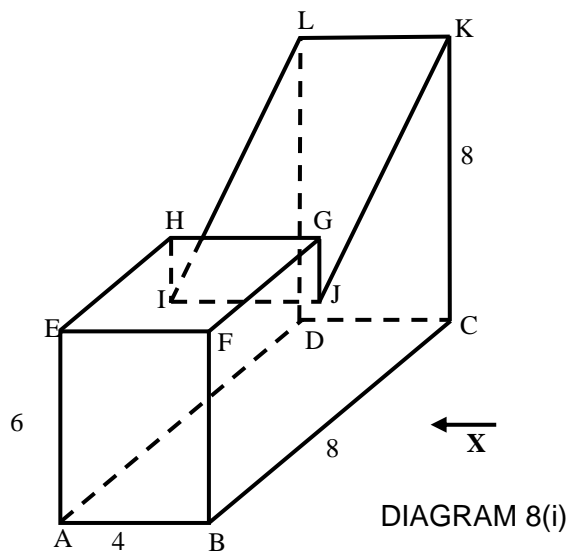
Answer:

a)

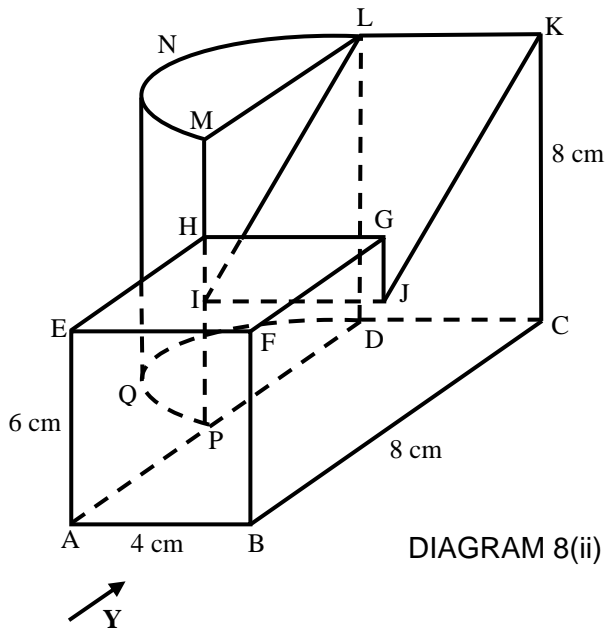
Age	Frequency	Midpoint
40-44		
45-49		

Table 2

15. . Diagram shows a solid right prism with rectangular base ABCD on a horizontal plane. The surface BFGJKC is its uniform cross-section. The rectangle LKJI is an inclined plane and the square EFGH is a horizontal plane. The edges GJ and HI are vertical and $HI = GJ = 2$ cm.



- (a) Draw full scale, the elevation of the combined solid on a vertical plane parallel to JI as viewed from X . [3 marks]
- (b) A half-cylinder of diameter 4 cm is joined to the prism in diagram 8(i) at the vertical plane $LDPM$. The combined solid is as shown in Diagram 8 (ii)



Draw full scale,

- (i) the plan of the combined solid. [4 marks]
- (ii) the elevation of the combined solid on a vertical plane parallel to AB as viewed from Y.

[5marks]

16. (50°S , 70°E), G, H and K are four points on the earth's surface. F, G and H are on the same latitude such that FG is the diameter. The longitude of H is 45°W .

- (a) Find the longitude of G. [2 marks]
- (b) An aeroplane flew due west from F to H. It then flew 4800 nautical miles due north to K. Given that its average speed for the whole journey was 680 knots, calculate
 - (i) the latitude of K, [3 marks]
 - (ii) the distance, in nautical miles, from F to H, [3 marks]
 - (iii) the time taken to complete the journey. [3 marks]

SECTION A

[52 marks]

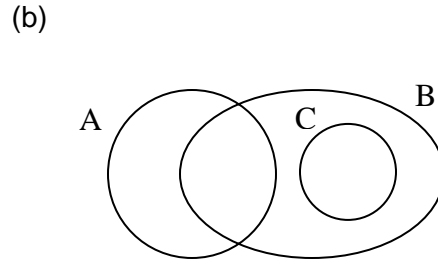
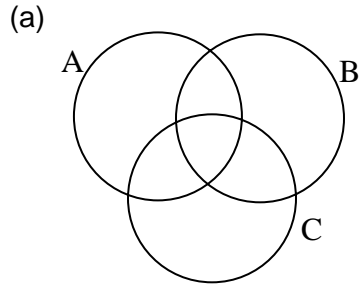
Answer all question in this section

1. The Venn Diagram shows set P, Q and R. On the diagrams provided, shade the following related region:

(a) $A \cup B \cap C'$

(b) $(A \cup C)' \cap B$

[3 marks]



2, Solve the equation $4(5x - 1) = \frac{-3(5x - 1)}{x}$

[4 marks]

3. Calculate the values of p and q that satisfy the simultaneous linear equations:

$$2m - n = 2$$

$$4m - 3n = 5$$

[4 marks]

4. Diagram 1 shows a right prism with a horizontal rectangular base $PQRS$. $VUQR$ is a trapezium. M and N are the midpoints of PS and QR respectively. Calculate the angle between the line TR and the base $PQRS$. [4 marks]

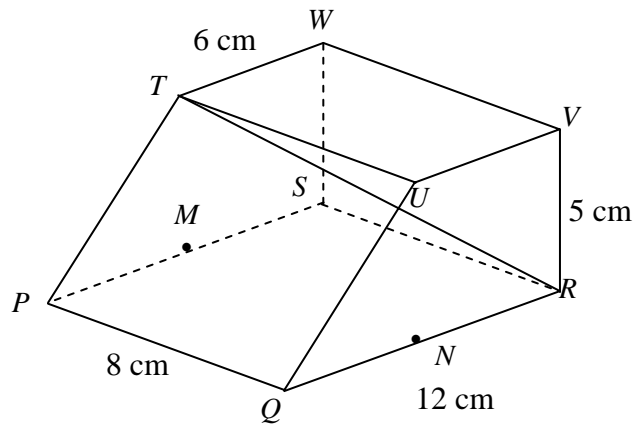


DIAGRAM 1

5. In Diagram 2, ABD is an arc of a sector with the centre O and BCD is a quadrant.

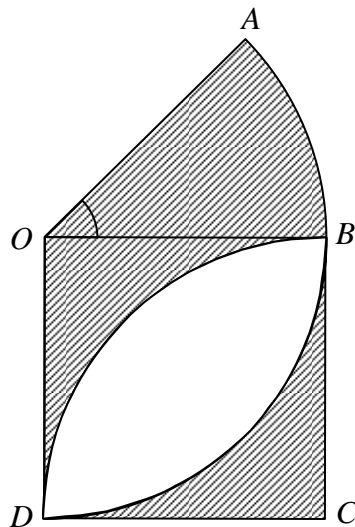


DIAGRAM 2

$OD = OB = 14$ cm and $\angle AOB = 45^\circ$.

