

GCSE Maths: Translation (Higher): worksheet

GCSE Maths - Transformations and Similarity - Higher - Lesson 21.3

Name: _____

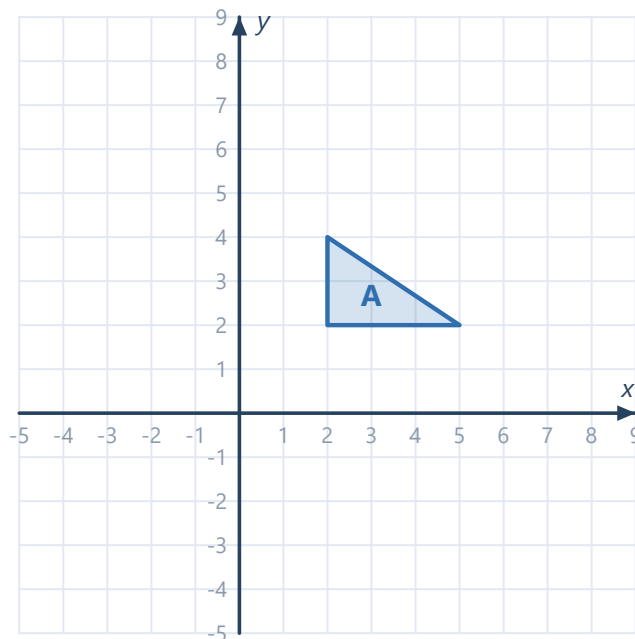
Date: _____

Score: _____

15 questions. Write your answers in the spaces. Answers and step-by-step help are free at websink.site/gcse/maths/ch21-transformations-congruence-similarity/higher/translation/

Exercise 21C Translation Non-calculator

- 1 Shape A has vertices at (2, 2), (5, 2), (2, 4). Translate A by each vector and write down the vertices of the image.



(a) $\begin{pmatrix} 3 \\ 2 \end{pmatrix}$

Answer: _____

(b) $\begin{pmatrix} -4 \\ 0 \end{pmatrix}$

Answer: _____

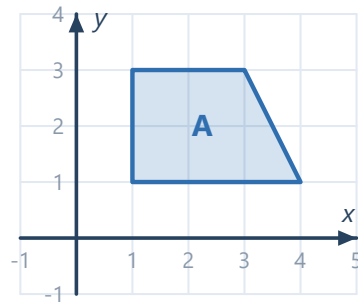
(c) $\begin{pmatrix} 0 \\ -5 \end{pmatrix}$

Answer: _____

(d) $\begin{pmatrix} -3 \\ 4 \end{pmatrix}$

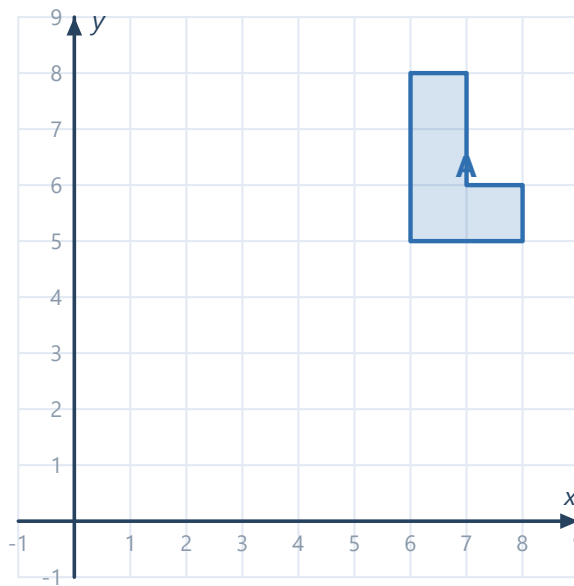
Answer: _____

- 2 Translate shape A by the vector $\begin{pmatrix} 3 \\ -4 \end{pmatrix}$. Write down the coordinates of the vertices of the image B. A has vertices at (1, 1), (4, 1), (3, 3), (1, 3).



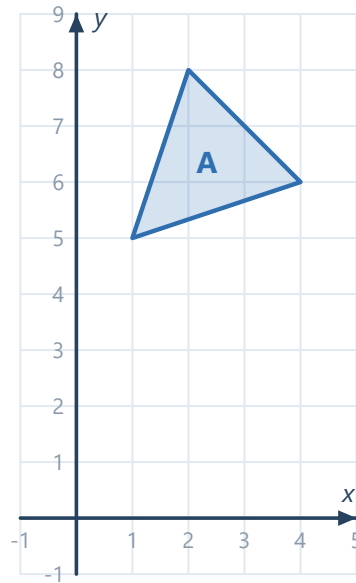
Answer:

- 3** Translate shape A by the vector $\begin{pmatrix} -4 \\ -5 \end{pmatrix}$. Write down the coordinates of the vertices of the image B. A has vertices at (6, 5), (8, 5), (8, 6), (7, 6), (7, 8), (6, 8).



