Inspiring Greatness

INDEPENDENCE SCHOOL DISTRICT

Math Virtual Learning

Math 8

Rotations of two dimensional figures

(Day 2-Rotations on a coordinates grid)

April 21, 2020

Lesson: April 21th, 2020

Objective/Learning Target:
Students will describe the effect of rotations of two-dimensional figures using coordinates.

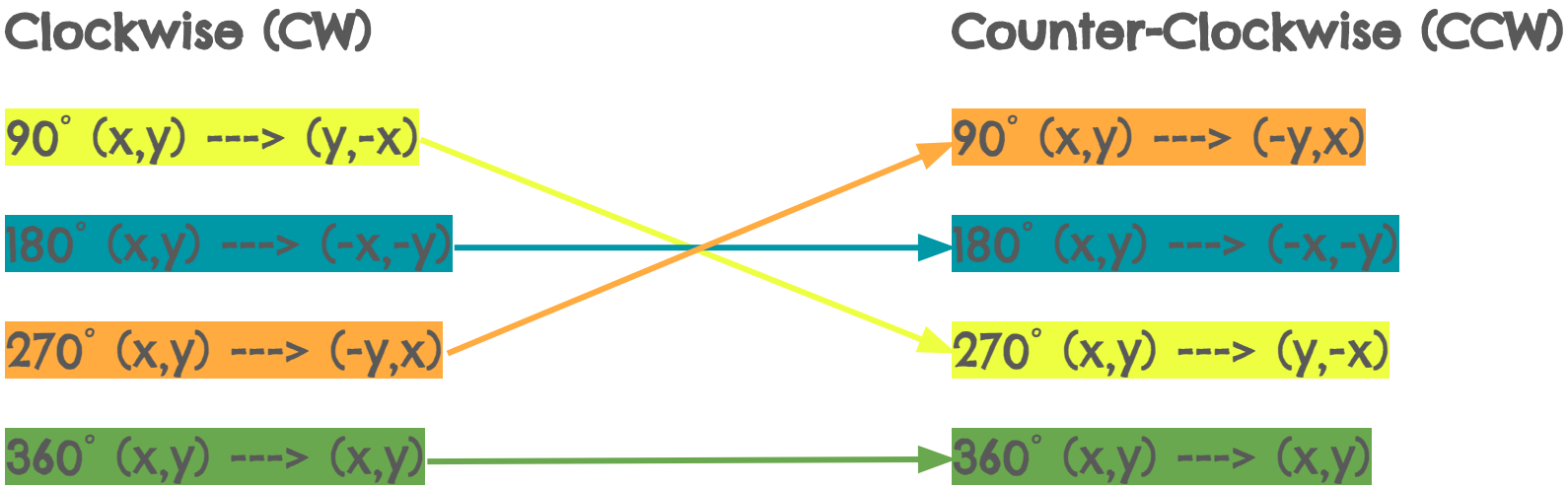
Warm-Up: Matching Rotation Rules

Matching the clockwise and counter-clockwise rules that are the same

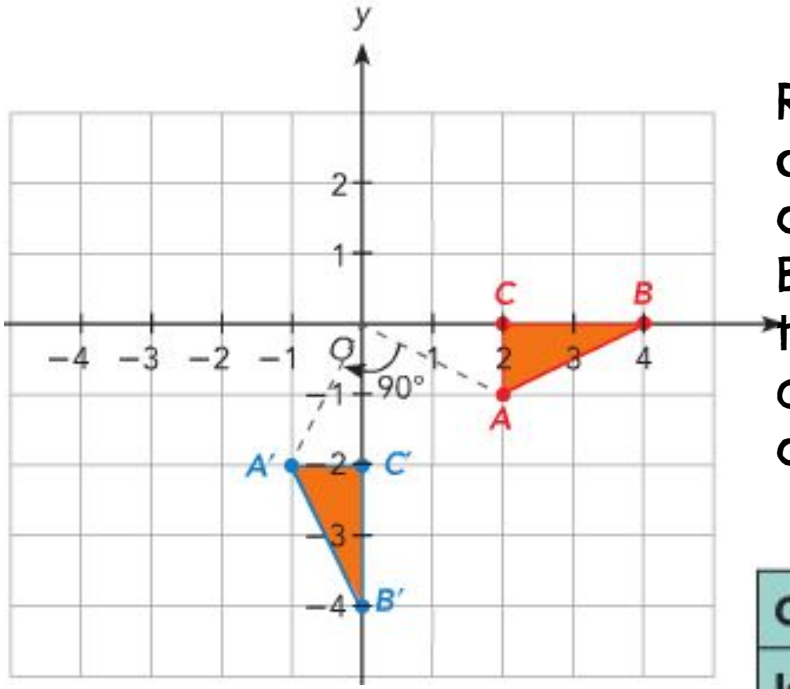
Clockwise (CW)	Counter-Clockwise (CCW)
90°	90°
180°	180°
270°	270°
360°	360°

Warm-Up: ANSWERS

Matching the clockwise and counter-clockwise rules that are the same



Guided Practice

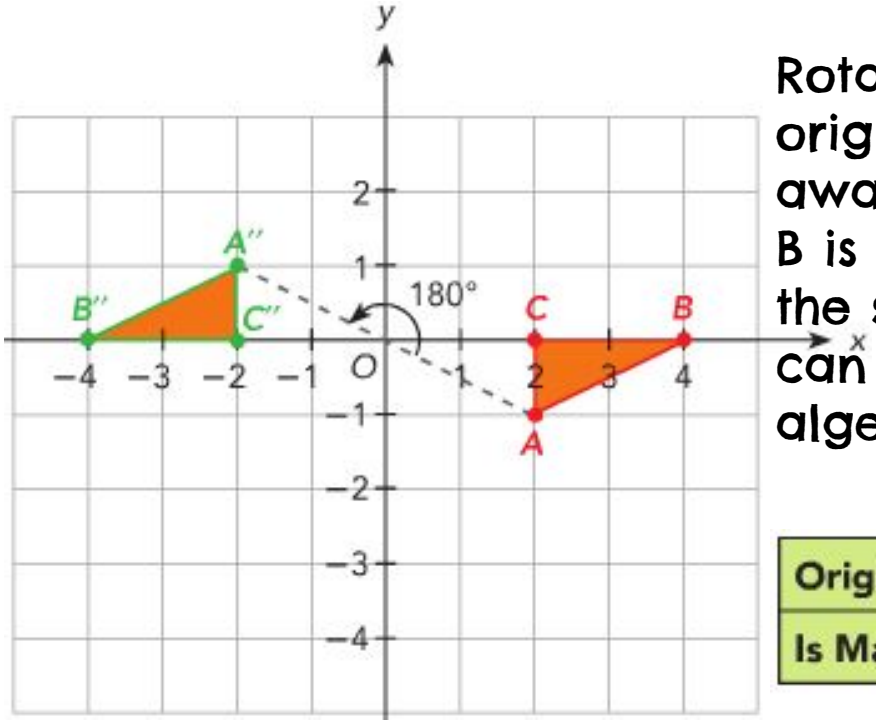


Rotate triangle ABC 90° CW about the origin. When rotating notice C is 2 units away from the origin and on the axis and B is 4 units away from the origin and on the same axis. A is 1 unit away from C. You can also check your work using the algebraic rule.

