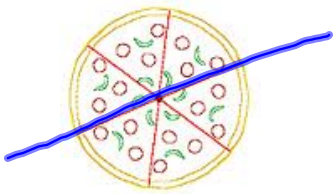
Section 7.6
Rotations and Rotational Symmetry



Terms:

Rotational Symmetry

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

360°

Order of rotation

The number of times the shape coincides with itself, during a rotation of 360 degrees. [for example rotational symmetry of order 4]

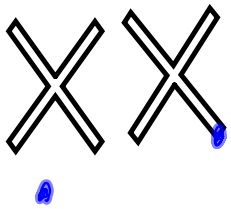
360°

Angle of rotation symmetry

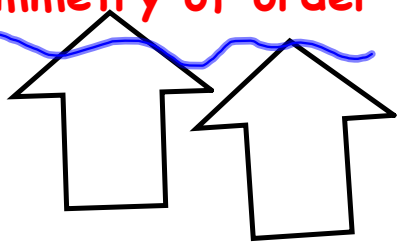
is equal to $\frac{360}{\text{the order of rotation}}$

$\frac{360^\circ}{2}$

180°



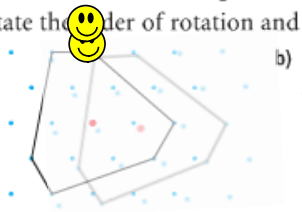
****A shape that requires 360 degrees to return to its original position does not have rotational symmetry. A shape cannot have rotational symmetry of order 1.*****

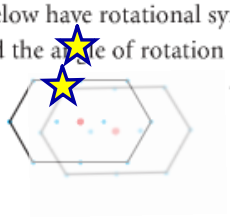


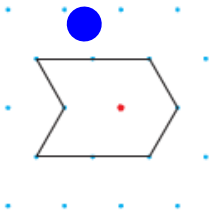
An object has an order of rotation equal to 4 what is the angle of rotation?

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

Determine which hexagons below have rotational symmetry.
State the order of rotation and the angle of rotation symmetry.

a) 

b) 

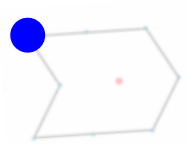
c) 