Answer:

- 4** Translate shape A by the vector $\begin{pmatrix} 6 \\ -5 \end{pmatrix}$. Write down the coordinates of the vertices of the image B. A has vertices at (1, 5), (4, 6), (2, 8).



Answer:

5 Write down the image of the point (2, -1) after a translation by:

(a) $\begin{pmatrix} 3 \\ 4 \end{pmatrix}$

Answer:

(b) $\begin{pmatrix} -5 \\ 2 \end{pmatrix}$

Answer:

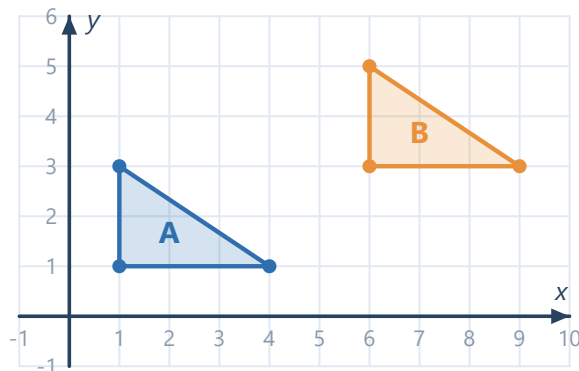
(c) $\begin{pmatrix} 0 \\ -6 \end{pmatrix}$

Answer:

(d) $\begin{pmatrix} -2 \\ -3 \end{pmatrix}$

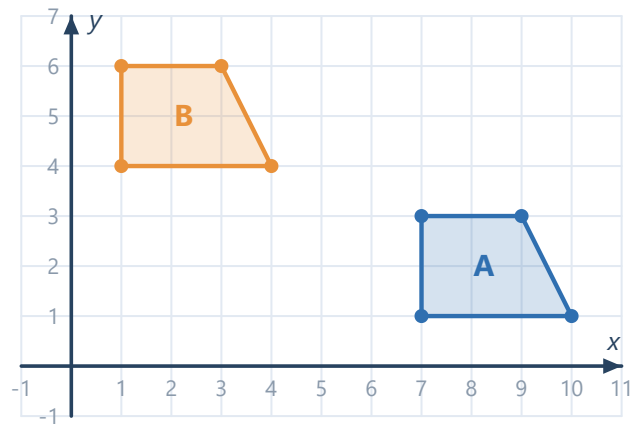
Answer:

6 Describe fully the single transformation that maps A onto B.



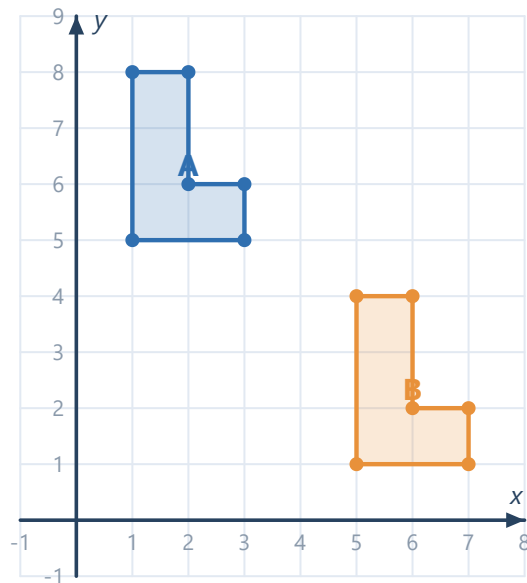
Answer:

7 Describe fully the single transformation that maps shape A onto shape B.



Answer:

- 8** Describe fully the single transformation that maps shape A onto shape B.



Answer:

- 9** Write down the column vector of the translation that takes each point to its image.

(a) $P(1, 2)$ to $P'(4, 6)$

Answer:

(b) $Q(5, 3)$ to $Q'(2, 3)$

Answer:

(c) $R(-2, 4)$ to $R'(1, -1)$

Answer:

- 10** Shape A is translated by $\begin{pmatrix} 4 \\ -3 \end{pmatrix}$ to give shape B. What is the column vector of the translation that takes B back to A?

Answer:

- 11** Tom says: "The vector $\begin{pmatrix} 2 \\ 3 \end{pmatrix}$ moves a shape 3 to the right and 2 up." Explain what is wrong with Tom's answer.

Answer:

- 12** A robot on a grid starts at (1, 1). It moves by $\begin{pmatrix} 3 \\ 2 \end{pmatrix}$ and then by $\begin{pmatrix} -5 \\ 1 \end{pmatrix}$. Work out where the robot finishes, and the single translation vector from the start to the finish.

Answer:

- 13** A translation maps the point (2, 1) onto the point (7, -3). Work out the image of the point (-1, 4) under the same translation.

Answer:

- 14** Show that a translation by $\begin{pmatrix} 3 \\ 2 \end{pmatrix}$ followed by a translation by $\begin{pmatrix} -1 \\ 4 \end{pmatrix}$ gives the same final position as the translations done in the opposite order. Start at (0, 0).

Answer:

- 15 Challenge.** Is it possible for a translation to map a shape onto itself? Give a reason.

Answer:
