Fully-Worked Solutions

PRACTICE 11

Section A

1 A reflection.
Answer: **A**

2 An anticlockwise rotation of 90° about the centre T.
Answer: **D**

3 Congruence means same shape and size.
Answer: **B**

4 $P + \begin{pmatrix} -4 \\ 3 \end{pmatrix} = \begin{pmatrix} 4 \\ -2 \end{pmatrix}$

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

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

$$= \begin{pmatrix} 8 \\ -5 \end{pmatrix}$$

Point $P = (8, -5)$
Answer: **C**

5 $\begin{pmatrix} x \\ y \end{pmatrix} + \begin{pmatrix} 2 \\ 5 \end{pmatrix} = \begin{pmatrix} -2 \\ 8 \end{pmatrix}$

$$\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} -2 \\ 8 \end{pmatrix} - \begin{pmatrix} 2 \\ 5 \end{pmatrix}$$

$$= \begin{pmatrix} -4 \\ 3 \end{pmatrix}$$

$\begin{pmatrix} -4 \\ 3 \end{pmatrix} + \begin{pmatrix} -3 \\ 2 \end{pmatrix} = \begin{pmatrix} -7 \\ 5 \end{pmatrix}$

Image = (–7, 5)
Answer: **A**

6 Translation = $\begin{pmatrix} 3 \\ -2 \end{pmatrix}$
Answer: **B**

7

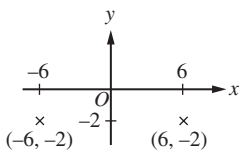
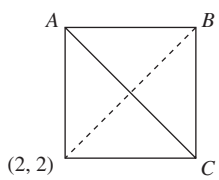


Image = (–6, –2)
Answer: **C**

8 B does not have inverted sides.
Answer: **B**

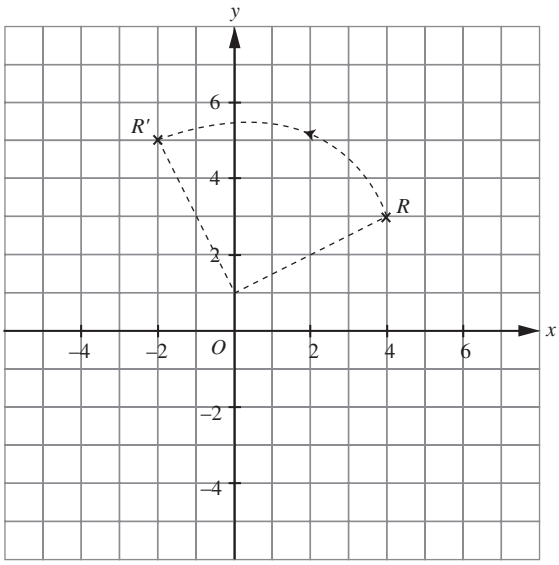
9



Answer: **A**

10 Distance of M to x-axis = Distance of **D** to x-axis
Answer: **D**

11



Answer: **D**

12 *Answer*: **C**

13 Under an isometric transformation, the shape and size of the object remain unchanged.
Answer: **D**

14 Reflection (Inverted sides)
Answer: **A**

15 **B** has two axes of symmetry.
Answer: **B**

16 The object has two axes of symmetry (Second order).
Answer: **B**

Section B

1 (a) (i) ✗
(ii) ✓
(b) (i) ✓
(ii) ✗

2 (a) B, D
(b) (i) V
(ii) T

3 (a) (i) FALSE (Not necessary to have the same orientation)
(ii) TRUE
(b) (i) ✓
(iii) ✓

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Section C

1 (a) (i) P : Reflection
Q : Translation

(ii) (1) Same size
(2) Same shape

(b) $\begin{pmatrix} p \\ q \end{pmatrix} + \begin{pmatrix} 3 \\ -5 \end{pmatrix} = \begin{pmatrix} 1 \\ -1 \end{pmatrix}$

$\begin{pmatrix} p \\ q \end{pmatrix} = \begin{pmatrix} 1 \\ -1 \end{pmatrix} - \begin{pmatrix} 3 \\ -5 \end{pmatrix}$

$= \begin{pmatrix} -2 \\ 4 \end{pmatrix}$

$\therefore p = -2,\ q = 4$

$\begin{pmatrix} -2 \\ 4 \end{pmatrix} + \begin{pmatrix} 6 \\ -2 \end{pmatrix} = \begin{pmatrix} -2 + 6 \\ 4 - 2 \end{pmatrix}$

$= \begin{pmatrix} 4 \\ 2 \end{pmatrix}$

Coordinates of image = (4, 2)

(c) Anticlockwise rotation of 90° at the point (4, 2).

2 (a) (1) Rotation of 180° at the point J.
(2) Reflection at point J.

(b) $T + \begin{pmatrix} -2 \\ 0 \end{pmatrix} = \begin{pmatrix} 6 \\ 3 \end{pmatrix}$

$T = \begin{pmatrix} 6 \\ 3 \end{pmatrix} - \begin{pmatrix} -2 \\ 0 \end{pmatrix}$

$= \begin{pmatrix} 6 + 2 \\ 3 \end{pmatrix}$

$= \begin{pmatrix} 8 \\ 3 \end{pmatrix}$

Translation = $\begin{pmatrix} 8 \\ 3 \end{pmatrix}$

(c) Reflection in the line JH.

(d) Area of $DFJG$
$= 136 \div 4$
$= 34 \text{ units}^2$

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