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

- the perimeter, in cm, of the whole diagram,
- the area, in cm^2 , of the shaded region.

[6 marks]

6. Diagram 3 shows a solid formed by removing a cylinder from a right prism.
The area of uniform cross-section EFG of the prism is 30 cm^2 and the diameter of the cylinder is 4 cm .

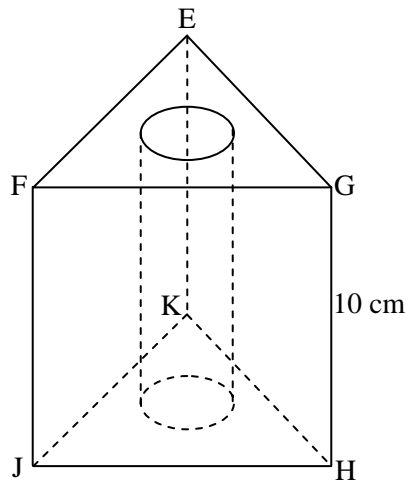


DIAGRAM 3

Calculate the volume, in cm^3 , of the remaining solid.

[4 marks]

7. In the Diagram 4, O is the origin and BC is parallel to AO .

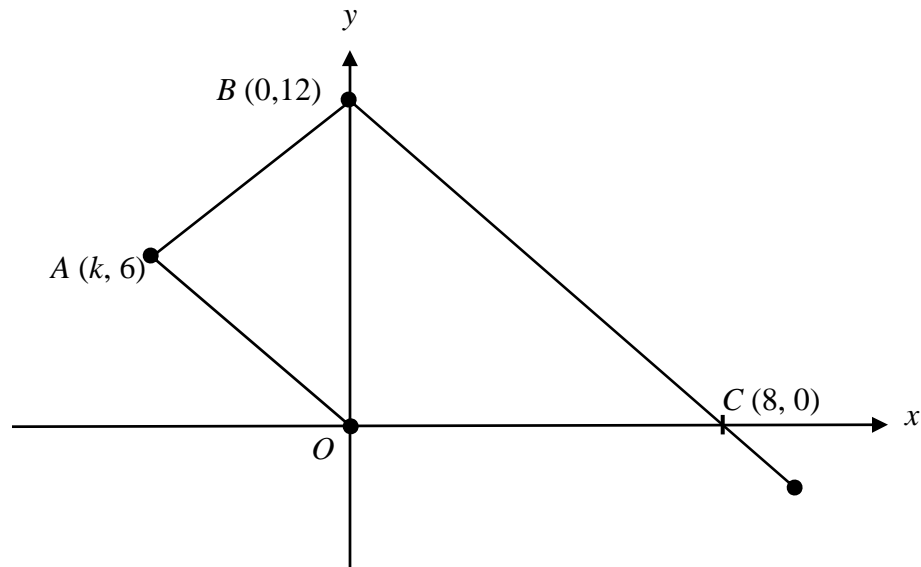


DIAGRAM 4

Find

- the gradient of straight line BC ,
- the value of k

(c) the x-intercept of straight line AB . [5 marks]

8. (a) State whether each of the following statement is true or false.

(i) $4^2 = 8$ or $\quad = -2$

(ii) $a \subset \{ a, b, c \}$ and $-3 > -7$

(b) Write down premise 1 to complete the following argument.

Premise 1 : _____

Premise 2 : $6 \times p \neq 42$

Conclusion : $p \neq 7$

(c) Form a general conclusion by induction for the number sequence

11, 23, 43, 71, ... which follow the pattern

$$11 = 4(1^2) + 7$$

$$23 = 4(2^2) + 7$$

$$43 = 4(3^2) + 7$$

$$71 = 4(4^2) + 7$$

[5 marks]

9. The diagram shows five cards labelled with letters



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

(a) List the sample space.

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

(i) the code begins with the letter G,

(ii) the code consists of two vowels or two consonants [5 marks]

10. Given matrix $P = \begin{pmatrix} 4 & 5 \\ 6 & 8 \end{pmatrix}$ and matrix $PQ = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$

(a) Find the matrix Q.

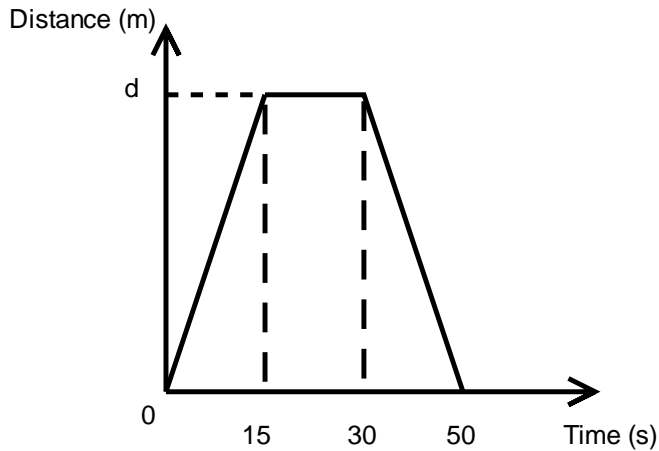
(b) Hence, calculate by using the matrix method, the values of m and n that satisfy the following simultaneous linear equations :

$$4m + 5n = 7$$

$$6m + 8n = 10$$

[6 marks]

11. The diagram shows the distance-time graph of the journey of a particle from point A to point B and then back to point A.



