

Year 6

Small Steps Guidance and Examples

Block 4: Position and Direction

White Rose Maths

Overview

Small Steps

- Coordinates in the first quadrant
- Coordinate in four quadrants
- Translations
- Reflections

NC Objectives

Describe positions on the full coordinate grid (all four quadrants).

Draw and translate simple shapes on the coordinate plane, and reflect them in the axes.

The First Quadrant

Notes and Guidance

Children recap work from Year 4 and Year 5 by reading and plotting coordinates.

They draw shapes on a 2D grid from co-ordinates given and use their increasing understanding to write co-ordinates for shapes with no grid lines.

Mathematical Talk

Which axis do we look at first?

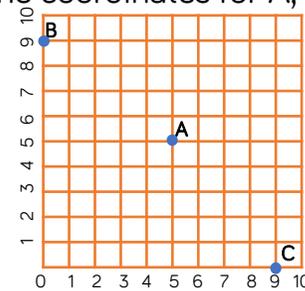
Does joining up the vertices already given help you to draw the shape?

Can you draw a shape in the first quadrant and describe the co-ordinates of the vertices to a friend?

Varied Fluency

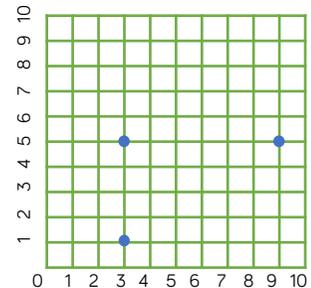
1

Chris plots three coordinates.
Work out the coordinates for A, B and C.



2

Amir is drawing a rectangle on a grid.
Plot the final vertex of the rectangle.
Write the co-ordinate of the final vertex.



3

Draw the vertices of the polygon with the co-ordinates
(7, 1), (7, 4) and (10, 1).
What type of polygon is the shape?

The First Quadrant

Reasoning and Problem Solving

Jamie is drawing a trapezium.
He wants his final shape to look like this:



Jamie uses the co-ordinates $(2, 4)$, $(4, 5)$, $(1, 6)$ and $(5, 6)$.

Will he draw a trapezium that looks correct?

If not, can you correct his co-ordinates?

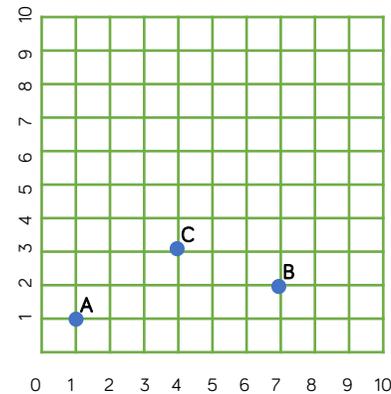


Jamie has plotted the co-ordinate $(4, 5)$ incorrectly. This should be plotted at $(4, 4)$ to make the trapezium that Jamie wanted to draw.

Marie has written the co-ordinates of point A, B and C.

A $(1, 1)$ B $(2, 7)$ C $(3, 4)$

Mark Marie's work and correct any mistakes.



A is correct but B & C have been plotted with the x & y co-ordinates the wrong way round.

Four Quadrants

Notes and Guidance

Children use knowledge of the first quadrant to read and plot coordinates in all four quadrants.

They draw shapes from co-ordinates given.

Children need to become fluent in deciding which part of the axis is positive or negative.

Mathematical Talk

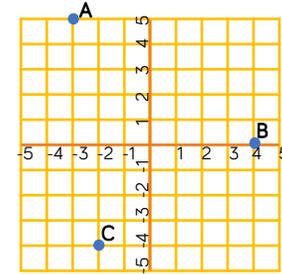
Which axis do we look at first?

If (0, 0) is the centre of the axis (the origin), which way do you move on the x axis to find negative co-ordinates? Which way do you move on the y axis to find negative co-ordinates?

Varied Fluency

1

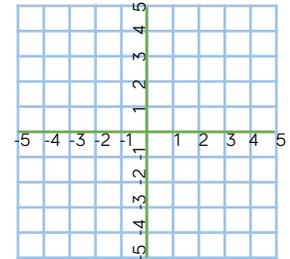
Emily plotted three co-ordinates. Work out the co-ordinates of A, B and C.



