

Translations

Year 7 About 70 minutes No calculator 45 marks

Hints online, answers free with an account:
mathswariz.uk/worksheets/ks3-year-7-translations/

Date _____

A Do Now

Quick questions to start.

A1 Needed today [1 mark]
Work out $-4 - 7$.

Answer

A2 Needed today [1 mark]
Which of these two points is further to the right: $(-5, 3)$ or $(-2, 3)$?

Answer

A3 Last lesson [1 mark]
One angle of a parallelogram is 64° . Work out the size of an angle next to it.

Answer

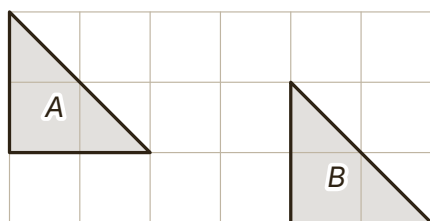
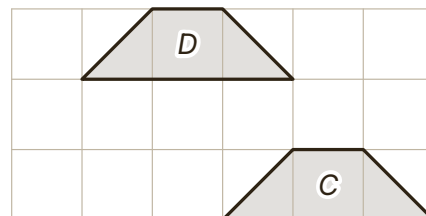
A4 From chapter 1 [1 mark]
Work out $(-3)^3$.

Answer

B Example, then your turn

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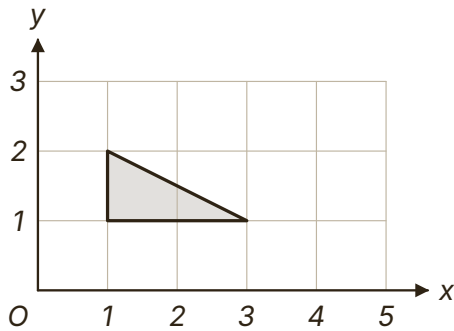
Your teacher works through each example with you. Then try the one beside it.

EXAMPLE 1Describe the translation that takes shape *A* onto shape *B*.**Hint** Pick one corner of *A*. Count the squares across to the same corner of *B*, then the squares up or down.**B1** Describe the translation that takes shape *C* onto shape *D*. [2 marks]

Answer

EXAMPLE 2

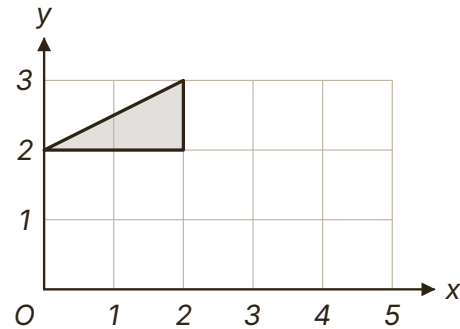
Translate the triangle 2 units right and 1 unit up. Write down the coordinates of the corners of the image.



Hint Move each corner on its own. Right adds to x , up adds to y .

B2 [2 marks]

Translate the triangle 3 units right and 2 units down. Write down the coordinates of the corners of the image.



Answer

EXAMPLE 3

A point Q is translated 4 units left and 2 units up. Its image is $(1, 6)$. Find the coordinates of Q .

Hint Undo the translation: go 4 units right and 2 units down from the image.

B3 [2 marks]

A point R is translated 5 units right and 6 units down. Its image is $(-3, 2)$. Find the coordinates of R .

Answer

EXAMPLE 4

A shape is translated 3 units right and 4 units up. Its image is then translated 5 units left and 1 unit up. Describe the single translation that has the same effect.

Hint Add the moves across, with left counting as negative. Then add the moves up and down.

B4 [2 marks]

A shape is translated 6 units right and 2 units down. Its image is then translated 1 unit left and 5 units down. Describe the single translation that has the same effect.

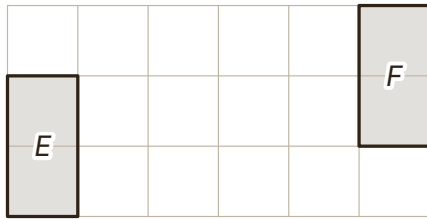
Answer

C Practice

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- C1** Describe the translation that takes shape F onto shape E .

[2 marks]



Answer

- C2** The point $(-1, -4)$ is translated 3 units left and 6 units up. Write down the coordinates of the image.

[2 marks]

Answer

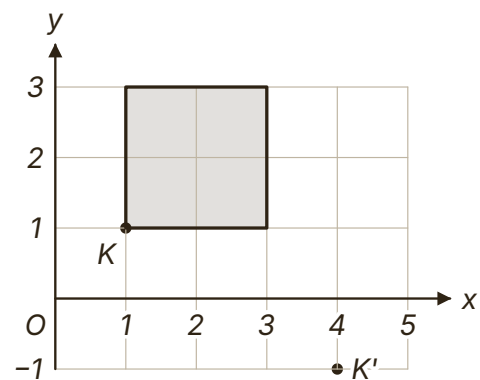
- C3** The translation 3 units left and 2 units up is written as the column vector $\begin{pmatrix} -3 \\ 2 \end{pmatrix}$. Write the translation 4 units right and 5 units down as a column vector.