If the speed of the journey from A to B is 6 ms^{-1} , calculate

- (a) the value of d
- (b) the speed, in ms^{-1} , of the particle from B to A.
- (c) the average speed, in ms^{-1} , of the whole journey

[6 marks]

SECTION B
[48 marks]

12. Complete Table 1 for the equation $y = x^3 - 5x + 8$

[2 marks]

x	-3.5	-3	-2	-1	0	1	2	3	3.5
Y	-17.4		10	12	8	4		20	33.4

TABLE 1

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

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 $y = x^3 - 5x + 8$ for $-3.5 \leq x \leq 3.5$ [4 marks]

(c) From your graph, find

- (i) the value of y when $x = 0.4$
- (ii) the value of x when $x^3 - 5x + 8 = 0$ [2 marks]

(d) Draw a suitable straight line on your graph to find all the values of x which satisfy the equation $x^3 - 7x - 2 = 0$ for $-3.5 \leq x \leq 3.5$. [4 marks]

13. (a) Transformation **P** is a reflection on the line $y = 4$. Transformation **T** is a translation $\begin{pmatrix} 4 \\ -3 \end{pmatrix}$. Transformation **R** is an anticlockwise rotation of 90° about the centre $(4, 0)$.

State the coordinates of the image of the point $(3, 6)$ under each of the following transformations :

- (i) **P**,
- (ii) **TP**.
- (iii) **RT**.

[4 marks]

- (b) Diagram 5 shows three triangles, PUV , PQT and PRS , drawn on a Cartesian plane.

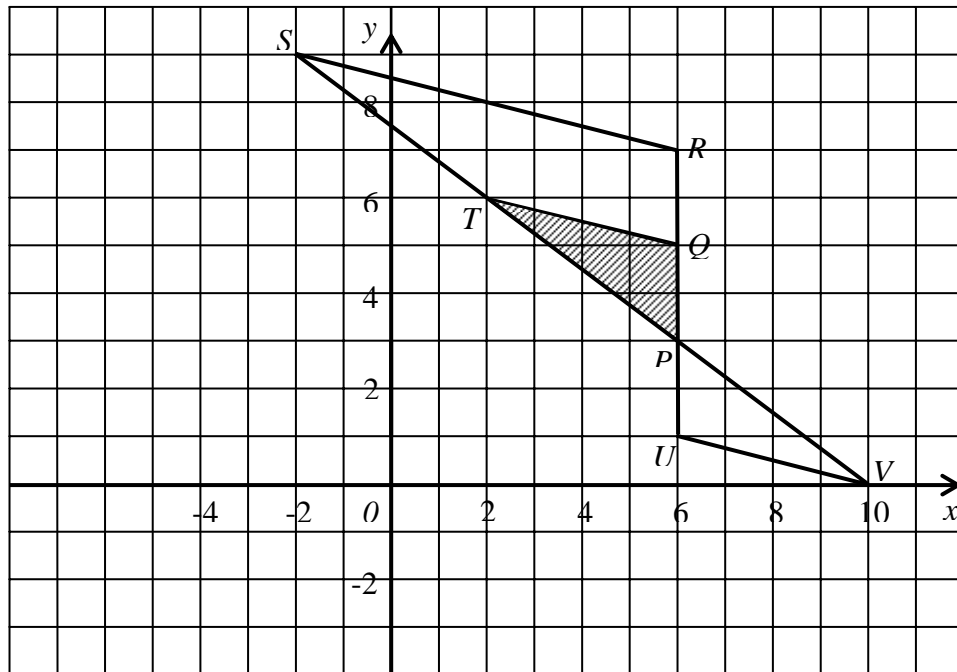


Diagram 5

- (i) PQT is the image of PUV under the transformation **M** and PRS is the image of PQT under the transformation **N**.

Describe in full the transformation :

- (a) **M**,

(b) **N.**

- (ii) If the area of triangle PQT is 16 m^2 , calculate the area of trapezium $QRST$. [8 marks]

14. The data in Diagram 6 show the donations, in RM, collected by 40 pupils.

49	26	38	39	41	45	45	43
22	30	33	39	45	43	39	31
27	24	32	40	43	40	38	35
34	34	25	34	46	23	35	37
40	37	48	25	47	30	29	28

Diagram 6

- (a) Based on the data in Diagram 6 and by using a class interval of 5, complete Table 2 in the answer space. [3 marks]
- (b) Based on Table 2 in (a), calculate the estimated mean of the donation collected by the pupils. [3 marks]

For this part of the question, use the graph provided. You may use a flexible ruler.

- © By using a scale of 2 cm to 5 marks on the horizontal axis and 2 cm to 1 pupil on the vertical axis, draw a histogram for the data. [4 marks]
- (d) Based on the frequency polygon in (c), state **one** piece of information about the donations. [2 mark]

Answer :

(a)

Class interval	Midpoint	Frequency
21 – 25	23	5
26 - 30		

TABLE 2

15. (a) Diagram 5(i) shows a solid right prism.
 Its rectangular base, CDEH lies on a horizontal plane.
 Trapezium ABCD is the uniform cross section of the prism.
 Rectangle ABGF is a horizontal plane and rectangle CBGH is inclined plane.
 The sides AD and FE are vertical.

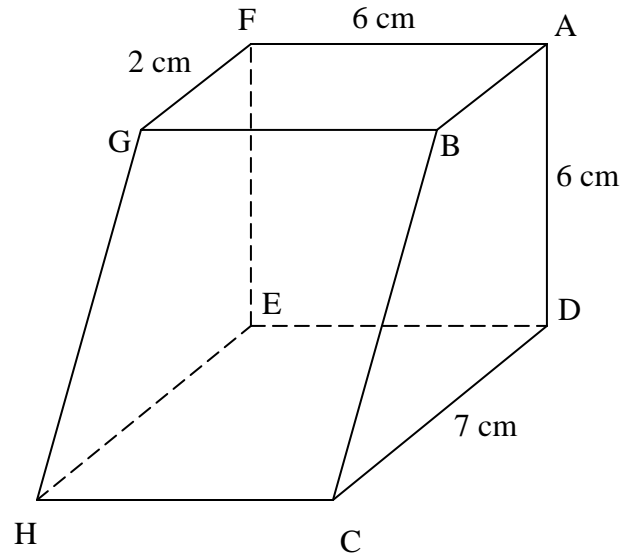


DIAGRAM 5(i)

Draw in full scale, the plan of the solid prism.

