

MODUL 11
MATEMATIK SPM "ENRICHMENT"
TOPIC : TRANSFORMATIONS
TIME : 2 HOUR

1. (a) Diagram 1 shows two points, *M* and *N*, on a Cartesian plane.

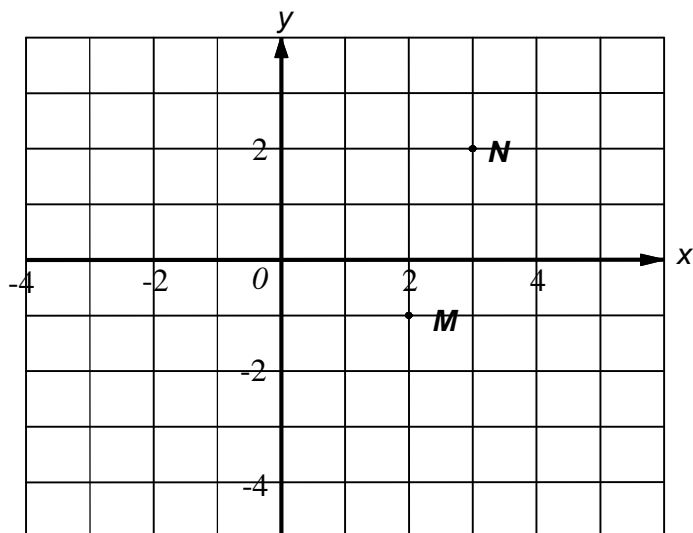


DIAGRAM 1

Transformation **Y** is a translation $\begin{pmatrix} -3 \\ -3 \end{pmatrix}$.

Transformation **P** is a reflection in the x-axis.

(i) State the coordinates of the image of point **N** under transformation **Y**.

(ii) State the coordinates of image of point **M** under the following transformation:

(a) **Y**²

(b) **YP**

[3 marks]

Answer:

(a) (i)

(ii) (a)

(b)

(b) Diagram 2 shows three trapezium $ABCD$, $EFGH$ and $PQRS$ on a Cartesian plane.

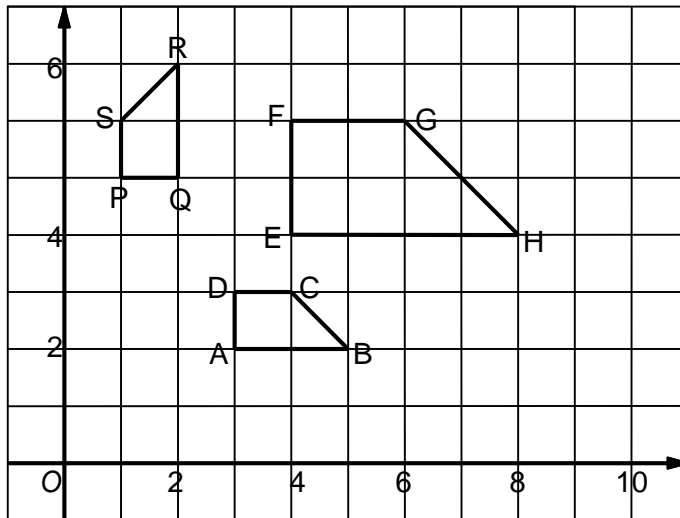


DIAGRAM 2

Trapezium $ABCD$ is the image of trapezium $PQRS$ under transformation **M**.
 Trapezium $EFGH$ is the image of trapezium $ABCD$ under transformation **N**.

(i) Describe in full transformation :

(a) **M**

(b) **N**

[6 marks]

(ii) Calculate the area of trapezium $EFGH$, if the area of trapezium $ABCD$ is 25 unit^2 .

[3 marks]

Answer:

(b) (i) (a)

(b)

(ii)

2. (a) Diagram 3 shows the point **K** on a Cartesian plane.