90° CW/270° CCW (x,y) ---> (y,-x)

Original Point	A (2, −1)	B (4, 0)	C (2, 0)
Is Mapped Onto	A′ (−1, −2)	B′ (0, −4)	C′ (0, −2)

Guided Practice

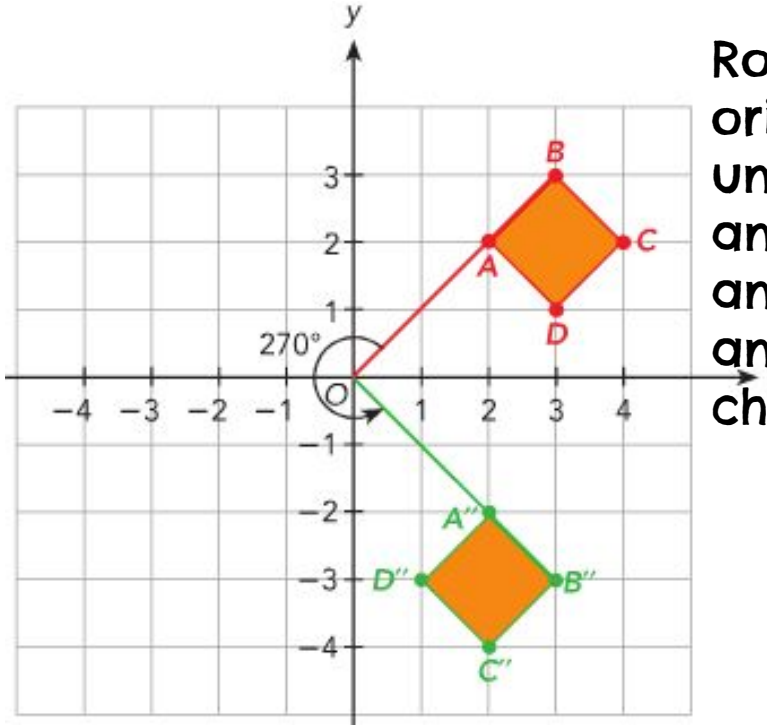


Rotate triangle ABC 180° CWW about the origin. When rotating notice C is 2 units away from the origin and on the axis and B is 4 units away from the origin and on the same axis. A is 1 unit away from C. You can also check your work using the algebraic rule.

180° CW/CCW (x,y) ---> (-x,-y)

Original Point	A (2, −1)	B (4, 0)	C (2, 0)
Is Mapped Onto	A″ (−2, 1)	B″ (−4, 0)	C″ (−2, 0)

Guided Practice



Rotate quadrilateral ABCD 270° CWW about the origin. When rotating notice A is 2 diagonal units away from the origin and on the axis and B is 3 diagonal units away from the origin and on the same line. C is 2 units away from A and D is 2 units away from D. You can also check your work using the algebraic rule.

270° CCW/ 90° CW (x,y) ---> (y,-x)

Original Point	Is Mapped Onto
A (2, 2)	A″ (2, −2)
B (3, 3)	B″ (3, −3)
C (4, 2)	C″ (2, −4)
D (3, 1)	D″ (1, −3)

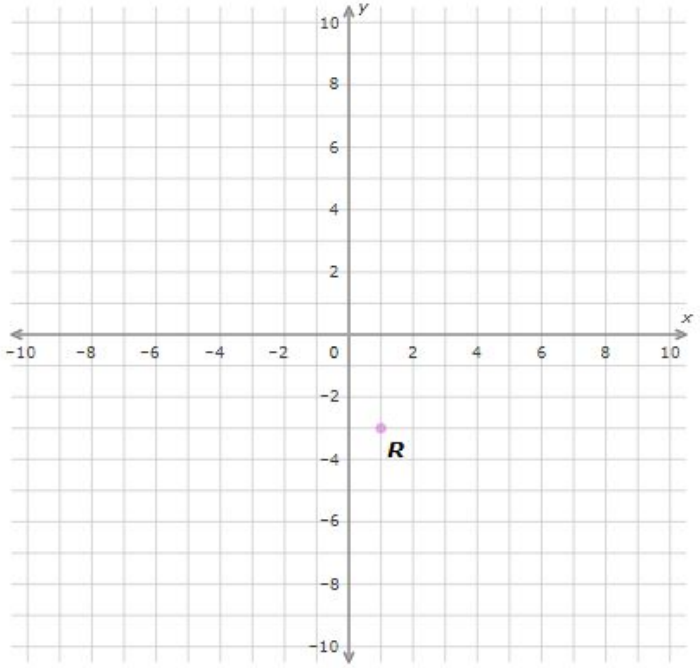
Practice:

Click the link below for additional practice on:

IXL Practice: Rotations-Graph the Image

1. Apply what you have learned about rotations to complete the given practice problems.
2. Use the mouse to plot the point on the graph.
3. Once you have graphed the rotation point, click submit to check your work.

Graph the image of $R(1, -3)$ after a rotation 270° clockwise around the origin.



Press here to check your work

Submit

Independent Practice: Problem 1

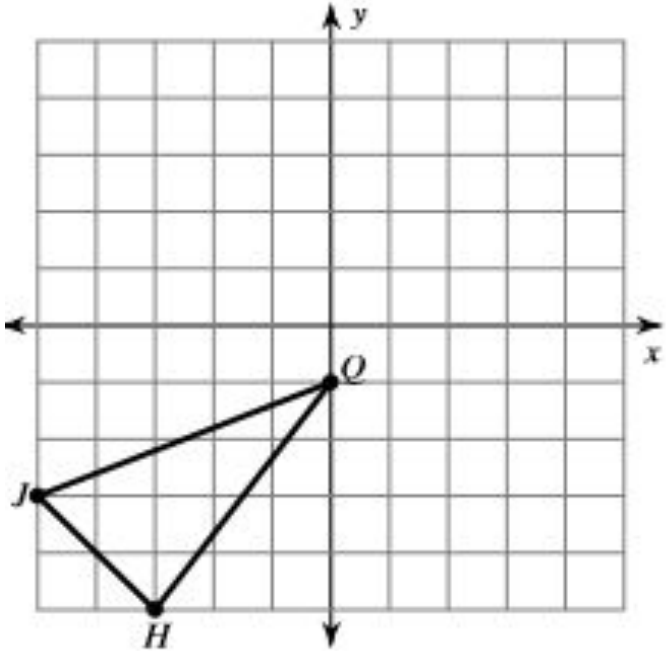
Work through the following example on a seperate piece of paper.

(Answer key on next slide.)

Graph the image of the figure after each rotation **about the origin**.
Read each rotation carefully!

1. Rotate 180°

Original Point	Is Mapped Onto
Q (0, -1)	
H (-3, -5)	
J (-5, -3)	



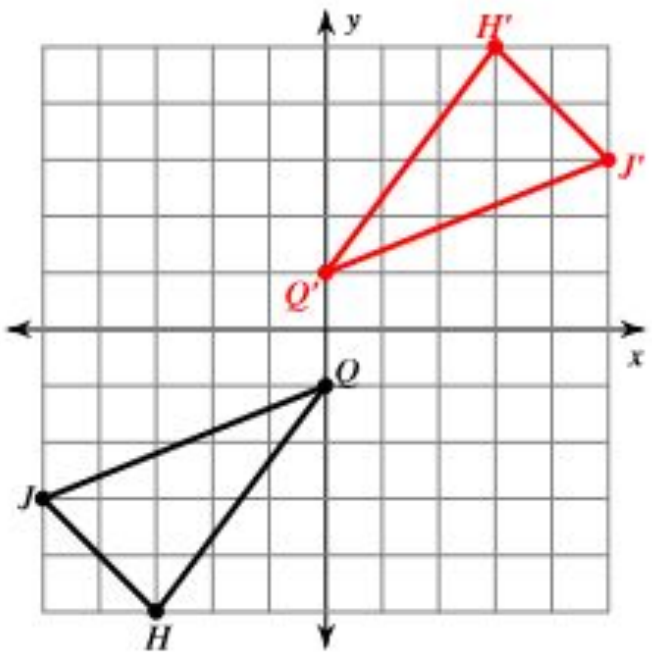
Independent Practice Answer Key: Problem 1

Once you have completed problem 1, check your answers here before going on to the next practice problems.

