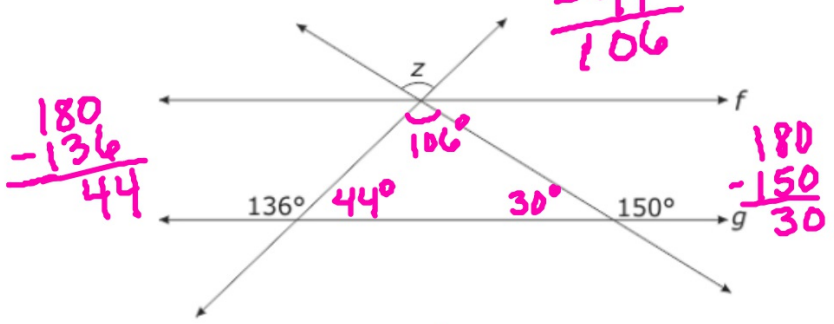
Warm-Up

In the figure below, lines *f* and *g* are parallel.

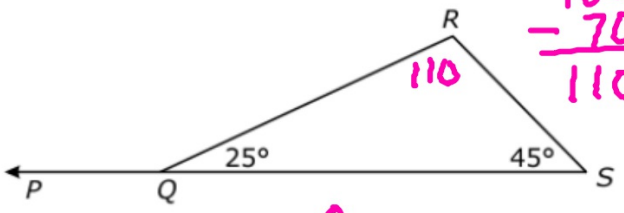


180 − 74 = 106

180 − 136 = 44

180 − 150 = 30

1) What is the measure of ∠*z*? 106°



180 − 70 ← (25+45) = 110

2) What is measure of angle *QRS*? 110°

3) A cylinder-shaped container is used to store water. The container has a height of 6 feet and a diameter of 3 feet. ***About*** how much water is in the container when it is $\frac{3}{4}$ full?

3) $V = \pi r^2 h$

$d = 3$, $r = 1.5$ $V = (3.14)(1.5)^2(6)$

$V = 42.39$

$V = \frac{3}{4}(42.39)$

$V = 31.8\ ft^3$

Homework Check

#3 #6

* Key steps
  - write your coordinates
  - multiply by scale factor
  or figure out the scale factor

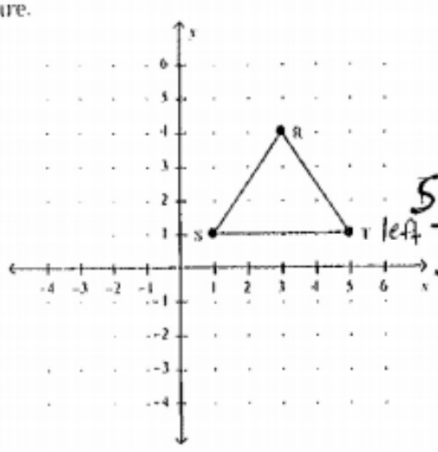
Name Key 5-7-15 Dilation Homework

~~Transformation Study Guide~~

Date _____
Block _____

Draw the image and label with letters. Then, identify the letter of the choice that best completes the statement or answers the question.

1. Translate triangle RST left 3 units and down 2 units. List the coordinates of the vertices of the new figure.

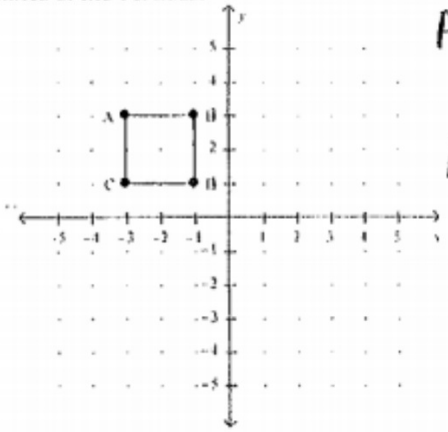


S(1,1)
left -3, -2 down
S'(-2,-1)

a. R'(6, 6), S'(4, 3), T'(8, 3)
b. R'(0, 4), S'(-2, 1), T'(2, 1)
c. R'(3, 2), S'(1, -1), T'(5, -1)
d. R'(0, 2), S'(-2, -1), T'(2, -1)

D

3. The plan for a room is drawn on a grid. It is then decided that the square table should be moved to the right 2 units and down 2 units. List the new coordinates of the vertices.



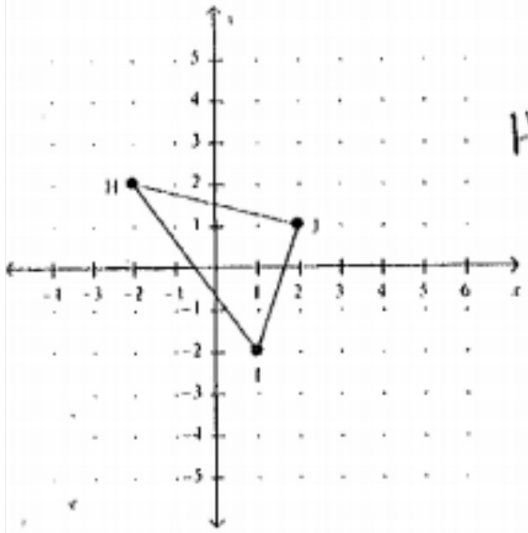
A(-3,3
+2 -
A'(-1

a. A'(-1, 1), B'(1, 1), D'(1, -1), C'(-1, -1)
b. A'(-5, 5), B'(-3, 5), D'(-3, 3), C'(-5, 3)
c. A'(-3, 1), B'(-1, 1), D'(-1, -1), C'(-3, -1)
d. A'(-1, 3), B'(1, 3), D'(1, 1), C'(-1, 1)

A

X-COOR Y-COOR

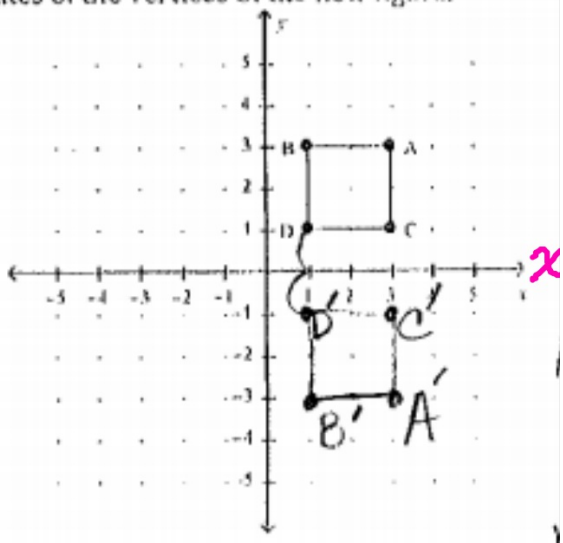
2. Translate HIJ right 1 unit and up 2 units. Write the coordinates of the vertices of the new figure.