[3 marks]

- (b) A cuboid is joined to the solid in Diagram 5(i) at a vertical plane BCPS to form a combined solid shown in Diagram 5(ii).

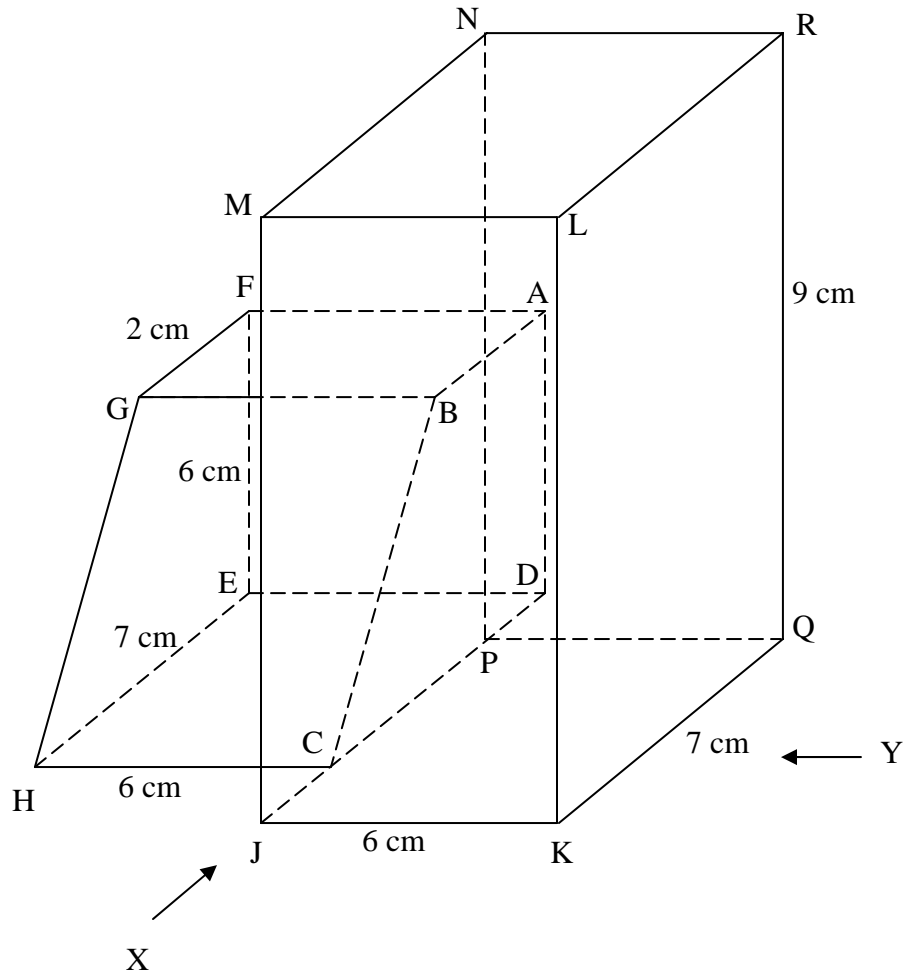


DIAGRAM 5(ii)

It is given that $JC = PD = 1$ cm.

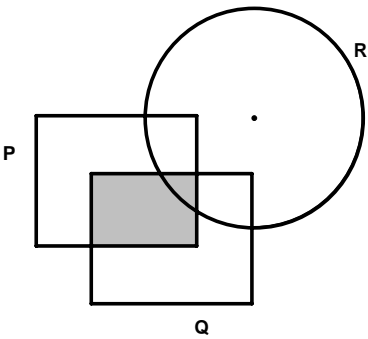
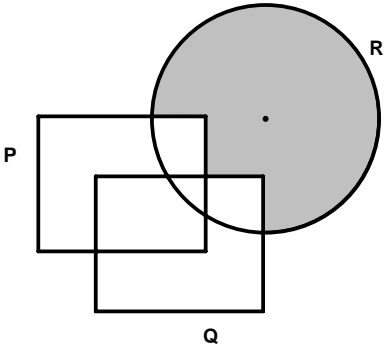
Draw in full scale,

- (i) the elevation of the combined solid on a vertical plane parallel to JK as viewed from X. [4 marks]
- (ii) the elevation of the combined solid on a vertical plane parallel to KQ as viewed from Y. [5 marks]

16. R (40°N , 80°W) , S and T are three points on the surface of the earth. RS is the diameter of a parallel of latitude 40°N . T is 6600 nautical miles to the south of R.

- (a) State the longitude of S. [2 marks]
- (b) Find the latitude of T. [4 marks]
- (c) Calculate the shortest distance, in nautical miles, from R to S measured along the surface of the earth. [2 marks]
- (d) A ship sailed from S to R along the common parallel of latitude and then due south to T. The total time taken for the journey was 20 hours. Calculate the average speed of the ship for the whole journey. [4 marks]

JAWAPAN GG SET 1

No.	Marking Scheme	Marks	
<p>1</p> <p>(a)</p>  <p>(b)</p>  <p>Note : Shade (P ∪ Q) (1)</p>		<p>1</p> <p>2</p>	<p>3</p>
<p>2</p>	$y^2 - 10y + 21 = 0$ $(y - 3)(y - 7) = 0$ $y = 3$ $y = 7$ <p>Note: accept without '= 0'</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>4</p>
<p>3</p>	$x + 2y = 6$ $3x - 2y = -14$ $4x = -8$ $x = -2$ $y = 4$	<p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>4</p>

