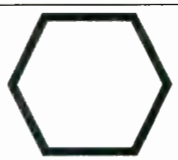
Name Answers Date

9.1 & 9.2 – Exploring Symmetry, Translations, & Vectors

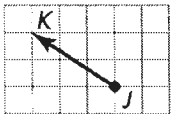
1) Draw and identify the lines of symmetry for the letters shown below. Write ***vertical***, ***horizontal***, or ***both*** to indicate the kind of symmetry. If there are no lines of symmetry, write ***none***.

A Vertical	B bigger None	C Horizontal	D Horizontal	E Horizontal	F None	G None
H Both	I Both	J None	K None	L None	M Vertical	N None
O Both	P None	Q None	R None	S None	T Vertical	U Vertical
V Vertical	W Vertical	X Both	Y Vertical	Z None		

2) Looking at the following shapes, indicate if they either have ***linear***, ***rotational*** (point) symmetry, or ***both***. If it does have rotational symmetry, indicate the ***angle of rotation*** for the figure.

 Rotational 180°	 Both Multiples of 60°	 Linear	 Both 180°
 Linear	 Both 180°	 Linear	 Both Multiples of 90°

3) Name the vector and write its component form.



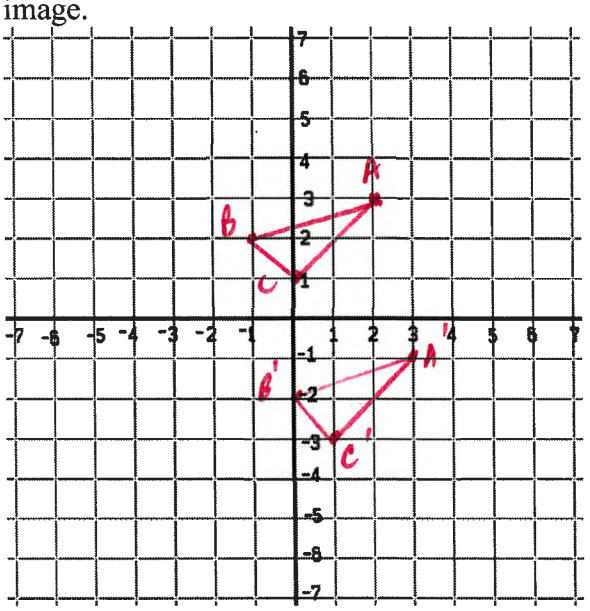
$\overrightarrow{JK}$

$\langle -3, 2 \rangle$

4) Find the component form of the vector that translates $A(3, -2)$ to $A'(-1, 4)$.

$\langle -4, 6 \rangle$

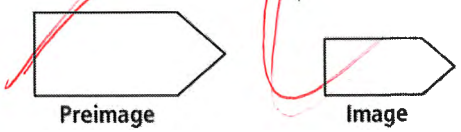
5) The vertices of $\triangle ABC$ are $A(2, 3)$, $B(-1, 2)$, and $C(0, 1)$. Translate $\triangle ABC$ using the vector $\langle 1, -4 \rangle$. Graph $\triangle ABC$ and its image.



Tell whether the transformation appears to be an isometry. Explain.

5)

6)



Skip

7) ΔXYZ has coordinates $X(2, 3)$, $Y(1, 4)$, and $Z(8, 9)$. A translation maps X to X' $(4, 7)$. What are the coordinates for Y' and Z' for this translation?

$\langle 2, 4 \rangle$

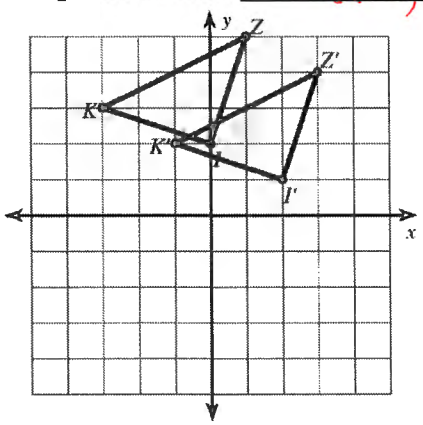
$Y'(3, 8)$

$Z'(10, 13)$

The blue figure is a translation image of the black-lined figure. Write a rule to describe each translation. For example, $(x, y) \rightarrow (x+?, y+?)$. Afterwards, write the component form of the vector $\langle ?, ? \rangle$ that would also produce the translation.