H(-2,2)
+1 +2
H'(-1,4)

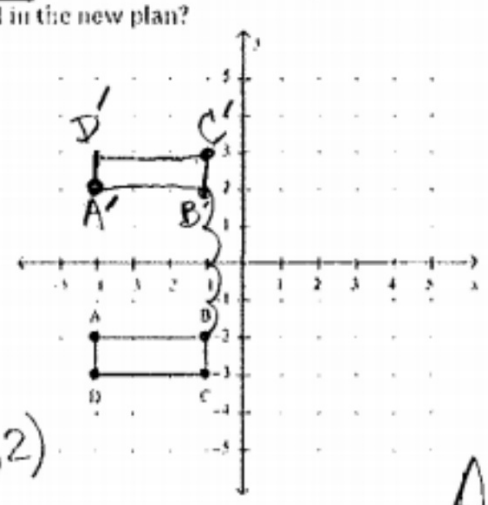
a. I'(2, -2), J'(3, 1)
b. I'(2, 0), J'(3, 3)
c. H'(-2, 4), I'(1, 0), J'(2, 3)
d. H'(-3, 0), I'(0, -4), J'(1, -1)

4. Reflect BACD across the x-axis. List the coordinates of the vertices of the new figure.



a. B'(1, 3), A'(3, 3), C'(3, 1), D'(1, 1)
b. B'(1, -3), A'(3, -3), C'(3, -1), D'(1, -1)
c. B'(-1, -3), A'(-3, -3), C'(-3, -1), D'(-1, -1)
d. B'(-1, 3), A'(-3, 3), C'(-3, 1), D'(-1, 1)

5. A bedroom plan is being designed on the below. The designer decides to reflect the placement e bed, which is represented by rectangle ABCD, across -axis. What will be the coordinates of the vertices of ed in the new plan?



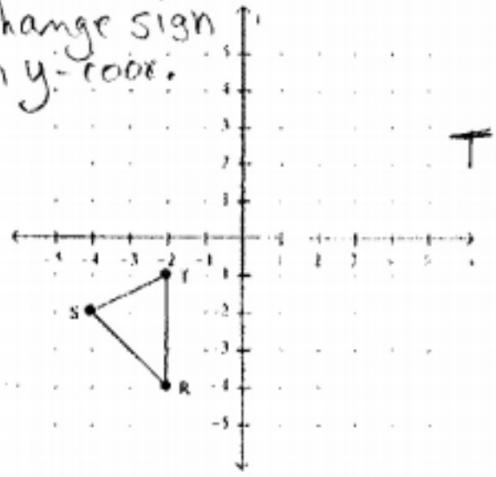
4,2)

A

(-4, 2), B'(-1, 2), C'(-1, 3), D'(-4, 3)
(-4, -2), B'(-1, -2), C'(-1, -3), D'(-4, -3)
(4, 2), B'(1, 2), C'(1, 3), D'(4, 3)
(4, -2), B'(1, -2), C'(1, -3), D'(4, -3)

7. A flag is represented by triangle RST on the grid below. The flag is moved so that it is reflected across the x-axis. What are the coordinates of the vertices after the reflection?

Change sign on y-coor.



T(-2,

T'(-

a. R'(2, 4), S'(4, 2), T'(2, 1)

b. R'(-2, 4), S'(-4, 2), T'(-2, 1)

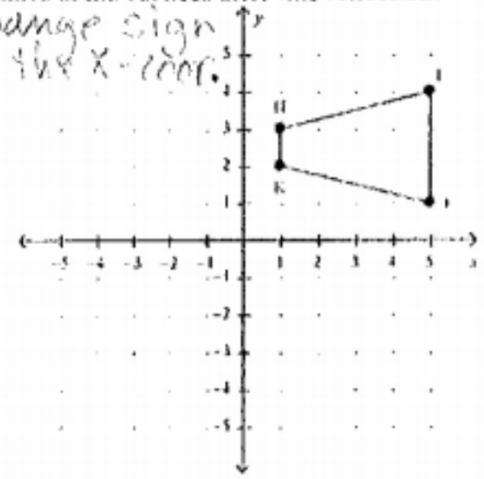
c. R'(-2, -4), S'(-4, -2), T'(-2, -1)

d. R'(2, -4), S'(4, -2), T'(2, -1)

F

6. Members of a dance team begin in a pezoid formation that is represented by trapezoid HIJK the grid below. They move so that their new formation reflection across the y-axis. What are the new rdinates of the vertices after this reflection?

change sign in the x-coor.



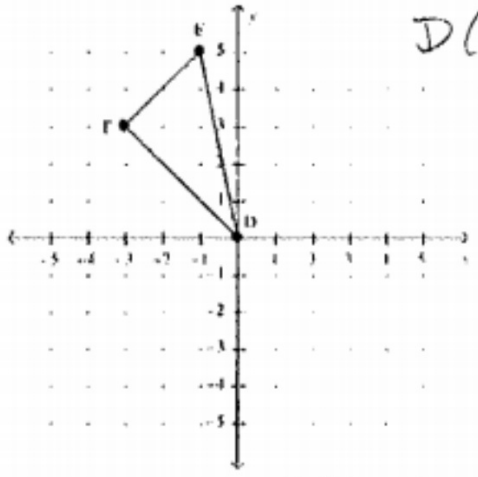
K(1,2)

K'(-1,2)

H'(-1, 3), I'(-5, 4), J'(-5, 1), K'(-1, 2)
H'(1, -3), I'(5, -4), J'(5, -1), K'(1, -2)
H'(1, 3), I'(5, 4), J'(5, 1), K'(1, 2)
H'(-1, -3), I'(-5, -4), J'(-5, -1), K'(-1, -2)

A

8. Rotate DEF 180° clockwise about the origin. List the coordinates of the vertices of the new figure.



D(0,0)

F(-3

180°

sig

bo

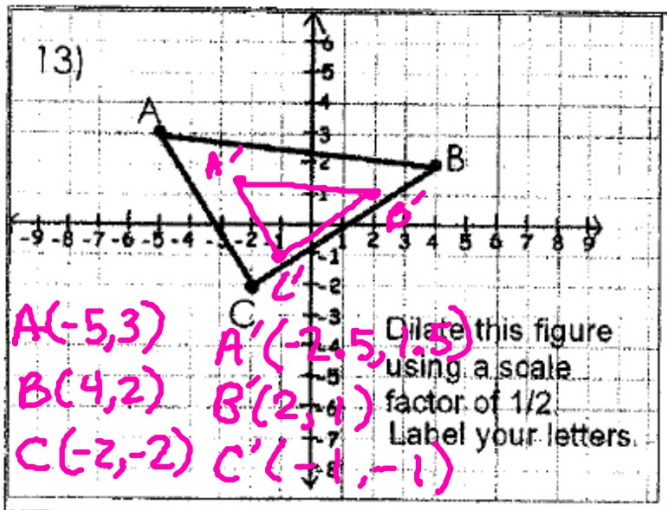
E'(

a. D'(0, 0), E'(-1, -5), F'(-3, -3)
b. D'(0, 0), E'(5, 1), F'(3, 3)
c. D'(0, 0), E'(1, -5), F'(3, -3)
d. D'(3, 3), E'(2, 2), F'(0, 0)

C

9. Translation Left 1, Down 3
10. Reflection across y-axis, then reflect across the x-axis
11. Reflection across x axis
12. 2