Graph the image of the figure after each rotation **about the origin**.
Read each rotation carefully!

1. Rotate 180°

Original Point	Is Mapped Onto
Q (0, -1)	Q' (0, 1)
H (-3, -5)	H' (3, 5)
J (-5, -3)	J' (5, 3)



Independent Practice: Problem 2

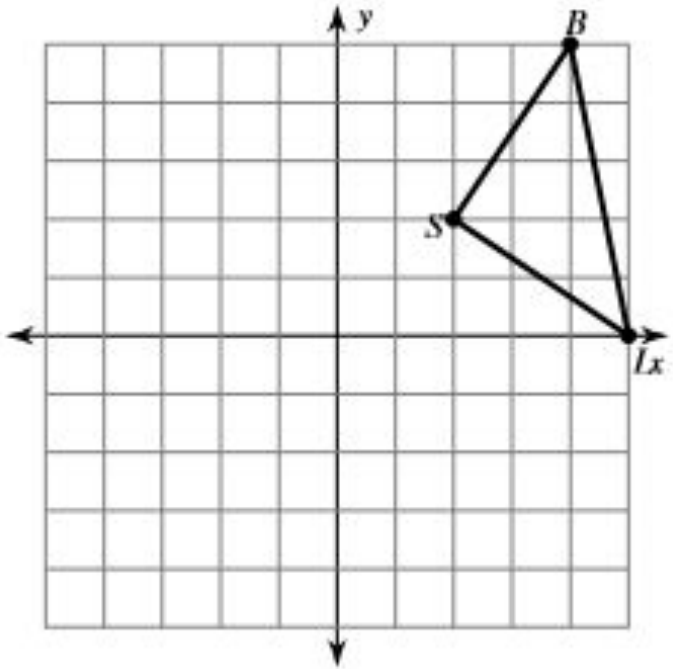
Work through the following example on a seperate piece of paper.

(Answer key on next slide.)

Graph the image of the figure after each rotation **about the origin**.
Read each rotation carefully!

2. Rotate 90° counterclockwise

Original Point	Is Mapped Onto
B (4, 5)	
L (5, 0)	
S (2, 2)	



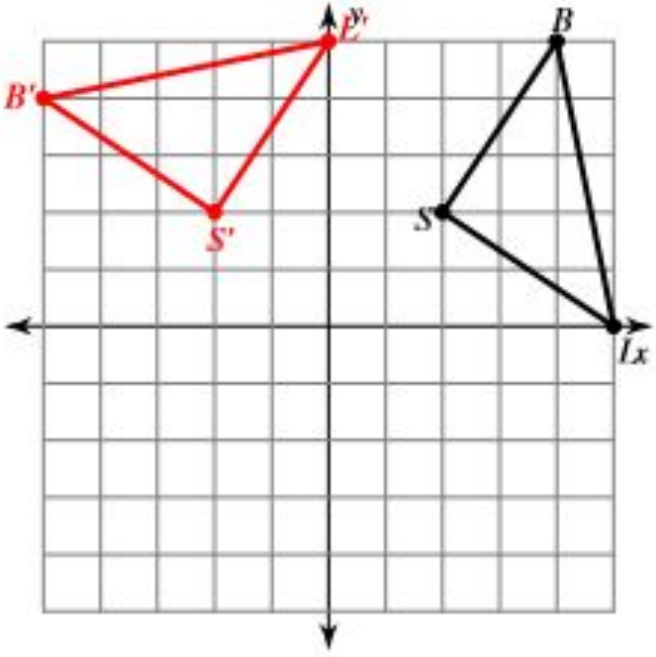
Independent Practice Answer Key: Problem 2

Once you have completed problem 2, check your answers here before going on to the next practice problems.

Graph the image of the figure after each rotation **about the origin**.
Read each rotation carefully!

2. Rotate 90° counterclockwise

Original Point	Is Mapped Onto
B (4, 5)	B' (-5, 4)
L (5, 0)	L (0, 5)
S (2, 2)	S' (-2, 2)



Independent Practice: Problem 3

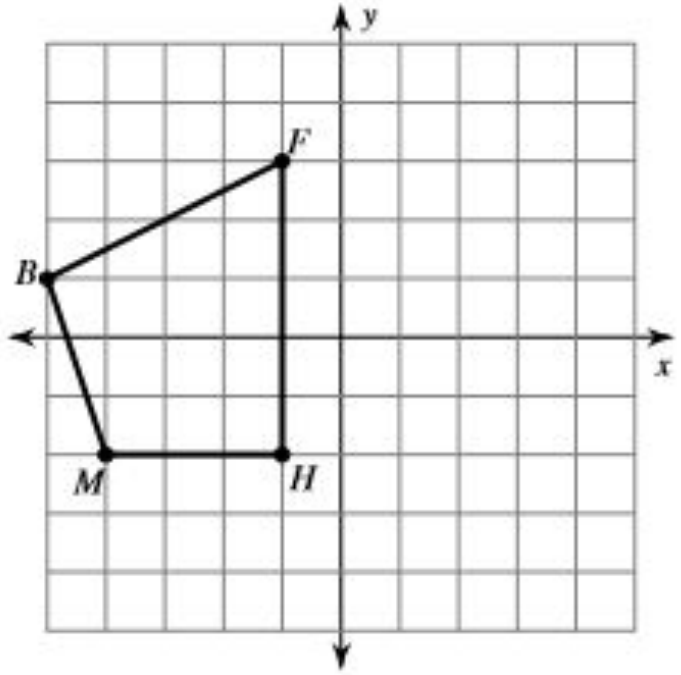
Work through the following example on a seperate piece of paper.

(Answer key on next slide.)

Graph the image of the figure after each rotation **about the origin**.
Read each rotation carefully!

3. Rotate 90° clockwise

Original Point	Is Mapped Onto
B (-5, 1)	
F (-1, 3)	
H (-1, -2)	
M (-4, -2)	



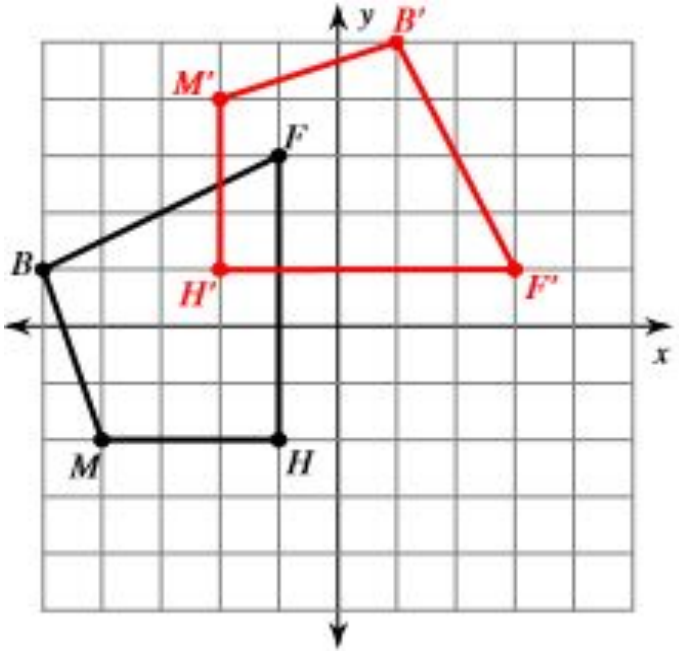
Independent Practice Answer Key: Problem 3

Once you have completed problem 3, check your answers here before going on to the next practice problems.

Graph the image of the figure after each rotation **about the origin**.
Read each rotation carefully!

