Symmetry

By .... Kru ชี่

What is symmetry?

- **Symmetry** in mathematics can refer to one of two types:
  - **Line symmetry** which deals with **reflections** and **mirror images** of shapes or parts of shapes
  - Rotational symmetry which deals with how often a shape looks identical (**congruent**) when it has been rotated

Symmetry : Lines of symmetry

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What is line symmetry?

- **Line symmetry** refers to shapes that can have **mirror** lines added to them
  - Each side of the line of symmetry is a **reflection** of the other side

- Lines of symmetry can be thought of as a **folding** line too
  - **Folding** a shape along a line of symmetry results in the two parts sitting **exactly** on top of each other

Symmetry : Lines of symmetry

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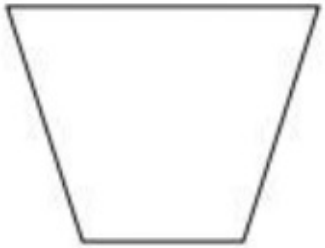
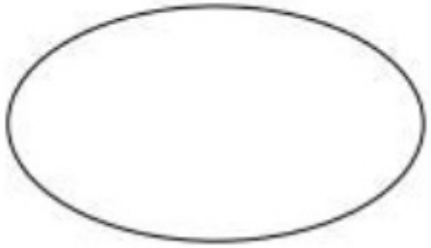
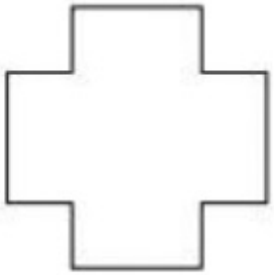
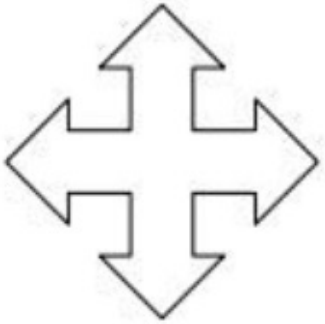
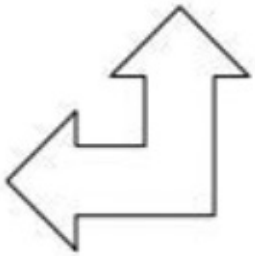




