

Rotations About the Origin

Name: _____ Date: _____

LEARNING OBJECTIVE

Students will rotate a figure 90 degrees, 180 degrees, and 270 degrees about the origin using tracing paper and a protractor, and apply coordinate rotation rules.

MATERIALS NEEDED

- graph paper
- protractor
- ruler
- pencil
- tracing paper
- colored pencils

HANDS-ON ACTIVITY

1. On graph paper, plot triangle DEF at D(2,1), E(5,1), F(2,4) and connect the points in blue.
2. Trace triangle DEF and the origin onto tracing paper. Place your protractor's center point on the origin and rotate the tracing paper 90 degrees counterclockwise, using the protractor to measure the exact angle.
3. Mark where the traced points land after the 90 degree rotation as D', E', F' on your graph paper, and connect them in green.
4. Repeat the rotation process for 180 degrees (mark D'', E'', F'' in red) and 270 degrees counterclockwise (mark D''', E''', F''' in orange), always starting from the original triangle DEF.
5. For each rotation, write the coordinate rule you can now infer from your drawing: 90 CCW: $(x,y) \rightarrow (-y,x)$; 180: $(x,y) \rightarrow (-x,-y)$; 270 CCW: $(x,y) \rightarrow (y,-x)$. Check that your traced coordinates match.

QUESTIONS

1. What are the coordinates of D', E', F' after a 90 degree counterclockwise rotation about the origin?
 2. What are the coordinates of D'', E'', F'' after a 180 degree rotation about the origin?
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3. Does a rotation change the size or shape of a figure? Use your tracing to explain.

4. How many degrees would you need to rotate a figure to return it exactly to its starting position?