3. Rotate 180°

Original Point	Is Mapped Onto
B (-5, 1)	B' (1, 5)
F (-1, 3)	F' (3, 1)
H (-1, -2)	H' (-2, 1)
M (-4, -2)	M' (-2, 4)



Independent Practice: Problem 4

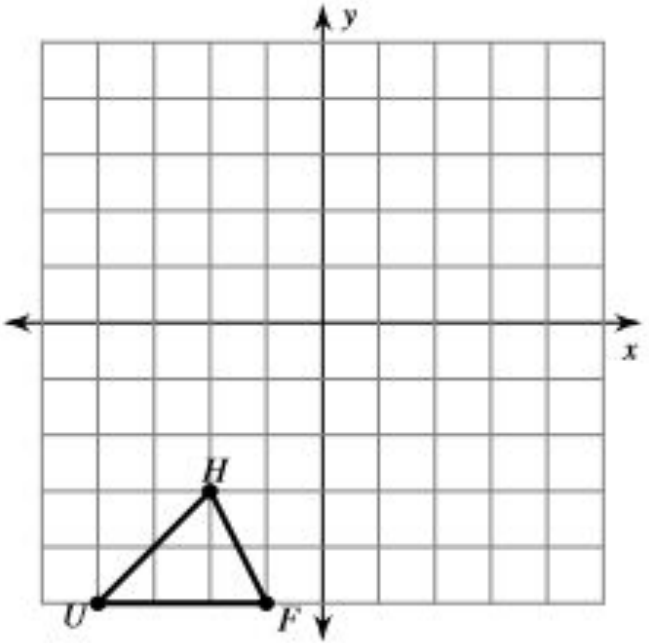
Work through the following example on a seperate piece of paper.

(Answer key on next slide.)

Graph the image of the figure after each rotation **about the origin**.
Read each rotation carefully!

4. Rotate 180°

Original Point	Is Mapped Onto
H (-2, -3)	
F (-1, -5)	
U (-4, -5)	



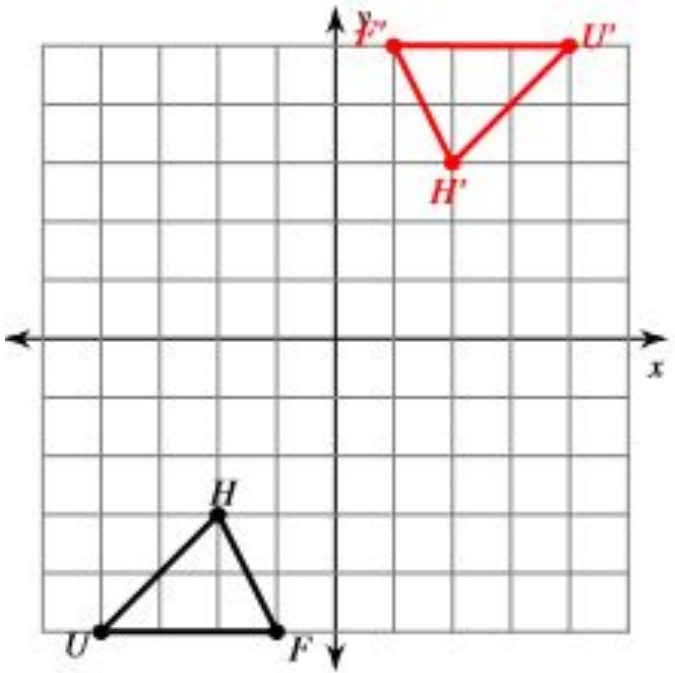
Independent Practice Answer Key: Problem 4

Once you have completed problem 4, check your answers here before going on to the next practice problems.

Graph the image of the figure after each rotation **about the origin**.
Read each rotation carefully!

4. Rotate 180°

Original Point	Is Mapped Onto
H (-2, -3)	H' (2, 3)
F (-1, -5)	F' (1, 5)
U (-4, -5)	U' (4, 5)



Independent Practice: Problem 5

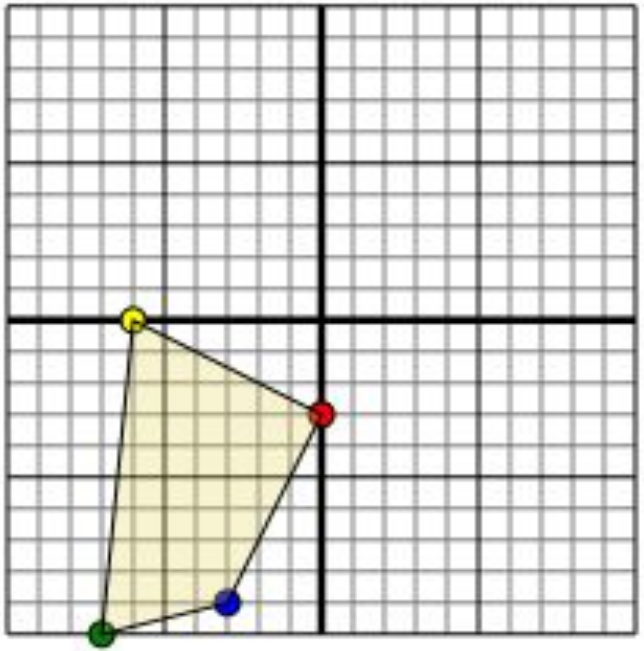
Work through the following example on a seperate piece of paper.

(Answer key on next slide.)

Graph the image of the figure after each rotation **about the origin**.
Read each rotation carefully!

5. Rotate 270° clockwise

Original Point	Is Mapped Onto
Red (0, -3)	
Blue (-3, -9)	
Green (-7, -10)	
Yellow (-6, 0)	



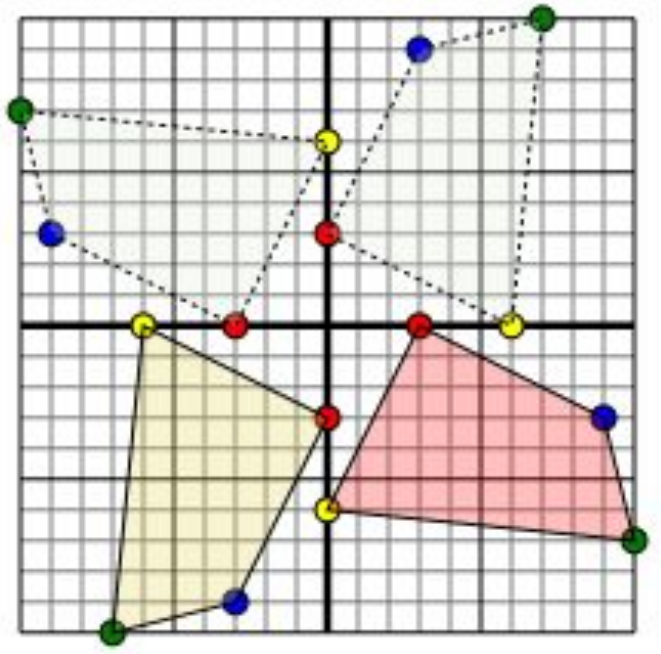
Independent Practice Answer Key: Problem 5

Once you have completed problem 5, check your answers here before going on to the next practice problems.

Graph the image of the figure after each rotation **about the origin**.
Read each rotation carefully!

