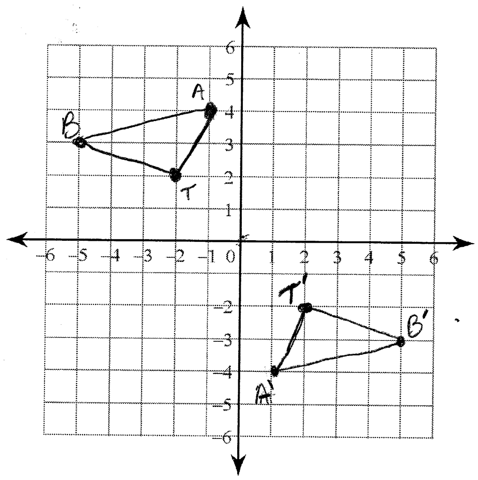
Geometry – Rotations

Name: Key

Every time you are told to rotate a shape, what three pieces of information do you need to know about the location?

- The center of rotation (a point)
- The angle of rotation (a positive number of degrees)
- The direction (clockwise or counterclockwise)

1) Rotate ΔBAT where B(-5,3), A(-1,4), and T(-2,2) 180° clockwise about the origin.



B (-5 , 3) B'(5 , -3)
A (-1 , 4) A'(1 , -4)
T (-2 , 2) T'(2 , -2)

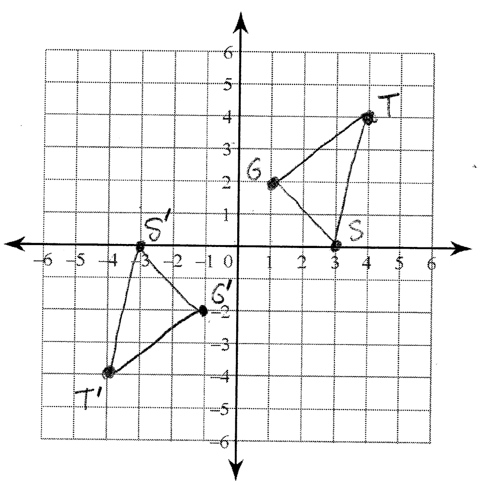
Describe how you did the rotation:

Describe what happened to the coordinates of each point:

All coordinates became opposites.

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

2) Rotate ΔGST G(1,2), S(3,0), AND T(4,4) 180° counterclockwise about the origin.



G (1 , 2) G'(-1 , -2)
S (3 , 0) S'(-3 , 0)
T (4 , 4) T'(-4 , -4)

Describe how you did the rotation:

Describe what happened to the coordinates of each point:

All coordinates became opposite, except 0.

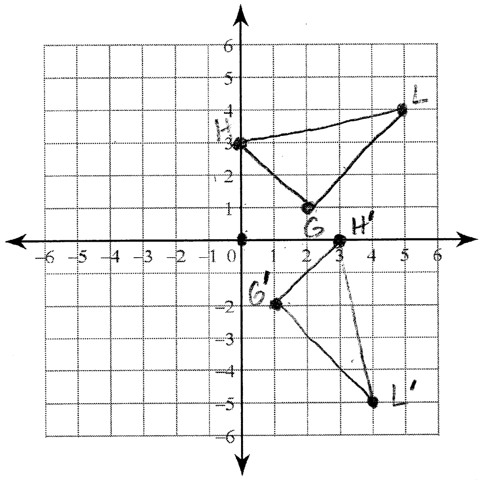
$(x, y) \rightarrow (-x, -y)$

When you rotate a shape 180°, does it matter if you go clockwise or counterclockwise? NO, because either way it's halfway around so it ends up at the same location.

Write a rule for what happens when you rotate a shape 180° about the origin.

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

3) Rotate ΔGHL, where G(2,1), H(0,3), and L(5,4), 90° clockwise about the origin.



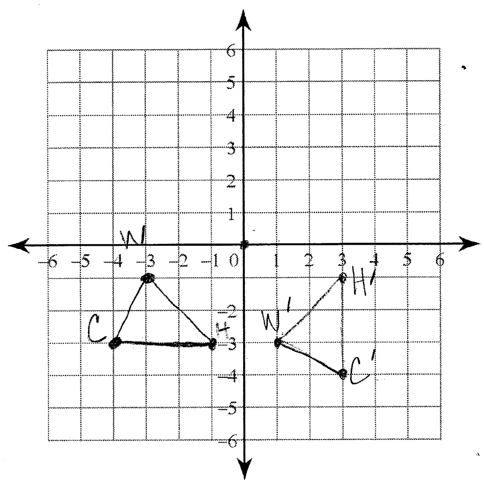
G(2 , 1)　　G'(1 , -2)
H(0 , 3)　　H'(3 , 0)
L(5 , 4)　　L'(4 , -5)

Describe how you did the rotation:

Describe what happened to the coordinates of each point:

The coordinates switched and the new y-coordinat became opposite. $(x,y) \to (y,-x)$

4) Rotate ΔWCH, where W(-3,-1), C(-4,-3), and H(-1,-3), 90° counterclockwise about the origin.



