Section 7.6 - Rotations and Rotational Symmetry

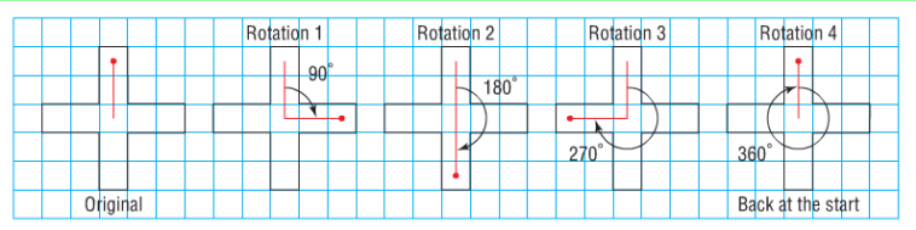
A tracing of this shape is rotated about its centre. We draw a line segment to help identify the angle the shape turned through before it coincided with itself.

Media video demonstrating rotations...

- open up Math Makes Sense DVD
- go into Proguide
- enter on media
- scroll down to "see it videos"
- scroll down to section 7.6
- enter on "see it" - top left of page

Use a piece of graph paper to demonstrate...

Tracing of a shape is rotated about its center. Draw a line segment to help identify the angle the shape turned through before it coincided with itself.



The shape coincided with itself 4 times in one complete turn - during a rotation of 360°

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

The number of times the shape coincides with itself, during a rotation of 360°, is the order of rotation. The shape above has rotational symmetry of order 4. (If it only coincided 2 times, it would have a rotational symmetry order of 2)

For each match, the shape rotated 90°.

We say the angle of rotation symmetry is 90°. This is

$$\frac{360}{4} = 90^o$$

$$Roational\ Symmetry = \frac{360^o}{the\ order\ of\ rotation}$$

Ie: if the order of rotation is 3, what is the angle of rotation symmetry?

$$Roational\ Symmetry = \frac{360^o}{the\ order\ of\ rotation}$$

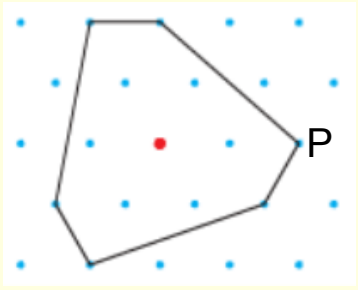
$$= \frac{360}{3} = 120^o$$

Identifying Shapes with Rotational Symmetry

In each of the hexagons below...Determine which ones have rotational symmetry

1) Find the order of rotation
2) Find the angle of rotation symmetry

A)



(Use this transparancy to determine the order of rotation)

Find the # of times it coincides with itself

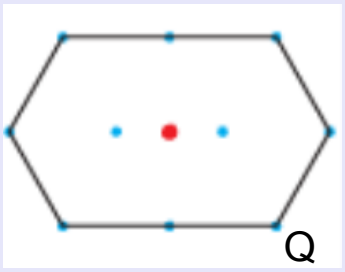
1) There is an order of rotation of "3"
2) The angle of rotation symmetry...

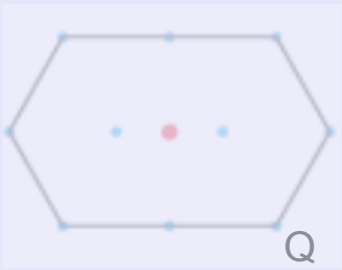
$$Roational\ Symmetry = \frac{360^\circ}{the\ order\ of\ rotation}$$

$$= \frac{360}{3} = 120^\circ$$

(Use this transparancy to determine the order of rotation)

