

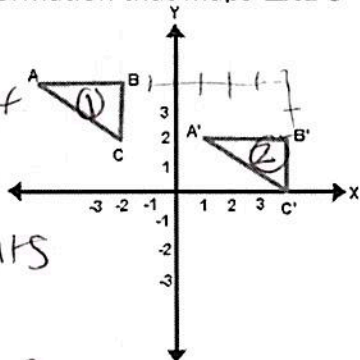
**AIM: HOW DO WE EVALUATE TRANSLATIONS AND REFLECTIONS ON THE COORDINATE PLANE?**

**Translations:**

NOTATION:  $T_{x \text{ direction (left/right), } y \text{ direction (up/down)}}$

1. Describe the transformation that maps  $\triangle ABC$  onto  $\triangle A'B'C'$ .

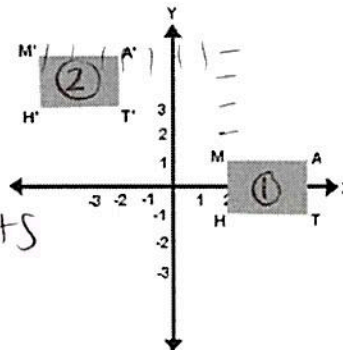
A translation of  
 right 6 units  
 and down 2 units



NOTATION:  $T_{6, -2}$   
 ↑ ↑  
 right/ up/down  
 left

2. Describe the transformation that maps  $MATH$  onto  $M'A'T'H'$ .

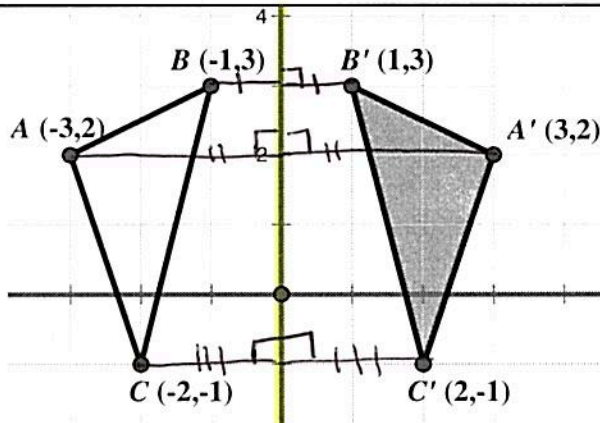
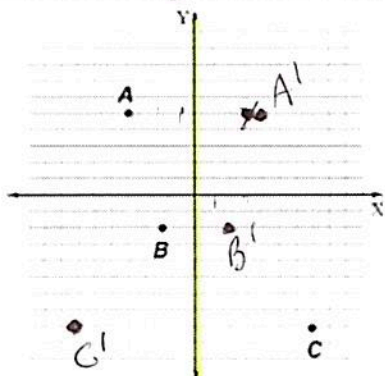
Translation  
 left 7 units  
 and up 4 units



$T_{-7, 4}$

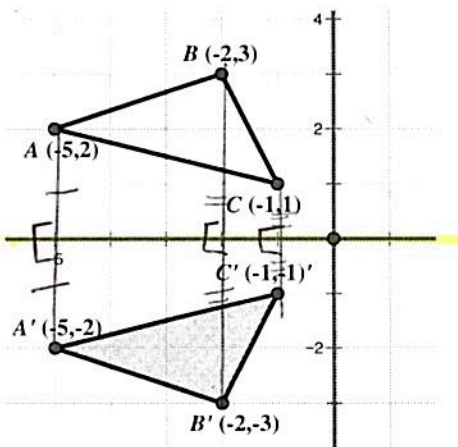
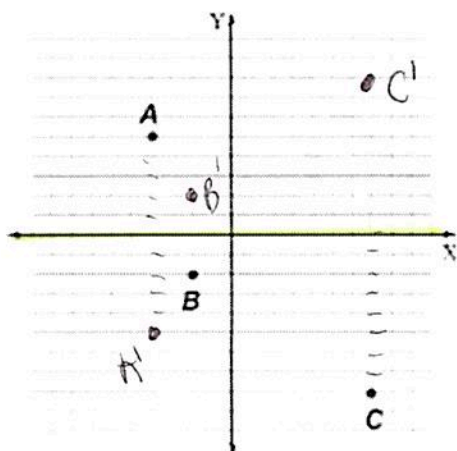
**Reflection over the y axis:** y-axis is the perpendicular bisector