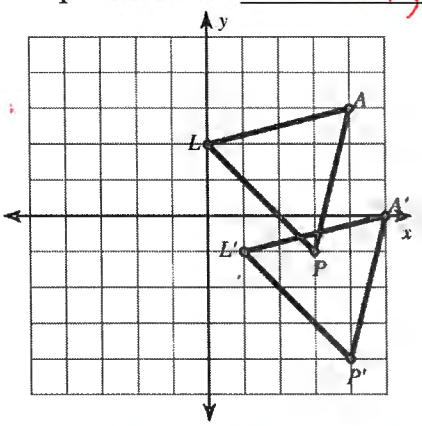
8) Rule: $(x, y) \rightarrow (x+2, y-1)$

Component Form: $\langle 2, -1 \rangle$



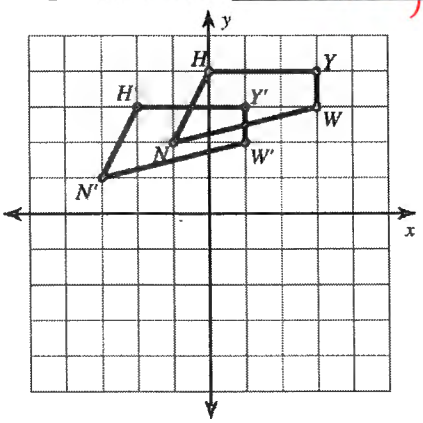
9) Rule: $(x, y) \rightarrow (x+1, y-3)$

Component Form: $\langle 1, -3 \rangle$



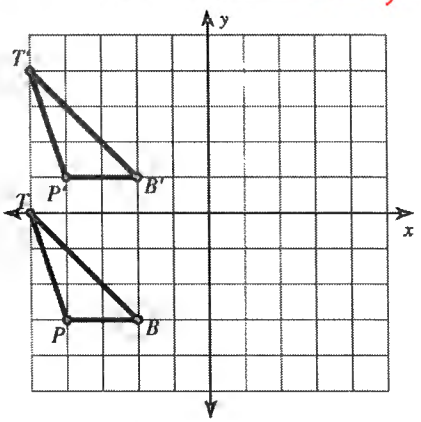
10) Rule: $(x, y) \rightarrow (x-2, y-1)$

Component Form: $\langle -2, -1 \rangle$



11) Rule: $(x, y) \rightarrow (x, y+4)$

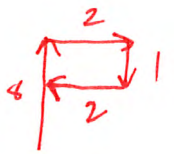
Component Form: $\langle 0, 4 \rangle$



12) You are visiting Washington, D.C. From the American History Museum you walk 5 blocks east and 1 block south to the Air and Space Museum. Then you walk 8 blocks west to the Washington Monument. Where is the Washington Monument in relation to the American History Museum?

3 blocks west and 1 block south

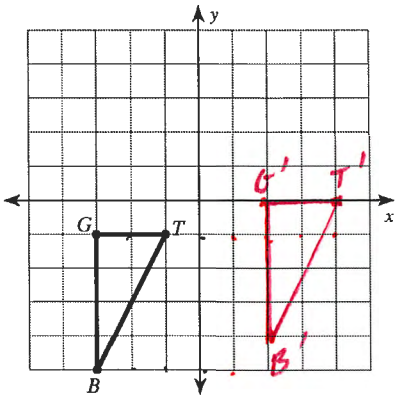
13) You and some friends go to a book fair where booths are set out in rows. You buy drinks at the refreshment stand and then walk 8 rows north and 2 rows east to the science fiction booth. Then you walk 1 row south and 2 rows west to the children's book booth. Where is the children's book booth in relation to the refreshment stand?



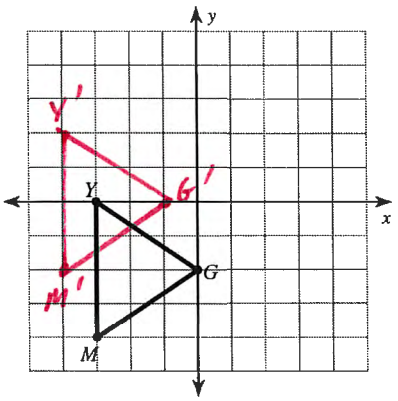
6 rows north

Graph the images according to the rule or the vector component.