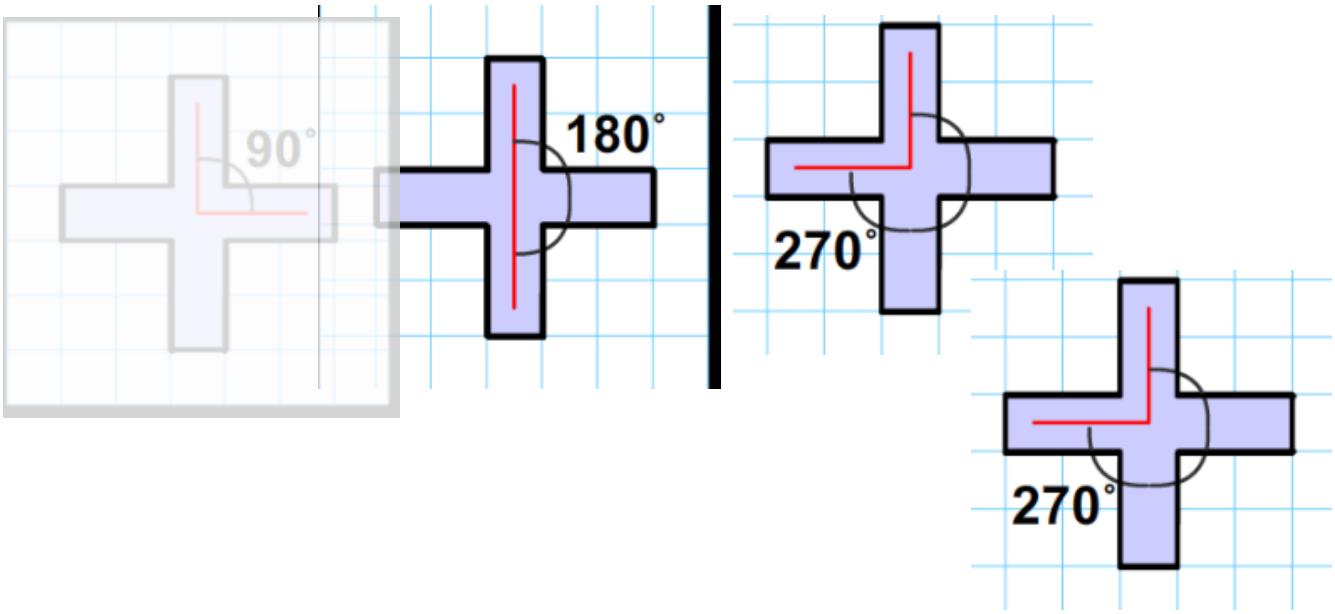
$\frac{360^\circ}{3}$

120°

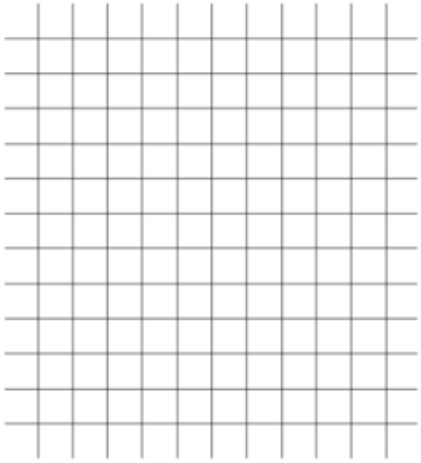
$\frac{360}{2}$

180°

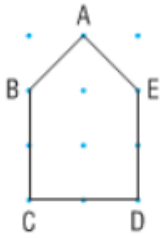



90°
180°
270°
270°

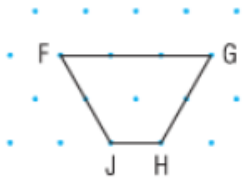
A rotation is another type of transformation.
We use a square grid to draw rotation images after a rotation of 90°, or any multiple of 90°, such as 180° and 270°.
We use isometric dot paper to draw rotation images after a rotation of 60°, or any multiple of 60°, such as 120° and 180°.



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

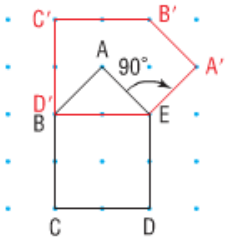


b) Rotate trapezoid FGHJ 120° counterclockwise about vertex F. Draw the rotation image.

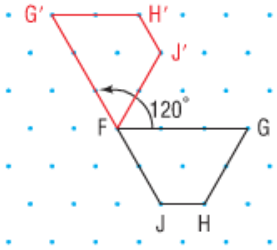


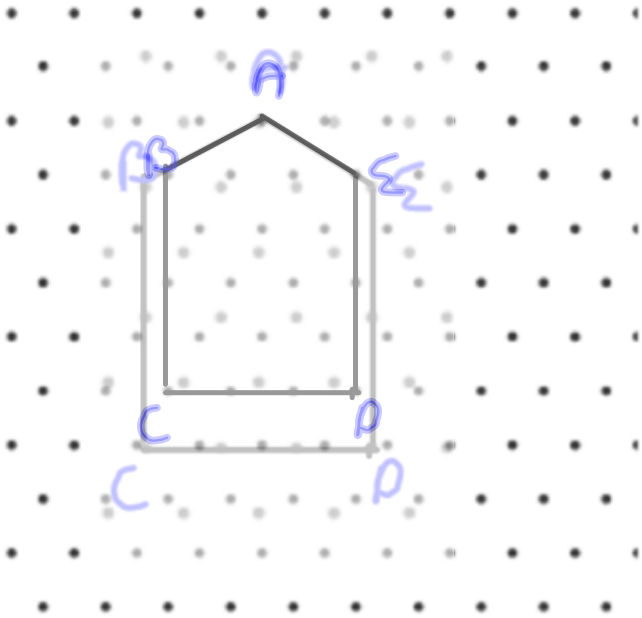
Trace each shape and label the vertices on the tracing.