4.	<p>(a) $\frac{90}{360} \times 2 \times \frac{22}{7} \times 12 @ \frac{120}{360} \times 2 \times \frac{22}{7} \times 7$ $\frac{90}{360} \times 2 \times \frac{22}{7} \times 12 + \frac{120}{360} \times 2 \times \frac{22}{7} \times 7 + 12 + 5$ 57.53</p> <p>(b) $\frac{90}{360} \times \frac{22}{7} \times 12^2 @ \frac{120}{360} \times \frac{22}{7} \times 7^2$ $\frac{90}{360} \times \frac{22}{7} \times 12^2 + \frac{120}{360} \times \frac{22}{7} \times 7^2 - \frac{1}{2} \times 7 \times 12$ 122.48</p>	1 1 1 1 1 1	6
5.	Identify $\angle EBD$ or $\angle DBE$ Tan $\angle EBD = \frac{6}{\sqrt{5^2 + 12^2}}$ or equivalent $\angle EBD = 24.78^\circ$ or $24^\circ 47'$.	1 2 1	4
6 (a)	If $y = x + 1$ then $x = y - 1$ If $x = y - 1$ then $y = x + 1$	1 1	
(b)	52 is divisible by 2	1	
©	$1 + 3(n)$, $n = 0, 1, 2, \dots$	1, 1	5
7	a) $y = -2x + 5$ $x = \frac{5}{2}$ b) $y = -2x + 9$, y- intercept = 9	1 1 2 1	5
8.	Volume of solid = Volume of half – cylinder + volume of prism $= [\frac{1}{2} \times \frac{22}{7} \times (\frac{14}{2})^2 \times 6] + [\frac{1}{2} \times 14 \times 8 \times 6]$ $= 462 + 336$ $= 798 \text{ cm}^2$	1, 1 1 1	4

9(a)	$h = 2, k = -2$	1, 1	
(b)	$\begin{pmatrix} 9 & -5 \\ -4 & 2 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} -6 \\ 2 \end{pmatrix}$	1	
	$\begin{pmatrix} x \\ y \end{pmatrix} = \frac{1}{-2} \begin{pmatrix} 2 & 5 \\ 4 & 9 \end{pmatrix} \begin{pmatrix} -6 \\ 2 \end{pmatrix}$	1	
	$= \begin{pmatrix} 1 \\ 3 \end{pmatrix}$	1	
	$x = 1, y = 3$	1	6

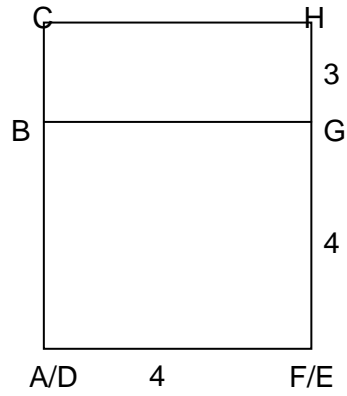
10 (a)	$\{(2, 3), (2, 4)\}$	1	
	$\frac{1}{10}$	1	
(b)	$\{(A, 3), (A, 4), (B, 3), (B, 4), (C, 3), (C, 4), (2, D), (2, E), (2, F)\}$	2	
	$\frac{9}{20}$	1	
			5

11.			
(a)	105 km	1	
(b)	0800 a.m	1	
©	$105 - 60 = 45\text{km}$	1	
		1	
(d)	$\frac{105}{2.5} = 42\text{km} / j$	1	
		1	6

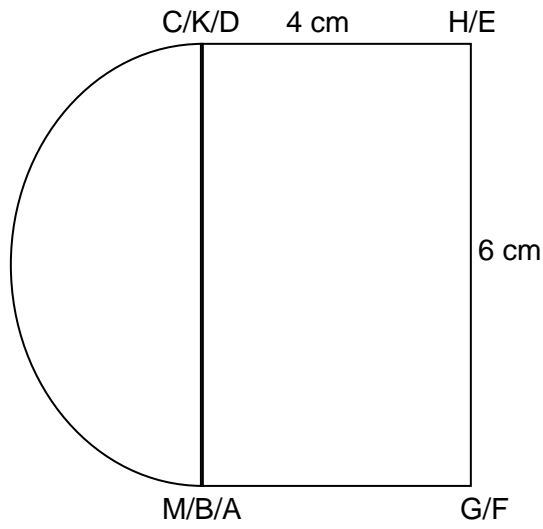
12	(a) $\begin{matrix} -2 \\ 1 \end{matrix}$	1	
		1	
	(b) Axes drawn in correct direction, uniform scales in $-3 \leq x \leq 4$ and $-24 \leq y \leq 4$	1	
	7 points and * 2 points correctly plotted or curve passes through these points for $-3 \leq x \leq 4$	2	
	Smooth and continuous curve without any straight line and passes through all 8 correct	1	
	Note : i) 7 or 8 points correctly plotted award 1 ii) Ignore curve out of range		
		1	

	<p>(b) i) $2.5 \leq y \leq 3.5$ ii) $-2.6 \leq x \leq -2.8$</p> <p>(d) Identify equation $y = x - 12$ Straight line $y = x - 12$ is drawn correctly</p> <p>$-2.4 \leq x \leq -2.2$ $3.2 \leq x \leq 3.4$</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	12																								
13(a)i	(4, -2)	1																									
ii	(1, 0)	2																									
(b)(i)	U is a rotation of 90° clockwise about the point (1, 1) V is an enlargement with centre at (4, 0) and scale factor of 2	3																									
(b)	Area OFJK = k^2 (Area ABCD)		12																								
(ii)	$120 + \text{Area ABCD} = 2^2(\text{Area ABCD})$ Area ABCD = 40 unit ²	3																									
14																											
(a)	<table border="1"> <thead> <tr> <th>Marks</th> <th>freq</th> <th>Cumulative freq</th> </tr> </thead> <tbody> <tr> <td>11-15</td> <td>1</td> <td>1</td> </tr> <tr> <td>16-20</td> <td>3</td> <td>4</td> </tr> <tr> <td>21-25</td> <td>6</td> <td>10</td> </tr> <tr> <td>26-30</td> <td>10</td> <td>20</td> </tr> <tr> <td>31-35</td> <td>11</td> <td>31</td> </tr> <tr> <td>36-40</td> <td>7</td> <td>38</td> </tr> <tr> <td>41-45</td> <td>2</td> <td>40</td> </tr> </tbody> </table>	Marks	freq	Cumulative freq	11-15	1	1	16-20	3	4	21-25	6	10	26-30	10	20	31-35	11	31	36-40	7	38	41-45	2	40	3	
Marks	freq	Cumulative freq																									
11-15	1	1																									
16-20	3	4																									
21-25	6	10																									
26-30	10	20																									
31-35	11	31																									
36-40	7	38																									
41-45	2	40																									
(b)	Refer to graph - Uniform scales used for both axes - 8 points plotted - (10.5, 0) plotted - A smooth and continuous curve passing through (10.5, 0) and the 8 points correct plotted	1																									
		1																									
		1																									
		1																									
© (i)	upper quartile $\frac{3}{4} \times 40 = 30 = 35$	2																									
(ii)	30 students scored less than 35	2																									
			12																								

