

## Warm-up:

1. What is the value of the expression  $5(x + 6)$  when  $x = -3$ ?

(A) -9  
(B) 15  
(C) 9  
(D) 45

2. Simplify:  
 $(12x - 4) - (8x + 4)$

(A)  $4x$   
(B)  $4x - 8$   
(C)  $20x - 8$   
(D)  $20x$

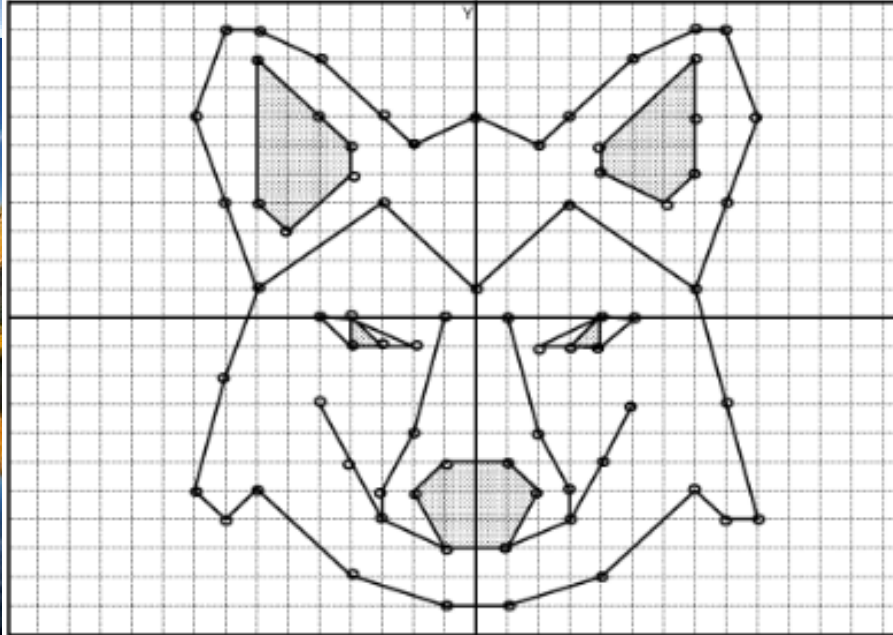
Be careful on this one.....

3.

On a trip to Alaska, the day time high temperature was  $21^{\circ}\text{F}$ . The wind-chill temperature, however, was  $-3^{\circ}\text{F}$ .

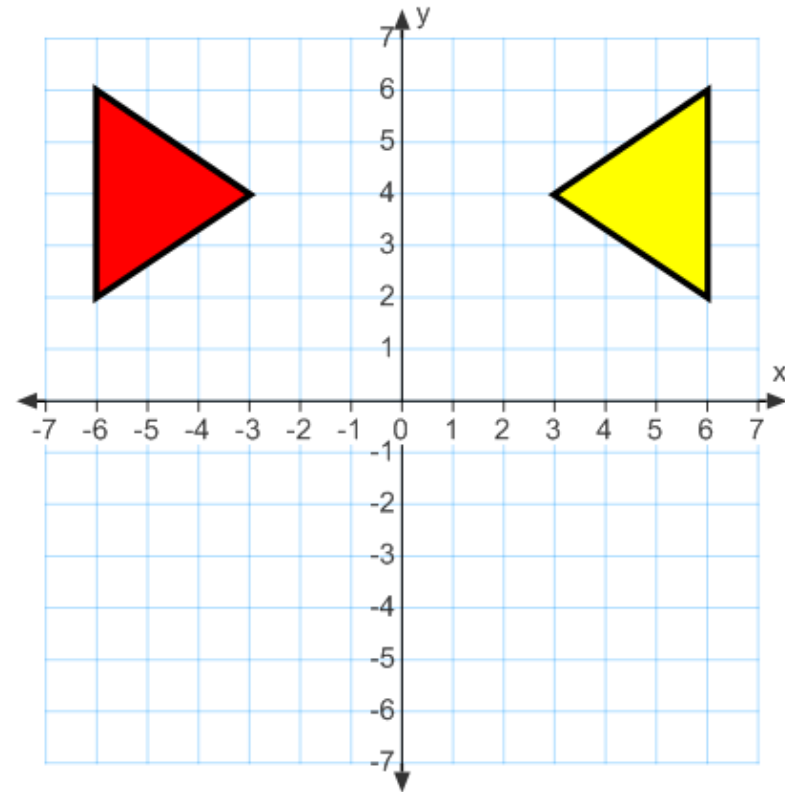
What was the difference between the day time high temperature and the wind-chill temperature?