NOTATION:  $r_{y \text{ axis}}$  or  $r_{x=0}$  Rule:  $(x, y) \rightarrow (-x, y)$

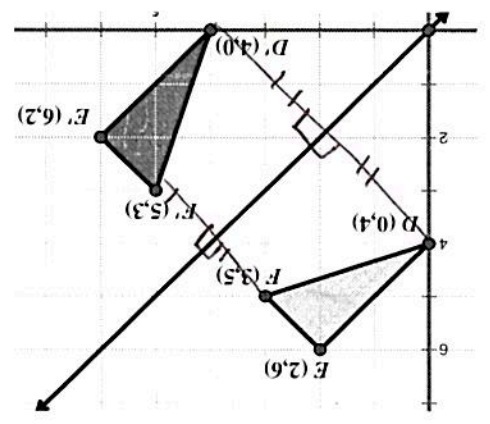
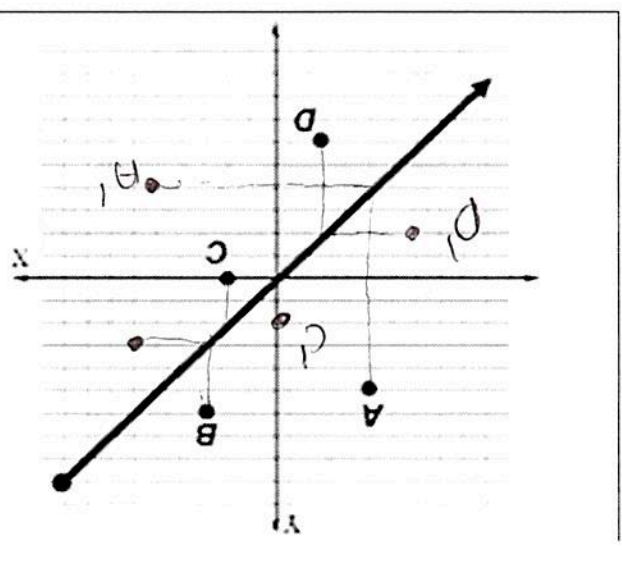