13)

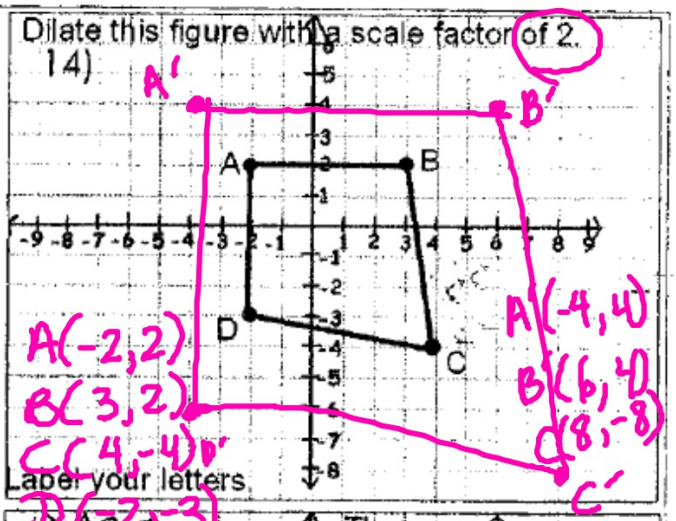


A(-5,3) A'(-2.5, 1.5)
B(4,2) B'(2, 1)
C(-2,-2) C'(-1, -1)

Dilate this figure using a scale factor of 1/2. Label your letters.

14)

Dilate this figure with a scale factor of 2.

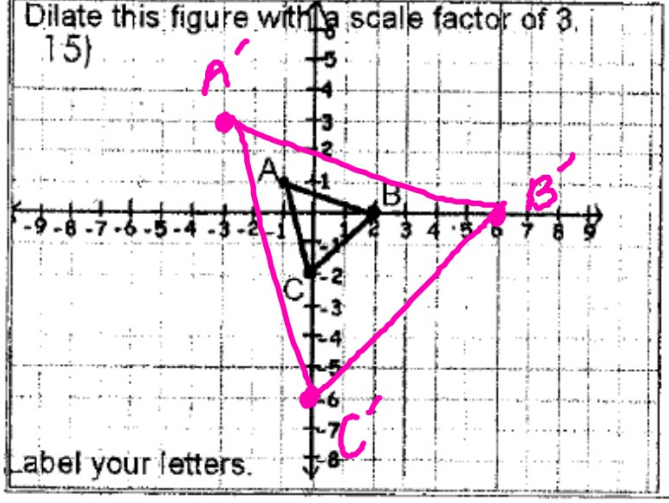


A(-2,2) A'(-4,4)
B(3,2) B'(6,4)
C(4,-4) C'(8,-8)
D(-2,-3)

Label your letters.

15)

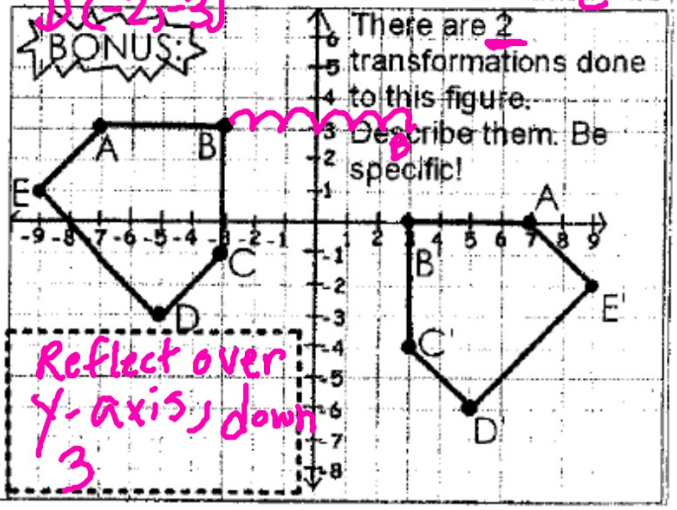
Dilate this figure with a scale factor of 3.



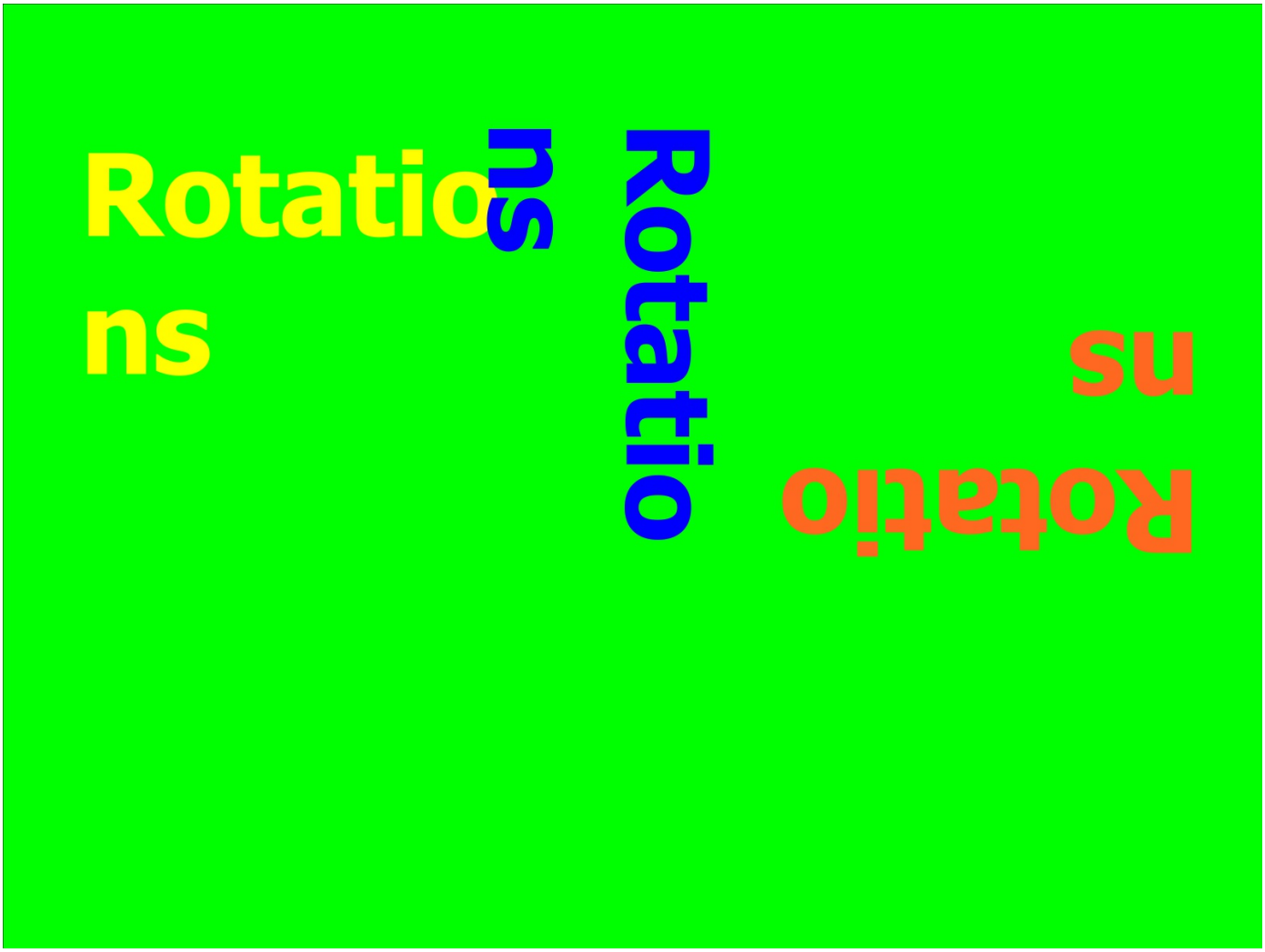
Label your letters.

