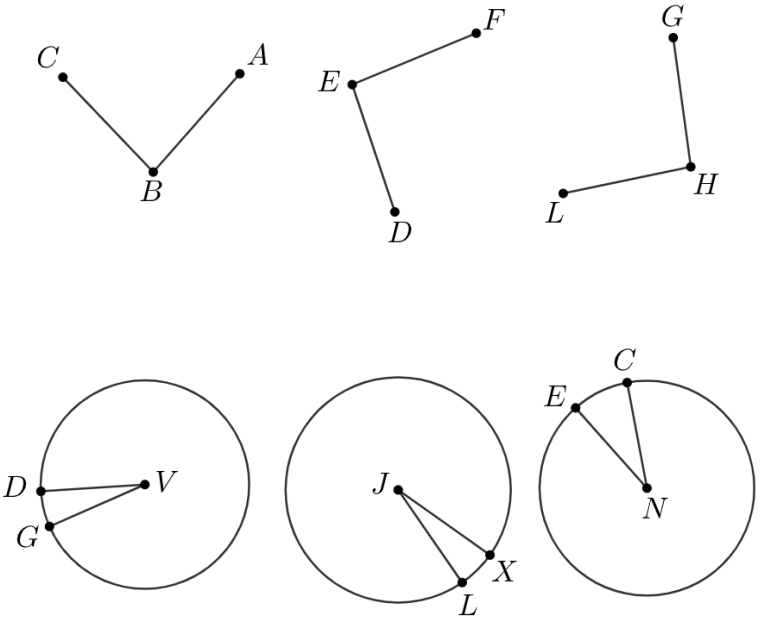
Name: _____

Lesson 1.10
Rotations

Geometry GT

Recall

For each figure, which pair of angles appears congruent? How could you check?



Explore

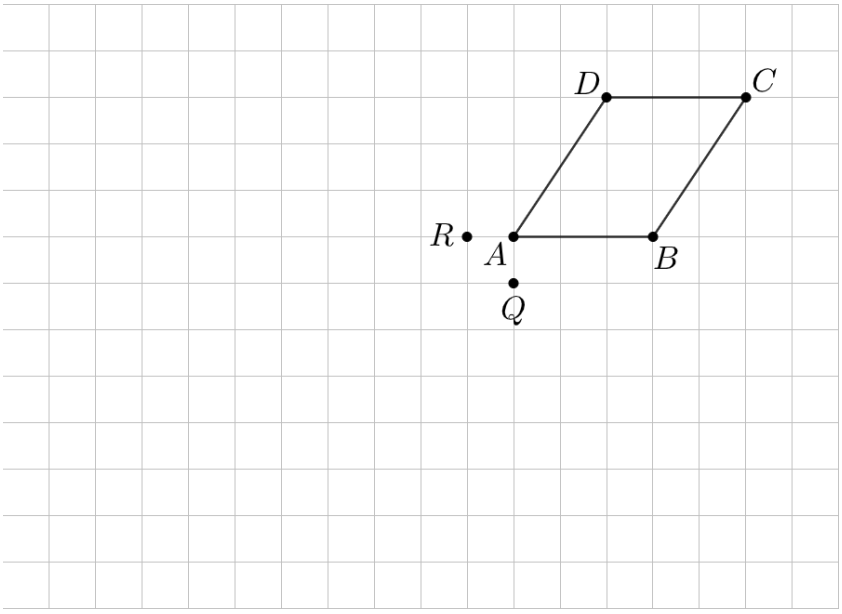
Use the grids to complete the rotations.

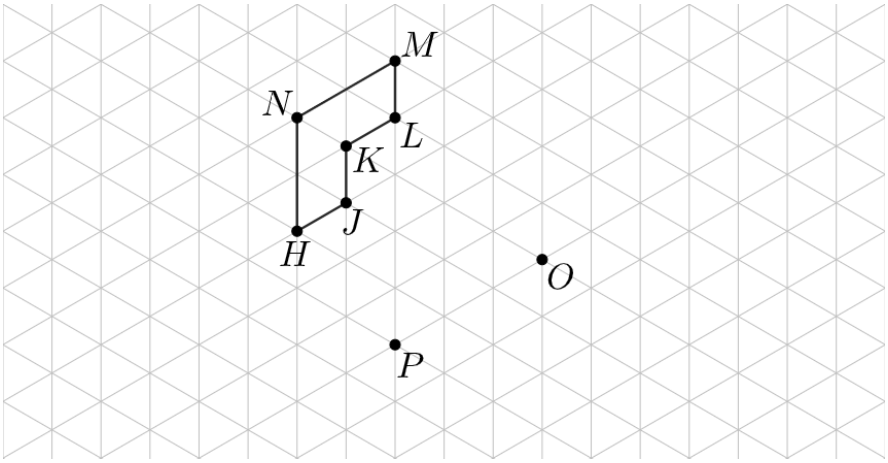
A. Rotate $ABCD$ 90° clockwise around Q.

B. Rotate $ABCD$ 180° around R.

C. Rotate $HJKLMN$ 120° clockwise around O.

D. Rotate $HJKLMN$ 60° counterclockwise around P.





Discuss

Draw a segment. Label the endpoints A and B.

A. Rotate segment $\overline{AB}$ clockwise around center B by 90°. Label the new endpoint A'.

B. Connect A to A' and lightly shade in the resulting triangle.

C. What kind of triangle did you draw? What other properties do you notice in the figure? Explain your reasoning.

Draw a segment. Label the endpoints C and D.

