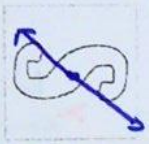
Rotational Symmetry

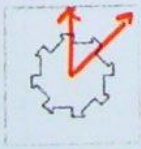
An image has **Rotational Symmetry** if there is a center point where an object is turned a certain number of degrees and still look the same. A rotation is sometimes called a TURN. These examples have rotational symmetry, but no reflectional symmetry.

How many **matches** there are as you go **once around** is called the **Order**.

Examples of Different Rotational Symmetry Order

Order	Example Shape	Angle of Rotation
Order 2		$360° \div 2 = 180°$
Order 3		$360° \div 3 = 120°$
Order 4		$360° \div 4 = 90°$

... and there is also Order 5, 6, 7, and ...

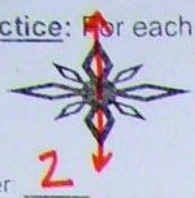
Order 8		$360° \div 8 = 45°$

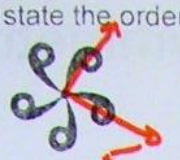
... and then there is Order 9, 10, and so on ...

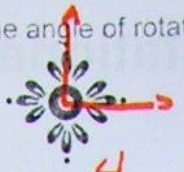
Is there Rotational Symmetry of Order 1 ?

Not really! If a shape only matches itself **once** as you go around (ie it matches itself after one full rotation) there is really no symmetry at all, because the word "Symmetry" comes from *syn-* ***together*** and *metron* ***measure***, and there can't be "together" if there is just one thing.

Practice: For each figure state the order and the angle of rotation.

1. 
Order: 2
Angle: 360 ÷ 2
180°

2. 
Order: 5
Angle: 360 ÷ 5
72°

3. 
Order: 4
Angle: 360 ÷ 4
90°

4. 
Order: 6
Angle: 360 ÷ 6
60°

Notes for Rotational Symmetry on a Coordinate Grid

The vertices of a polygon are listed. Graph and label each polygon and its image after a given rotation. Name the coordinates of the image.

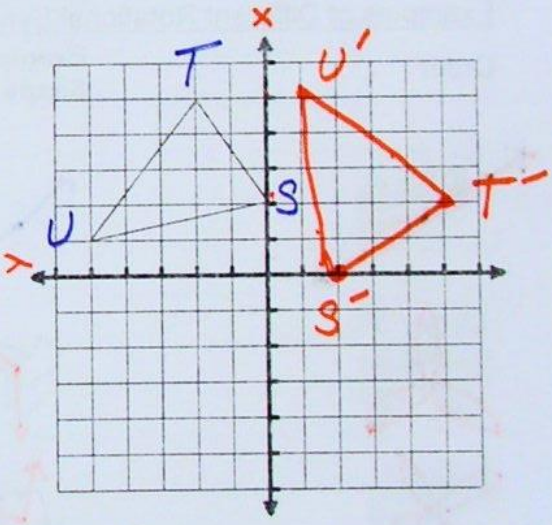
1. Rotate figure STU about the origin 90° clockwise.

x y
S (0, 2) → S' (2, 0)

T (-2, 5) → T' (5, 2)

U (-5, 1) → U' (1, 5)

Write the general rule:
(x, y) → (y, -x)



2. Rotate figure EFG about the origin 180°.

E (1, 4) → E' (-1, -4) (h-1-)

F (3, -2) → F' (-3, 2) (2-3-)

G (5, 4) → G' (-5, -4)

Write the general rule:
(x, y) → (-x, -y)