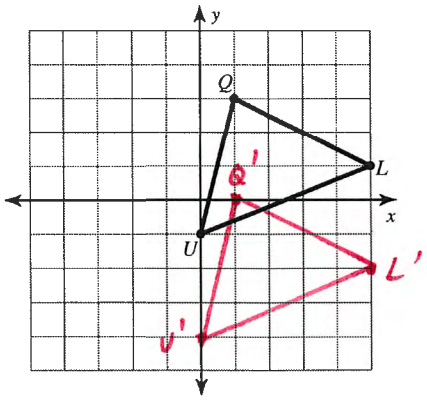
14) $(x, y) \rightarrow (x+5, y+1)$



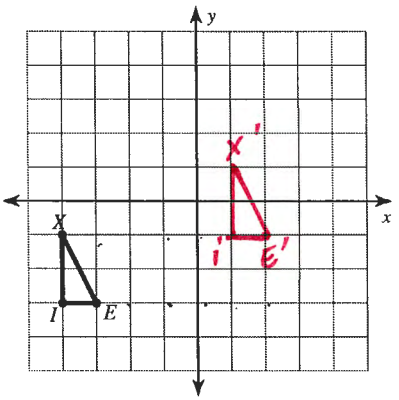
15) $\langle -1, 2 \rangle$



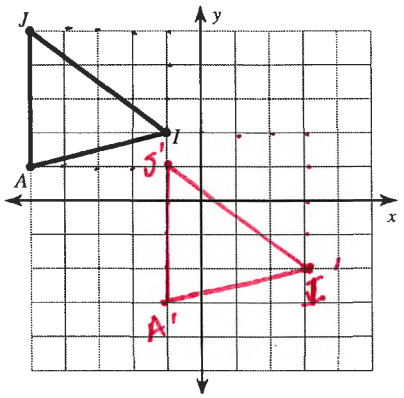
16) $(x, y) \rightarrow (x, y-3)$



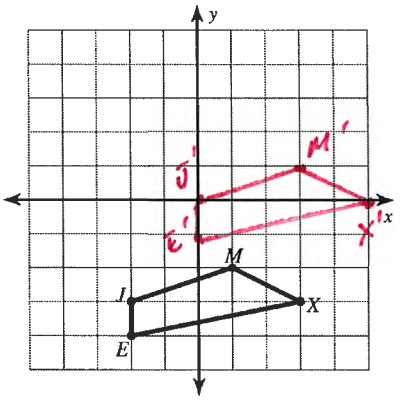
17) $\langle 5, 2 \rangle$



18) $(x, y) \rightarrow (x+4, y-4)$



19) $\langle 2, 3 \rangle$



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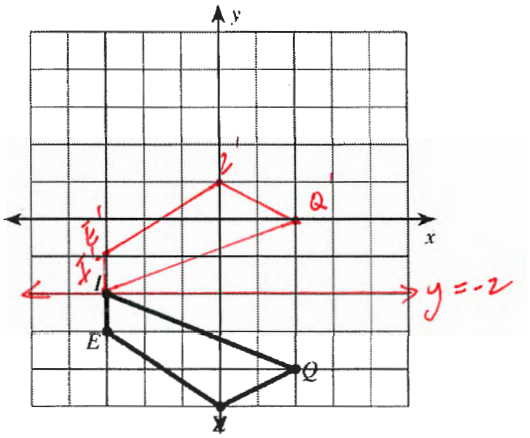
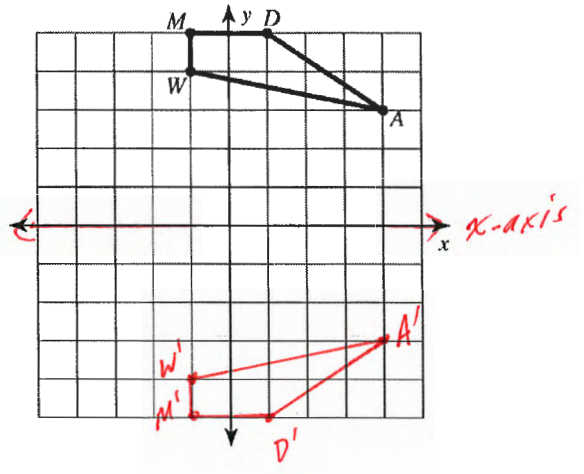
9.3 – Reflections

Find the image of the figure using the transformation given.

