Lesson 13: Rotations

Cut this angle down these lines and follow the directions.

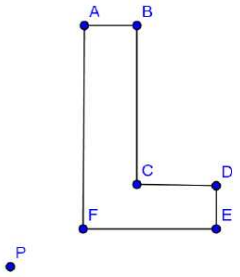
Classwork

Opening Exercise

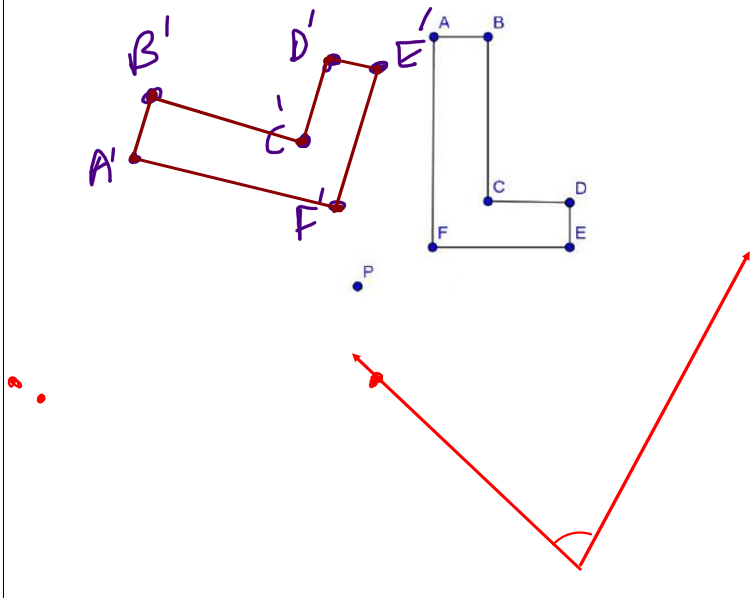
You will need a pair of scissors and a ruler.

Cut out the 75° angle at the right and use it as a guide to rotate the figure below 75° counterclockwise around the given center of rotation (Point P).

- Place the vertex of the 75° angle at point P.
- Line up one ray of the 75° angle with vertex A on the figure. Carefully measure the length from point P to vertex A.
- Measure that same distance along the other ray of the reference angle, and mark the location of your new point, A'.
- Repeat these steps for each vertex of the figure, labeling the new vertices as you find them.
- Connect the six segments that form the sides of your rotated image.



Rotation 75° CCW



For $0° < \theta < 180°$, the rotation of θ degrees around the center C is the transformation $R_{C,\theta}$ of the plane defined as follows:

θ theta - the angle

For the center point C, $R_{C,\theta}(C)$

Rotation — center of rotation — degrees + direction — object to be rotated

$R_{X,90}(\triangle ABC)$ = Rotate $\triangle ABC$ 90° CCW about X.