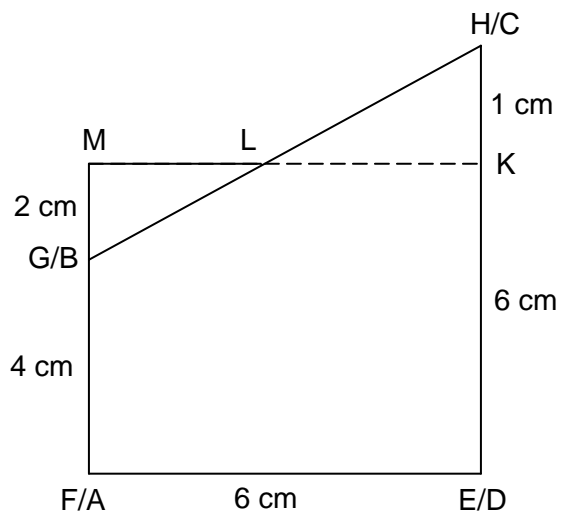
15



3



4



5

12

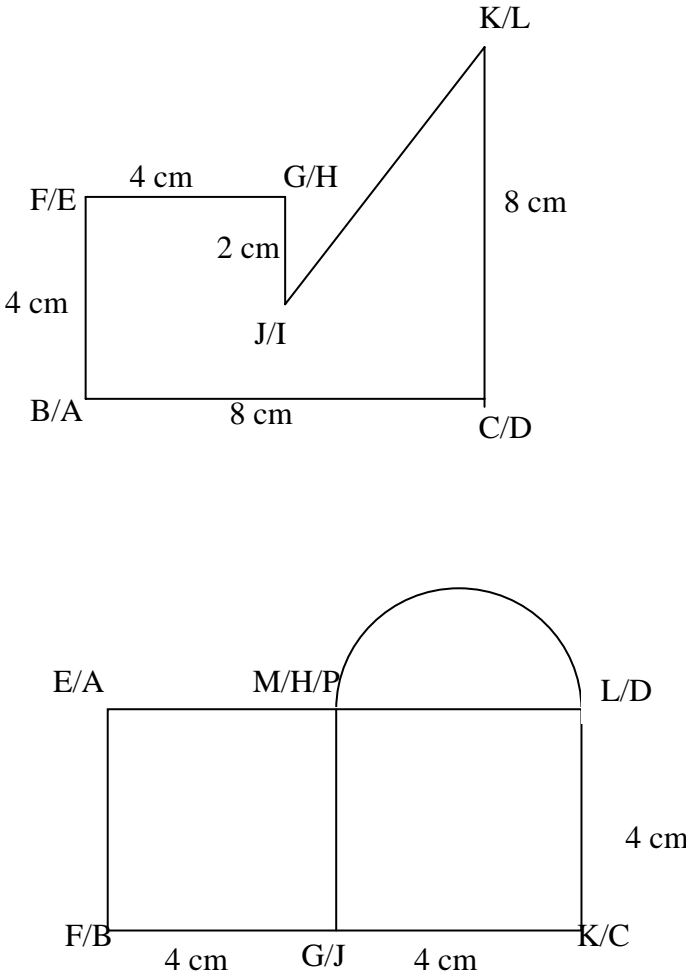
16(a)	(a)	60°S	2	
(b)	(b)	Point H Point L L (60°N, 160°E)	1 1 1	
©	(c)	Distance H to south pole = 30 X 60 = 1800 n.m.	1 1	
(d)(i)	(d)	(i) Distance = 450 x 8 = 3600 n.m.	1 1	
(ii)		$\angle GOP = \frac{3600}{60 \cos 60^\circ}$ $= 120^\circ$ Longitude = 120° - 20° = 100°E	2 1	
				12

JAWAPAN GG SET 2

1	<p>Dash line</p>	1	2	3
2.	$2m^2 + 3m - 2 = 0$ $(2m - 1)(m + 1) = 0$ $x = -2 \quad x = \frac{1}{2}$	1	1	1, 1
3,	$p - 4q = 26$ $3p + 4q = -2$ $4p = 24$ $p = 6$ $q = -5$	1	1	1
4.	<p>(a) $\angle FEC = 135^\circ$</p> $\frac{135}{360} \times 2 \times \frac{22}{7} \times 7$ <p>16.5</p> <p>(b) $L_3 = \frac{135}{360} \times \frac{22}{7} \times 7 \times 7$</p> $\text{Shaded area} = (21 \times 14) - \left(\frac{1}{2} \times 14 \times 14 \right) - L_3$ $= 138.25$	1	1	1
		1	1	6

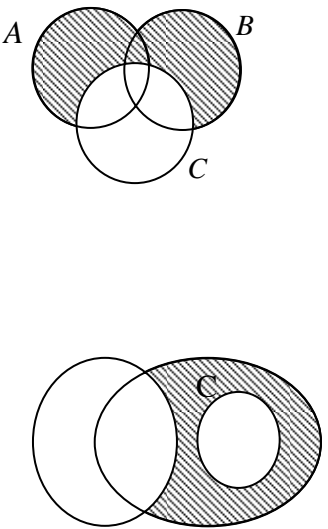
5.	Identify \angle GSJ $\tan \angle \text{GSJ} = \frac{6}{8}$ $36.87^\circ \text{ or } 36^\circ 52'$	1 1,1 1	4
6(a)(i) (ii) (b) ©	(i) True (ii) False The determinant of matrix a = 0 If $A \subset B$ then $A \cap B = A$ If $A \cap B = 0$ then $A \subset B$	1 1 1 1 1	5
7.	a) $F = (0,4)$, $G = (-4, 0)$ $\text{Gradient} = \frac{4-0}{0-(-4)}$ $= \frac{4}{4} = 1$ b) x-intercept of HIJ = $-\left(\frac{-3}{5}\right)$ $= \frac{3}{5}$ c) $y = mx + c$ $y = 5x - 3$	1 1 1 1 1	5
8	$\frac{1}{3}\pi r^2 h + \pi r^2 h = 231$ $\frac{1}{3} \times \frac{22}{7} \times (3.5)^2 h + \frac{22}{7} \times (3.5)^2 \times 4 = 231$ $h = 6$	1 2 1	4
9.	$S = \{(B1,B2), (B1,B3), (B1, G1), (B1,G2), (B2,B1), (B2,B3), (B2,G1), (B2,G2), (B3,B1), (B3,B2), (B3,G1), (B3,G2), (G1,B1), (G1,B2), (G1,B3), (G1,G2), (G2,B1), (G2,B2), (G2,B3), (G2,G1)\}$ $n(S) = 20$	1	5
(a)	$\{(B1,B2), (B1,B3), (B2,B1), (B2,B3), (B3,B1), (B3,B2)\}$	1	
	$P(\text{two boys}) = \frac{6}{20} = \frac{3}{10}$ $\{(B1,G1), (B1,G2), (B2,G1), (B2,G2), (B3,G1), (B3,G2), (G1,B1), (G1,B2), (G1,B3), (G2,B1), (G2,B2), (G2,B3), (G1,G2), (G2,G1)\}$ $P(\text{at least 1 girl}) = \frac{14}{20} = \frac{7}{10}$	1 1 1	
10 (a)	$k = -12$	1	