BONUS:

There are 2 transformations done to this figure. Describe them. Be specific!



Reflect over y-axis, down 3


Rotations
Rotations
Rotations

A ROTATION IS A TRANSFORMATION IN WHICH A FIGURE IS TURNED AROUND A FIXED POINT, CALLED THE CENTER OF ROTATION .

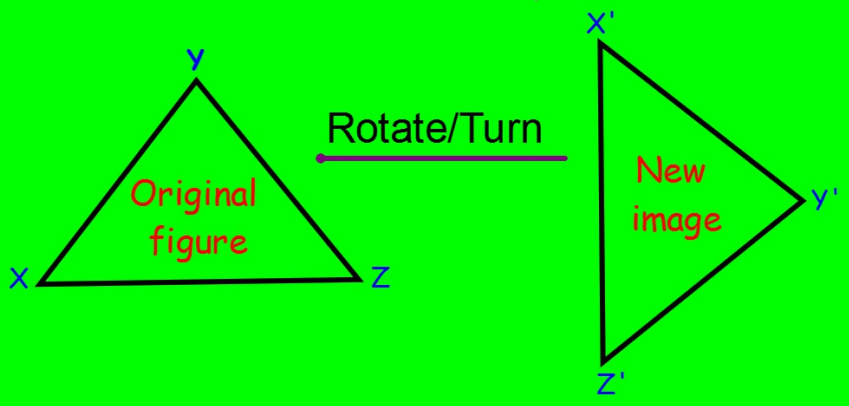
Rotating a figure creates a congruent figure called an image. The original figure and the image have the same shape and same size and are an equal distance from the center of rotation.

Rules for **Rotations** about the origin (0, 0)

Degrees	Clockwise		Counterclockwise	
90°	(x, y)	(y, -x)	(x, y)	(-y, x)
180°	(x, y)	(-x, -y)	(x, y)	(-x, -y)
270°	(x, y)	(-y, x)	(x, y)	(y, -x)
360°	(x, y)	(x, y)	(x, y)	(x, y)

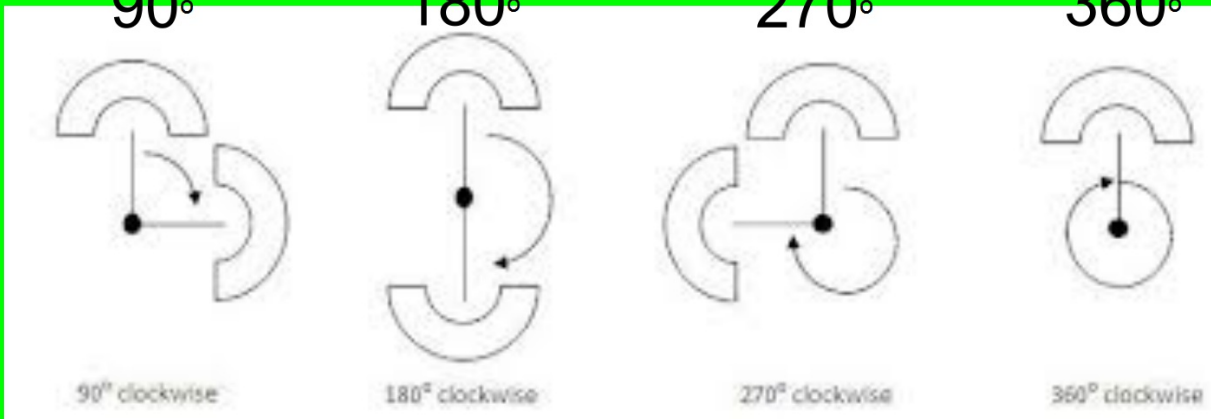
When an image ABCD is rotated,
the new image is A'B'C'D'.

**Make sure you label the original figure XYZ and the new image will be labeled with the "prime" marks: X'Y'Z'.

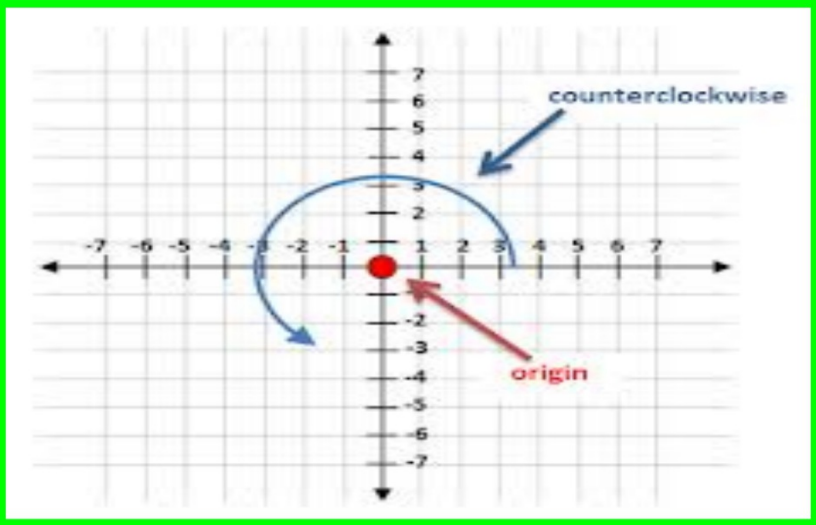


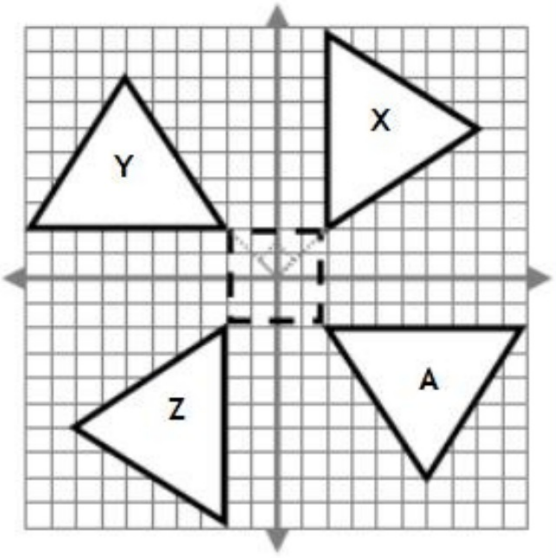
Clockwise Rotations at different degree examples:

90° 180° 270° 360°



Counterclockwise rotations move to the left around the center of rotation.