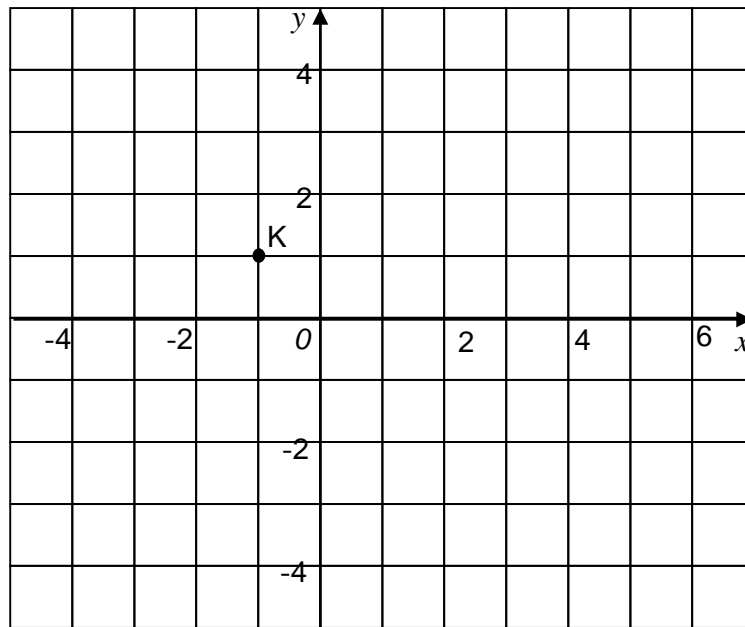


DIAGRAM 3

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]

Answer:

(a) (i)

(ii)

(b) Diagram 4 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 .

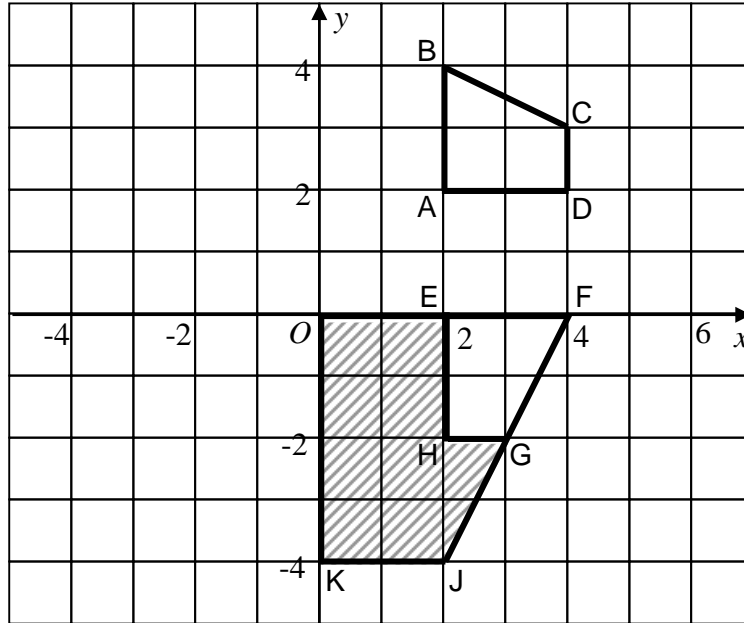


DIAGRAM 4

(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]

Answer:

(b) (i) (a)

(b)

(ii)

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

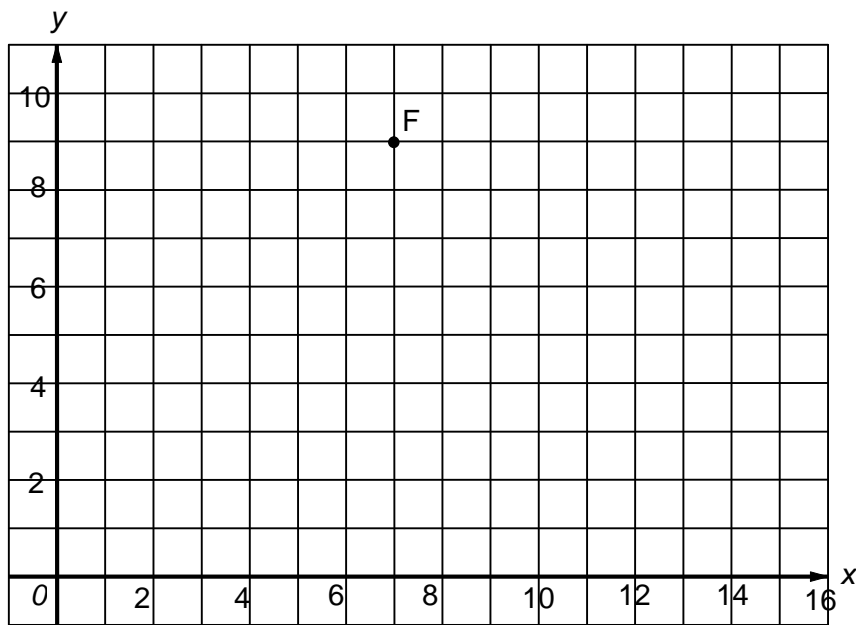


DIAGRAM 5

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

Transformation **T** is a reflection in the $x = 9$.