\+ degree is CCW

\- degree is CW

1) $R_{C,40}(A)$ Center C

degrees + direction 40 CCW

2) $R_{X,-60}(A)$ C X

D + D 60 CW

3) $R_{Z,270}(X)$ C Z

D + D 270 CCW

$R_{z,270}(X)$

$f(x)$
$f(g(x))$

composite transformation

$R_{z,180}\left(R_{z,90}(X)\right) =$

1st

2nd

270
$+90$
360

$R_{z,-90}(X)$

$R_{x,-240}(\Delta ABC) = R_{x,120}(\Delta ABC)$

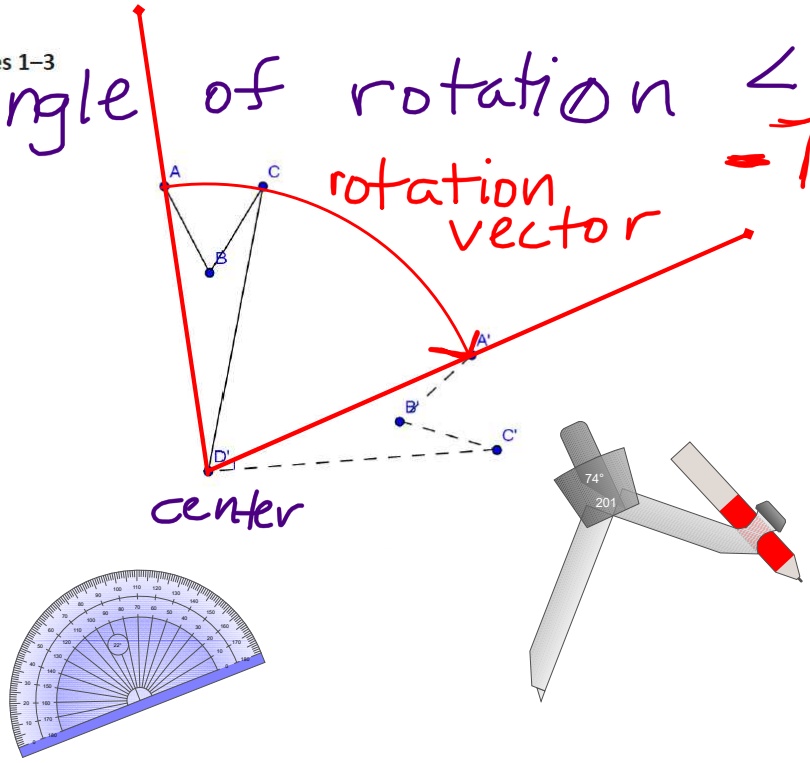
360
-240
120

Exercises 1–3

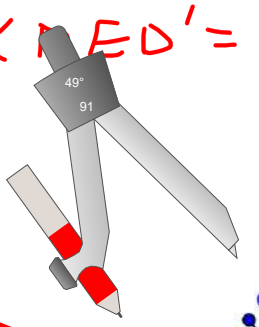
1. Angle of rotation $\angle ADA'$ $= -75^\circ$ or 75 CW

rotation vector

center



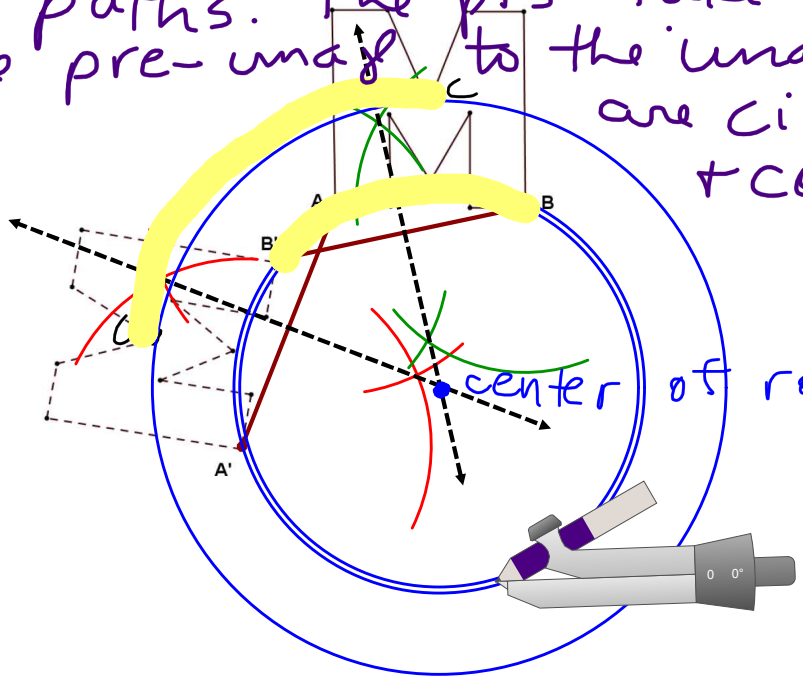
2. $m\angle CED' = 50$ or 50 CCW



Now that you can find the angle of rotation, let's move on to finding the center of rotation. Follow the directions below to locate the center of rotation taking the figure at the top right to its image at the bottom left.

3. Construct the center of rotation

The paths the pts take from the pre-image to the image are circular + concentric



1. Rotate the triangle ABC 60° around point F using a compass and straightedge only.

60° ccw