

Sec. 1.2: Rotation Symmetry

Learning Targets:

1. Recognize when a shape or figure has rotation symmetry.
2. Determine the order of rotation for a shape or figure.
3. Calculate the angle of rotation for a shape or figure.

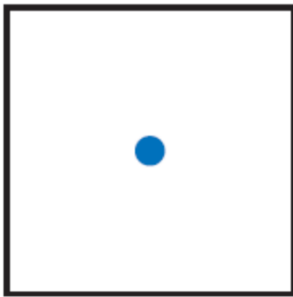
Key Ideas:

- Some shapes or figures that do not have any line symmetry may still be symmetrical in a different way.
- **Rotation** symmetry exists whenever a shape or design can be rotated about its **centre** in such a way that it fits back into its own outline **more than once** in a complete turn.
- A figure may have line symmetry in addition to rotation symmetry.

Rotation Symmetry:



This shape does not have any line symmetry, but it does exhibit **rotation** symmetry



This shape has _____.



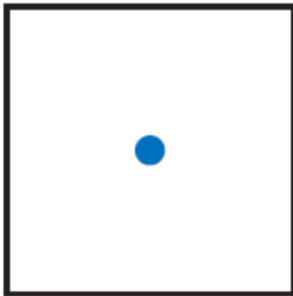
This shape has _____.

Mathematics 9
Unit 4(a): Symmetry

Order of Rotation:



The **order of rotation** for a figure is the number of times the shape will fit back into its outline in one complete turn.



Angle of Rotation:

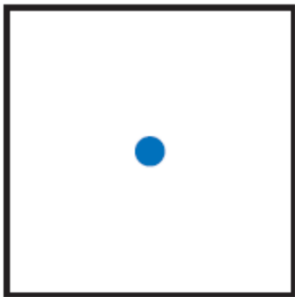


The **angle of rotation** for a figure is minimum amount of rotation Needed in order for the shape to fit back into its outline.
The angle of rotation is measured in degrees using the **formula**:

$$\text{angle of rotation} = \frac{360^\circ}{\text{order of rotation}}$$

The angle of rotation can also be measured as a **fraction of a full turn**.

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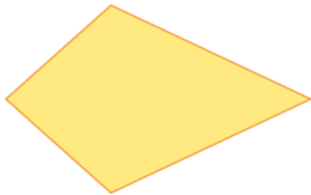
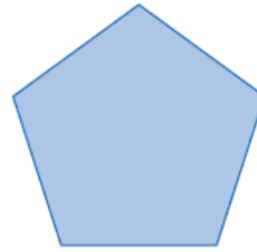


Example:

For each shape, determine the order of rotation and angle of rotation, both in degrees and as a fraction of a full turn.



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You Try:

Show You Know

For each shape, give the order of rotation, and the angle of rotation in degrees and as a fraction. Which of the designs have rotation symmetry?



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Unit 4(a): Symmetry

Example:

- a) What type of symmetry does each shape exhibit?
- b) For each example of line symmetry, indicate how many lines of symmetry there are. Describe whether the lines of symmetry are horizontal, vertical, or oblique.
- c) For each example of rotation symmetry, give the order of rotation, and the angle of rotation in degrees.



Figure 1

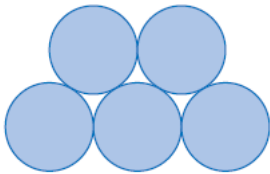


Figure 2

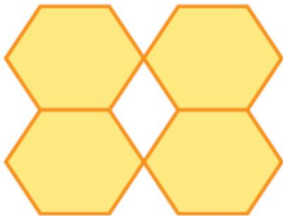


Figure 3

You Try:

Show You Know

Consider each figure.

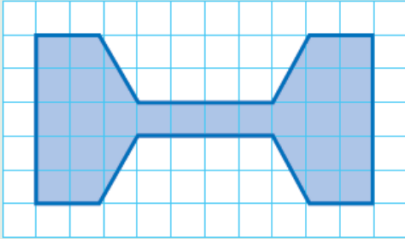


Figure A

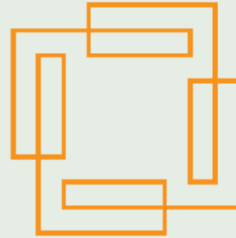


Figure B

- Does the figure show line symmetry, rotation symmetry, or both?
- If the figure has line symmetry, describe each line of symmetry as vertical, horizontal, or oblique.
- For each example of rotation symmetry, give the order of rotation.