**Reflection over the x axis:** x-axis is the perpendicular bisector

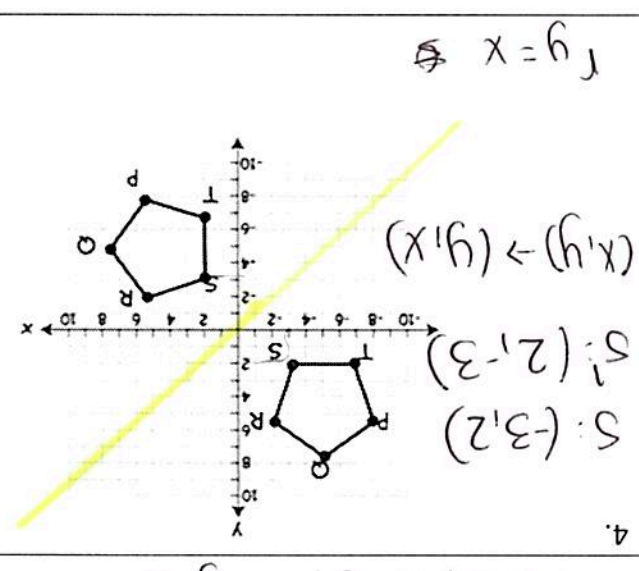
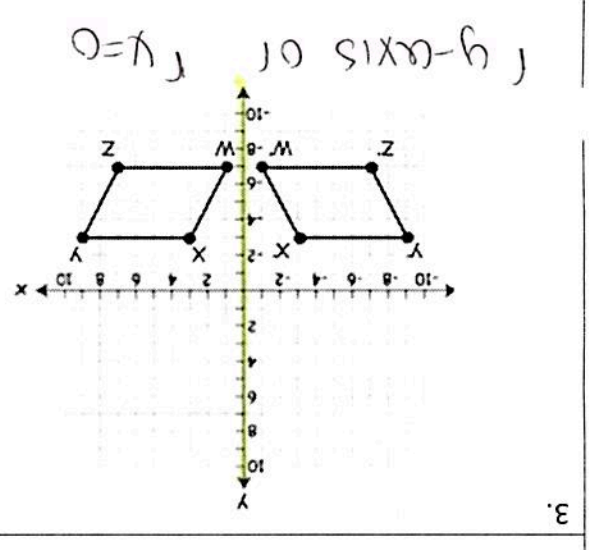
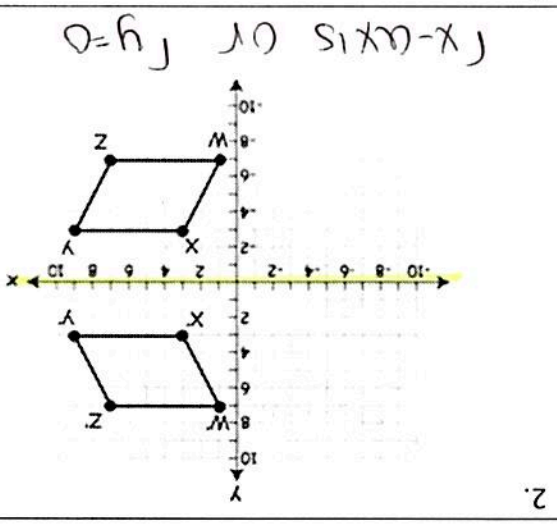
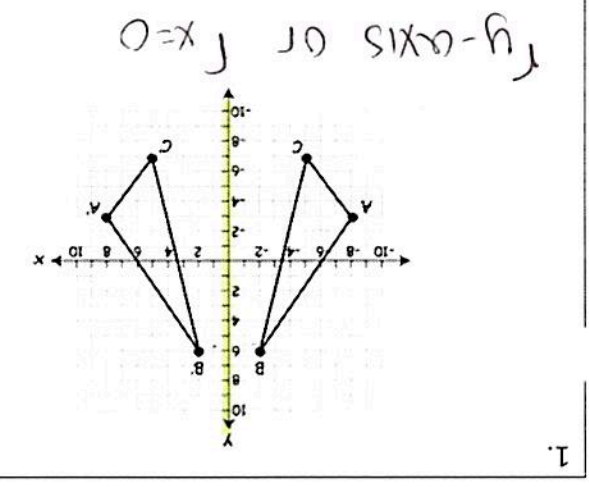
NOTATION:  $r_{x \text{ axis}}$  or  $r_{y=0}$  Rule:  $(x, y) \rightarrow (x, -y)$



Reflection over  $y=x$ :  $y=x$  is the perpendicular bisector  
 Notation:  $r_{y=x} : (x,y) \rightarrow (y,x)$



**PRACTICE:** Given the examples below describe the reflection that would map the preimage onto its image.

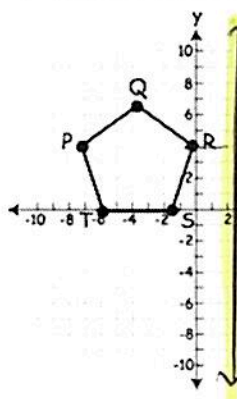




The line of reflection does not have to be an axis!