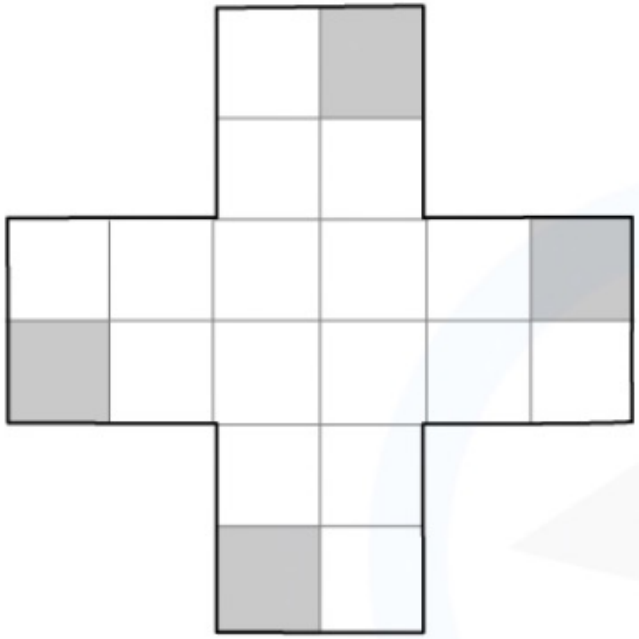






M A T H S

Draw line of symmetry



Symmetry : Lines of symmetry

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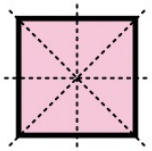
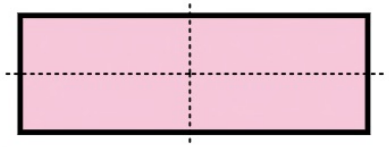
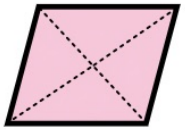
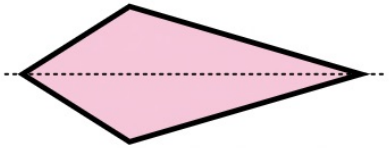
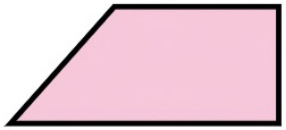
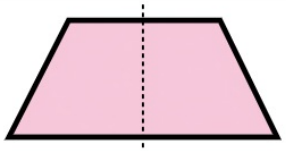
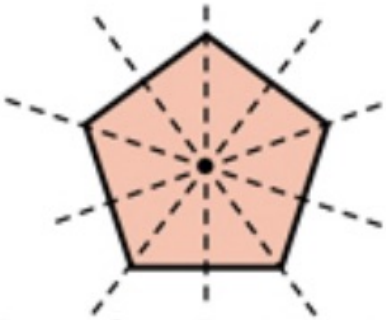
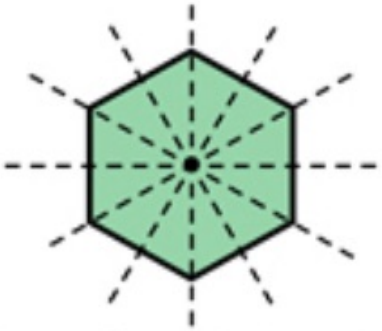
Quadrilateral	Image	Number of Lines of Symmetry
Square		4
Rectangle		2
Parallelogram		0
Rhombus		2
Kite		1
Trapezium		0
Isosceles Trapezium		1

