

Honors Geometry

Review 9.1- 9.3

Name _____

Use the translation $(x, y) \rightarrow (x - 5, y + 8)$.

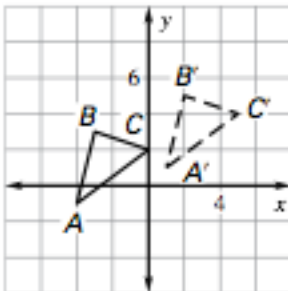
1. What is the image of $B(4, 2)$?
2. What is the image of $D(-1, 5)$?
3. What is the preimage of $F'(-3, -4)$?
4. What is the preimage of $H'(7, -5)$?
5. What is the image of $J(0, 2)$?
6. What is the preimage of $K'(-4, 6)$?

Write a rule for the translation.

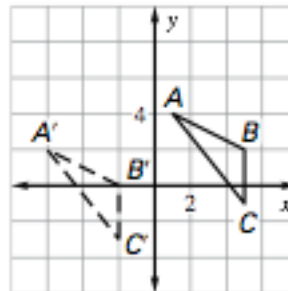
7. 1 unit to the left and 1 unit up
8. 3 units down
9. 7 units to the left and 4 units down
10. 10 units right and 8 units up

$\triangle A'B'C'$ is the image of $\triangle ABC$ after a translation. Write a rule for the translation. Then *verify* that the translation is an isometry.

11.



12.

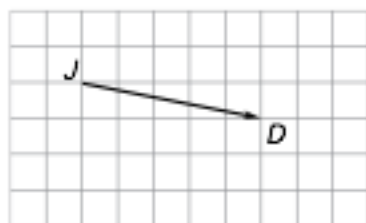


Name the vector and write its component form.

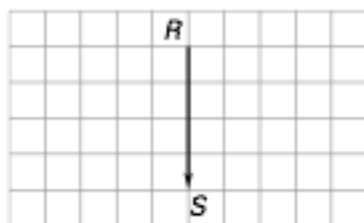
13.



14.



15.



$\triangle ABC$ with vertices $A(-2, 4)$, $B(6, 2)$, and $C(3, -2)$ is translated to $\triangle A'B'C'$.

Determine the translation using a vector in component form, and

determine the coordinates of the remaining vertices.

16. $A'(-5, 5)$

17. $B'(2, -5)$

18. $C'(-4, -5)$

19. $B'(8, 6)$

In Exercises 20 and 21, let P' and Q' be the images of P and Q , respectively, after an isometry. Determine whether the statement is *true* or *false*. If it is true, give a proof using coordinate geometry. If it is false, give a counterexample.

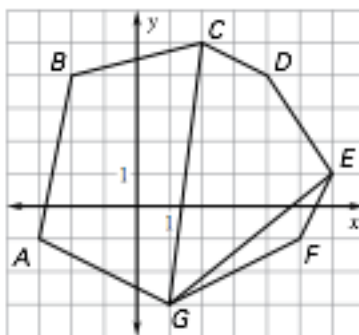
20. If the isometry is the translation $(x, y) \rightarrow (x + h, y + k)$, where h and k are constants, then $\overline{PP'}$ and $\overline{QQ'}$ are congruent and parallel (or collinear).

21. If $\overline{PP'}$ and $\overline{QQ'}$ are congruent and parallel, then the isometry is a translation.

LESSON
9.2

Use the diagram to write a matrix to represent the polygon.

- $\triangle EFG$
- Quadrilateral $ABCG$
- Heptagon $ABCDEFG$



Add or subtract.

4. $[7 \ -3] - [-3 \ -6]$

5. $\begin{bmatrix} 1 & -4 \\ -7 & 2 \end{bmatrix} + \begin{bmatrix} 3 & 5 \\ -5 & 2 \end{bmatrix}$

6. $\begin{bmatrix} 7 & -1 & 4 \\ 11 & -9 & 2 \end{bmatrix} + \begin{bmatrix} -3 & 6 & 3 \\ 10 & 1 & -5 \end{bmatrix}$

7. $\begin{bmatrix} \frac{1}{2} & \frac{1}{4} \\ 3 & 8 \end{bmatrix} - \begin{bmatrix} 2 & \frac{3}{4} \\ \frac{1}{2} & 5 \end{bmatrix}$

