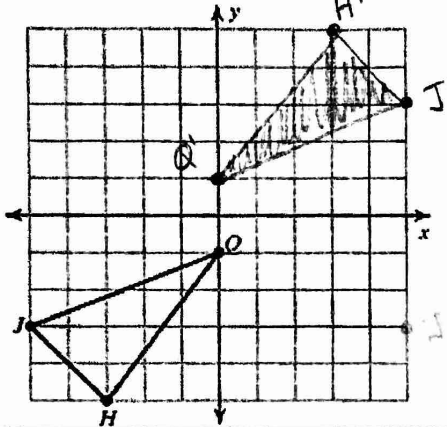**Homework: Rotations About the Origin**

Name: _____

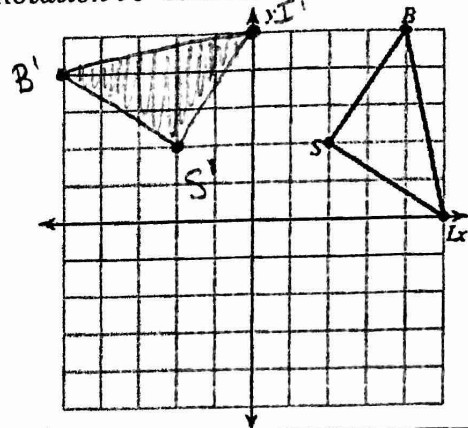| 90° *clockwise* $(x,y) \rightarrow (y,-x)$ | 90° *counterclockwise* $(x,y) \rightarrow (-y,x)$ | 180° $(x,y) \rightarrow (-x,-y)$ |

Graph the image of the figure using the transformation given. Find the coordinates of the shaded image.
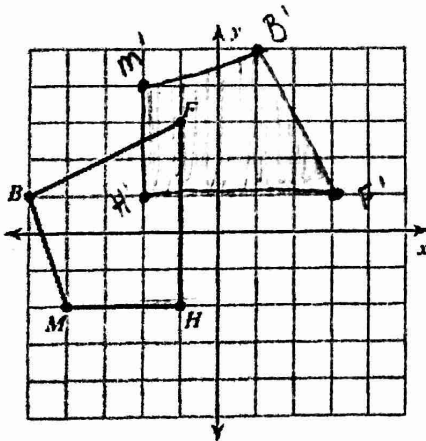
1. *Rotation* 180° *about the origin*

(x,y)	$\rightarrow$ $(-x,-y)$
J $(-5,3)$	J' $(5,3)$
Q $(0,-1)$	Q' $(0,1)$
H $(-3,-5)$	H' $(3,5)$

2. *Rotation* 90° *counterclockwise about the origin*

(x,y)	$\rightarrow$ $(-y,x)$
B $(4,5)$	B' $(-5,4)$
I $(5,0)$	I' $(0,5)$
S $(2,2)$	S' $(-2,2)$

3. *Rotation* 90° *clockwise about the origin*

(x,y)	$\rightarrow$ $(y,-x)$
F $(-1,3)$	F' $(3,1)$
H $(-1,-2)$	H' $(-2,1)$
m $(-4,-2)$	m' $(-2,4)$
B $(-5,1)$	B' $(1,5)$

4. *Rotation* 180° *about the origin*
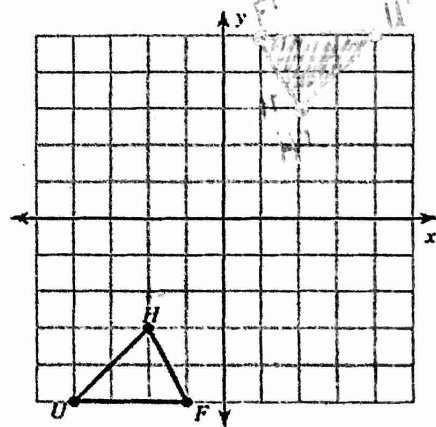
(x,y)	$\rightarrow$ $(-x,-y)$
H $(-2,-3)$	H' $(2,3)$
U $(-4,-5)$	U' $(4,5)$
F $(-1,-5)$	F' $(1,5)$

5. Rotation 90° clockwise about the origin
$U(1,-2)$, $W(0,2)$, $K(3,2)$, $G(3,-3)$
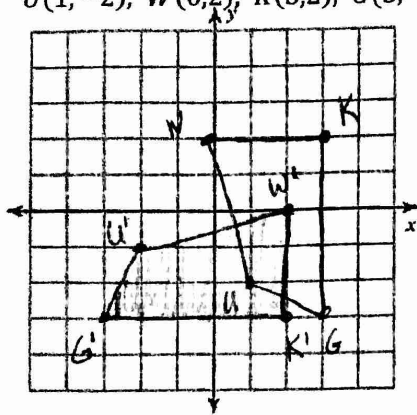
(x,y)	$\rightarrow$	$(y, -x)$
$U(1,-2)$		$U'(-2,-1)$
$W(0,2)$		$W'(2,0)$
$K(3,2)$		$K'(2,-3)$
$G(3,-3)$		$G'(-3,-3)$

6. Rotation 90° counterclockwise about the origin
$L(1,3)$, $Z(5,5)$, $F(4,2)$
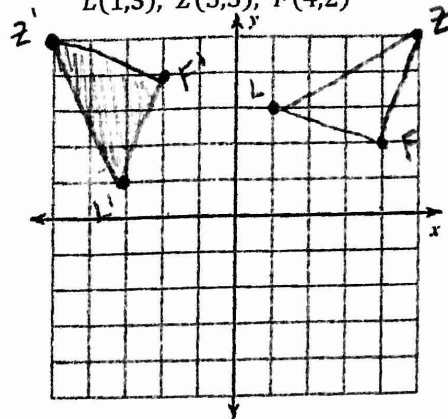
(x,y)	$\rightarrow$	$(-y, x)$
$L(1,3)$		$L'(-3,1)$
$Z(5,5)$		$Z'(-5,5)$
$F(4,2)$		$F'(-2,4)$

7. Rotation 90° clockwise about the origin
$S(1,-4)$, $W(1,0)$, $J(3.-4)$

(x,y)	$\rightarrow$	$(y, -x)$
$S(1,-4)$		$S'(-4,-1)$
$W(1,0)$		$W'(0,-1)$
$J(3,-4)$		$J'(-4,-3)$

Find the coordinates of the vertices of each figure after the given transformation.

8. Rotation 180° about the origin $(-x,-y)$)
$Z(-1,-5)$, $K(-1,0)$, $C(1,1)$, $N(3,-2)$

$Z'(1,5)$ $K'(1,0)$ $C'(-1,-1)$ $N'(-3,2)$

9. Rotation 90° clockwise about the origin $(y,-x)$
$A(-4,-5)$, $B(2,-2)$, $C(-3,0)$

$A'(-5,4)$ $B'(-2,-2)$ $C'(0,3)$

10. Rotation 90° counterclockwise about the origin
$V(-5,-3)$, $A(-3,1)$, $G(0,-3)$ $(-y,x)$

$V'(3,-5)$ $A'(-1,-3)$ $G'(3,0)$