A.  $3^{\circ}$   
B.  $18^{\circ}$   
C.  $21^{\circ}$   
D.  $24^{\circ}$

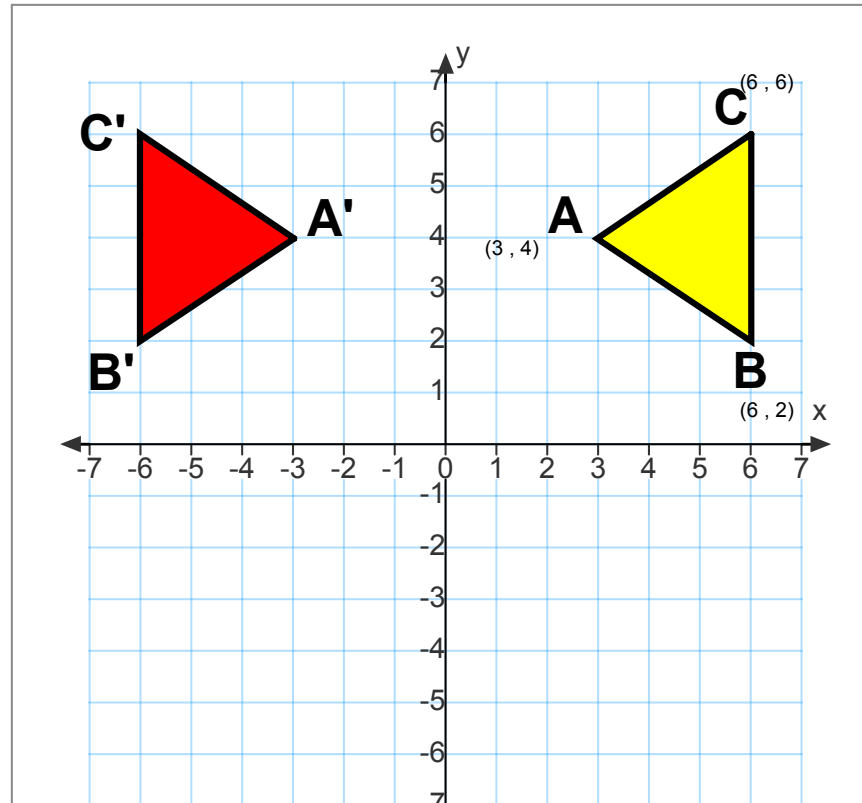


# Reflection

A reflection is a flip over a line

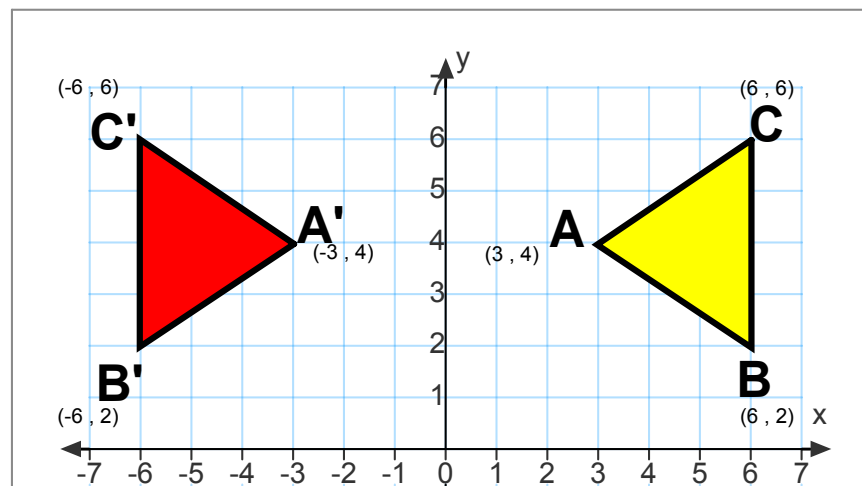


**What do you notice about the original and the reflected triangle?**



**What happens to the coordinates of triangle ABC when it is reflected over the y-axis?**

## Summary: Reflection over the y-axis



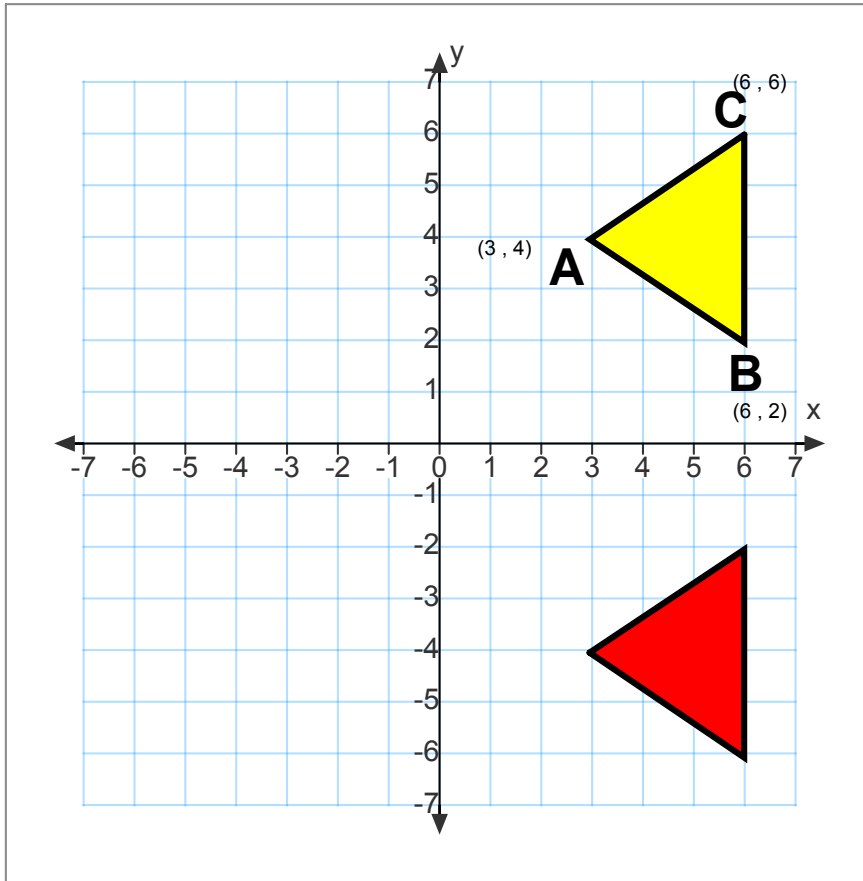
$$A(3,4) \longrightarrow A'(-3,4)$$

$$B(6,2) \longrightarrow B'(-6,2)$$

$$C(6,6) \longrightarrow C'(-6,6)$$

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

What do you notice about the original and the reflected triangle?



A'

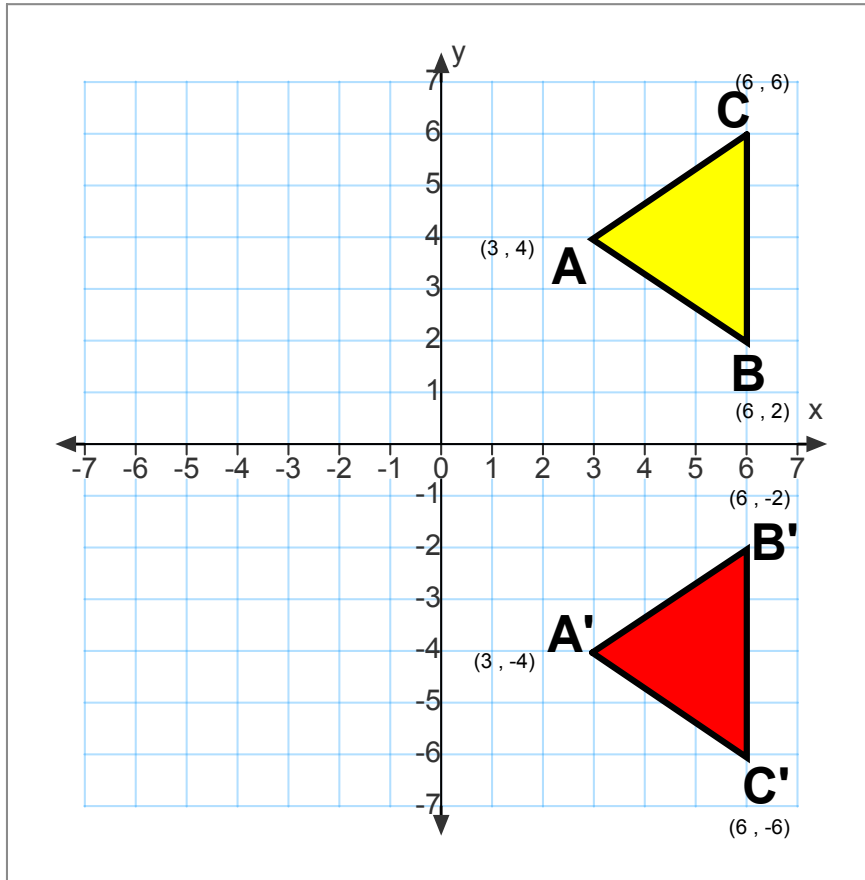
B'

C'

Label the image



## Summary: Reflection over the x-axis



$$A(3,4) \longrightarrow A'(3,-4)$$

$$B(6,2) \longrightarrow B'(6,-2)$$

$$C(6,6) \longrightarrow C'(6,-6)$$

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

# Reflection



## Line of reflection Review

To reflect across the y- axis,  
multiply the x-coordinate by -1

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

To reflect across the x- axis,  
multiply the y-coordinate by -1

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



# Reflect rectangle ABCD over: a) the y-axis b) the x-axis

a) **A'** (\_\_\_\_,\_\_\_\_)

**B'** (\_\_\_\_,\_\_\_\_)

**C'** (\_\_\_\_,\_\_\_\_)

**D'** (\_\_\_\_,\_\_\_\_)

b) **A''** (\_\_\_\_,\_\_\_\_)

