Geometry
Notes: Rotations

Rotate: _moving in a direction around a fixed point._

Clockwise (CW):   Counterclockwise (CCW):

There are __360__ degrees in a circle. When we rotate clockwise or counterclockwise, the two rotations should always add up to __360°__ degrees.

Examples

What rotation will take P to P'?

1.
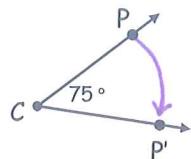
75°

CW __75°__
CCW __285°__

2.

CW __180°__
CCW __180°__

3.

40°
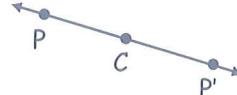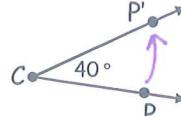
CW __320°__
CCW __40°__

4.   Which figure is a rotation of the original?
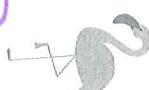
a)   b)   c)

5.   Which figure is a rotation of the original?

a)   b)   c)

Rules of Rotation

90° CW or 270° CCW	$(x,y) \rightarrow (y,-x)$
180° CW or 180° CCW	$(x,y) \rightarrow (-x,-y)$
90° CCW or 270° CW	$(x,y) \rightarrow (-y,x)$

1. Rotate TRY 90° CW from the origin. Call it T'R'Y'. $(x,y) \rightarrow (y,-x)$

T $(-7,1)$ T' $(1, 7)$
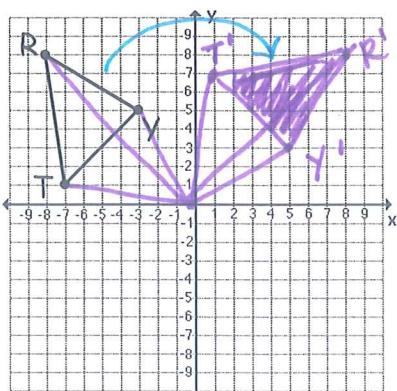
R $(-8,8)$ R' $(8,8)$

Y $(-3,5)$ Y' $(5,3)$

2. Rotate TRY 90° CCW from the origin. Call it T'R'Y'. $(x,y) \rightarrow (-y,x)$

T $(-7,1)$ T' $(-1,-7)$
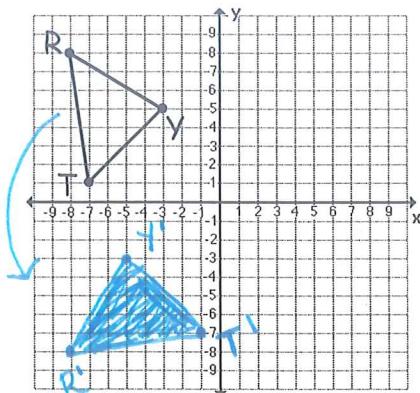
R $(-8,8)$ R' $(-8,-8)$

Y $(-3,5)$ Y' $(-5,-3)$

3. Rotate TRY 180° CW from the origin. Call it T'R'Y'. $(x,y) \rightarrow (-x,-y)$

T $(-7,1)$ T' $(7,-1)$
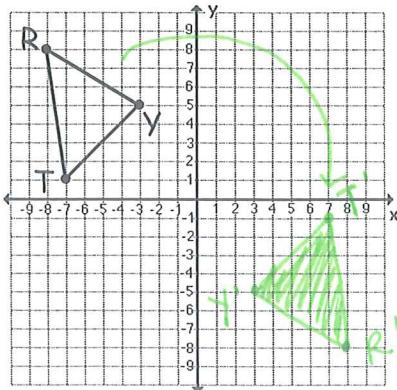
R $(-8,8)$ R' $(8,-8)$

Y $(-3,5)$ Y' $(3,-5)$

4. a. Rotate 90° CW from the origin.
        Call it H'A'T'.

$(x,y) \rightarrow (y, -x)$

H $(2,-2)$ H' $(-2,-2)$

A $(7,-6)$ A' $(-6,-7)$

T $(5,-9)$ T' $(-9,-5)$
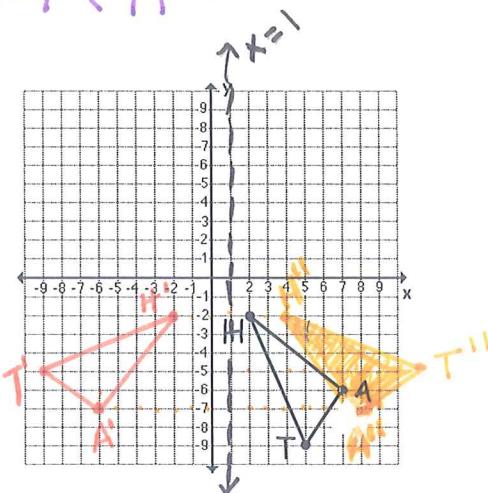
    b. Reflect over the line $x = 1$.
        Call it H"A"T".

H" $(4,-2)$ A" $(8,-7)$ T" $(11,-5)$

    c. Translate 3 right and 4 down.
        Call it BUG.

$(x,y) \longrightarrow (x+3, y-4)$
                        add 3   subtract
                        to x   4 from y

B $(7,-6)$ U $(11,-11)$ G $(14,-9)$

	Translation	Reflection	Rotation
Is congruency preserved?	Yes	Yes	Yes
Is orientation preserved?	Yes	NO	NO