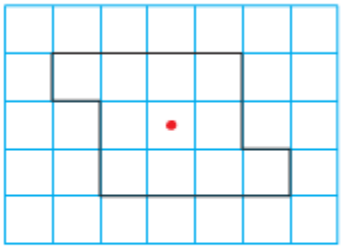
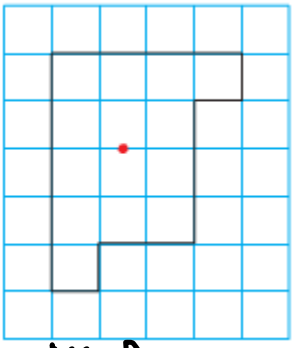
7.6 Rotations and Rotational Symmetry – Notes

INVESTIGATE

- Trace each shape on tracing paper. Place the tracing to coincide with the shape. Place a pencil point on the red dot.
- Rotate the tracing, counting the number of times the tracing coincides with the original shape, until you make a complete turn.



Order of rotational Symmetry is 2.



NO Rotational Symmetry

Order of rotational Symmetry is 3.

Angle of Rotational Symmetry $= \frac{360°}{2}$

$= 180°$

Angle of rotational Symmetry $= \frac{360}{3} = 120°$

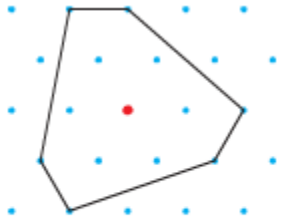
NOTE:

A shape has rotational Symmetry when it coincides with itself after a rotation of less than 360° about its centre.

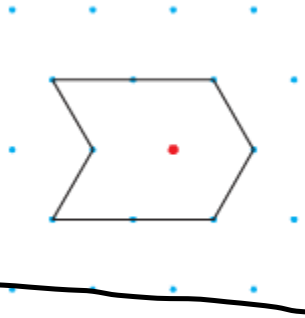
The number of times the shape coincides with itself, during a rotation of 360°, is the order of rotation.

$$angle\ of\ rotational\ symmetry = \frac{360°}{the\ order\ of\ rotation}$$

Example (1): Determine which hexagons below have rotational symmetry.
State the order of rotation and the angle of rotation symmetry.

a) 

b) 

c) 

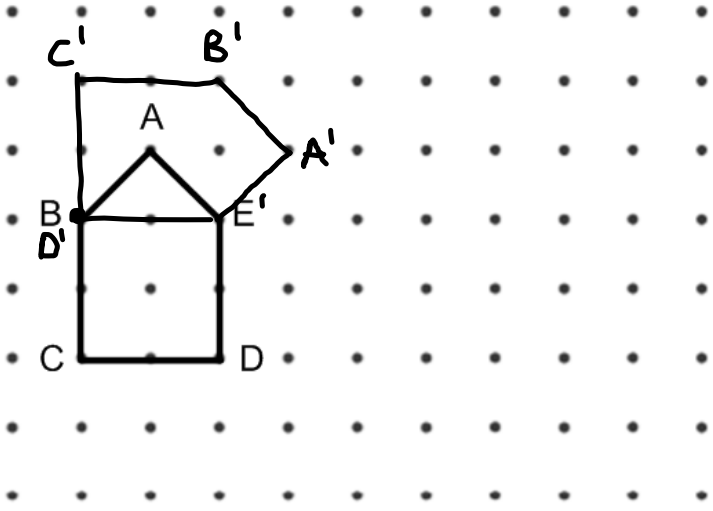
	a)	b)	c)
Order of Rotation	3	2	0
Angle of rotational Symmetry	$\frac{360^\circ}{3} = 120^\circ$	$\frac{360^\circ}{2} = 180^\circ$	—

NOTE: A rotation is another type of transformation.