Counterclockwise rotation:

X ——— Y = 90°

X ——— Z = 180°

X ——— A = 270°

X ——— X = 360°

Rotate the right triangle ABC:

a) 90° counterclockwise

(x, y) ⇨ (-y, x)

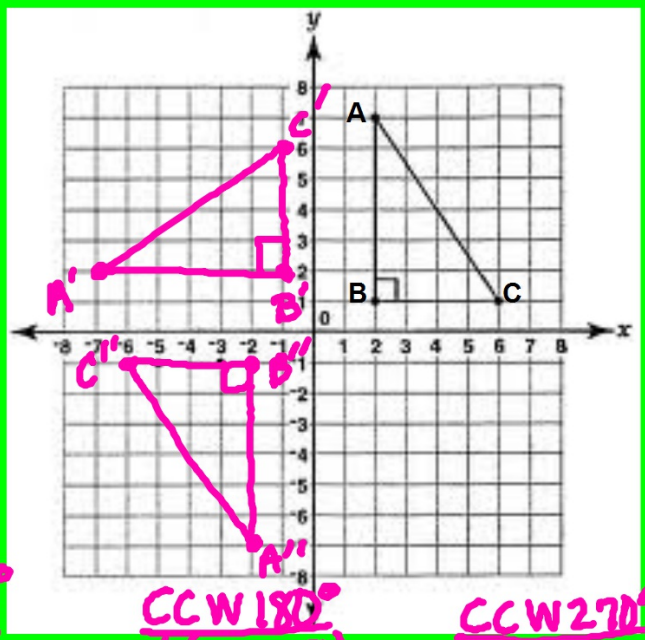
b) 180° counterclockwise

(x, y) ⇨ (-x, -y)

c) 270° counterclockwise

(x, y) ⇨ (y, -x)

*Make sure your new image is named with "prime" marks.

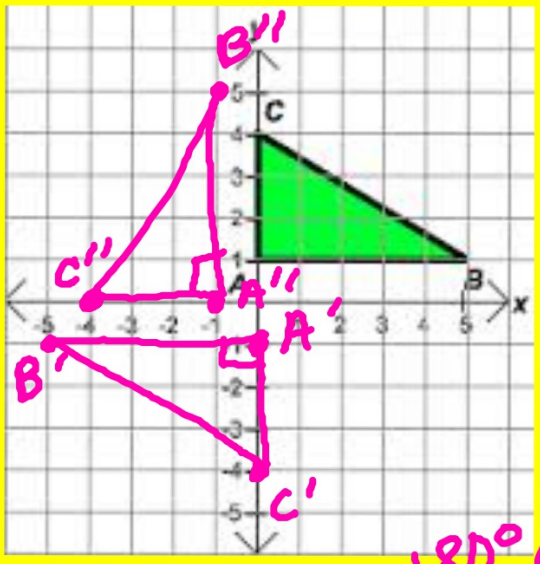


A(2,7)
B(2,1)
C(6,1)

CCW 90°
A'(-7,2)
B'(-1,2)
C'(-1,6)

CCW 180°
A''(-2,-7)
B''(-2,-1)
C''(-6,-1)

CCW 270°
A'''(7,-2)
B'''(1,-2)
C'''(1,-6)



Rotate triangle ABC clockwise:

a) 180° (x, y) ⇨ (-x, -y)

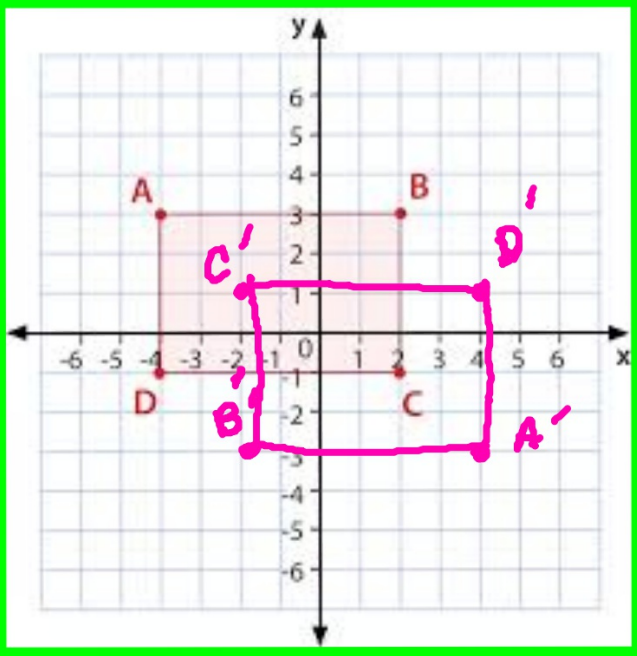
b) 270° (x, y) ⇨ (-y, x)

Make sure your new image is named with "prime" marks

A(0,1)
B(5,1)
C(0,4)

180° CW
A'(0,-1)
B'(-5,-1)
C'(0,-4)

270° CW
A''(-1,0)
B''(-1,5)
C''(-4,0)



Rotate rectangle ABCD 180° counterclockwise about the origin.

$(-x,-y)$

A(-4, 3)
B(2, 3)
C(2, -1)
D(-4, -1)

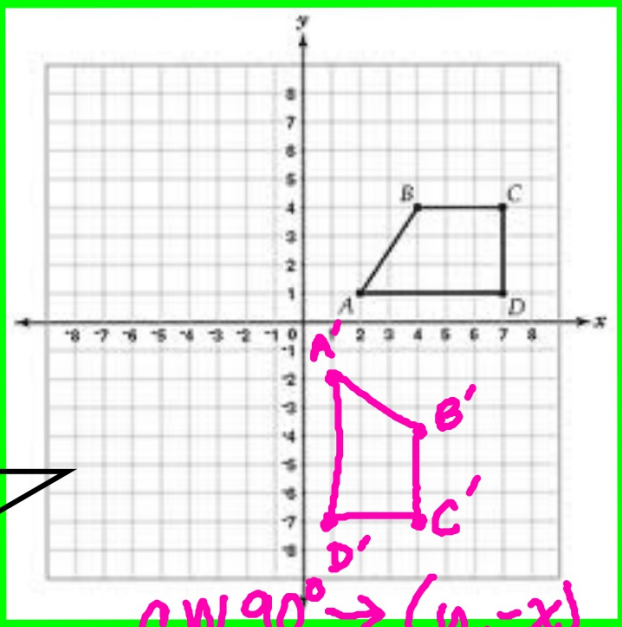
A'B'C'D'

CCW 180°

A'(4, -3)
B'(-2, -3)
C'(-2, 1)
D'(4, 1)