Lines of symmetry in regular polygons



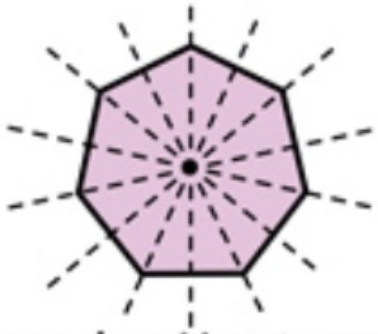
Regular Pentagon

Five lines of Symmetry



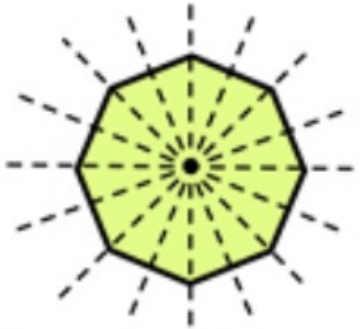
Regular Hexagon

Six lines of Symmetry



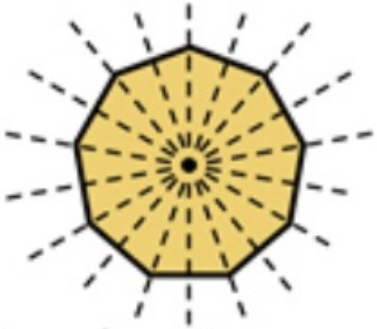
Regular Heptagon

Seven lines of Symmetry



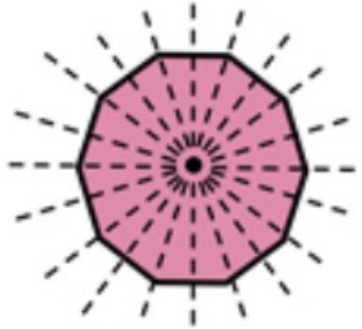
Regular Octagon

Eight lines of Symmetry



Regular Nonagon

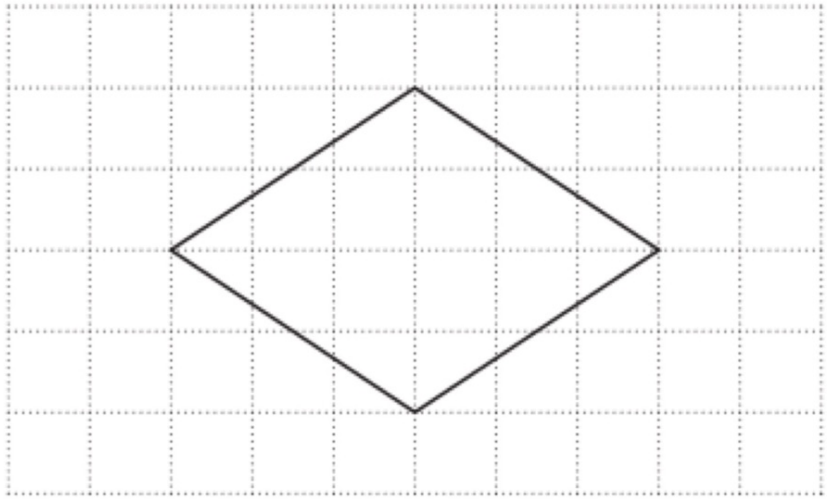
Nine lines of Symmetry



Regular Decagon

Ten lines of Symmetry

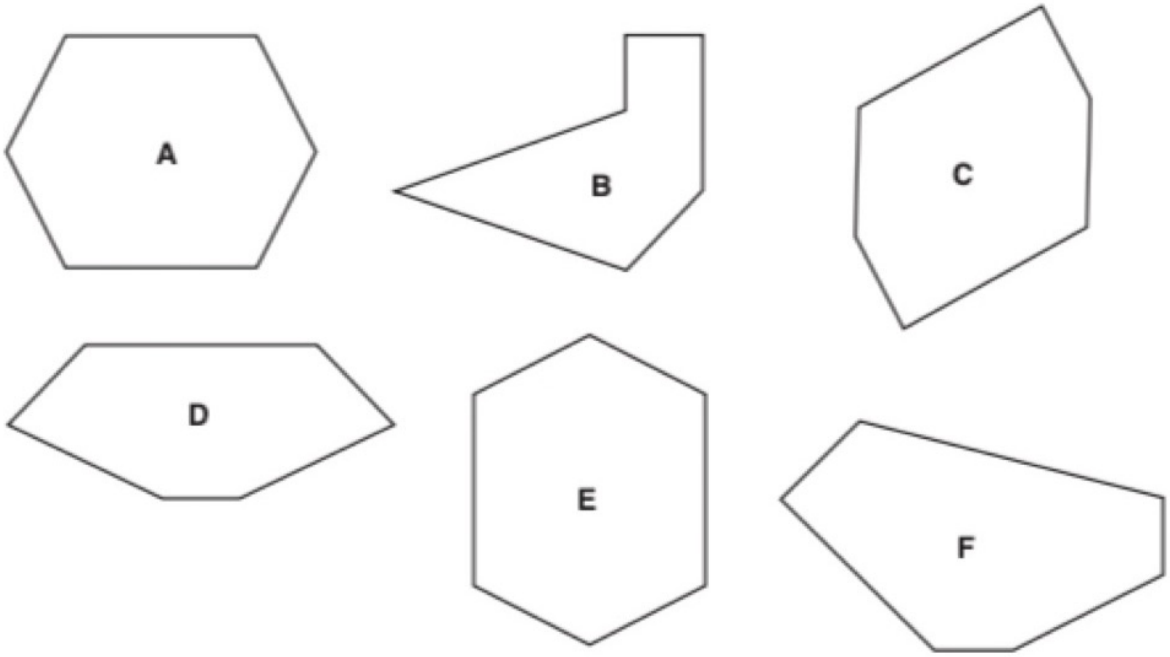
Question 1



A shape is drawn on a one-centimetre grid.

How many lines of symmetry does the shape have?

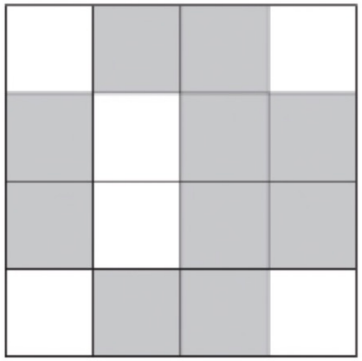
Question 2



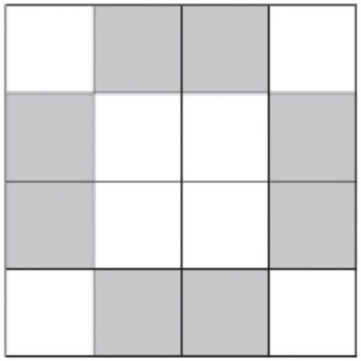
Which hexagon has **just one** line of symmetry?