5. Rotate 270° clockwise

Original Point	Is Mapped Onto
Red (0, -3)	Red' (3, 0)
Blue (-3, -9)	Blue' (9, -3)
Green (-7, -10)	Green' (10, -7)
Yellow (-6, 0)	Yellow' (0, -6)



Independent Practice: Problem 6

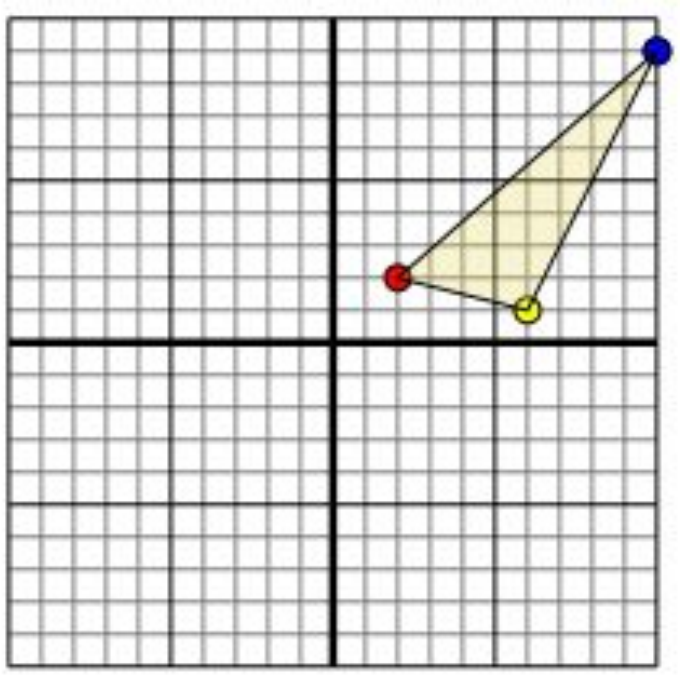
Work through the following example on a seperate piece of paper.

(Answer key on next slide.)

Graph the image of the figure after each rotation **about the origin**.
Read each rotation carefully!

6. Rotate 270° counterclockwise

Original Point	Is Mapped Onto
Red (2, 2)	
Yellow (6, 1)	
Blue (10, 9)	



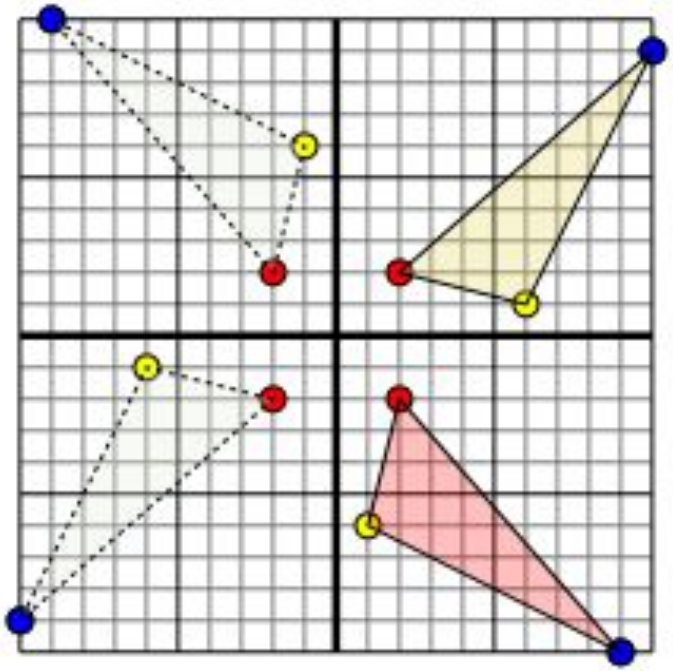
Independent Practice Answer Key: Problem 6

Once you have completed problem 6, check your answers here before going on to the next practice problems.

Graph the image of the figure after each rotation **about the origin**.
Read each rotation carefully!

6. Rotate 270° counterclockwise

Original Point	Is Mapped Onto
Red (2, 2)	Red' (2, -2)
Yellow (6, 1)	Yellow' (1, -6)
Blue (10, 9)	Blue' (9, -10)



Independent Practice: Problem 7

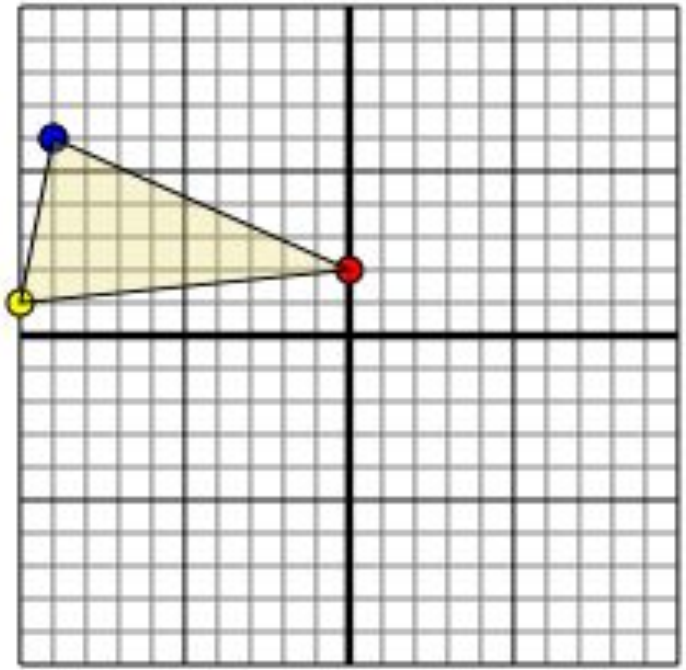
Work through the following example on a seperate piece of paper.

(Answer key on next slide.)

Graph the image of the figure after each rotation **about the origin**.
Read each rotation carefully!

7. Rotate 270° clockwise

Original Point	Is Mapped Onto
Red (0, 2)	
Yellow (-10, 1)	
Blue (-9, 6)	



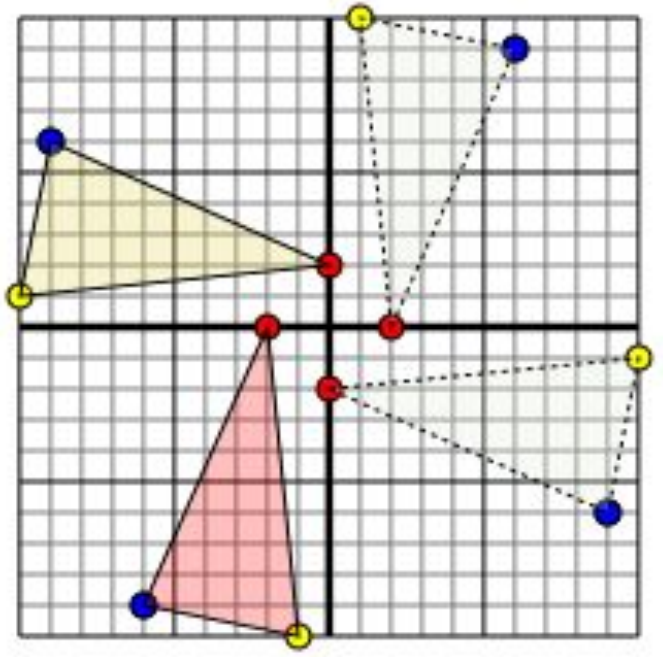
Independent Practice Answer Key: Problem 7

Once you have completed problem 7, check your answers here before going on to the next practice problems.

Graph the image of the figure after each rotation **about the origin**.
Read each rotation carefully!