W(-3 , -1)　　W'(1 , -3)
C(-4 , -3)　　C'(3 , -4)
H(-1 , -3)　　H'(3 , -1)

Describe how you did the rotation:

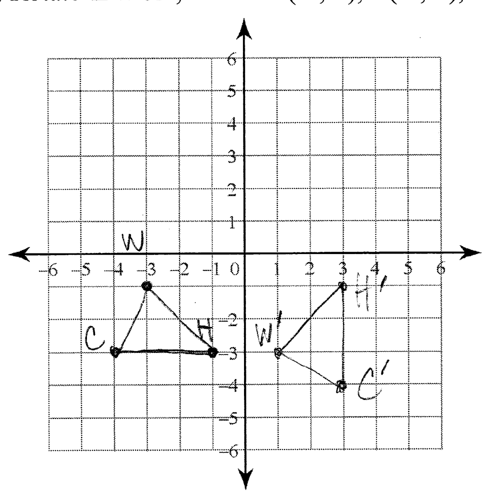
Describe what happened to the coordinates of each point:

The coordinates switched and the new x-coordinates became opposite.

(1, 2)　(-2, 1)

(-3, -1)　(1, -3)

5) Rotate ΔWCH, where W(-3,-1), C(-4,-3), and H(-1,-3), 270° clockwise about the origin.



W(-3 , -1)　　W'(1 , -3)
C(-4 , -3)　　C'(3 , -4)
H(-1 , -3)　　H'(3 , -1)

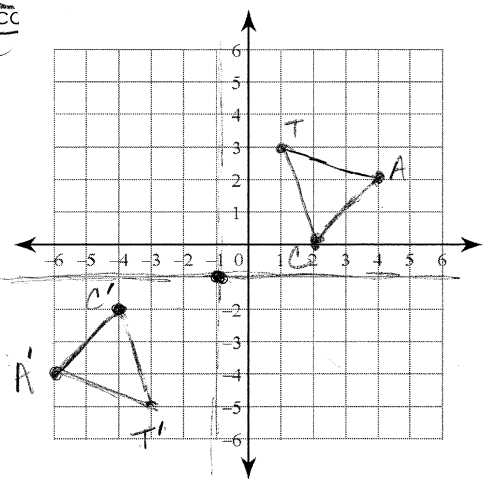
Describe how you did the rotation:

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

How does this relate to rotating ΔWCH 90° counterclockwise about the origin?

Same rotation

5) Rotate $\triangle CAT$, where C(2,0), A(4,2), and T(1,3), 180^o clockwise about the point (-1,-1).



C(2 , 0)	C'(-4 , -2)
A(4 , 2)	A'(-6 , -4)
T(1 , 3)	T'(-3 , -5)

Describe how you did the rotation:

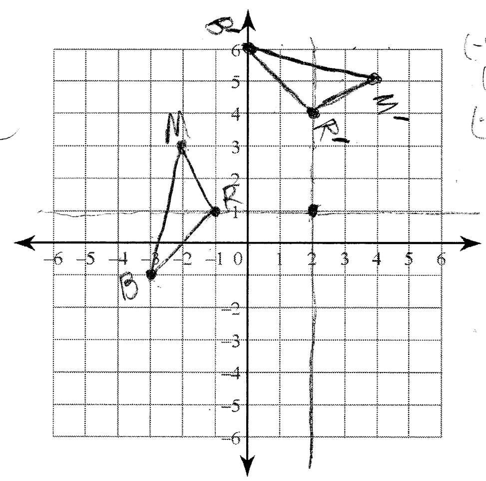
Drew lines through (-1,-1) like a new x-axis + y-axis, then used those lines to help rotate,

How is this different from rotating 180^o about the origin?

The figure moves further away from the origin.

$(x, y) \rightarrow (-x-2, -y-2)$

6) Rotate $\triangle BR$,, where B(-3,-1), R(-1,1), and M(-2,3), $\boxed{90^o \text{ clockwise}}$ about the point (2,1).



(-5,-2)	B(-3 , -1)	B'(0 , 6)
(-3,0)	R(-1 , 1)	R'(2 , 4)
(-4,2)	M(-2 , 3)	M'(4 , 5)

Describe how you did the rotation:

I drew lines through (2,1) and use those lines as my new x-axis + y-axis, then rotated around the point (2,1).

How is this different from rotating about the origin?

The figure moves further away from the origin.