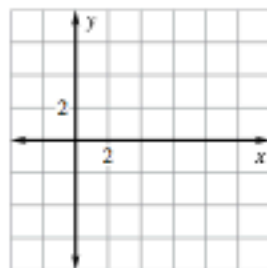
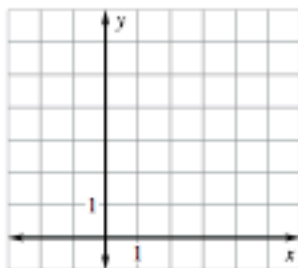
8. $\begin{bmatrix} 1.2 & 3.5 \\ 0.2 & 5.1 \end{bmatrix} + \begin{bmatrix} 4.1 & 8.7 \\ 2.6 & 5.3 \end{bmatrix}$

9. $\begin{bmatrix} 8 & 3 \\ 4 & 0 \end{bmatrix} - \begin{bmatrix} 2 & -7 \\ 6 & -1 \end{bmatrix}$

**Find the image matrix that represents the translation of the polygon.
Then graph the polygon and its image.**

10. $\begin{matrix} A & B & C \\ \begin{bmatrix} -2 & 1 & 2 \\ 3 & 5 & 2 \end{bmatrix} \end{matrix}$; 3 units right and
2 units down

11. $\begin{matrix} M & N & O & P \\ \begin{bmatrix} 4 & 5 & 6 & 8 \\ 1 & -2 & -3 & -1 \end{bmatrix} \end{matrix}$; 6 units left
and 3 units up



Multiply.

12. $\begin{bmatrix} 4 & 4 \end{bmatrix} \begin{bmatrix} -2 \\ -3 \end{bmatrix}$

13. $\begin{bmatrix} -3 & 3 \\ 3 & -2 \\ 0 & -1 \end{bmatrix} \begin{bmatrix} 1 & 0 \\ -2 & -1 \end{bmatrix}$

14. $\begin{bmatrix} 1 & -4 \\ 3 & -2 \end{bmatrix} \begin{bmatrix} 4 & -1 \\ 0 & -3 \end{bmatrix}$

15. $\begin{bmatrix} -1 & -0.5 & 1.25 \\ 1 & -1.5 & -0.25 \end{bmatrix} \begin{bmatrix} 1.2 \\ 0.2 \\ 0 \end{bmatrix}$

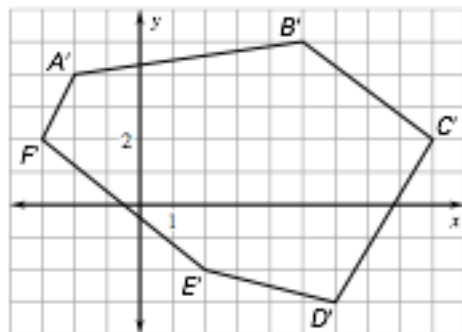
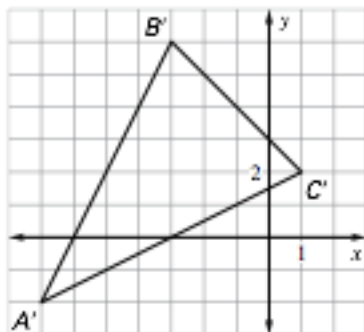
16. $\begin{bmatrix} 6 & -4 & -2 \end{bmatrix} \begin{bmatrix} -5 \\ -2 \\ 1 \end{bmatrix}$

17. $\begin{bmatrix} 0 & -1 \\ -4 & -2 \end{bmatrix} \begin{bmatrix} 7 & 2 \\ -1 & 0 \end{bmatrix}$

**Use the described translation and the graph of the image to find the
matrix that represents the preimage.**

18. 4 units right and 2 units up

19. 3 units left and 2 units down



- 20. Matrices** Write two matrices that have a defined product. Then find the product.
- 21. Matrix Equation** Use the description of matrix multiplication to find the value of each variable.

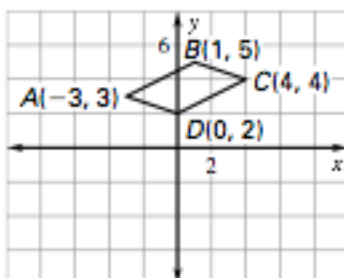
$$\begin{bmatrix} -5 & x \\ y & 8 \end{bmatrix} \begin{bmatrix} -2 & 4 \\ y & 2 \end{bmatrix} = \begin{bmatrix} 0 & -15 \\ -24 & 0 \end{bmatrix}$$

- 22. Shopping** You and a friend are shopping for DVDs and video games at a discount store. A new release DVD costs \$19.95 and a new release video game costs \$15.95. Each of you has \$150 to spend. You want to buy five video games and as many DVDs as possible. Your friend wants to buy six DVDs and as many video games as possible. Use matrix multiplication to find the maximum number of DVDs you can buy and the maximum number of video games your friend can buy.