2

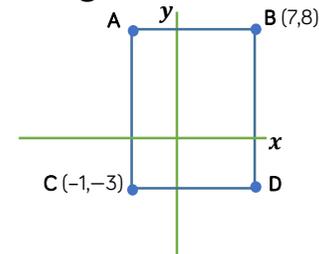
Draw the shape with the following co-ordinates $(-2, 2)$, $(-4, 2)$, $(-2, -3)$ and $(-4, -2)$.

What kind of shape have you drawn?



3

Work out the missing co-ordinates of the rectangle.

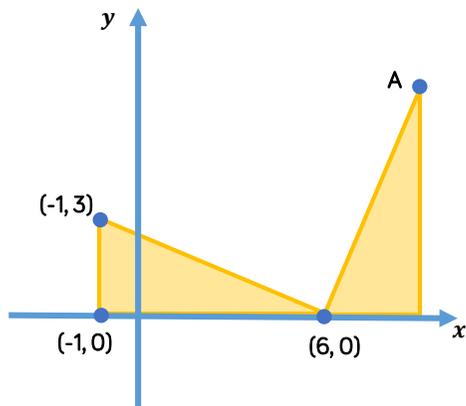


Four Quadrants

Reasoning and Problem Solving

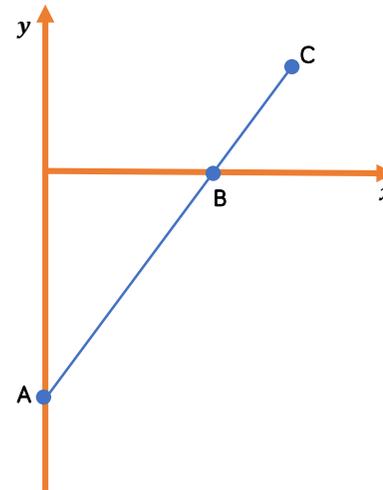
The diagram shows two identical triangles. The co-ordinates of three points are shown.

Find the co-ordinates of point A.



Answer:
 $(9, 7)$

A is the point $(0, -10)$
B is the point $(8, 0)$
The distance from A to B is two thirds of the distance from A to C.
Find the co-ordinates of C



Answer:
 $(12, 5)$

Translations

Notes and Guidance

Children use knowledge of co-ordinates and positional language to translate shapes in all four quadrants. They describe translations using direction and use instructions draw translated shapes.

Mathematical Talk

What does translation mean?

Which point are you going to look at when describing the translation?

Does each vertex translate in the same way?

Varied Fluency

1 Use the graph describe the translations.

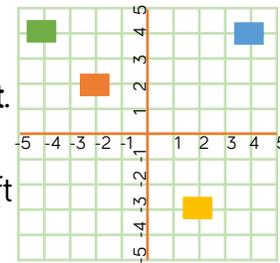
One has been done for you.

From  to  translate **8** units to the **left**.

From  to  translate units to the left and units up.

From  to  translate 4 units to the and 5 units .

From  to  translate units to the and units .

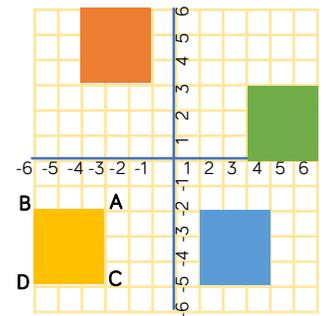


2 Write the coordinates for A, B, C and D.

Describe the translation of ABCD to the blue square.

ABCD is moved 8 units up and 2 units to the right- which colour square is it moved to?

Write the co-ordinates for A, B, C and D now it is translated.

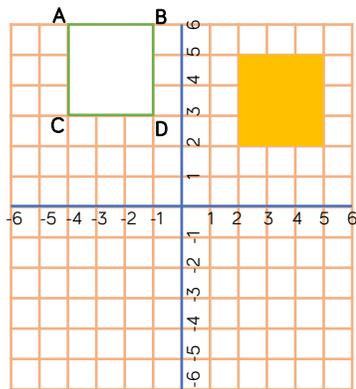


Translations

Reasoning and Problem Solving

True or false

Sam has translated ABCD 6 units down and 1 unit to the right to get to the yellow square.

