MATHEMATICS · GRADES 4-6

Reflections and rotations

Difficulty level: Intermediate

Mathematics: Grades 4-6

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Overview of the concept

This is how you describe shapes flipping in a mirror or turning in place, like a logo flipped on a shirt or a windmill blade turning without changing size. A logo printed backwards on a shirt is a reflection, and a windmill blade that turns is a rotation, but neither one changes the shape itself. A pattern on a tile floor repeats by flipping and turning the same tile, and a dancer turning on the spot is a rotation too. Naming the move tells you exactly what happened to the shape, and what stayed the same.



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Rule

A reflection flips a shape across a mirror line, and each point moves to the same distance on the other side.

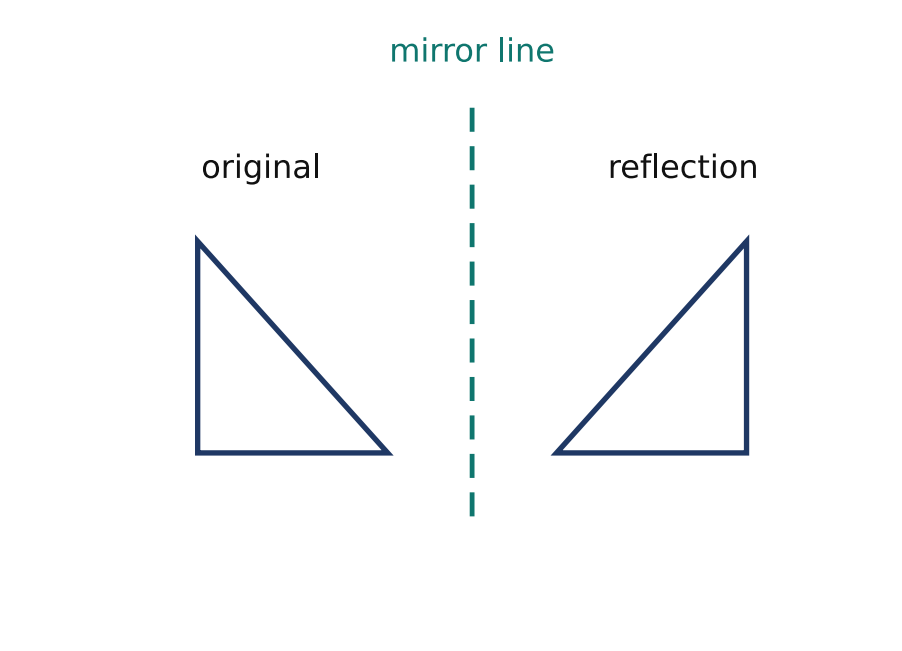
A rotation turns a shape around a centre by a set amount. Both keep the shape the same size.

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Worked examples

EXAMPLE 1

Q A triangle is reflected across a vertical mirror line. What does its reflection look like?



SOLUTION

Left: /| Right: |\

Mirror line between them

Same size, flipped left to right

Draw the mirror line.

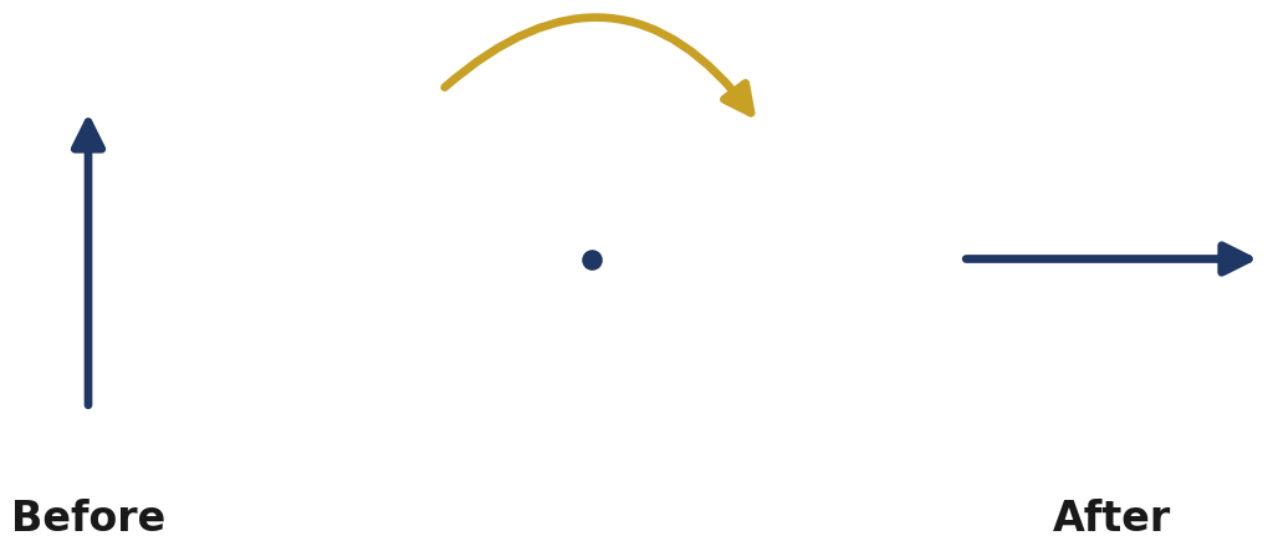
Copy each corner to the same distance on the other side of the line.

Join the copied corners: the shape is flipped, not changed in size.

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EXAMPLE 2

Q Rotate a shape a quarter turn clockwise



SOLUTION

Before: arrow pointing up

Quarter turn clockwise

After: arrow pointing right

Find the centre of the turn.

Turn every point a quarter turn, clockwise, around that centre.

The shape keeps its size; only its direction changes.

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Practice questions

1 A square is reflected across a horizontal mirror line. What does its reflection look like?

- **A** A square the same size, flipped top to bottom
- **B** A square twice as big, flipped top to bottom
- **C** A square the same size, flipped left to right
- **D** A rectangle the same size, flipped top to bottom

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2

An arrow points up. After three quarter turns clockwise, which way does it point?

A Left

B Right

C Up

D Down

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3

A triangle is reflected across a horizontal mirror line. Does the shape change size?

A Yes

B No

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4 An arrow points right. After a quarter turn clockwise, which way does it point?

- **A** Down
- **B** Up
- **C** Left
- **D** Right

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5 An arrow points up. After a half turn, which way does it point?

- **A** Down
- **B** Up
- **C** Left
- **D** Right

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6 **A triangle is reflected across a vertical mirror line. One corner of the triangle is 3 cm from the mirror line. How far is its reflection from the mirror line?**

- A 3 cm
- B 6 cm
- C 1.5 cm
- D 0 cm

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7 **An arrow points down. After a quarter turn anticlockwise, which way does it point?**

- A Left
- B Right
- C Up
- D Down

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8 The letter F is flipped left to right, like in a mirror. Is this a reflection or a rotation?

- A A reflection
- B A rotation

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9 An arrow turns clockwise. Is turning clockwise a reflection or a rotation?

- A A rotation
- B A reflection

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10 How many quarter turns make one full turn?

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ANSWER KEY

1. A square the same size, flipped top to bottom

2. Left

3. No

4. Down

5. Down

6. 3 cm

7. Right

8. A reflection

9. A rotation

10. 4

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