5. Directions: Write the equation for the line of reflection in the examples below.

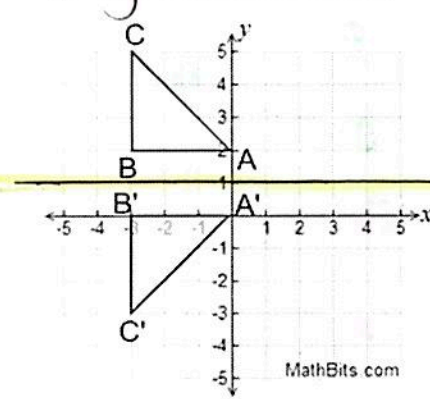
a)  $x = 2.5$



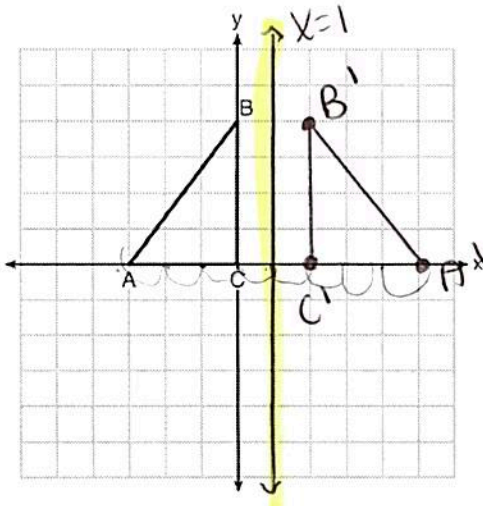
\* Vertical lines are always  $x = \#$

\* Horizontal lines are always  $y = \#$

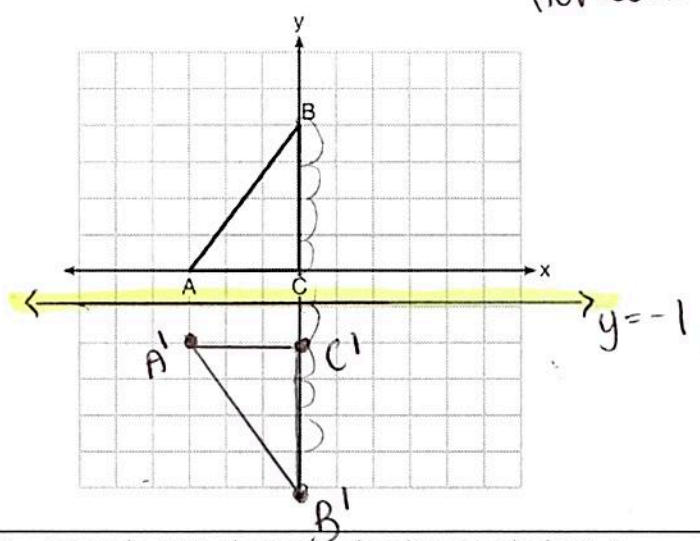
b)  $y = 1$



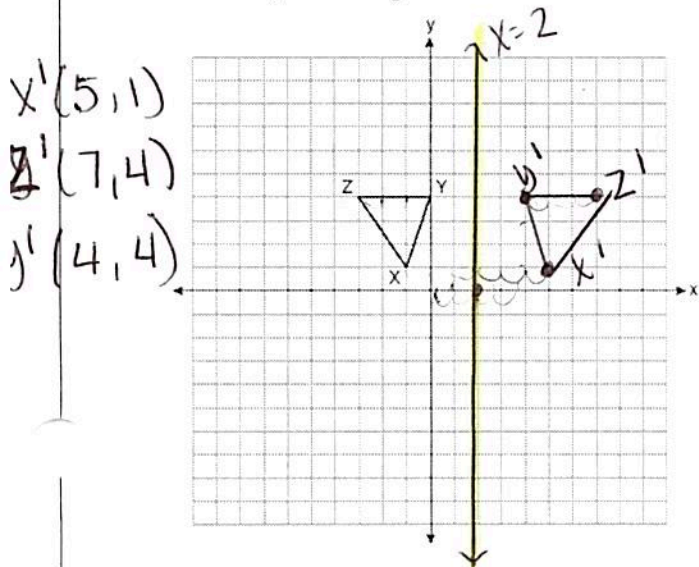
6. Triangle ABC is graphed on the set of axes below. Graph and label  $\triangle A'B'C'$ , the image of  $\triangle ABC$  after a reflection over the line  $x = 1$ . Vertical