7. Rotate 270° clockwise

Original Point	Is Mapped Onto
Red (0, 2)	Red' (-2, 0)
Yellow (-10, 1)	Yellow' (-1, -10)
Blue (-9, 6)	Blue' (-6, -9)



Independent Practice: Problem 8

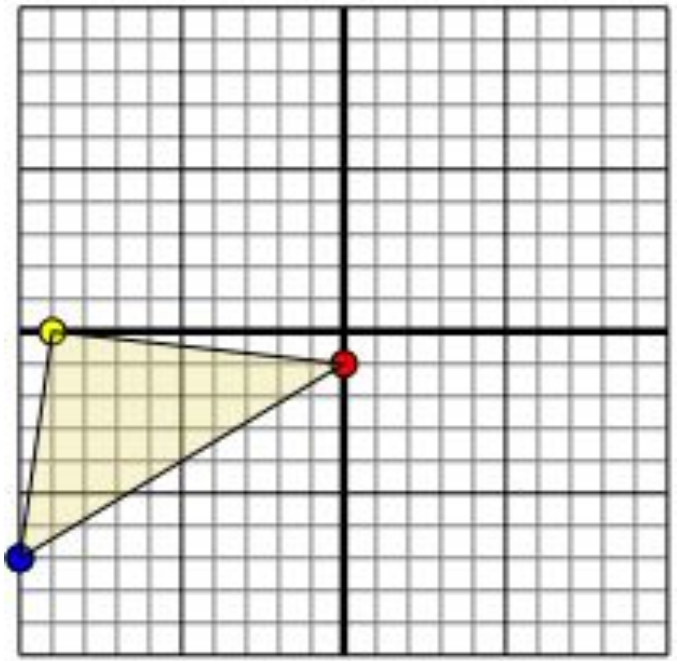
Work through the following example on a seperate piece of paper.

(Answer key on next slide.)

Graph the image of the figure after each rotation **about the origin**.
Read each rotation carefully!

8. Rotate 270° counterclockwise

Original Point	Is Mapped Onto
Red (0, -1)	
Blue (-10, -7)	
Yellow (-9, 0)	



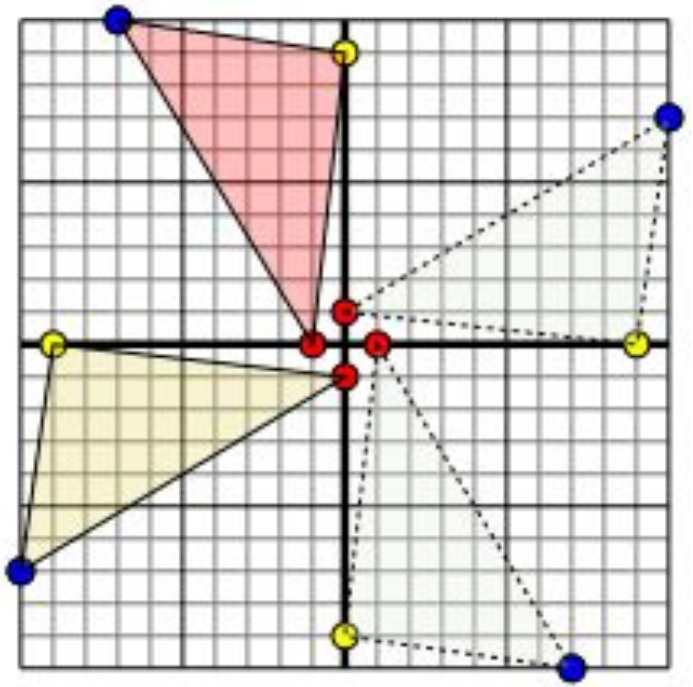
Independent Practice Answer Key: Problem 8

Once you have completed problem 8, check your answers here before going on to the next practice problems.

Graph the image of the figure after each rotation **about the origin**.
Read each rotation carefully!

4. Rotate 270° counterclockwise

Original Point	Is Mapped Onto
Red (0, -1)	Red' (-1, 0)
Blue (-10, -7)	Blue' (-7, 10)
Yellow (-9, 0)	Yellow' (0, 9)



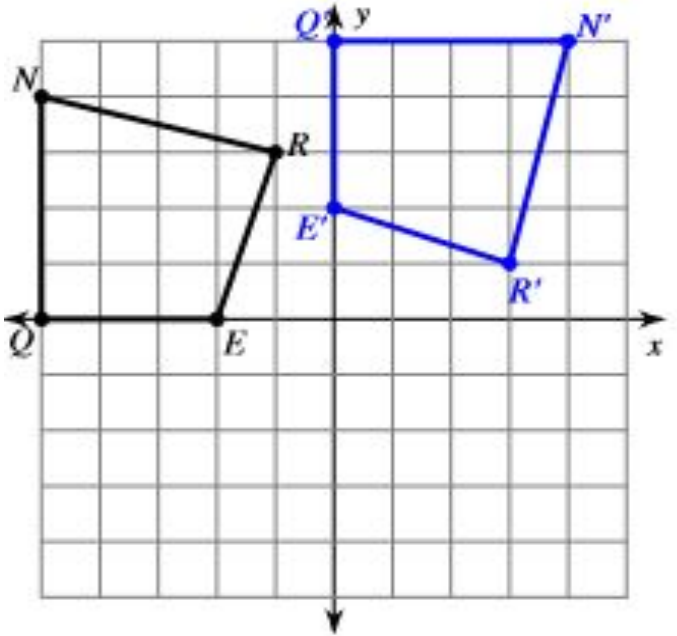
Independent Practice: Problem 9

Work through the following example on a seperate piece of paper.

(Answer key on next slide.)

Look carefully at the rotated images. Write a rule to describe the rotation.

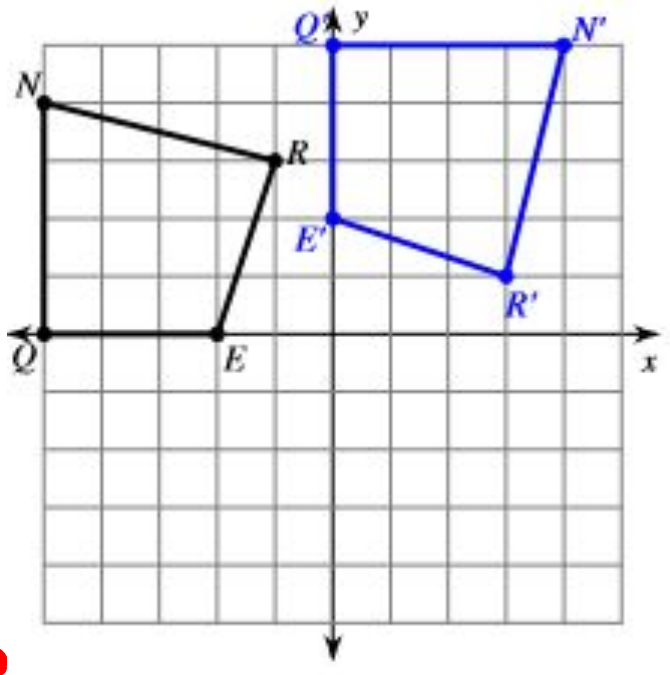
Original Point	Is Mapped Onto
N (-5, 4)	
R (-1, 3)	
E(-2, 0)	
Q (-5, 0)	



Independent Practice Answer Key: Problem 9

Once you have completed problem 9, check your answers here before going on to the next practice problems.

Original Point	Is Mapped Onto
N (-5, 4)	N' (4, 5)
R (-1, 3)	R' (3, 1)
E(-2, 0)	E' (0, 2)
Q (-5, 0)	Q' (0, 5)



The figure NREQ was rotated 90° clockwise to form image N'R'E'Q'.