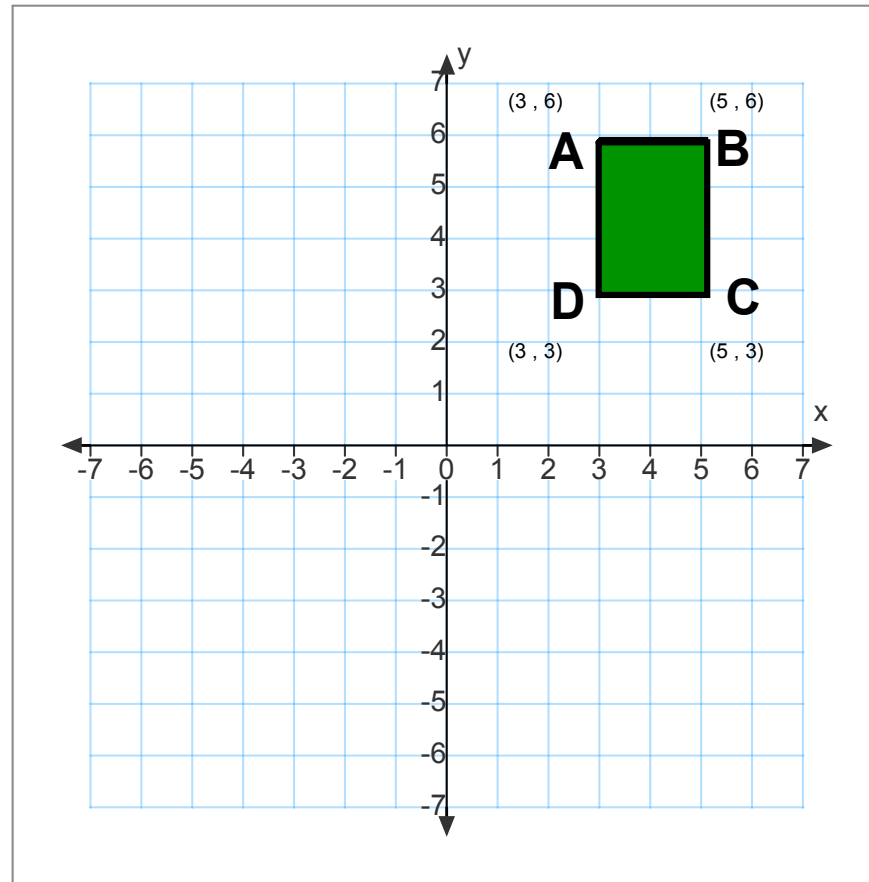
**B''** (\_\_\_\_,\_\_\_\_)

**C''** (\_\_\_\_,\_\_\_\_)

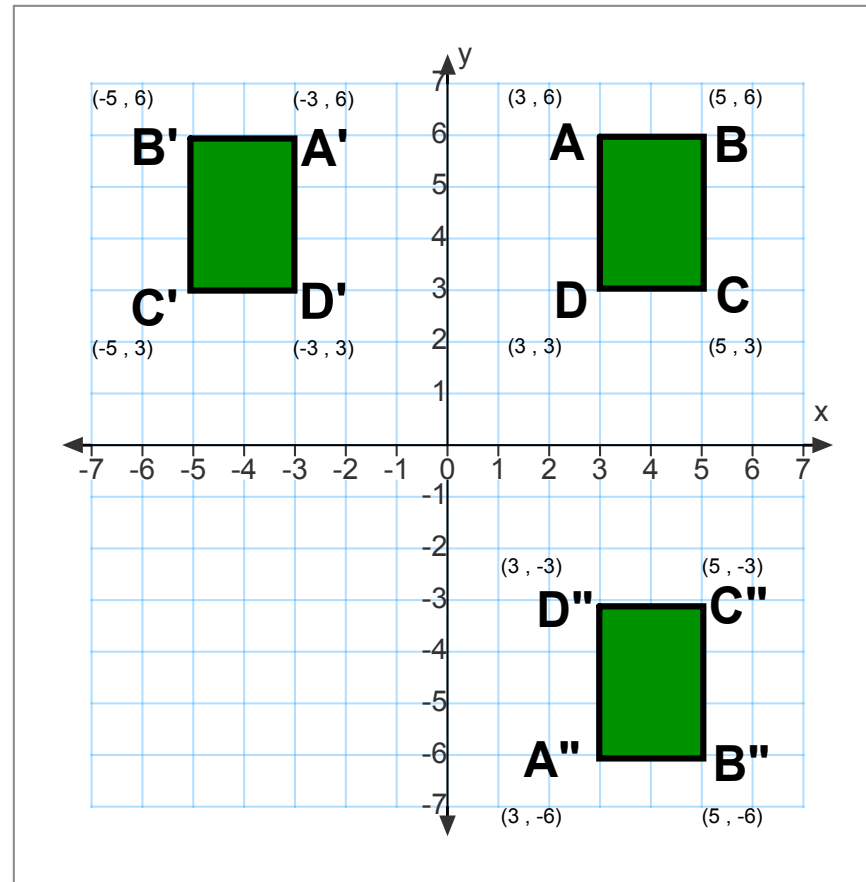
**D''** (\_\_\_\_,\_\_\_\_)

DRAG

DRAG



# Solution



# Reflect triangle ABC over: a) the y-axis b) the x-axis

a) **A'** (\_\_\_\_,\_\_\_\_)