7. Triangle ABC is graphed on the set of axes below. Graph and label  $\triangle A'B'C'$ , the image of  $\triangle ABC$  after a reflection over the line  $y = -1$ . Horizontal

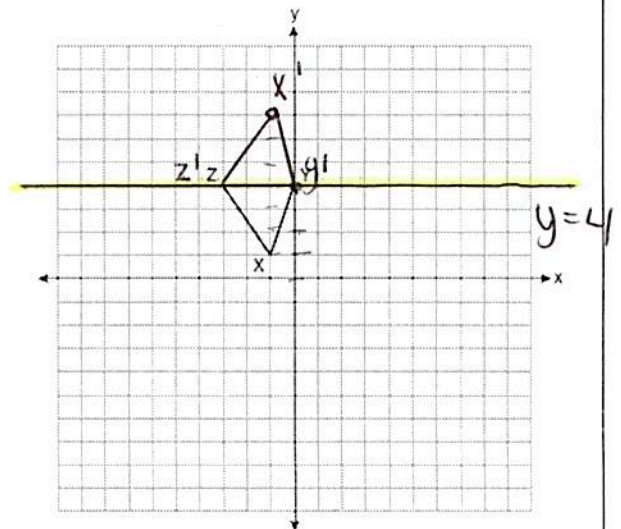


8. Triangle XYZ, shown in the diagram below, is reflected over the line  $x = 2$ . State the coordinates of  $\triangle X'Y'Z'$ , the image of  $\triangle XYZ$ .



$X'(3, 1)$   
 $Y'(3, 0)$   
 $Z'(2, 1)$

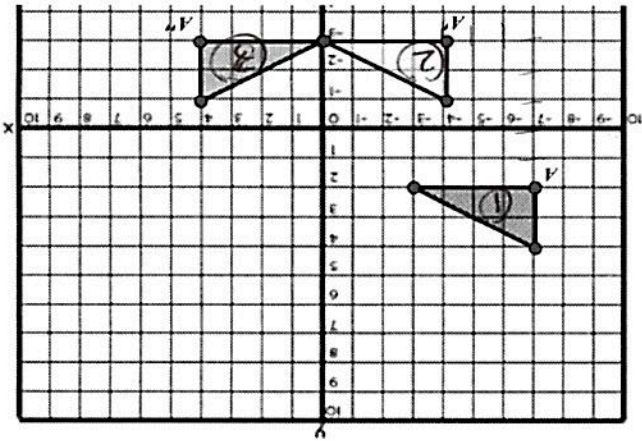
9. Triangle XYZ, shown in the diagram below, is reflected over the line  $y = 4$ . State the coordinates of  $\triangle X'Y'Z'$ , the image of  $\triangle XYZ$ .



$y = 4$

→ more than 1!

10. Describe a sequence of transformations that maps triangle  $A'B'C'$ .

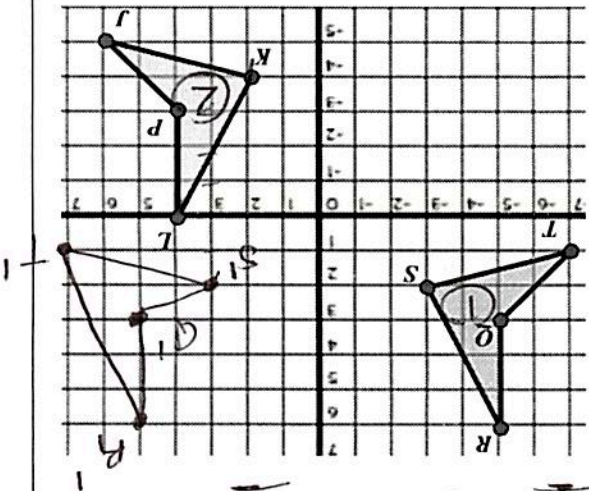


A translation of down 5 units and right 3 units followed by a reflection over the y-axis