- (i) State the coordinates of the image of point **F** under transformation **S**.
- (ii) State the coordinates of image of point **F** under transformation **TS**. [3 marks]

Answer:

(a) (i)

(ii)

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

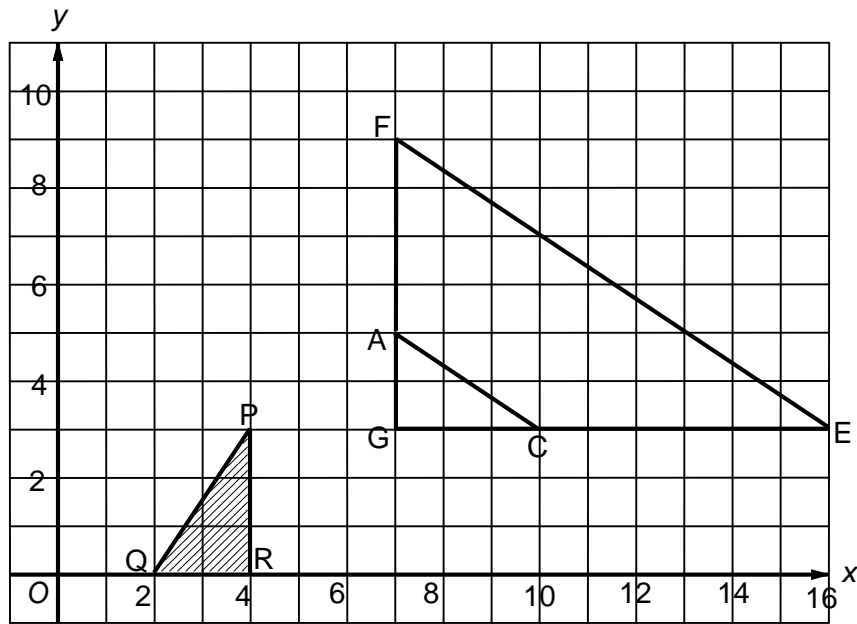


DIAGRAM 2

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

[3 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 .

[6 marks]

[
Answer:

(b) (i) (a)

(b)

(ii)

4. (a) Diagram 7 shows the point **M** on a Cartesian plane.

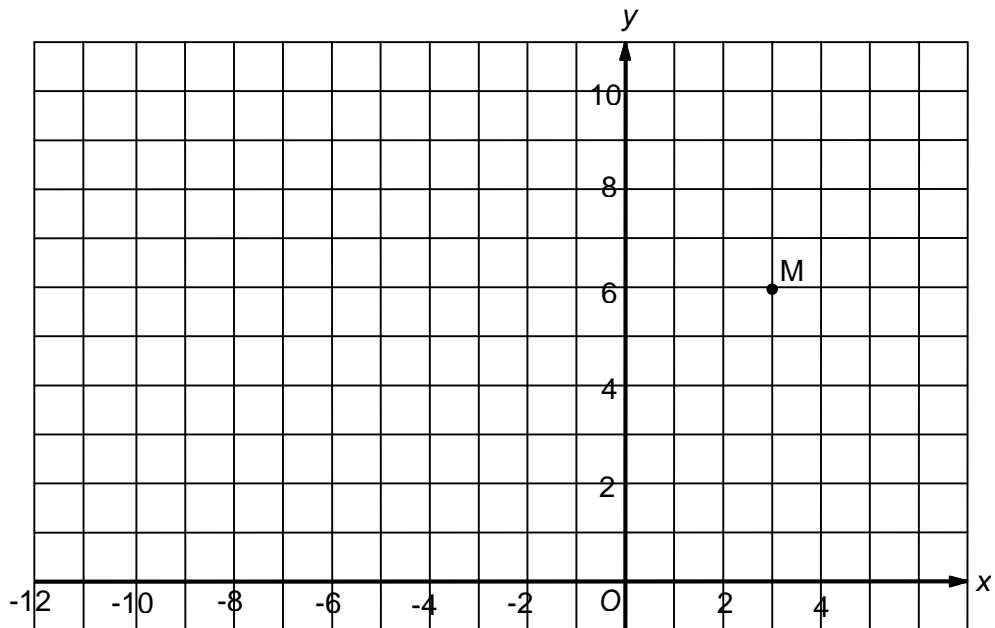


DIAGRAM 7

Transformation **P** is a reflection in the line $x = -3$.