Rotate trapezoid ABCD 90° clockwise about the origin

**What would be the coordinates of the new image A'B'C'D'?



**The new image will be labeled A'B'C'D'

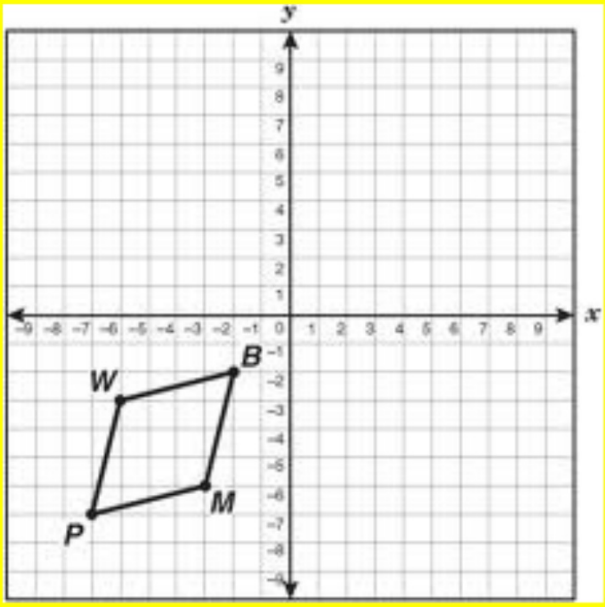
CW 90° → (y, -x)

A(2,1) A'(1,-2)

B(4,4) B'(4,-4)

C(7,4) C'(4,-7)

D(7,1) D'(1,-7)



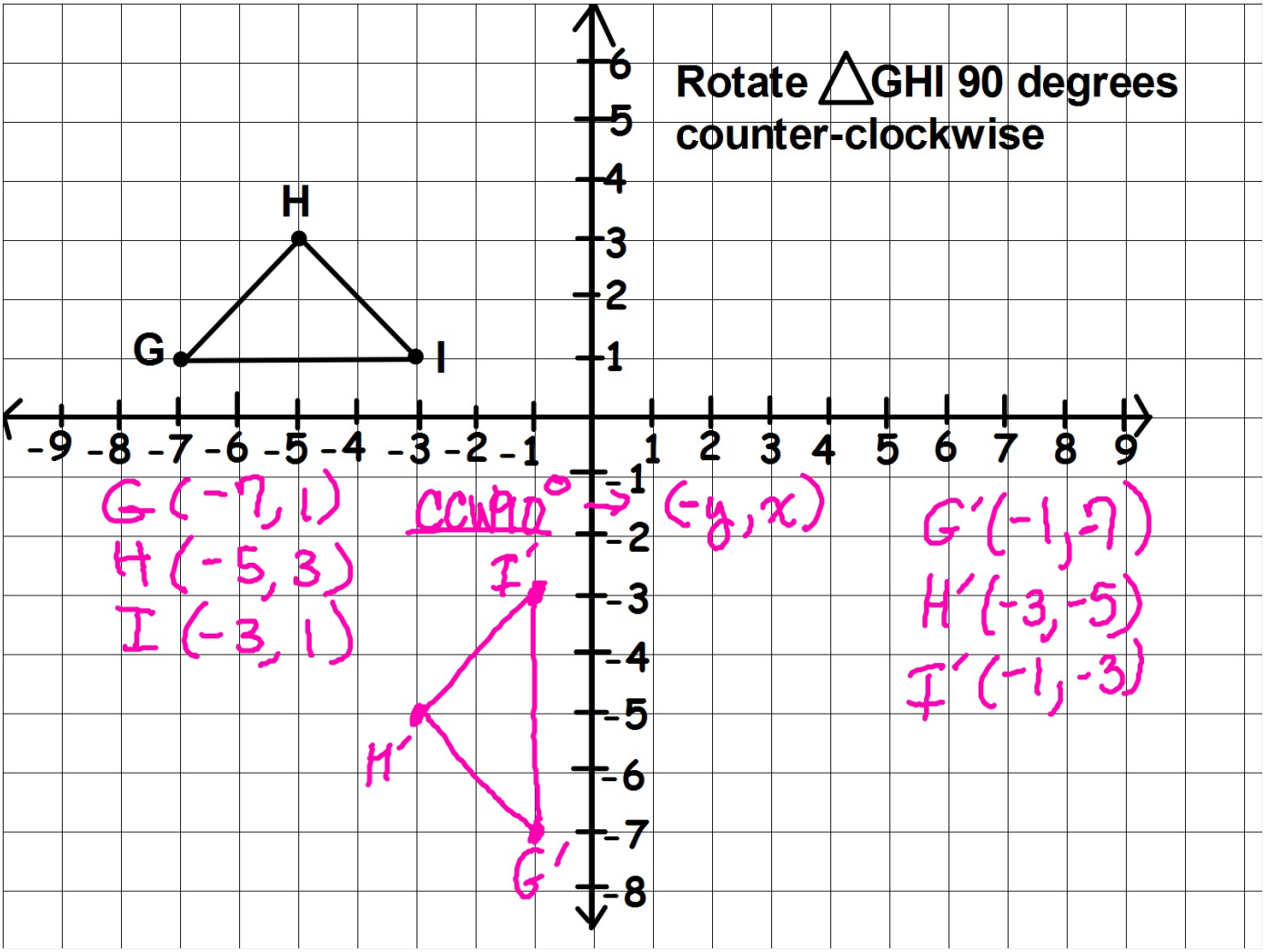
B (-2, -2)
M (-3, -6)
P (-7, -7)
W (-6, -3)