Question 3

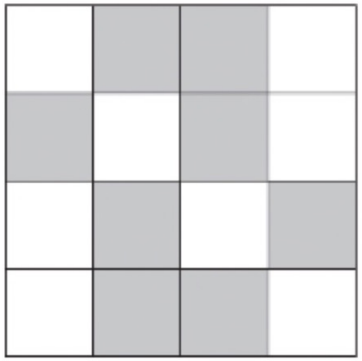
The diagrams show patterns made from grey tiles and white tiles.



A



B



C

One of the patterns has exactly 1 line of symmetry.

Write down the letter of this pattern.

Question 4

A B C D E

Which **three** flags have line symmetry?

What is rotational symmetry ?

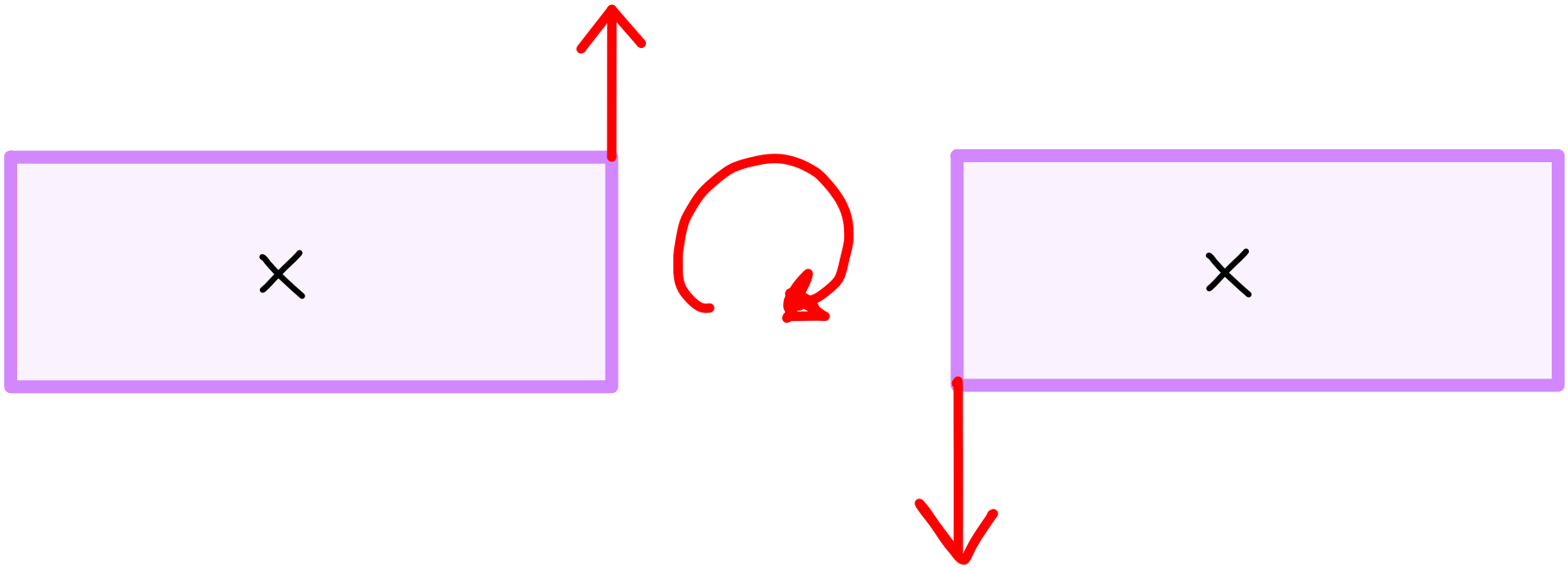
Rotational symmetry is the number of times a shape can "fit into itself" when it is rotated 360 degrees about its centre.

To calculate the order of rotational symmetry of a shape, you need to locate the centre of the shape.

If the polygon has an even number of sides, this can be done by joining the diagonals. If the polygon has an odd number of sides, this can be done by joining each vertex to the midpoint of the opposing side.