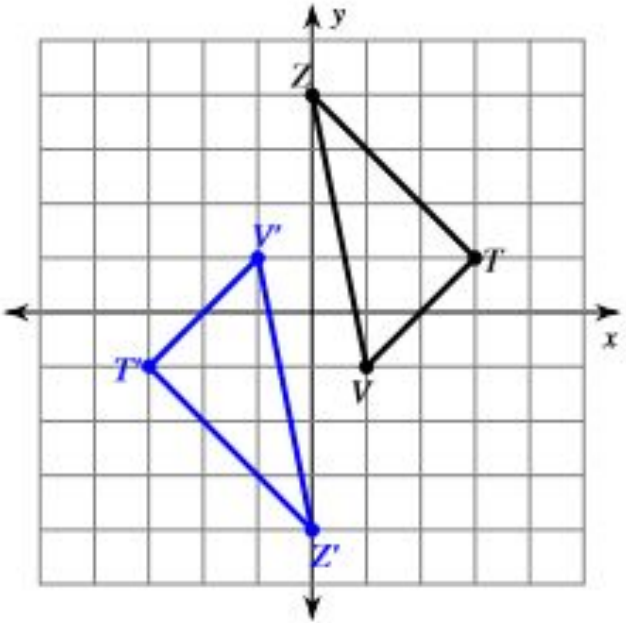
Independent Practice: Problem 10

Work through the following example on a seperate piece of paper.

(Answer key on next slide.)

Look carefully at the rotated images. Write a rule to describe the rotation.

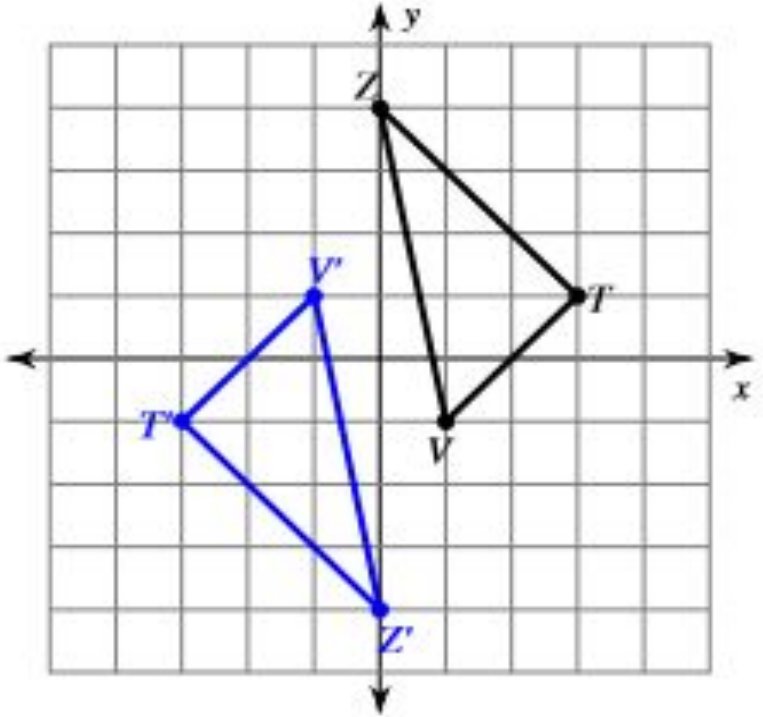
Original Point	Is Mapped Onto
Z (4, 0)	
T (3, 1)	
V (1, -1)	



Independent Practice Answer Key: Problem 10

Once you have completed problem 10, check your answers here before going on to the next practice problems.

Original Point	Is Mapped Onto
Z (0, 4)	Z' (0, -4)
T (3, 1)	T' (-3, -1)
V (1, -1)	V' (-1, 1)



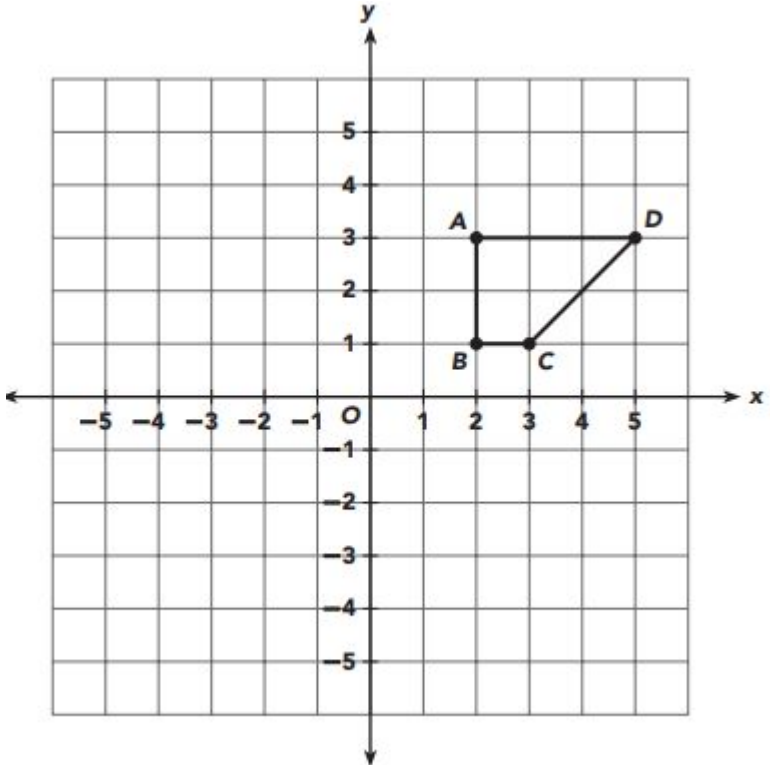
The figure ZTV was rotated 180° about the Origin to form image Z'T'V'.

Independent Practice: Problem 11

Work through the following example on a seperate piece of paper.

(Answer key on next slide.)

A trapezoid, ABCD, is drawn on the coordinate plane.



a) ABCD is rotated 90° counterclockwise about the origin O. Draw and label the image of A'B'C'D'.

b) What are the coordinates of A'B'C'D'?

c) ABCD is rotated 180° clockwise about the origin, O. Draw and label the image of A"B"C"D".

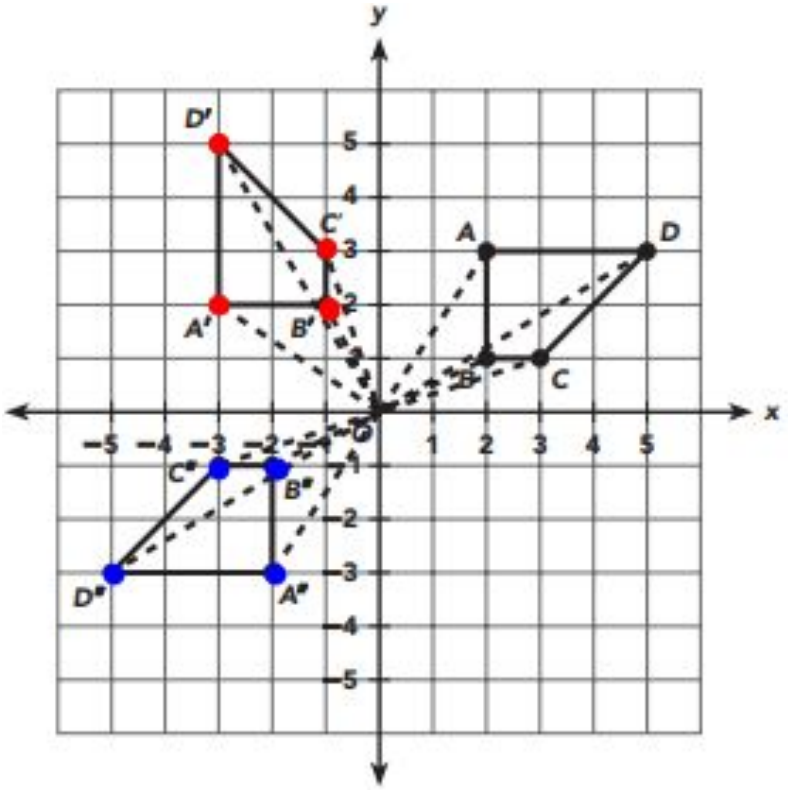
d) What are the coordinates of A"B"C"D"?