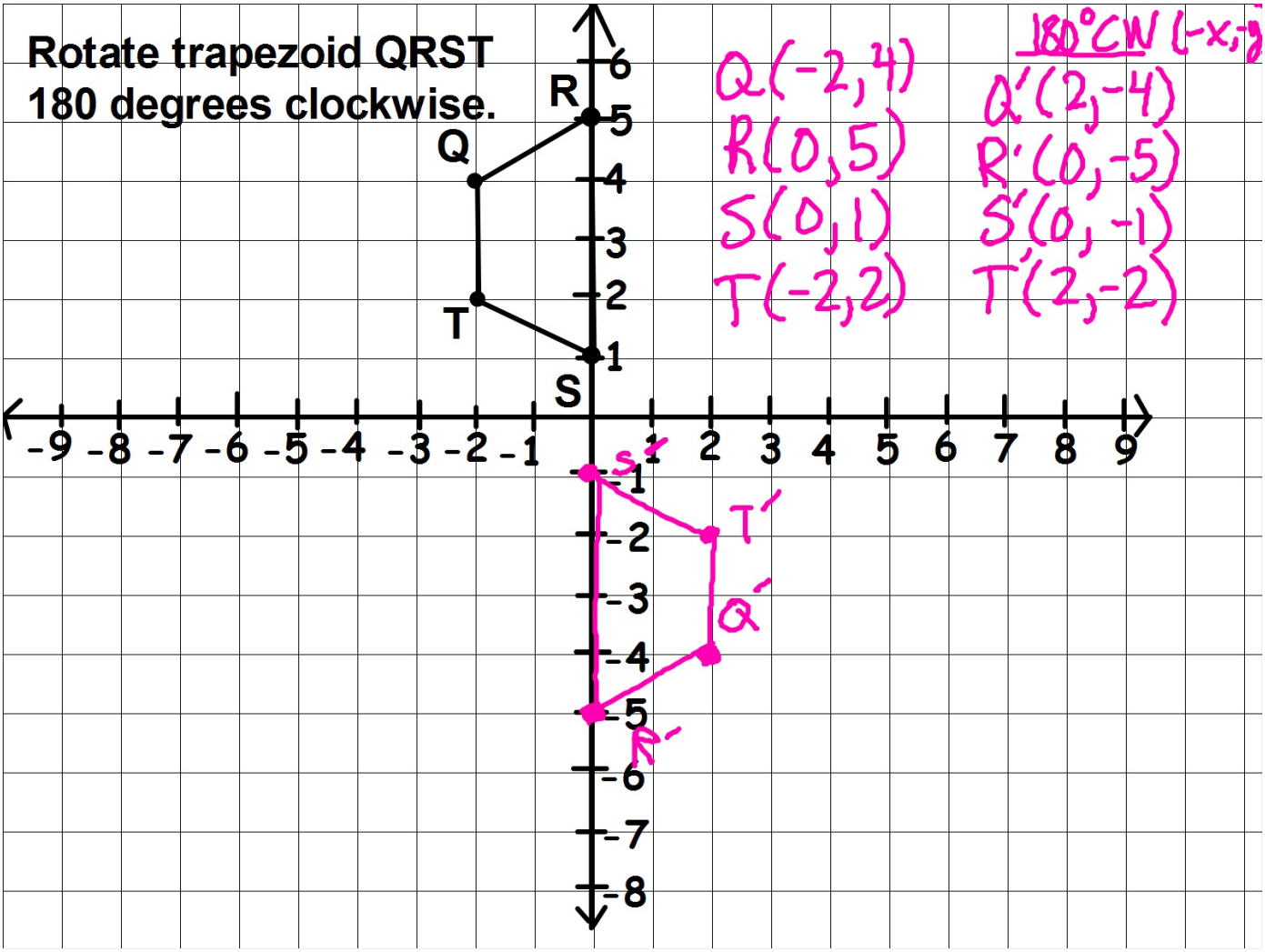
Rotate
□BMPW
a) 270° counterclockwise

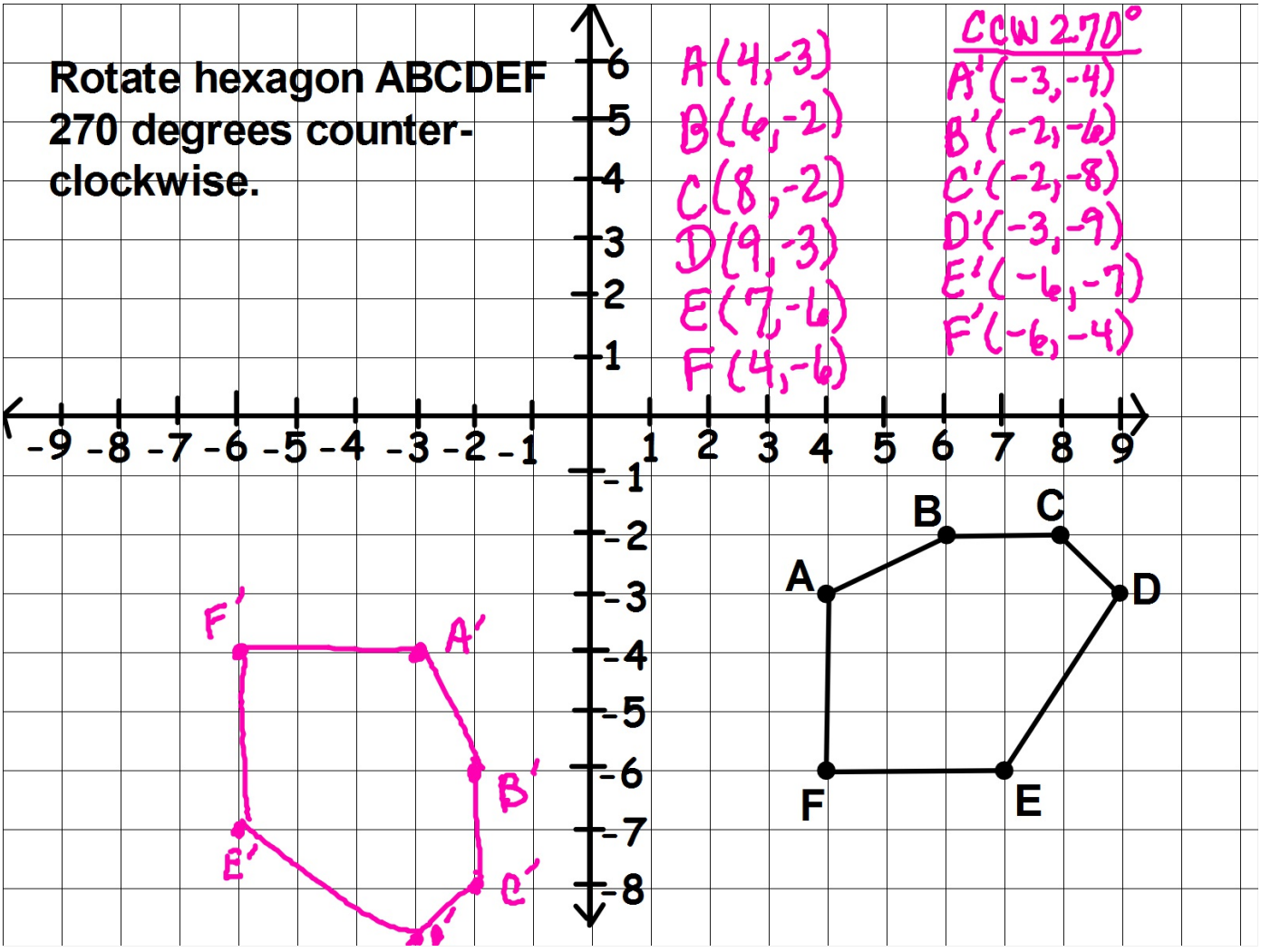
*what would be the coordinates of B'M'P'W'?

★ b) 360° clockwise same position

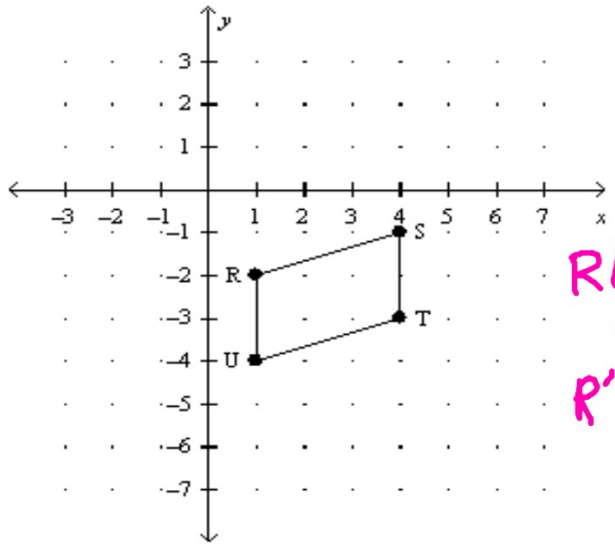
270° CCW → (y, -x)
B' (-2, 2)
M' (-6, 3)
P' (-7, 7)
W' (-3, 6)