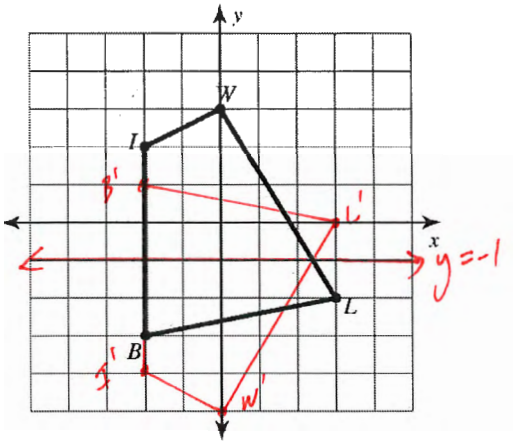
1) Reflection across $y = -2$



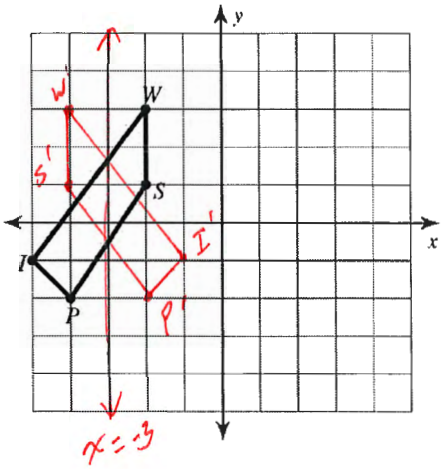
2) Reflection across the x-axis



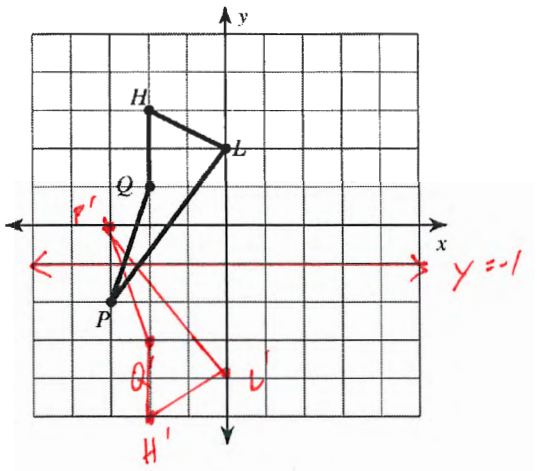
3) Reflection across $y = -1$



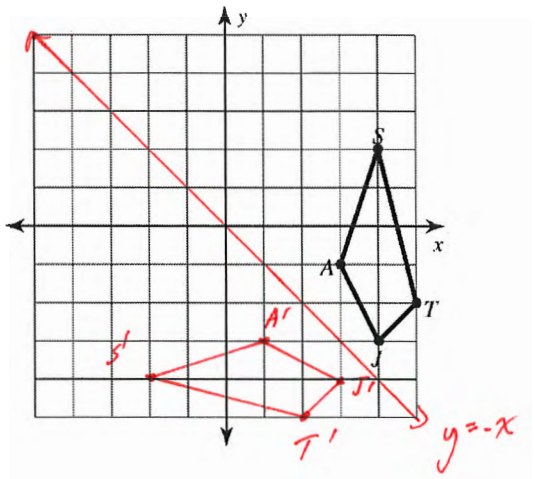
4) Reflection across $x = -3$



5) Reflection across $y = -1$

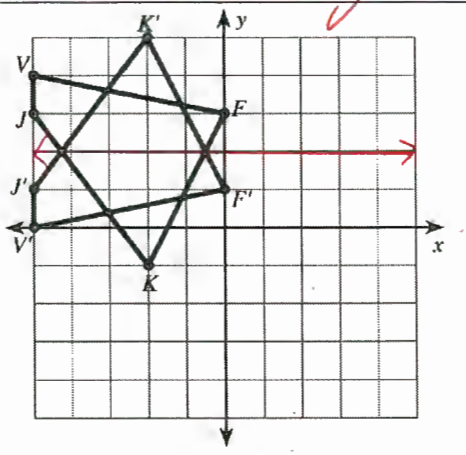


6) Reflection across $y = -x$

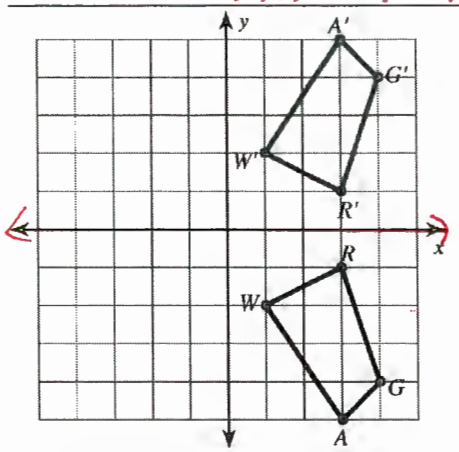


Write a rule for the reflection.

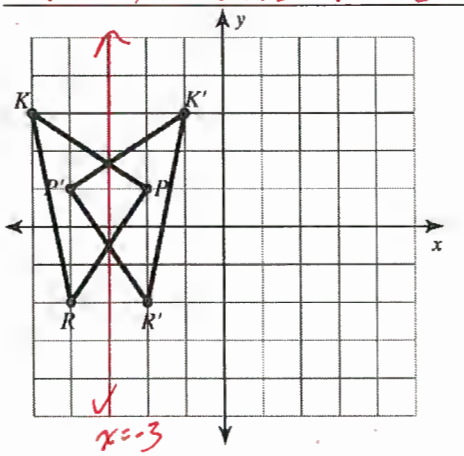
7) Reflection across $y = 2$