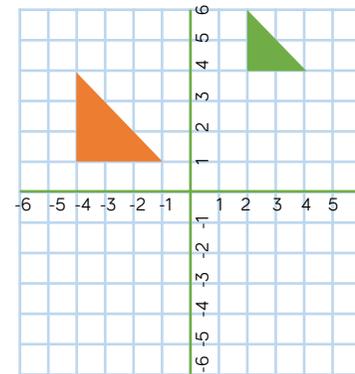


Explain your reasoning.

Answer:
False.
The translation is 6 units to the right and 1 unit down.

Spot the mistake.

The green triangle has been translated 6 units to the left and 3 units down.



Answer:
The mistake is that the red triangle is larger than the blue triangle

Reflections

Notes and Guidance

Children extend their knowledge of reflection by reflecting shapes in four quadrants. They will reflect in both the x and the y -axis.

Children should use their knowledge of co-ordinates to ensure that shapes are correctly reflected.

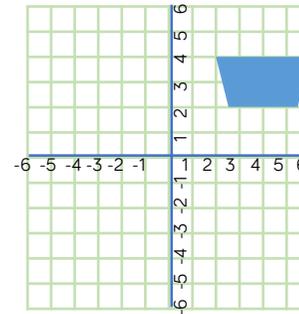
Mathematical Talk

How is reflecting different to translating?

Can you reflect one vertex at a time? Does this make it easier to reflect the shape?

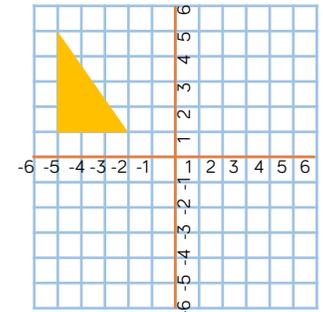
Varied Fluency

- 1 Reflect the trapezium in the x and the y axis. Complete the table with the new co-ordinates of the shape.



	Reflected in the x axis	Reflected in the y axis
(3,4)		
(6,4)		
(7,7)		
(2,7)		

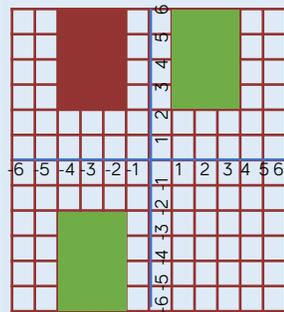
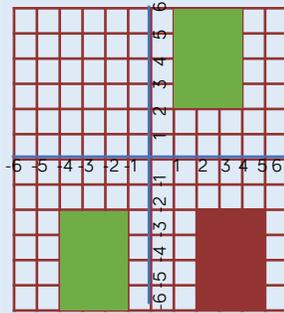
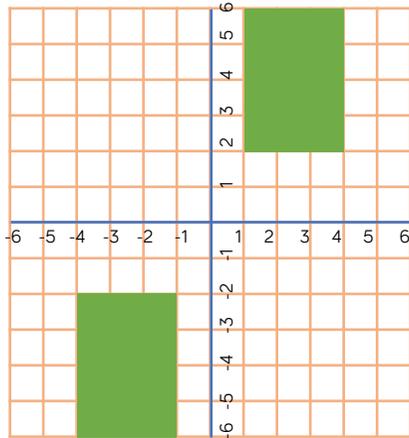
- 2 Translate the shape 4 units to the right. Reflect the shape in the y axis.



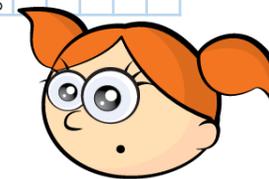
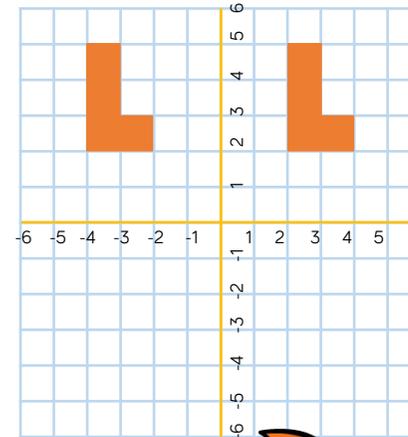
Reflections

Reasoning and Problem Solving

A rectangle has been reflected in the x axis and the y axis.
Where could the starting rectangle have been? Is there more than one option?



Tess has reflected the orange shape across the x axis. Is her drawing correct? If not explain why.



Answer:
The shape has been translated 6 across and 0 down but has not been reflected.