Rotate △GHI 90 degrees counter-clockwise
H
G
I
G(-7, 1)
H(-5, 3)
I(-3, 1)
CCW 90° → (-y, x)
I'
H'
G'
G'(-1, -7)
H'(-3, -5)
I'(-1, -3)


Rotate trapezoid QRST
180 degrees clockwise.
Q
R
T
S
Q(-2,4)
R(0,5)
S(0,1)
T(-2,2)
180°CW (-x,-y)
Q'(2,-4)
R'(0,-5)
S'(0,-1)
T'(2,-2)
S'
T'
Q'
R'


Rotate hexagon ABCDEF 270 degrees counter-clockwise.
A(4,-3)
B(6,-2)
C(8,-2)
D(9,-3)
E(7,-6)
F(4,-6)
CCW 270°
A'(-3,-4)
B'(-2,-6)
C'(-2,-8)
D'(-3,-9)
E'(-6,-7)
F'(-6,-4)
A
B
C
D
E
F
A'
B'
C'
D'
E'
F'

____ 6. The playing field for a new park is modeled on the grid below. A last minute change in plans will move the park to the right 2 units and down 3 units. What will be the coordinates of the vertices of the new park under the new plan?



R(1,-2)
+2 -3
R'(3,-5)

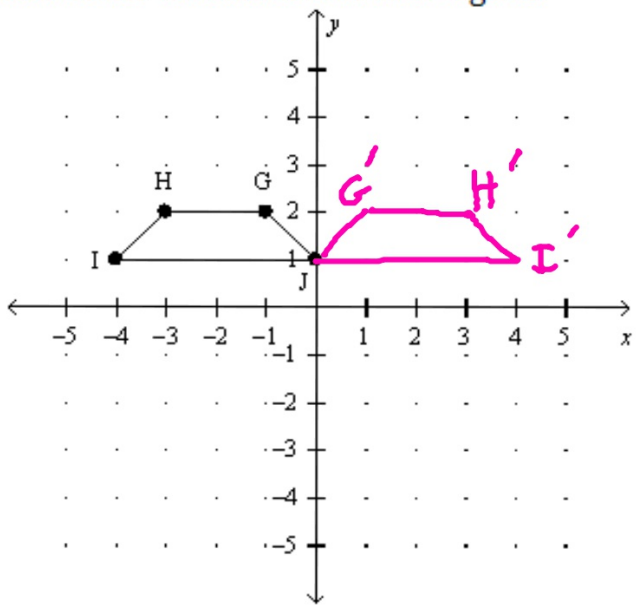
a. R′(3, −2), S′(6, −1), T′(6, −3), U′(3, −4)

b. R′(3, −5), S′(6, −4), T′(6, −6), U′(3, −7)

c. R′(1, −5), S′(4, −4), T′(4, −6), U′(1, −7)

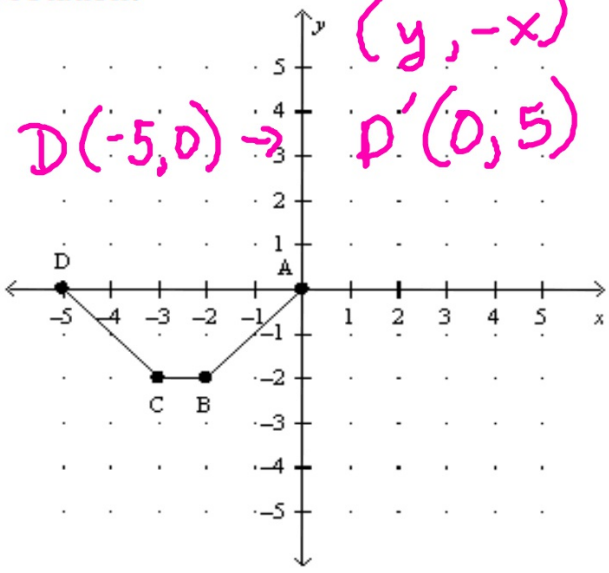
d. R′(−1, 1), S′(2, 2), T′(2, 0), U′(−1, −1)

___ 9. Reflect GHIJ across the y-axis. List the coordinates of the vertices of the new figure.



a. G′(−1, 2), H′(−3, 2), I′(−4, 1), J′(0, 1)
b. G′(−1, −2), H′(−3, −2), I′(4, −1), J′(−0, −1)
c. G′(1, −2), H′(3, −2), I′(4, −1), I′(0, −1)
d. G′(1, 2), H′(3, 2), I′(4, 1), J′(0, 1)

___ 16. Plans for a trapezoidal fountain are represented by trapezoid ABCD on the grid below. Contractors decide to rotate ABCD 90° clockwise about the origin. What will the coordinates of the new vertices be after the rotation?

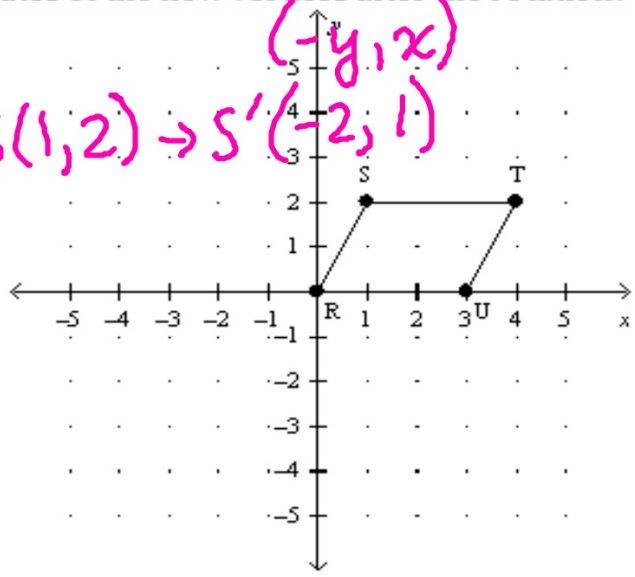


a. A′(2, 2), B′(0, 0), C′(−1, 0), D′(−2, 2)
b. A′(0, 0), B′(2, −2), C′(3, −2), D′(5, 0)
c. A′(0, 0), B′(2, −2), C′(2, −3), D′(0, −5)
d. A′(0, 0), B′(−2, 2), C′(−2, 3), D′(0, 5)

_____ 17. A dance team begins in the formation modeled on the grid below. They then rotate 90° counterclockwise about the origin. What are the coordinates of the new vertices after the rotation?

$(-y, x)$

$S(1,2) \rightarrow S'(-2, 1)$



a. R′(−2, 4), S′(0, 3), T′(0, 0), U′(−2, 1)
b. R′(0, 0), S′(−2, 1), T′(−2, 4), U′(0, 3)
c. R′(0, 0), S′(2, −1), T′(2, −4), U′(0, −3)
d. R′(0, 0), S′(−1, 2), T′(−4, 2), U′(−3, 0)

HW: Transformations#1-8
#25-28 EOG Packet