a) Rotate pentagon ABCDE 90° clockwise about E. Side ED moves from being vertical to being horizontal.



b) Rotate trapezoid FGHJ 120° counterclockwise about F. The angle between FG and FG′ is 120°.




A
B
C
D
C
D

Plot the following
A (4,1)
B (2,1)
C (2,4)
D (4,4)

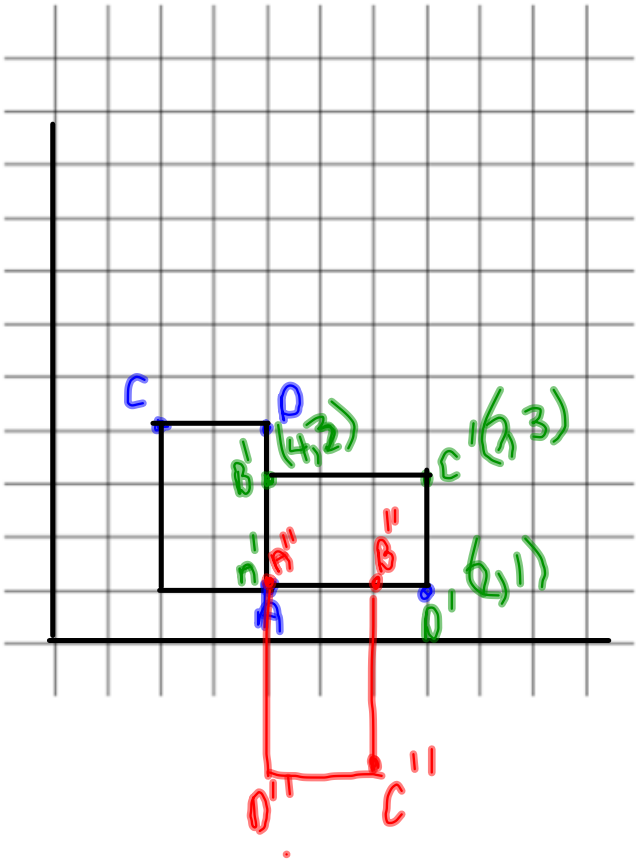
1. Rotate ABCD 90 degrees clockwise about vertex A

2. Rotate ABCD 180 degrees clockwise about vertex A

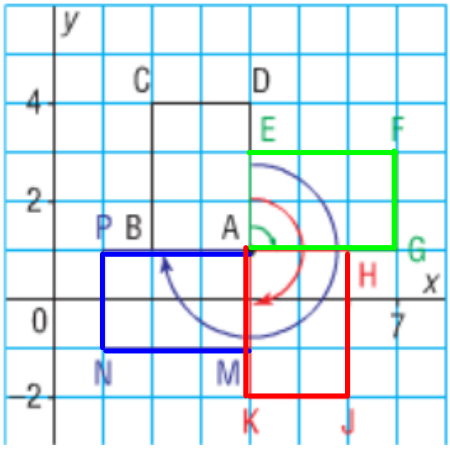
3. Rotate ABCD 270 degrees about vertex A

Label each rotation image

3. What is the rotational symmetry



Coordinates for A'B'C'D'


y
C
D
4
E
F
2
P
B
A
G
H
x
0
7
N
M
−2
K
J

Homework

Page 365

4, 5, 6, 9, 10, 14, 15

4.a) $\frac{360^\circ}{3} = 120^\circ$

$\frac{360^\circ}{60^\circ}$

b) a, b, c, d