Use the following space to describe how to do a rotation about a point:

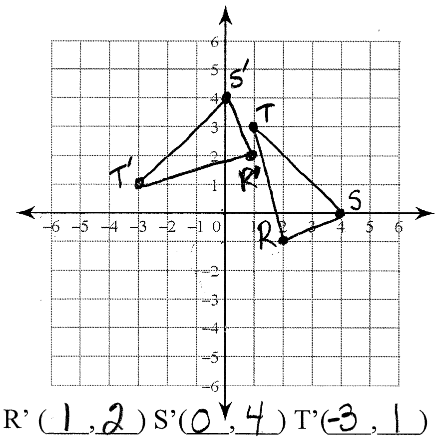
What stays the same when you do a rotation? Figures are $\cong$

Does the distance from the center of rotation change during a rotation? NO

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

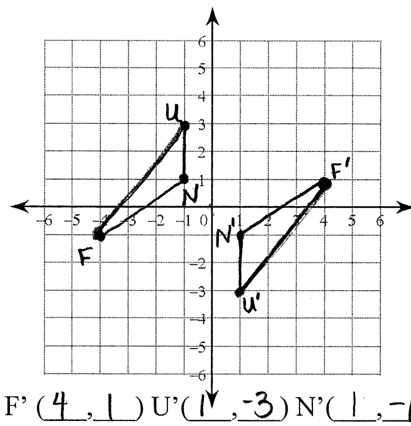
Rotate each triangle as indicated by each problem.

1) ΔRST: R(2, -1), S(4, 0), and T(1, 3) 90° counter clockwise about the origin.



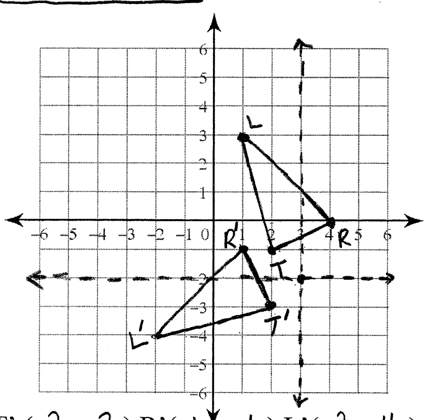
R' (1 , 2) S'(0 , 4) T'(-3 , 1)

2) ΔFUN: F(-4, -1), U(-1, 3), and N(-1, 1) 180° clockwise about the origin. $(x, y) \rightarrow (-x, -y)$



F' (4 , 1) U'(1 , -3) N'(1 , -1)

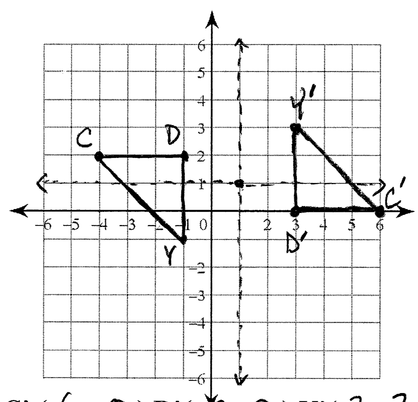
3) ΔTRL: T(2, -1), R(4, 0), and L(1, 3) 90° counter clockwise about the point (3,-2)



R(1,2)
T(-1,1)
L(-2,5)

T' (2 , -3) R'(1 , -1) L'(-2 , -4)

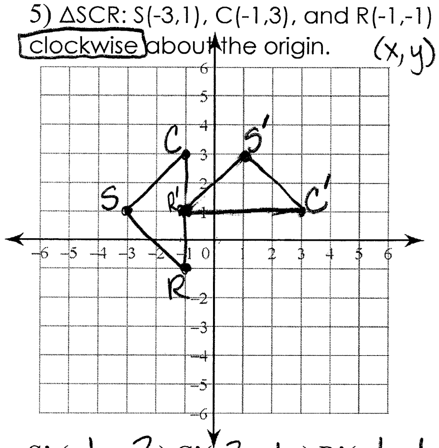
4) ΔCDY: C(-4,2), D(-1, 2), and Y(-1, -1) 180° counter clockwise about the point (1, 1)



C(-5,1)
D(-2,1)
Y(-2,-2)

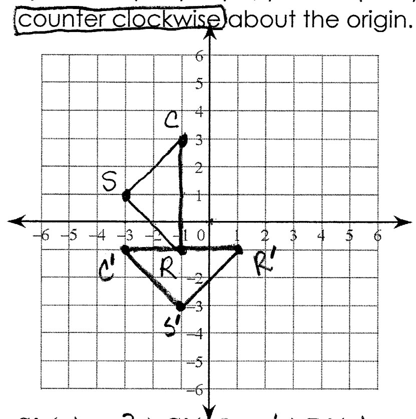
C' (6 , 0) D'(3 , 0) Y'(3 , 3)

5) ΔSCR: S(-3,1), C(-1,3), and R(-1,-1) 90° clockwise about the origin. $(x, y) \rightarrow (y, -x)$



S' (1 , 3) C'(3 , 1) R'(-1 , 1)

6) ΔSCR: S(-3,1), C(-1,3), and R(-1,-1) 90° counter clockwise about the origin. $(x, y) \rightarrow (-y, x)$



S' (-1 , -3) C'(-3 , -1) R'(1 , -1)