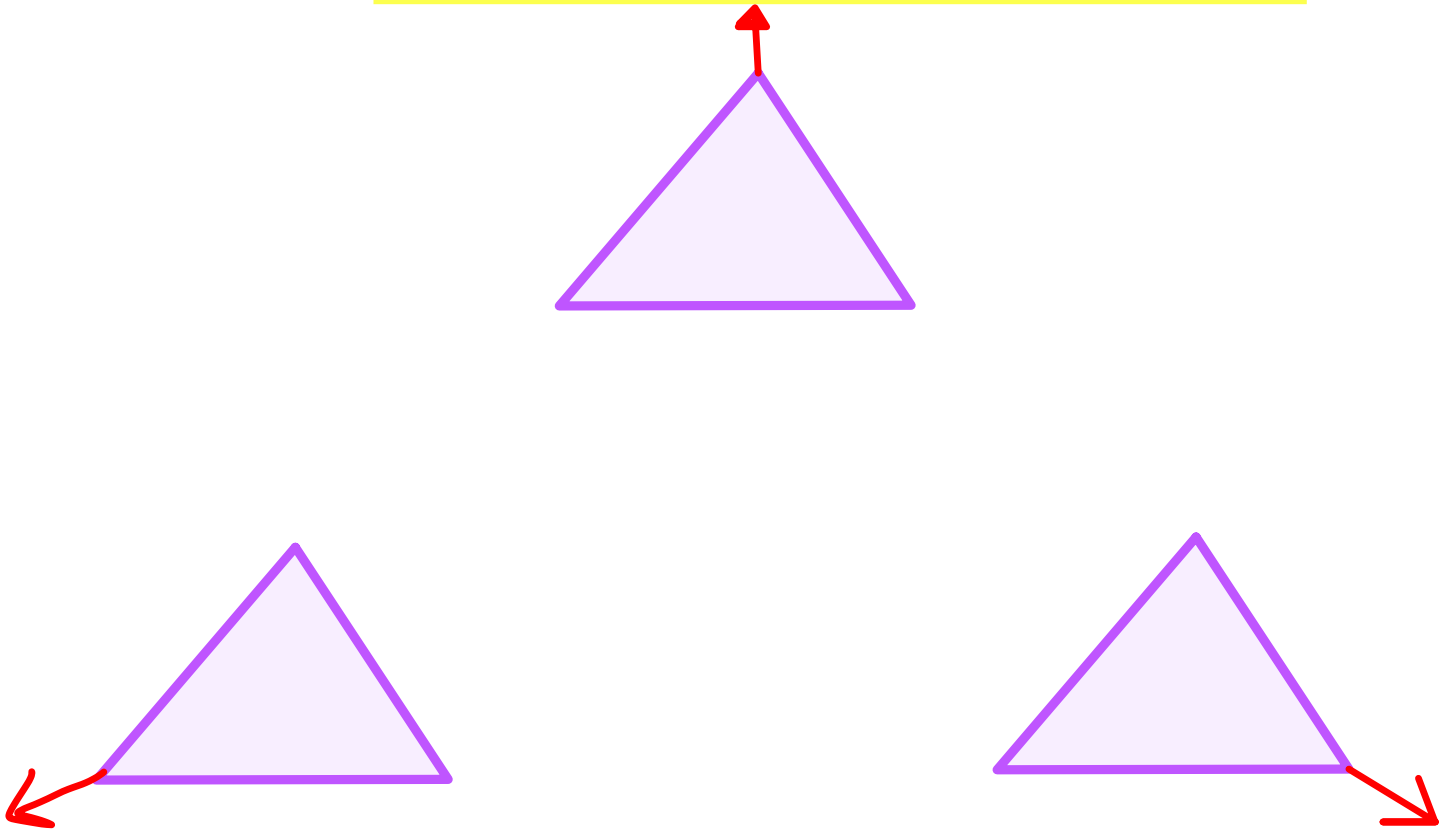
You then rotate the shape 360 degrees around the centre and see how many times the shape looks exactly like the original.

