Your notes

GCSE Maths: revision notes

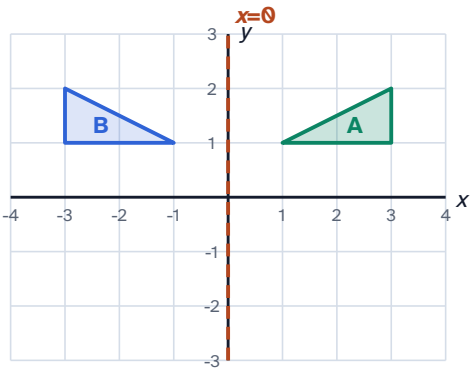
Transformations

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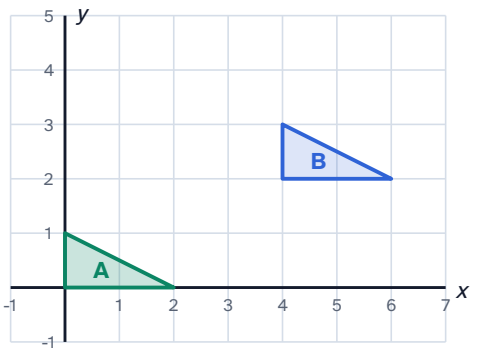
Reflection and rotation

- A **reflection** is described by its mirror line, such as '**reflection** in the y-axis' or '**reflection** in the line y = x'.
- A **rotation** is described by its angle, its direction (clockwise or anticlockwise) and its centre, such as '**rotation** 90° clockwise about (0, 0)'.
- Reflecting (3, 1) in the x-axis gives (3, –1); in the y-axis gives (–3, 1); in the line y = x gives (1, 3).
- Rotating (3, 1) about the origin: 90° clockwise gives (1, –3); 180° gives (–3, –1).



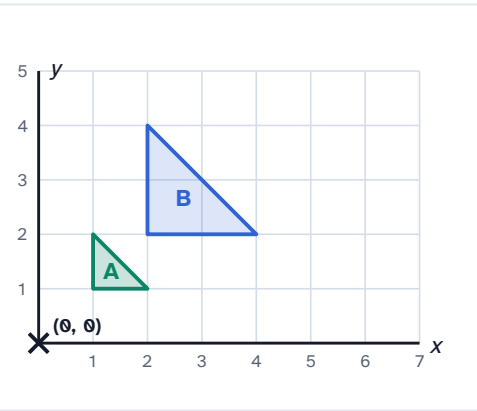
Translation

- A **translation** slides a shape without turning it. It is described by a **column vector**: the top number moves it right (positive) or left (negative), and the bottom number moves it up (positive) or down (negative).
- A **translation** 4 right and 2 down moves (1, 5) to (5, 3).



Enlargement

- An **enlargement** is described by its **scale factor** and its **centre of enlargement**.
- **Scale factor** 2 doubles every length. **Scale factor** ½ halves every length, so the shape gets smaller.
- To find the centre, draw straight lines through matching corners of the shape and its image. They meet at the centre.
- (Higher) With a negative **scale factor**, the image is on the other side of the centre and upside down.



Describing fully

- 'Describe fully' needs one transformation with all its details: **reflection** (mirror line); **rotation** (angle, direction, centre); **translation** (vector); enlargement (scale factor, centre).
- **Reflections**, **rotations** and **translations** give congruent images. Enlargements give similar images.
- (Higher) An **invariant point** stays in the same place, such as a point on the mirror line of a **reflection**.

Key terms

Reflection	Flipping a shape in a mirror line.
Rotation	Turning a shape through an angle about a fixed point.

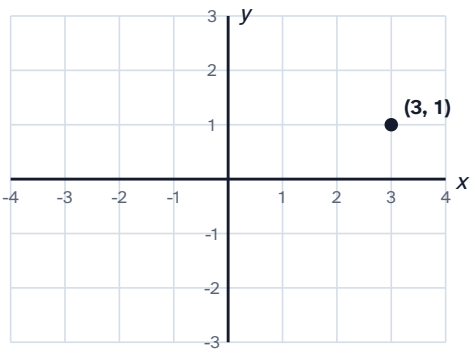
Your notes

Translation	Sliding a shape without turning or flipping it.
Enlargement	Changing the size of a shape by a scale factor from a centre.
Scale factor	The number every length is multiplied by in an enlargement.
Centre of enlargement	The fixed point an enlargement is measured from.
Column vector	Two numbers, one above the other, that describe a movement across and up.
Invariant point	A point that does not move under a transformation.

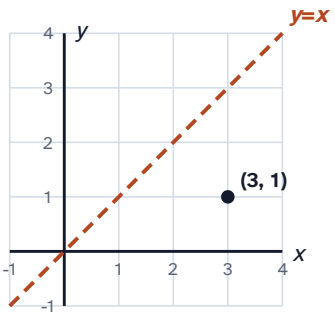
Quick questions

Cover the answers and test yourself: remembering is what makes it stick.

1. Which transformation slides a shape without turning it?
2. Which three details describe a rotation?
3. What do you need to describe a reflection?
4. Reflect (3, 1) in the x-axis.

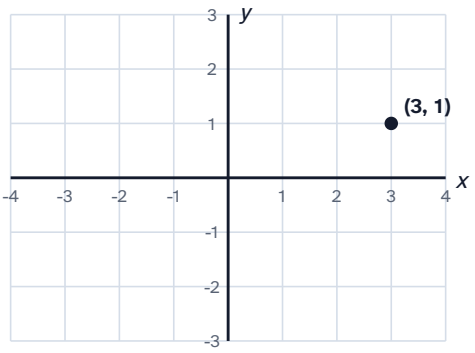


5. Reflect (3, 1) in the line y = x.



Your notes

6. Rotate (3, 1) through 180° about the origin.



7. A shape is enlarged by scale factor 3. One side was 4 cm. How long is it now?
8. What does an enlargement with scale factor ½ do?

Answers

1. Translation
2. Angle, direction and centre
3. The mirror line
4. (3, –1)
5. (1, 3)
6. (–3, –1)
7. 12 cm
8. Halves every length

What to do next

Practise 12 questions on this topic

Try 6 exam questions, with mark schemes

Read the lesson, one step at a time

Free revision for GCSE and KS3 at lycolearn.co.uk. Some notes are for one exam board only, and say so in brackets.

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