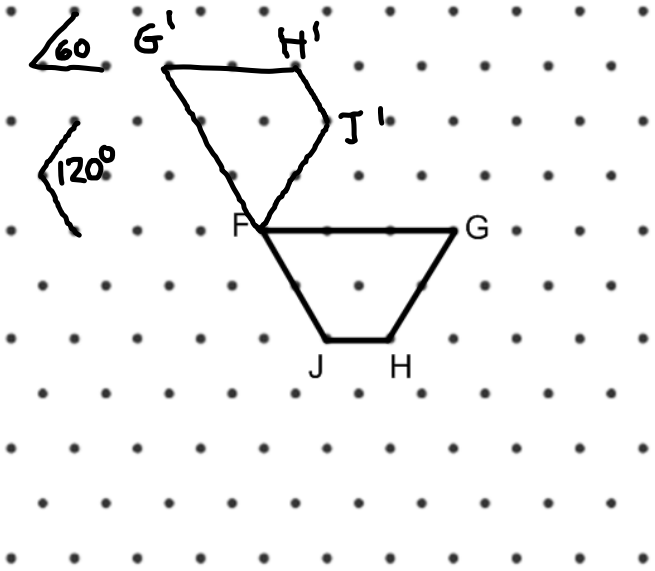
We use a square grid to draw rotations images after a rotation of 90°, or any multiples of 90°, such as 180°, 270°. We use isometric dot paper to draw rotation images after a rotation of 60°, or any multiple of 60°, such as 120° and 180°.

Example (2):

a) Rotate pentagon ABCD 90° clockwise about vertex E. Draw the rotation image.



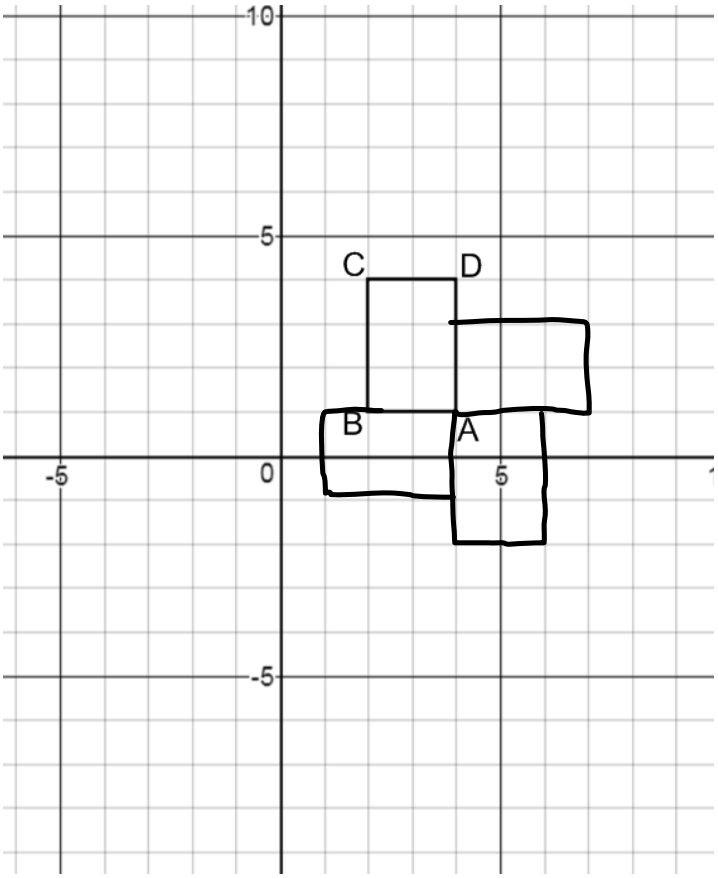
b) Rotate trapezoid FGHJ 120° counterclockwise about vertex F. Draw the rotation image.



Example 3:

a) Rotate rectangle ABCD:
   i. 90° clockwise about vertex A
   ii. 180° clockwise about vertex A
   iii. 270° clockwise about vertex A

   Draw and label each rotation image.



b) Look at the shape formed by the rectangle and all its images.

   Identify any rotational symmetry in this shape.

Order of Rotational Symmetry is 4.