Rectangle



Order 2

Equilateral Triangle



Symmetry : Rotational symmetry

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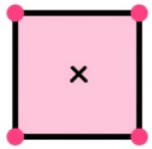
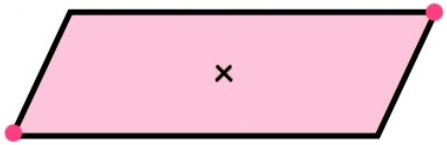
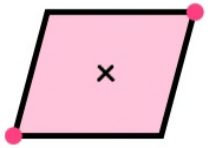
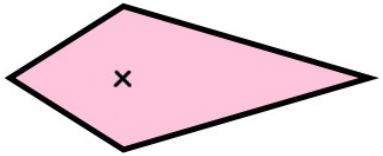
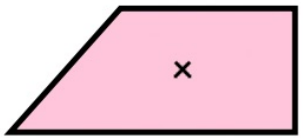
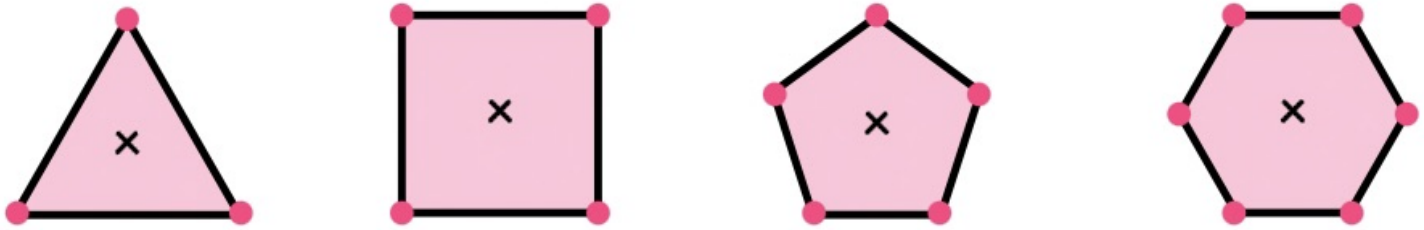
Quadrilateral	Image	Order of Rotational Symmetry
Square		4
Rectangle		2
Parallelogram		2
Rhombus		2
Kite		0
Trapezium		0
Isosceles Trapezium		0

Rotational symmetry in regular polygons



2D Polygon	Equilateral Triangle	Square	Regular Pentagon	Regular Hexagon
Order of Rotational Symmetry	3	4	5	6

Symmetry : Exercise

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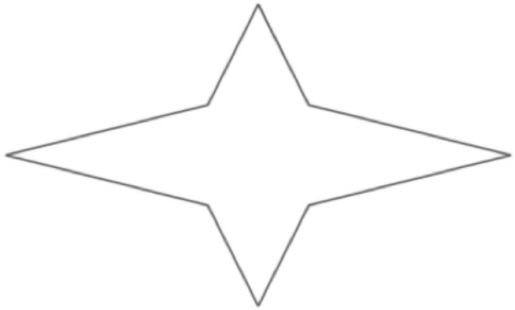

Lines of symmetry _____

Rotational symmetry order _____

Lines of symmetry _____

Rotational symmetry order _____

Lines of symmetry _____

Rotational symmetry order _____

Lines of symmetry _____

Rotational symmetry order _____

Symmetry : Exercise

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Lines of symmetry _____

Rotational symmetry order _____

Lines of symmetry _____

Rotational symmetry order _____

Lines of symmetry _____

Rotational symmetry order _____

Lines of symmetry _____

Rotational symmetry order _____

Symmetry : Exercise

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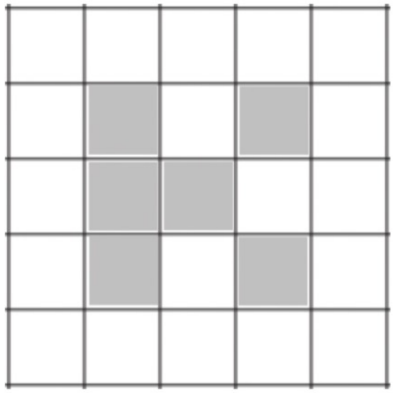
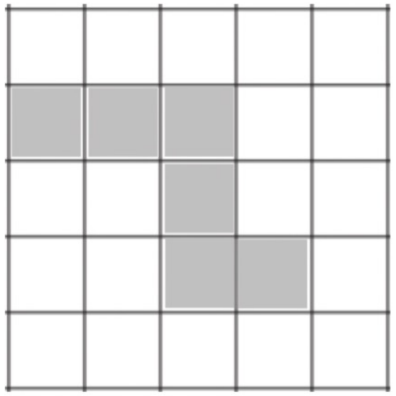


Shade one more square to make a pattern with 1 line of symmetry.



Shade one more square to make a pattern with rotational symmetry order 2.