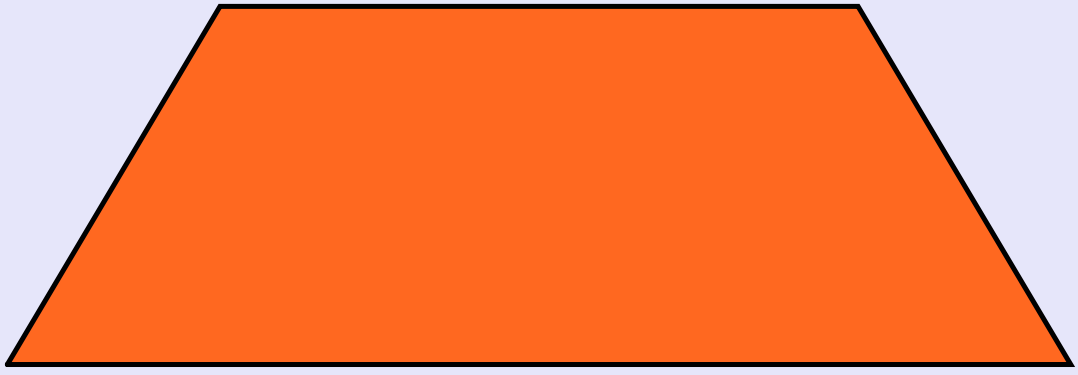
B)





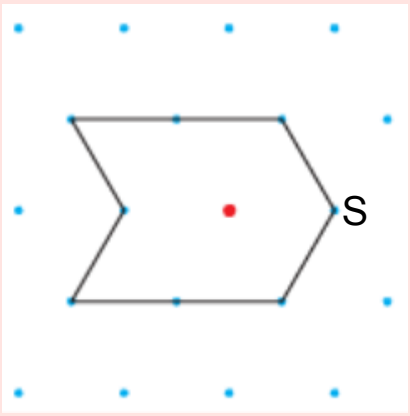
Find the # of times it coincides with itself

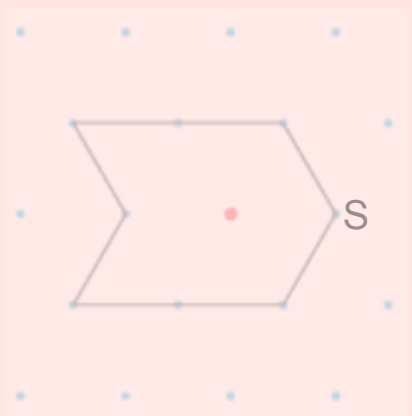
1) There is an order rotation of??
2) The angle of rotation symmetry...



(Use this transparancy to determine the order of rotation)

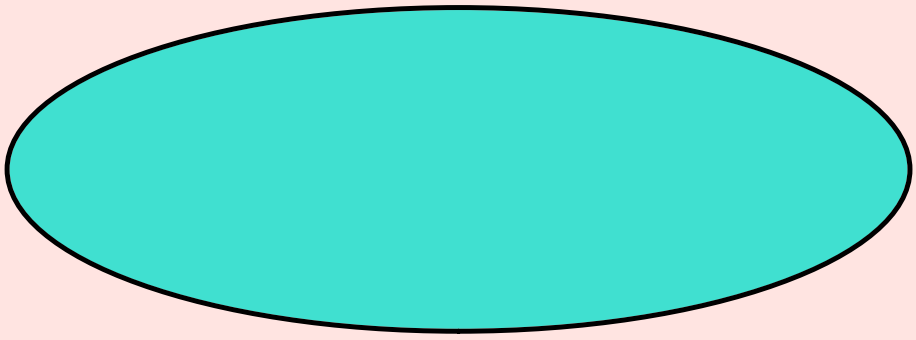
C)





Find the # of times it coincides with itself

1) The order or rotation???
2) The angle of rotation symmetry...