(b)	(i) $h = 26$	1	
	(ii) $\begin{pmatrix} x \\ y \end{pmatrix} = \frac{1}{26} \begin{pmatrix} 8 & 6 \\ 5 & 7 \end{pmatrix} \begin{pmatrix} -4 \\ 1 \end{pmatrix}$ $= \frac{1}{26} \begin{pmatrix} -26 \\ -13 \end{pmatrix}$ $= \begin{pmatrix} -1 \\ -\frac{1}{2} \end{pmatrix}$ $x = -1$ $y = -\frac{1}{2}$	1 1 1 1	6
11 (a)	20	1	
(b)	$\frac{23-5}{0-6}$ -3 atau nyahpecutan 3 atau awapecutan 3	1 1	
©	$\frac{1}{2} \times 6(23+5) + 4 \times 5 + \frac{1}{2} \times 5(5+k) = 139$ $k = 9$	2 1	6
12(a)	$x=-2$ $y=-1$ $x=2.5$ $y=0.8$	2	
(b)	graph	4	
©	i) $y=-1.3$ ii) $x=1.7$	2	
(d)	The straight line is $y = \frac{3}{4}x - 2$ The values of $x = -0.75$ and 3.45	2 2	12
13(a)	(i) (12, 7) (ii) (6, 7)	1 2	
(b)(i)	V is a rotation of 90° clockwise about point (7, 0) W is an enlargement with centre at (7, 3) and scale factor of 3	3 3	

(ii)	$\text{Area EFG} = k^2(\text{Area PQR})$ $72 = 3^2(\text{Area PQR})$ $\text{Area PQR} = 8 \text{ unit}^2$	3	12																		
14.	<p>a)</p> <table border="1" data-bbox="373 357 1153 619"> <thead> <tr> <th>Age</th> <th>Frequency</th> <th>Midpoint</th> </tr> </thead> <tbody> <tr> <td>40-44</td> <td>6</td> <td>42</td> </tr> <tr> <td>45-49</td> <td>12</td> <td>47</td> </tr> <tr> <td>50-54</td> <td>18</td> <td>52</td> </tr> <tr> <td>55-59</td> <td>9</td> <td>57</td> </tr> <tr> <td>60-64</td> <td>5</td> <td>62</td> </tr> </tbody> </table> <p>b) Mean age = 51.5 c) graph b) The modal age is 50-54 years old</p>	Age	Frequency	Midpoint	40-44	6	42	45-49	12	47	50-54	18	52	55-59	9	57	60-64	5	62	4 2 4 2	12
Age	Frequency	Midpoint																			
40-44	6	42																			
45-49	12	47																			
50-54	18	52																			
55-59	9	57																			
60-64	5	62																			
15.		3 4																			

			5	
				12
16.(a)	110 °W		2	
(b)(i)	$\angle HOK = \frac{4800}{60}$ $= 80^\circ$ <p>Latitude of K = 80 – 50 = 30°N</p>		1	
(ii)	<p>Distance F to H</p> $= (70 + 45) 60 \cos 50^\circ$ $= 4435.23 \text{ n.m}$		1	
(iii)	<p>Time = $\frac{4435.23 + 4800}{680}$</p> $= 13.58 \text{ hrs}$		2	
			3	
			1	12

JAWAPAN

<p>1</p>		<p>1</p> <p>2</p>	<p>3</p>
<p>2.</p>	$(p) \quad 4(5x - 1) = \frac{-3(5x - 1)}{x}$ $20x^2 - 11x - 3 = 0$ $(5x + 1)(4x - 3) = 0$ $x = -\frac{1}{5} \quad x = \frac{1}{4}$	<p>1</p> <p>1</p> <p>1, 1</p>	<p>4</p>
<p>3,</p>	$6m - 3n = 6$ $4m - 3n = 5$ $2m = 1$ $m = \frac{1}{2}$ $n = 1$	<p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>4</p>
<p>4.</p>	<p>Identify $\angle TRM$</p> $\tan \angle TRM = \frac{5}{\sqrt{8^2 + 6^2}}$ $\angle TRM = 26.57^\circ \text{ or } 26^\circ 34'$	<p>1</p> <p>1, 1</p> <p>1</p>	<p>4</p>

5.(a)	$\frac{45}{360} \times 2 \times \frac{22}{7} \times 14$ $\left(\frac{45}{360} \times 2 \times \frac{22}{7} \times 14 \right) + 14 + 14 + 14 + 14$ $70\frac{2}{3}$	1	6	
(b)	$\frac{45}{360} \times \frac{22}{7} \times 14 \times 14 \quad \text{or} \quad \frac{90}{360} \times \frac{22}{7} \times 14 \times 14$ $\left(\frac{45}{360} \times \frac{22}{7} \times 14 \times 14 \right) + 2 \left(14 \times 14 - \frac{90}{360} \times \frac{22}{7} \times 14 \times 14 \right)$ 161	1 1 1 1		
6.	30×10 $\frac{22}{7} \times 2^2 \times 10$ $30 \times 10 - \frac{22}{7} \times 2^2 \times 10 \quad \text{or any equivalent}$ $174.29 \quad \text{or } 174\frac{2}{7} \quad \text{or } \frac{1220}{7}$	1 1 1 1		4
7.	<p>(i) $m_{BC} = \frac{12-0}{0-8} = -\frac{3}{2}$</p> <p>(ii) $\frac{6-0}{k-0} = -\frac{3}{2}$, $k = -4$ or any equivalent</p> <p>(iii) $m_{AB} = \frac{12-6}{0-(-4)}$ $y = \frac{3}{2}x + 12$ or $0 = \frac{3}{2}x + 12$ or any equivalent x-intercept is -8 or $x = -8$.</p>	1 1 1 1 1		5