Transformation **R** is a rotation of 90° clockwise about the origin.

State the coordinates of the image of point **M** under the following transformation:

(i) **P**

(ii) **RP**

[3 marks]

Answer:

(a) (i)

(ii)

(b) Diagram 8 shows three trapezium $ABCD$, $RSTU$ and $WSYX$ on a Cartesian plane.

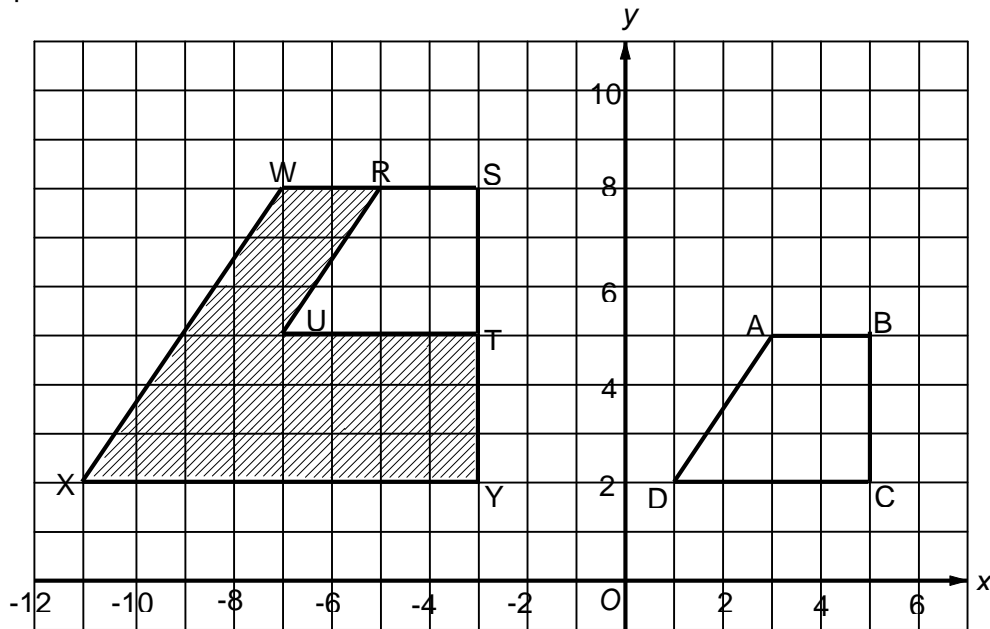


DIAGRAM 8

$WSYX$ is the image of $ABCD$ under combined transformation UV .

(i) Describe in full transformation :

(a) U

(b) V

[5 marks]

(ii) Given that the area of shaded region $WXYTUR$ represents a region of area 150 cm^2 . Calculate the area, in cm^2 , of the region represented by $RSTU$.

[4 marks]

Answer:

(b) (i) (a)

(b)

(ii)

5. (a) Transformation **R** is a 90° clockwise rotation at centre (2, 2).

Transformation **T** is a translation $\begin{pmatrix} 4 \\ -3 \end{pmatrix}$.

State the coordinate of the image for coordinate (6, 4) under the following transformations:

(i) **R**².

(ii) **TR**.

[4 marks]

Answer:

(a) (i)

(ii)

(b) Diagram 9 shows quadrilateral, *ABCD*, *PQRS* and *EFGH*, drawn on a Cartesian plane.