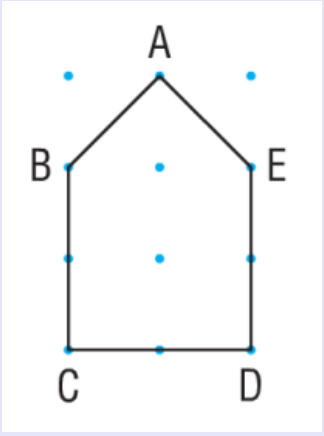


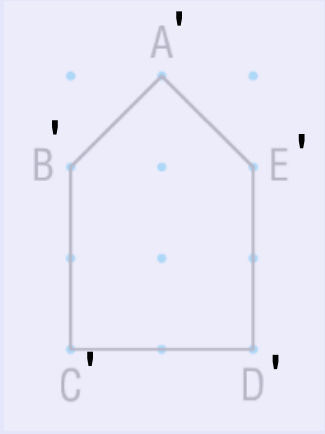
Drawing Rotation Images

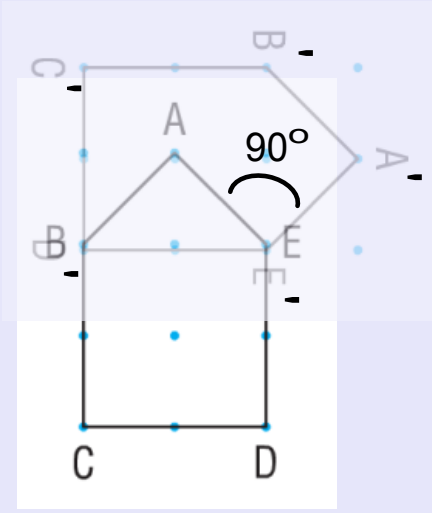
Rotate the following images according to directions given...

1) Rotate pentagon ABCDE 90° clockwise about vertex E.

Step 1 - Draw the image (p. 364 - textbook)
Step 2 - Trace the shape and label the vertices on tracing paper
Step 3 - Put the tracing paper over the original diagram and rotate 90°





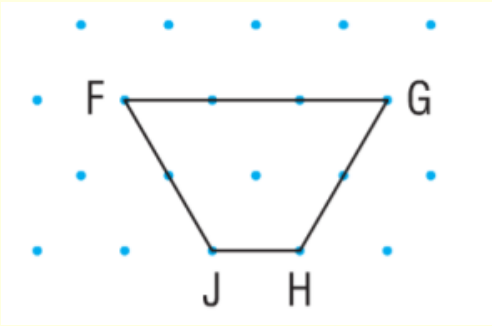


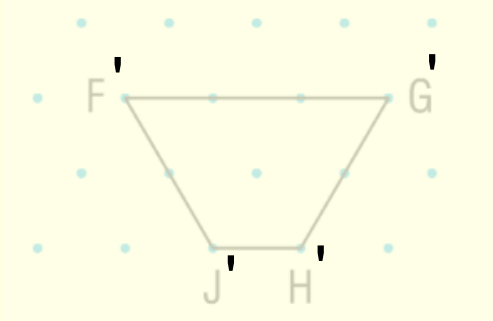
90° tern about point E

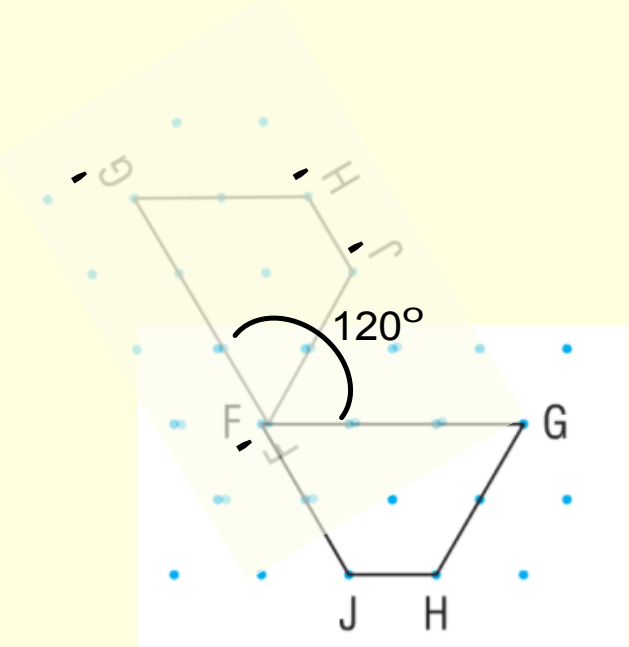
Note: Side ED moves from being vertical to being horizontal

2) Rotate trapezoid FGHJ 120° counterclockwise about vertex F.

Step 1 - Draw the image (p. 364 - textbook)
Step 2 - Trace the shape and label the vertices on tracing paper
Step 3 - Put the tracing paper over the original diagram and rotate 120° counterclockwise







120° counterclockwise turn about point F

Note: The angle between FG and FG' is 120°

Try example 3 as a class, page 364

Textbook: page 365 - 367, #'s 4 -15
Extra Practice # 6