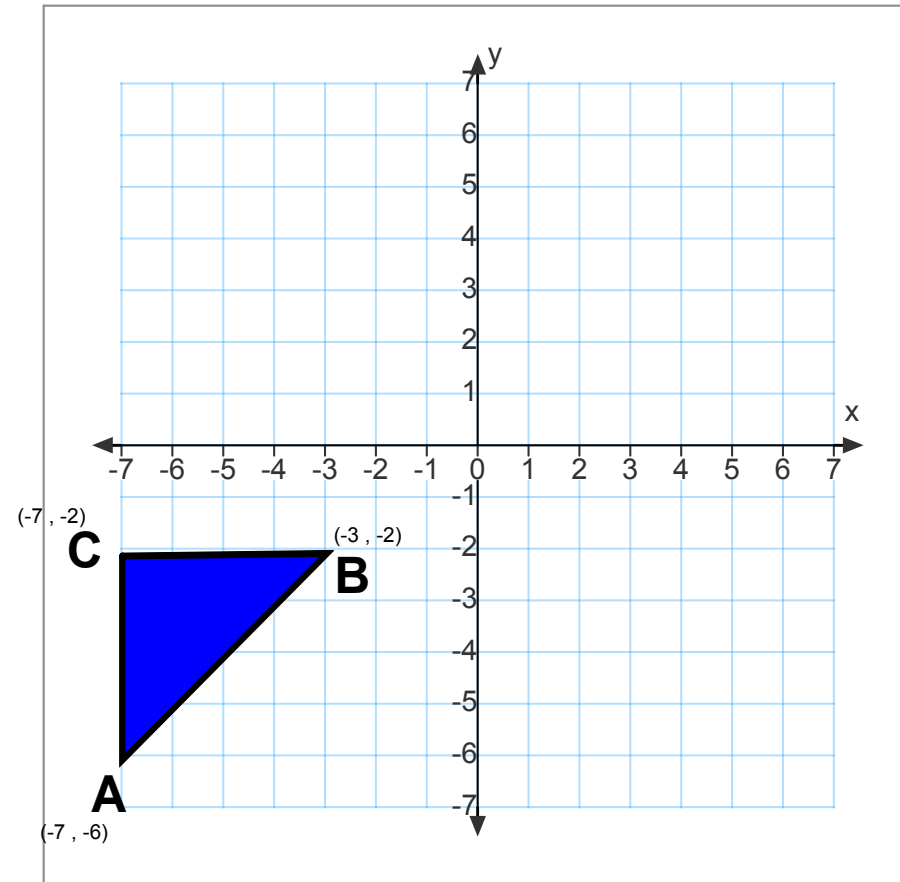
**B'** (\_\_\_\_,\_\_\_\_)

**C'** (\_\_\_\_,\_\_\_\_)

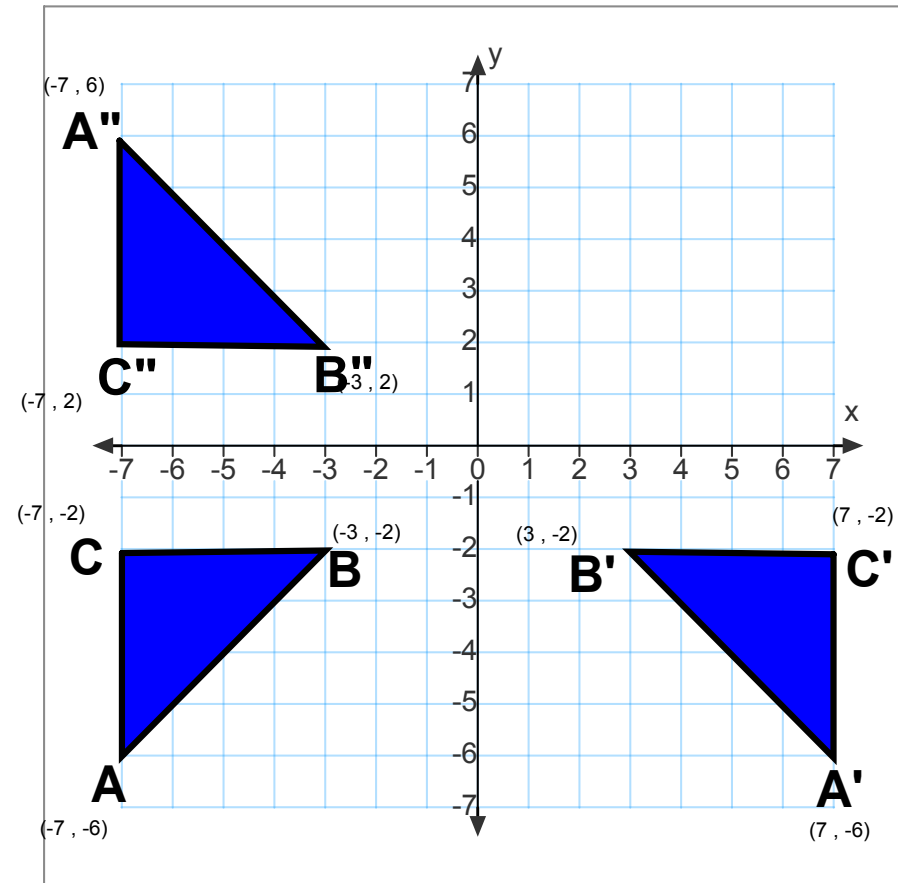
b) **A''** (\_\_\_\_,\_\_\_\_)