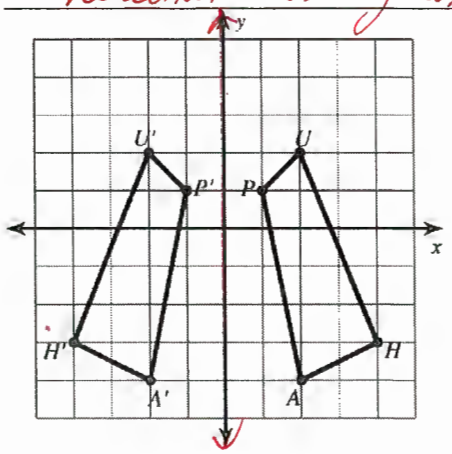
8) Reflection across x-axis



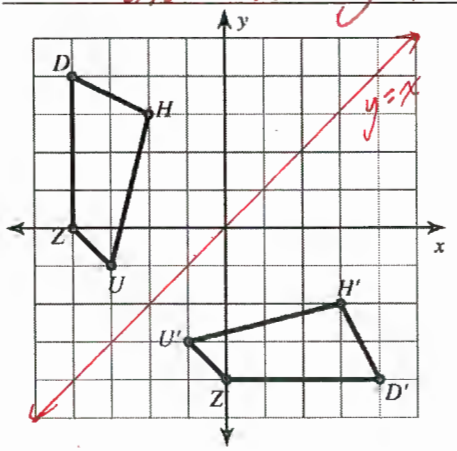
9) Reflection across $x = -3$



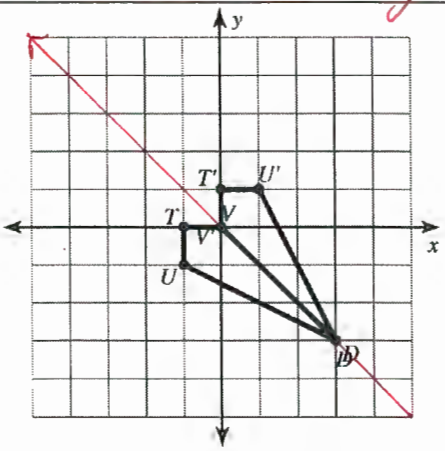
10) Reflection across y-axis



11) Reflection across $y = x$



12) Reflection across $y = -x$



13) Point A on a coordinate grid is at (3, 4). If the point is reflected across the line $y = x$, what are the coordinates of its image?

$A'(4,3)$

14) Point Z on a coordinate grid is at (−1, 3). If the point is reflected across the line $y = -x$, what are the coordinates of its image?

$Z'(-3,-1)$