OR

$T_{3, -5}$  followed by  $r_{y\text{-axis}}$

11. Describe a sequence of transformations that maps quadrilateral  $QRST$  onto quadrilateral  $PLKI$ .

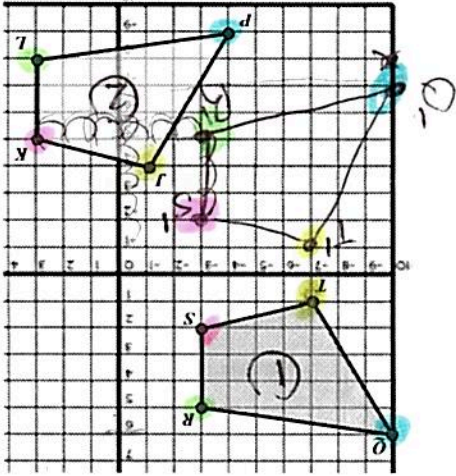


A reflection over the y-axis followed by a translation of 6 units down and one unit left

OR

$r_{y\text{-axis}}$  followed by  $T_{-1, 6}$

12. Describe a sequence of transformations that maps quadrilateral  $QRST$  onto quadrilateral  $PLKI$ .



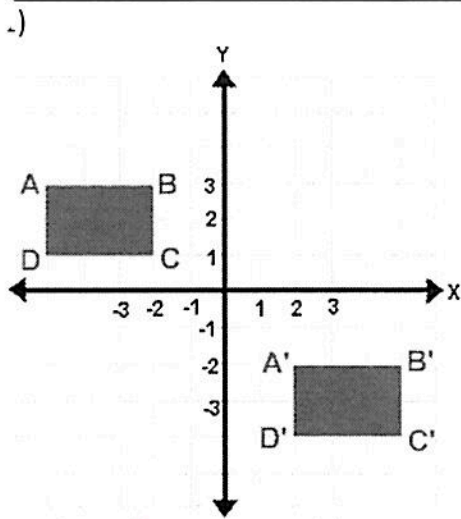
A reflection over the x-axis followed by a translation of down 3 units and right 6 units

OR

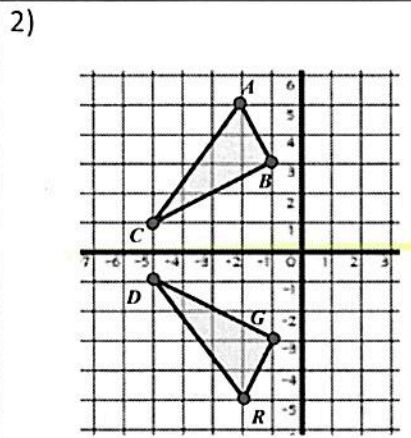
$r_{x\text{-axis}}$  followed by  $T_{6, -3}$



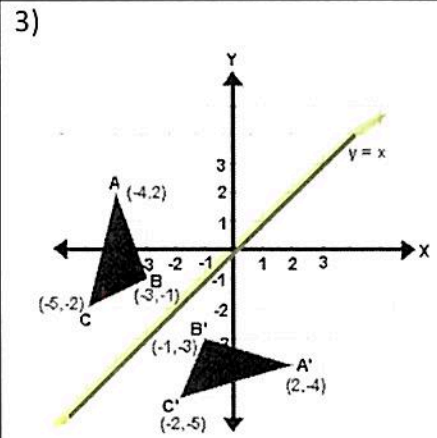
Given the examples below describe the reflection or translation that would map the preimage onto its image.