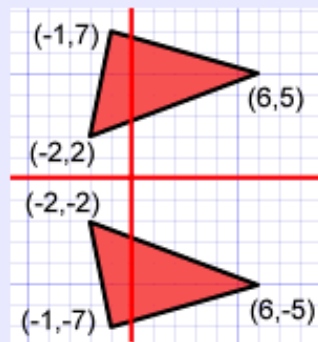
**B''** (\_\_\_\_,\_\_\_\_)

**C''** (\_\_\_\_,\_\_\_\_)



# Solution



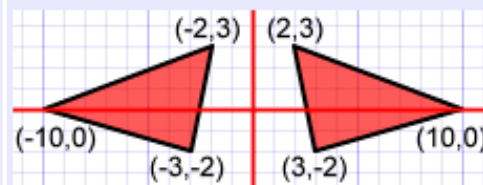


### X-Axis

If the mirror line is the x-axis, just change each  $(x,y)$  into  $(x,-y)$

### Y-Axis

If the mirror line is the y-axis, just change each  $(x,y)$  into  $(-x,y)$



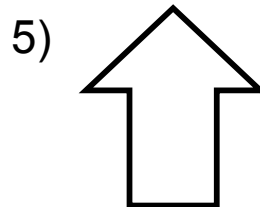
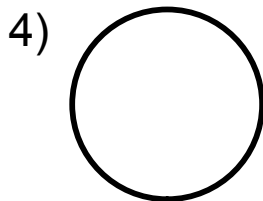
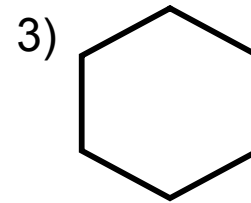
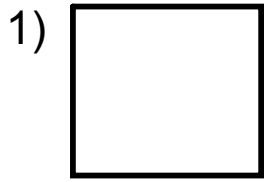
### Fold the Paper

And if all else fails, just fold your sheet of paper along the mirror line and then hold it up to the light !

## Line Symmetry(Reflectional Symmetry)

A figure has line symmetry if a line can be drawn down the figure so that it divides the figure into mirror images.

Draw the line(s) of symmetry on each figure. If there are none, write none.



6) **B**

7) **Z**

8) **A**

9) **MOM**

## Line Reflection

(FLIP) A transformation that creates figures which are mirror images.

Rule for a reflection in the:

$$\text{x-axis} \quad (x, y) \longrightarrow (x, -y)$$

$$\text{y-axis} \quad (x, y) \longrightarrow (-x, y)$$

Give the coordinates of the image of each point after a reflection in axis indicated.

10)  $(5, 7)$  ; x-axis

11)  $(3, 4)$  ; y-axis

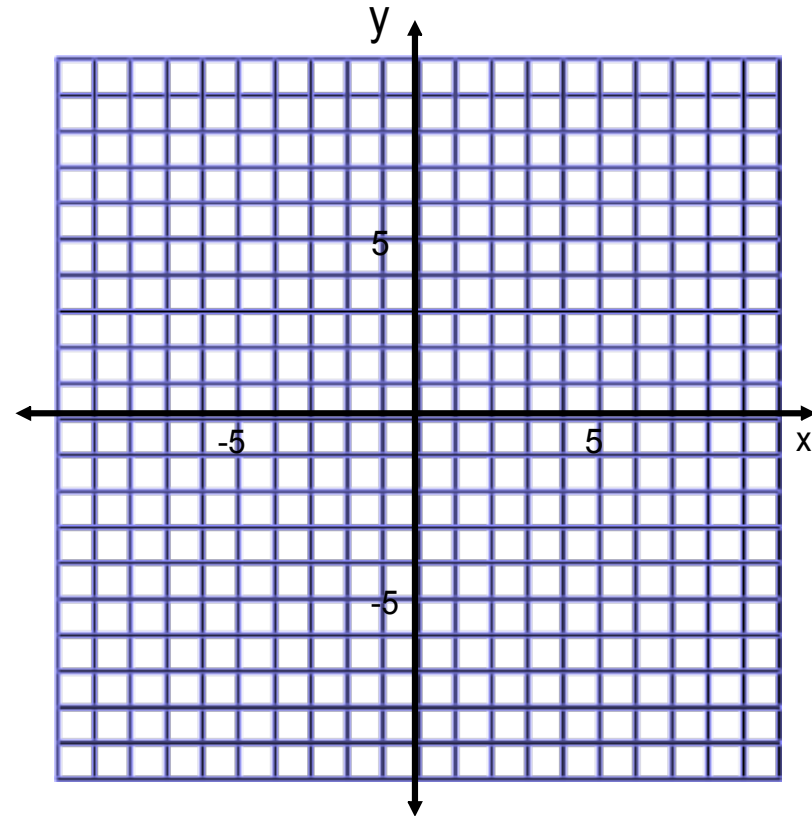
12)  $(-8, -2)$  ; x-axis

13)  $(-5, -1)$  ; y-axis

14) (a) Graph triangle ABC with vertices A(-7, 6), B(-2, 1), and C(-7, 1).

(b) Graph the image of triangle ABC after a reflection in the y-axis.

(c) Give the coordinates of the image.