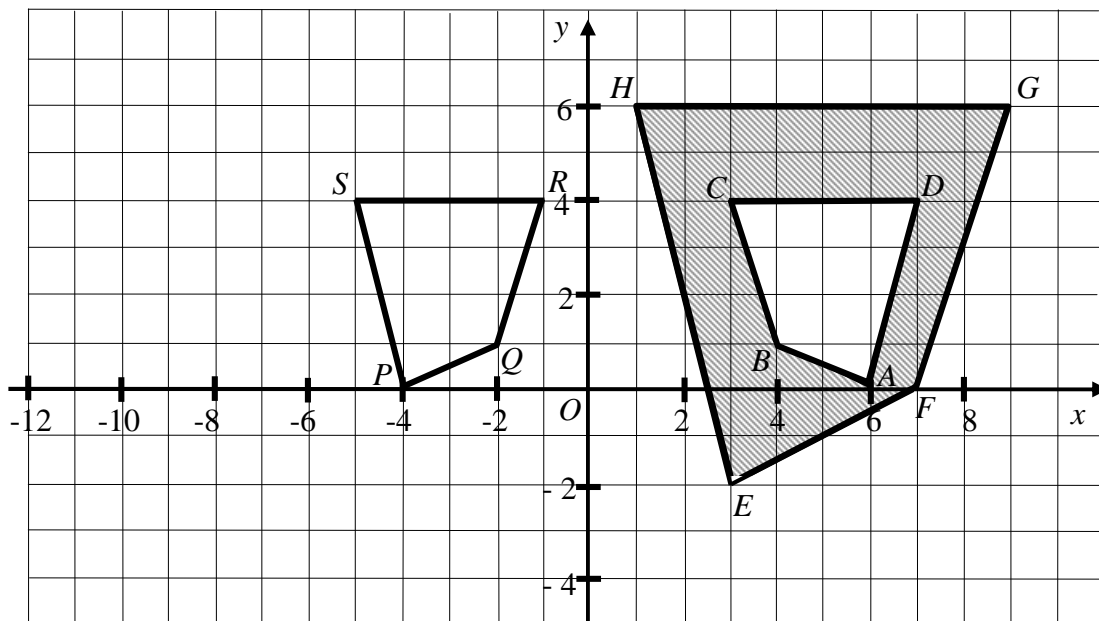


DIAGRAM 9

PQRS is the image of *ABCD* under transformation **S** and *EFGH* is the image of *PQRS* under transformation **Q**.

(i) Describe in full transformation :

(a) Transformation **S**

(b) Transformation **Q**

[5 marks]

(ii) Given the area of $ABCD$ is 64 unit^2 , calculate the area of shaded region.

[3 marks]

Answer:

(b) (i) (a)

(b)

(ii)

JAWPAN MODUL11
TOPIC : TRANSFORMATIONS

1	(a) (i)	(0, -1)	1
	(ii)(a)	(-3, -4)	1
	(b)	(-1, -2)	1
	(b)(i)(a)	M is a rotation of 90° clockwise about point (1,3)	3
	(b)	N is an enlargement with centre at (2,0) and a scale factor of 2	3
	(ii)	Area EFGH = k^2 (Area ABCD) = $2^2(25)$ = 100 unit ²	3
2	(a)(i)	(4, -2)	1
	(ii)	(1, 0)	2
	(b)(i)(a)	U is a rotation of 90° clockwise about the point (1, 1)	3
	(b)	V is an enlargement with centre at (4, 0) and scale factor of 2	3
	(ii)	Area OFJK = k^2 (Area ABCD) $120 + \text{Area ABCD} = 2^2(\text{Area ABCD})$ Area ABCD = 40 unit ²	3
3	(a)(i)	(12, 7)	1
	(ii)	(6, 7)	2
	(b)(i)(a)	V is a rotation of 90° clockwise about point (7, 0)	3
	(b)	W is an enlargement with centre at (7, 3) and scale factor of 3	3
	(ii)	Area EFG = k^2 (Area PQR) $72 = 3^2(\text{Area PQR})$ Area PQR = 8 unit ²	3
4	(a)(i)	(-3, 6)	1
	(ii)	(6, 11)	2
	(b)(i)(a)	U is a translation $\begin{pmatrix} -8 \\ 3 \end{pmatrix}$	1
	(b)	V is an enlargement with centre at (-3, 8) and scale factor of 2.	3
	(ii)	Area WXYZ = k^2 (Area RSTU) $150 + \text{RSTU} = 2^2(\text{Area RSTU})$ Area RSTU = 50 cm ²	4
5	(a)(i)	(-3, 0)	2
	(ii)	(4, 4)	2
	(b)(i)(a)	S is a reflection in the line x=1 Q is an enlargement with centre at (-11, 2) and scale factor of 2.	2 3
	(ii)	Area ABCD + Area of shaded region = k^2 (Area ABCD) $64 + \text{Area of shaded region} = 2^2(64)$ Area of shaded region = $(256 - 64)$ cm ² Area of the shaded region = 192 cm ²	3 3