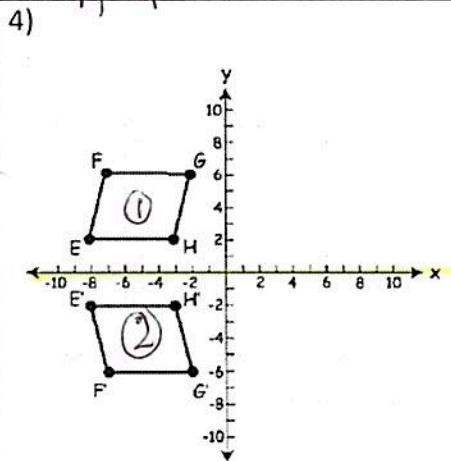
right 7, down 4  
 $T_{7, -4}$



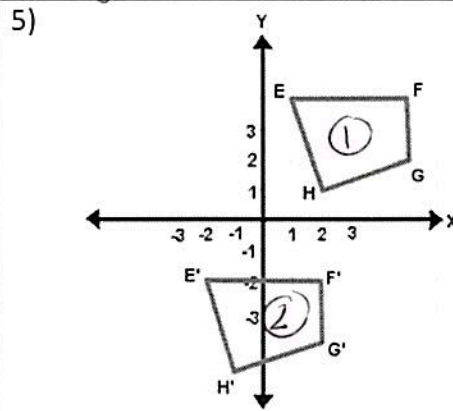
$r_{x\text{-axis}}$   
 $r_{y=0}$



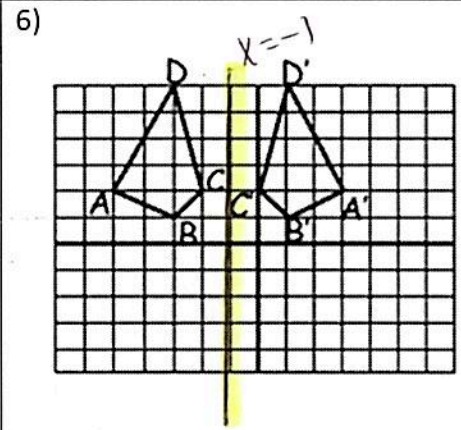
$r_{y=x}$



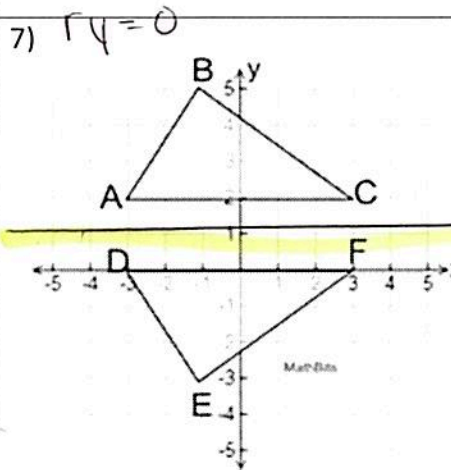
$r_{x\text{-axis}}$



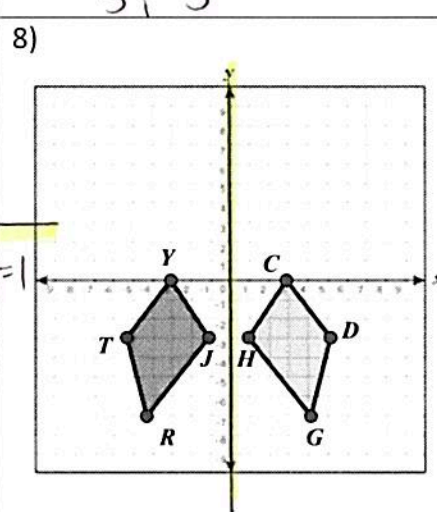
left 3, down 5  
 $T_{-3, -5}$



$r_{x=-1}$

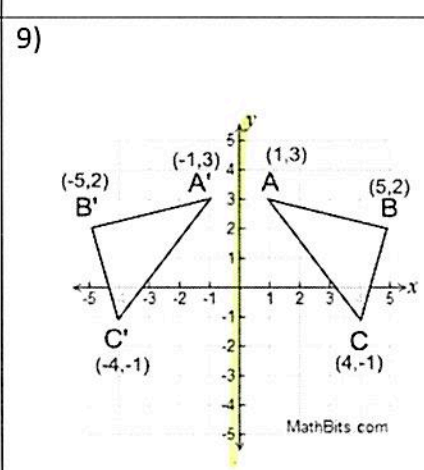


$r_{y=1}$



$r_{y\text{-axis}}$

$r_{x=0}$



$r_{y\text{-axis}}$

$r_{x=0}$