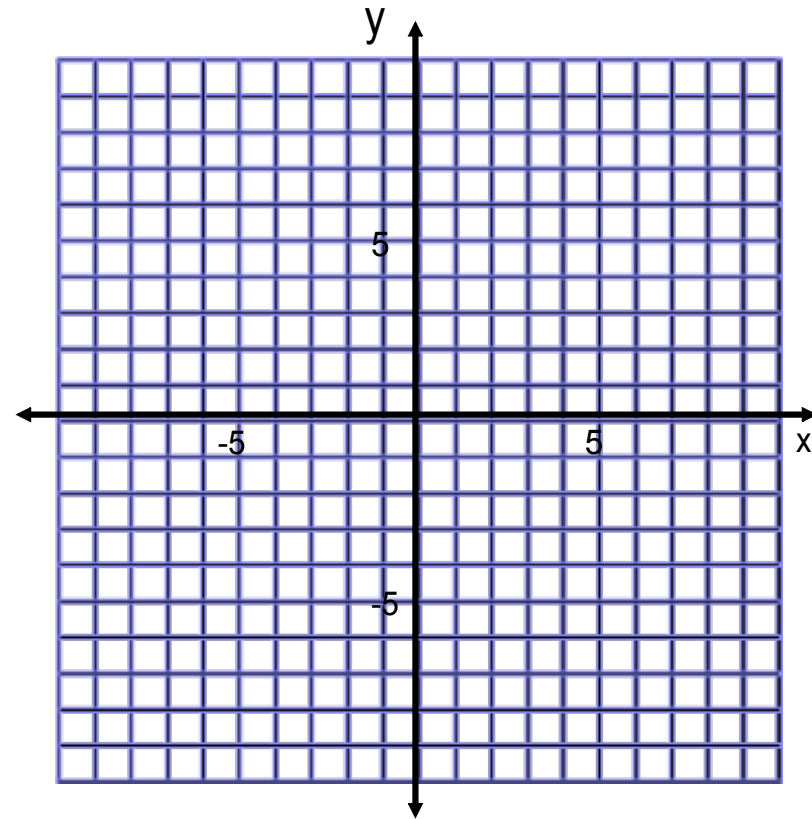


15)(a) Graph quadrilateral WXYZ with vertices  $W(1, -6)$ ,  $X(2, -1)$ ,  $Y(8, -1)$ , and  $Z(7, -6)$ .

(b) Identify the type of quadrilateral graphed in part a.

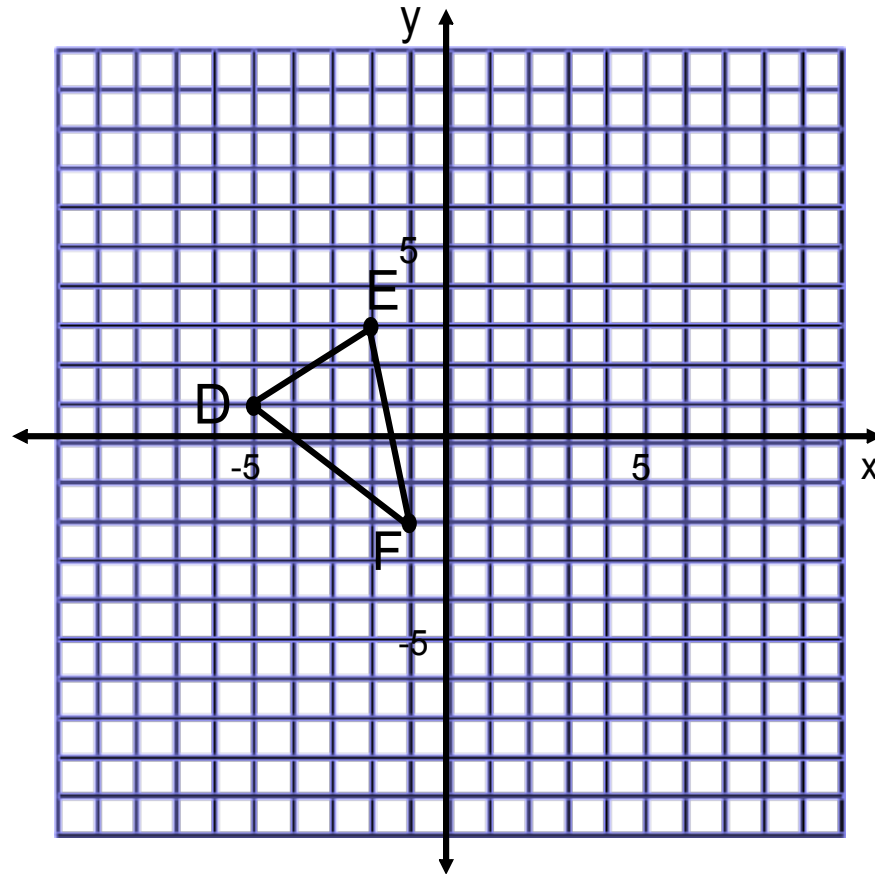
(c) Graph the image of WXYZ after a reflection in the x-axis.

(d) Find the area of WXYZ.