A. Rotate segment $\overline{CD}$ counterclockwise around center D by 30°. Label the new endpoint C'.

B. Rotate segment $\overline{C'D}$ counterclockwise around center D by 30°. Label the new endpoint C''.

C. Connect C to C'' and lightly shade in the resulting triangle.

D. What kind of triangle did you draw? What other properties do you notice in the figure? Explain your reasoning.

Definition

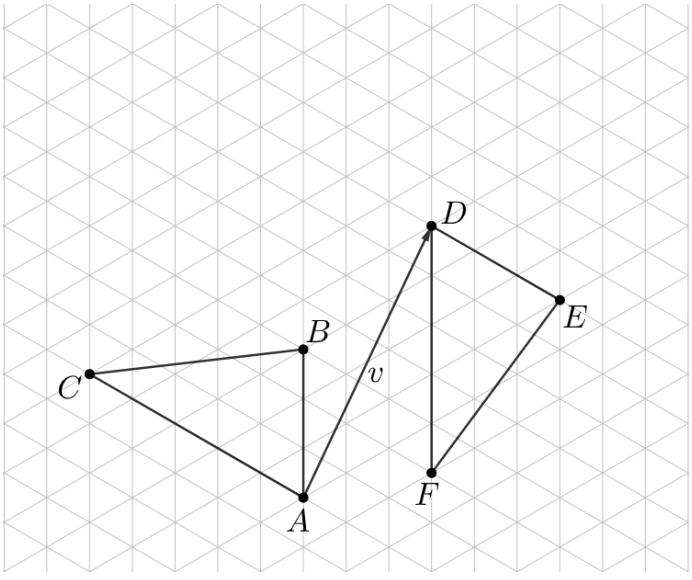
Rotation: a rigid transformation that takes a point to another point on the circle through the original point with a given center by a directed angle

Demonstrate

AJ suspects ΔABC is congruent to ΔDEF. They think these steps will work to show there is a rigid transformation from ABC to DEF:

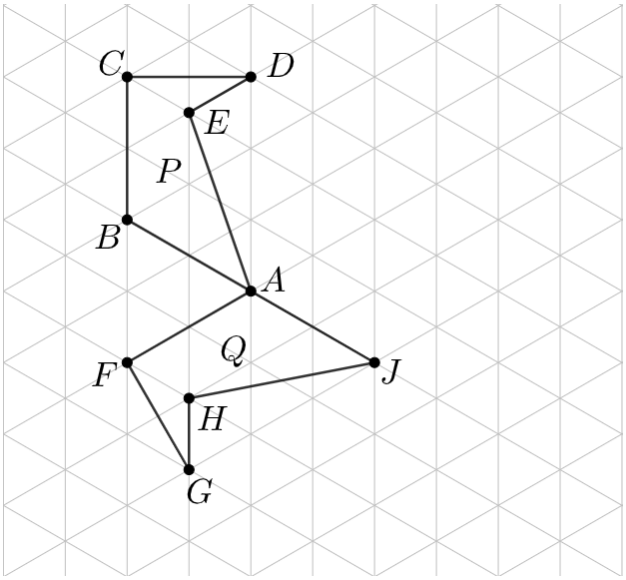
- Translate by directed line segment v
- Rotate the image ____ degrees clockwise around point D
- Reflect that image over segment $\overline{DE}$

Draw each image and determine the angle of rotation needed for these steps to takes ABC to DEF.



Practice

1. Here are 2 polygons, P and Q. Select **all** sequences of translations, rotations, and reflections below that would take polygon P to polygon Q.



A. Rotate 180° around point A.

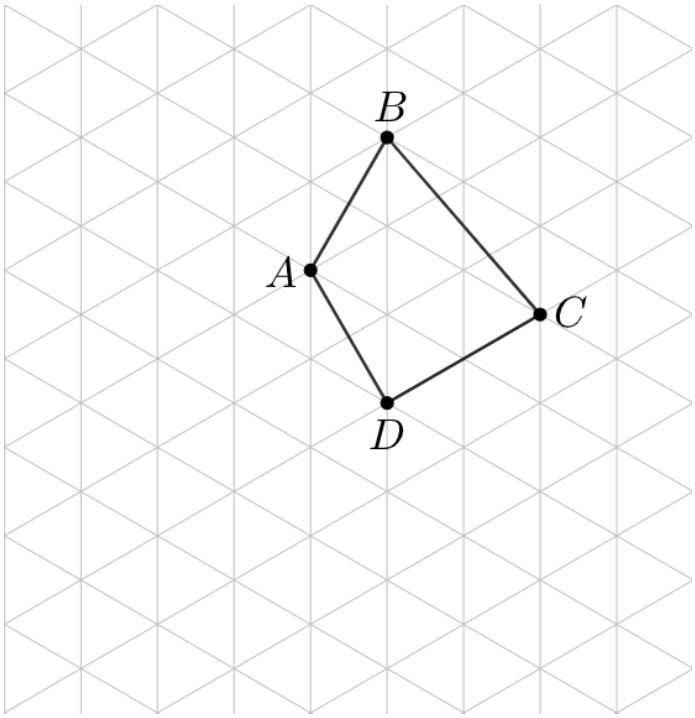
B. Rotate 60° counterclockwise around point A and then reflect over segment $\overline{FA}$.

C. Translate so that A is taken to J. Then reflect over segment $\overline{BA}$.

D. Reflect over segment $\overline{BA}$ and then translate by directed line segment $\overline{BA}$.

E. Reflect over segment $\overline{BA}$ and then rotate 60° counterclockwise around point A.

2. Draw the image of quadrilateral $ABCD$ when rotated 120° counterclockwise around the point D.



3. There is an equilateral triangle, ΔABC, inscribed in a circle with center D. What is the smallest angle you can rotate ΔABC around D so that the image of A is B?

4. Which segment is the image of $\overline{AB}$ when rotated 90° counterclockwise around point P?