Independent Practice Answer Key: Problem 11

Once you have completed problem 11, check your answers here before going on to the next practice problem.

b.)

Original Point	Is Mapped Onto
A (2, 3)	A' (-3, 2)
B (2, 1)	B' (-1, 2)
C (3, 1)	C' (-1, 3)
D (5, 3)	D' (-3, 5)

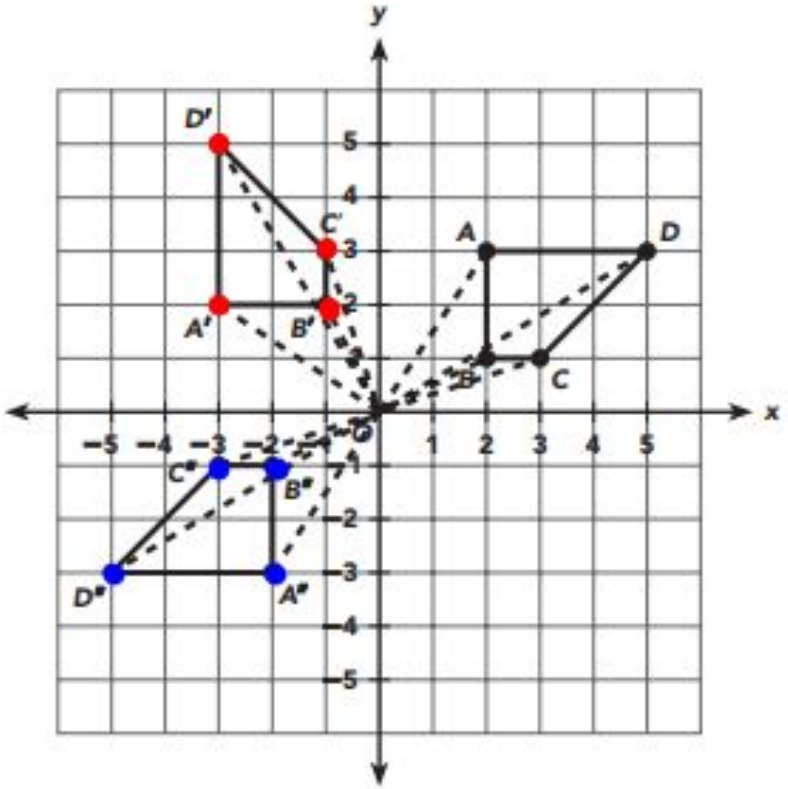


Independent Practice Answer Key: Problem 11

Once you have completed problem 11, check your answers here before going on to the next practice problem.

d.)

Original Point	Is Mapped Onto
A (2, 3)	A" (-2, -3)
B (2, 1)	B" (-2, -1)
C (3, 1)	C" (-3, -1)
D (5, 3)	D" (-5, -3)



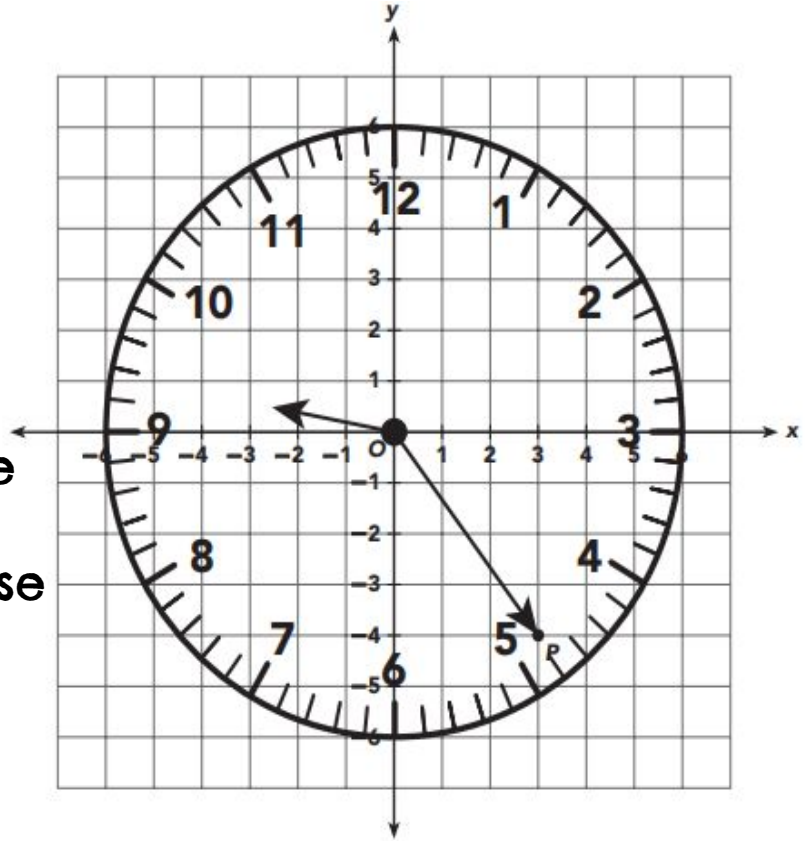
Independent Practice: Problem 12

Work through the following example on a seperate piece of paper.

(Answer key on next slide.)

The diagram shows the minute hand of a clock rotating about the center, O of the clock face. The minute hand is initially represented by OP. Point P is at position (3, −4). Find the position of the minute hand under each of the following rotations.

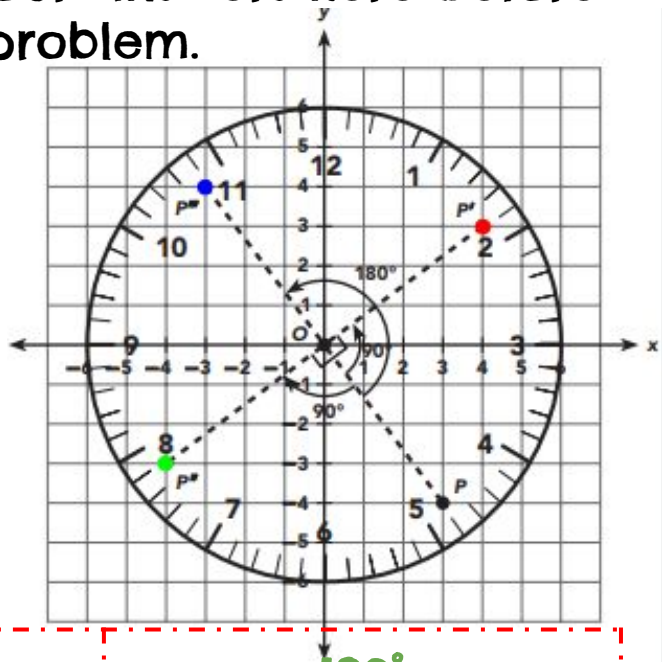
a) Image P': rotation of 90° counterclockwise
b) Image P": rotation of 90° clockwise
c) Image P"": rotation of 180° counterclockwise



Independent Practice Answer Key: Problem 12

Once you have completed problem 12, check your answers here before going on to the next practice problem.

a) Image P': rotation of 90° counterclockwise
b) Image P": rotation of 90° clockwise
c) Image P"': rotation of 180° counterclockwise



Original Point	90° counterclockwise Is Mapped Onto	90° clockwise Is Mapped Onto	180° counterclockwise Is Mapped Onto
P (3, -4)	P' (4, 3)	P" (-4, -3)	P"' (-3, 4)

Additional Practice:

Choose from the links below for additional practice and to check your understanding!

CK-12 Rotations on a Coordinate Plane Games

Khan Academy-Rotating Shapes Video and Practice

Math Games-Rotations: Find the Coordinates

Mangahigh Math Game-Rotation OR Rotation about Any Point

Math Warehouse-Interactive Demonstration of Rotations Practice