16) (a) Graph the reflection of triangle DEF in the x-axis.

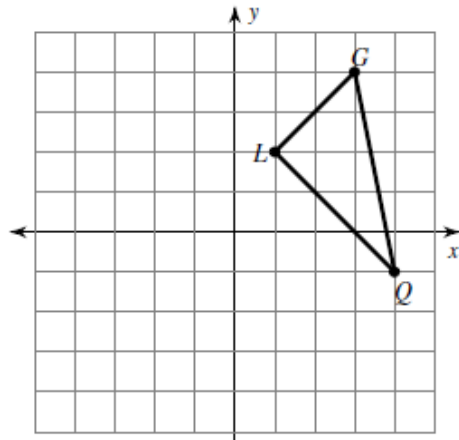
(b) Give the coordinates of the image.



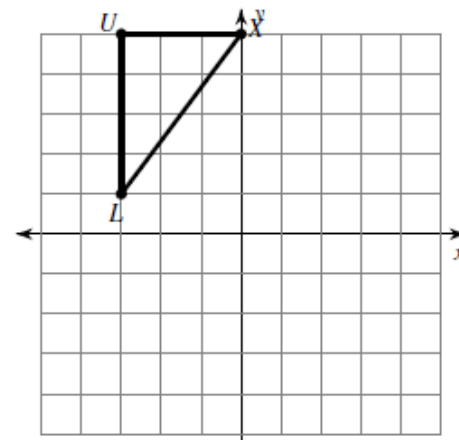
# Practice

Graph the image of the figure using the transformation given.

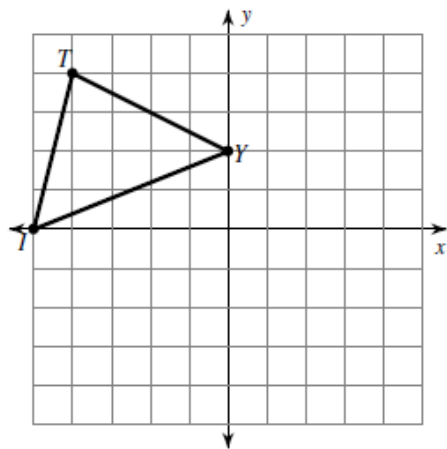
- 1) reflection across the y-axis



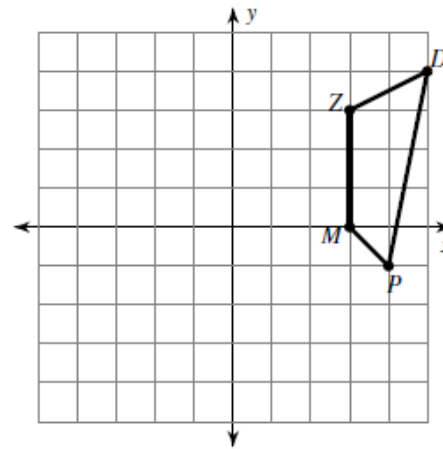
- 2) reflection across the x-axis



- 3) reflection across the x-axis



- 4) reflection across the y-axis



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

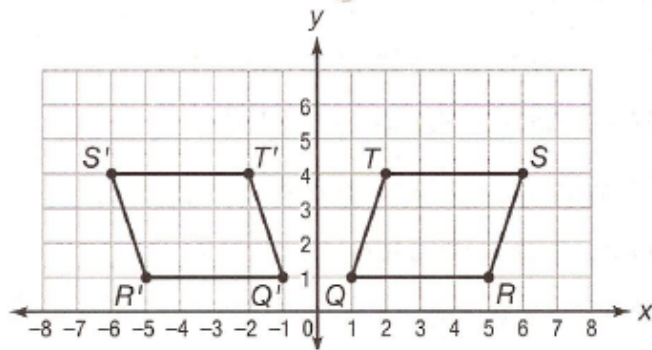
5) reflection across the x-axis

**$T(2, 2)$ ,  $C(2, 5)$ ,  $Z(5, 4)$ ,  $F(5, 0)$**

6) reflection across the y-axis


**$K(1, -1)$ ,  $N(4, 0)$ ,  $Q(4, -4)$**


Parallelogram  $QRST$  is reflected over the  $y$ -axis to create parallelogram  $Q'R'S'T'$ .



7. Which angle is congruent to  $\angle S$ ?
- $\angle Q'$
  - $\angle R'$
  - $\angle S'$
  - $\angle T'$
8. Which side is congruent to  $\overline{QT}$ ?
- $\overline{Q'T'}$
  - $\overline{ST}$
  - $\overline{Q'R'}$
  - $\overline{QR}$
9.  $\overline{QR}$  is parallel to  $\overline{TS}$ . Which side is parallel to  $\overline{Q'R'}$ ?
- $\overline{S'R'}$
  - $\overline{S'T'}$
  - $\overline{Q'T'}$
  - $\overline{RS}$

# **Answer the following questions relating to line reflections.**

 <http://www.regentsprep.org/Regents/math/geometry/GT1/PracRefl.htm>

 <http://www.ixl.com/math/grade-8/reflections-find-the-coordinates>

## Attachments

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GeometricTransformations.ppsx