[1 mark]

Answer

- C4** The square is translated so that corner K moves to K' . Write down the coordinates of the image of the corner $(3, 3)$.

[2 marks]



Answer

D Exam-style questions

GCSE Foundation

- D1** Mia says, "The translation 4 units right and 1 unit down takes shape A onto shape B . So the same translation takes shape B back onto shape A ."

[3 marks]

Mia is wrong. Explain why, and describe the translation that takes B onto A .

D2 A robot on a coordinate grid starts at $(2, 1)$. It makes three moves, one after the other: 3 units right and 4 units up, then 5 units left and 2 units down, then 1 unit right and 6 units down.

(a) Work out the coordinates of the point where the robot finishes.

[2 marks]

Answer

(b) Describe the single translation that takes the robot from where it finishes back to $(2, 1)$.

[2 marks]

Answer

Total for D2: 4 marks

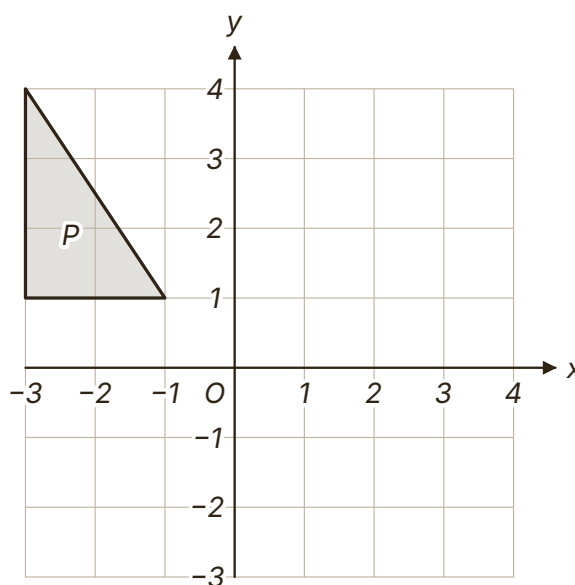
D3 Triangle P is drawn on the grid.

(a) P is translated 5 units right and 3 units down to give triangle Q . Write down the corners of Q .

Answer

(b) Q is translated 4 units left and 1 unit down to give triangle R . Write down the corners of R .

Answer



(c) Describe the single translation that takes triangle R back onto triangle P .

[2 marks]

Answer

Total for D3: 6 marks

D4 The point K is translated by the column vector $\begin{pmatrix} -3 \\ 5 \end{pmatrix}$. Its image is $K' = (1, 2)$.

(a) Work out the coordinates of K .

[2 marks]

Answer

- (b) K' is then translated by the column vector $\begin{pmatrix} 6 \\ -2 \end{pmatrix}$ to give K'' . Write down the single column vector that translates K to K'' . [2 marks]

Answer

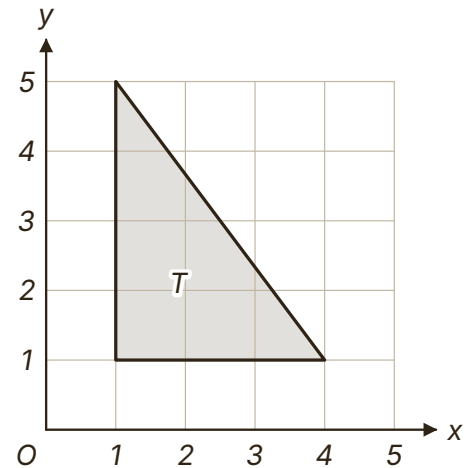
Total for D4: 4 marks

D5 Triangle T has corners $(1, 1)$, $(4, 1)$ and $(1, 5)$.

- (a) Work out the area of triangle T . [2 marks]

Answer

- (b) T is translated 5 units left and 2 units down. Write down the area of the image. Give a reason. [2 marks]



Answer

Total for D5: 4 marks

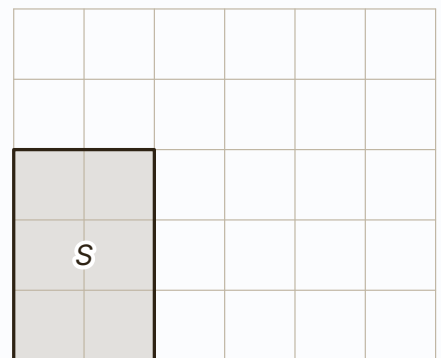
E Extension

Stretch

No route is given. The hints are at the end of the sheet. Use one at a time.

- E1** A translation moves rectangle S to a new position on whole squares, still completely on this grid. How many different translations are there? [5 marks]

Answer



Extension hints

Cover these with paper. Uncover one at a time.

- E1 Hint 1** Work out how far right S can move, and how far up, without leaving the grid.
- Hint 2** S can move 0, 1, 2, 3 or 4 units right and 0, 1 or 2 units up.
- Hint 3** That is $5 \times 3 = 15$ positions. One is where S already is, so there are $15 - 1 = 14$ translations.

How did it go?

Colour one circle on each line: not yet, nearly, yes.

I can describe a translation in words and as a column vector. ☐ ☐ ☐

I can translate a shape or a point, and undo a translation. ☐ ☐ ☐

I can join two translations into one. ☐ ☐ ☐