8.(a)			
(i)	True	1	
(ii)	False	1	
(b)	Premise 1 : If $p = 7$, then $6 \times p = 42$	1	
©	$4n^2 + 7, n = 1,2,3,4,\dots$	1,1	5
9.			
(a)	$S = \{TI, TG, TE, TR, IT, IG, IE, IR, GT, GI, GE, GR, ET, EI, EG, ER, RT, RI, RG, RE\}$	1	
(b)(i)	$\{GT, GI, GE, GR\}$	1	
	$\frac{1}{5}$	1	
(ii)	$\{TG, TR, IE, GT, GR, EI, RT, RG\}$	1	
	$= \frac{2}{5}$	1	5
10			
(a)	$P = \frac{1}{32-30} \begin{pmatrix} 8 & -5 \\ -6 & 4 \end{pmatrix}$ $= \frac{1}{2} \begin{pmatrix} 8 & -5 \\ -6 & 4 \end{pmatrix}$	1	
(b)	$\begin{pmatrix} 4 & 5 \\ 6 & 8 \end{pmatrix} \begin{pmatrix} m \\ n \end{pmatrix} = \begin{pmatrix} 7 \\ 10 \end{pmatrix}$ $\begin{pmatrix} m \\ n \end{pmatrix} = \frac{1}{2} \begin{pmatrix} 8 & -5 \\ -6 & 4 \end{pmatrix} \begin{pmatrix} 7 \\ 10 \end{pmatrix}$ $m = 3$ $n = -1$	1	
		1	
		1	
		1	6
11.			
(a)	15×6 $= 90$	1	
(b)	$\frac{90}{20}$ $= 4.5 \text{ ms}^{-1}$	1	
©	$\frac{180}{50}$ $= 3.6 \text{ ms}^{-1}$	1	
		1	6

12	<p>(a) $y = -4,$ $y = 6$</p> <p>(b) <u>Graph</u> : Axes are drawn in the correct direction with uniform scale in the range $-3.5 \leq x \leq 3.5$ and $-18 \leq y \leq 34$. All 7 points and 2 points* are correctly marked Smooth curve and continuously in range of $-3.5 \leq x \leq 3.5$ with no straight line part and passing through all the correct 9 points.</p> <p><u>Note</u>: (i) 7 @ 8 points are correctly plotted, 1 mark. (ii) Other scale used, minus 1 mark.</p> <p>(c) (i) $6.0 \leq y \leq 6.5$ (ii) $-2.8 \leq x \leq -2.7$</p> <p>(d) The equation $y = 2x + 10$ Straight line $y = 2x + 10$ correctly drawn and meet the curve. The value of x : $-2.5 \leq x \leq -2.4$ $-0.4 \leq x \leq -0.3$ $2.7 \leq x \leq 2.8$</p>	<p>1,1</p> <p>1</p> <p>2</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>2</p>	<p>12</p>
13.	<p>(a) (i) (3, 2) (ii) (7, -1) (iii) (1, 3)</p> <p>(b) (i) (a) M: Rotation, 180° clockwise/anticlockwise, centre at P @ (6, 3)</p> <p>(ii) N: Enlargement, scale factor 2, Centre at P @ (6, 3)</p> <p>(ii) $16 \times (2)^2 - 16$ 48</p>	<p>1</p> <p>1</p> <p>2</p> <p>3</p> <p>3</p> <p>1</p> <p>1</p>	<p>12</p>

<p>14.</p> <p>(a)</p> <table border="1" data-bbox="347 226 1154 472"> <thead> <tr> <th>Class interval</th> <th>Midpoint</th> <th>Frequency</th> </tr> </thead> <tbody> <tr> <td>21 – 25</td> <td>23</td> <td>5</td> </tr> <tr> <td>26 - 30</td> <td>28</td> <td>6</td> </tr> <tr> <td>31 – 35</td> <td>33</td> <td>8</td> </tr> <tr> <td>36 – 40</td> <td>38</td> <td>10</td> </tr> <tr> <td>41 – 45</td> <td>43</td> <td>7</td> </tr> <tr> <td>46 - 50</td> <td>48</td> <td>4</td> </tr> </tbody> </table> <p>(b)</p> $\text{Mean} = \frac{1420}{40}$ $= \text{RM } 35.50$ <p>(c)</p> <p>Graph</p> <p>(d)</p> <p>Modal class of the donations is 36 – 40</p>	Class interval	Midpoint	Frequency	21 – 25	23	5	26 - 30	28	6	31 – 35	33	8	36 – 40	38	10	41 – 45	43	7	46 - 50	48	4		<p>3</p> <p>3</p> <p>4</p> <p>2</p>	<p>12</p>
Class interval	Midpoint	Frequency																						
21 – 25	23	5																						
26 - 30	28	6																						
31 – 35	33	8																						
36 – 40	38	10																						
41 – 45	43	7																						
46 - 50	48	4																						
<p>15.</p>		<p>3</p> <p>4</p>																						

	<p>Diagram description: A large rectangle L/M/R/N with width 7 cm and height 3 cm. A dashed line segment B/G connects point B/G on the top edge to point C/H on the bottom edge. A horizontal dashed line segment S connects point S on the right edge to point B/G. The bottom edge is divided into segments C/H (1 cm), Q/P (6 cm), and P/N (1 cm).</p>	5	12
<p>16. (a) (b) © (d)</p>	<p>Longitude of S = 100° E</p> $\angle ROT = \frac{3600}{60}$ $= 60^\circ$ <p>Latitude of T = 60 - 40 = 20°S</p> <p>Distance R to S = 100 x 60 = 6000 n.m.</p> <p>Average speed = $\frac{180 \times 60 \times \cos 40 + 3600}{20}$ = $\frac{8273.30 + 3600}{20}$ = 593.66 n.m.</p>	<p>2 1 1 1 1 1 1 3 1</p>	12