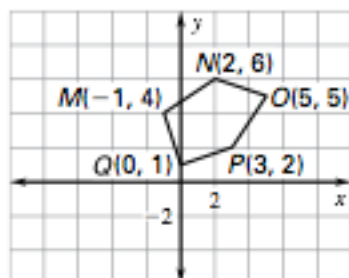
LESSON
9.3

Graph the reflection of the polygon in the given line.

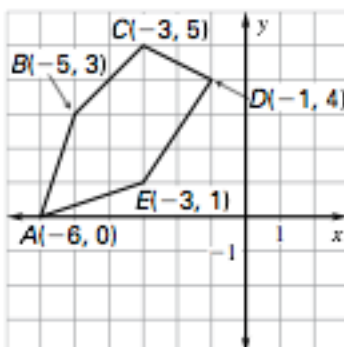
- 1. x -axis**



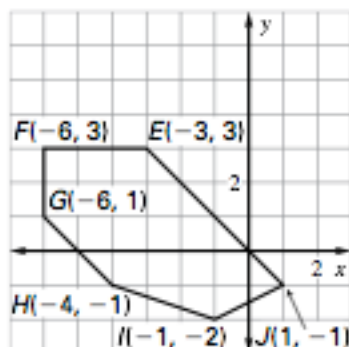
- 2. y -axis**



- 3. $x = -2$**



- 4. $y = -x$**

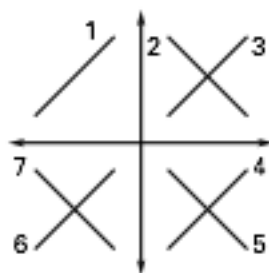


Find the coordinates of the image without using a coordinate plane. Then check your answer by plotting the image and preimage on a coordinate plane.

5. $M(3, 4)$ reflected in the line $y = 1$. 6. $N(-2, 2)$ reflected in the line $y = -1$.
 7. $P(-2, 3)$ reflected in the line $x = -3$. 8. $Q(5, -2)$ reflected in the line $x = 3$.

Use the diagram to name the image of Segment 1 after the reflection.

9. Reflection in the x -axis
 10. Reflection in the y -axis
 11. Reflection in the line $y = x$
 12. Reflection in the line $y = -x$
 13. Reflection in the y -axis, followed by a reflection in the x -axis
 14. Reflection in the x -axis, followed by a reflection in the y -axis

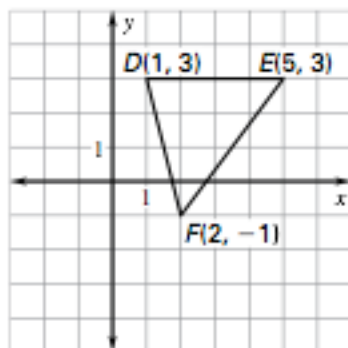


Find point C on the x -axis so $AC + BC$ is a minimum.

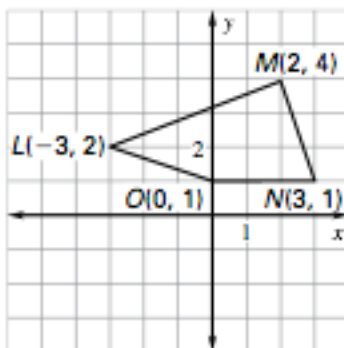
15. $A(10, 2), B(17, 5)$ 16. $A(3, 2), B(-3, 4)$

Write a matrix for the polygon. Then use matrix multiplication to find the image matrix that represents the polygon after a reflection in the given line.

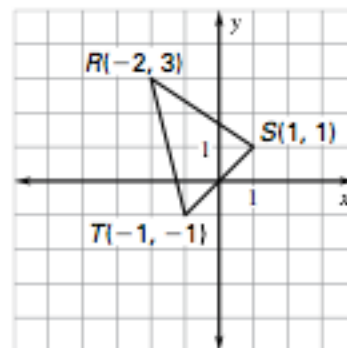
17. y -axis



18. x -axis

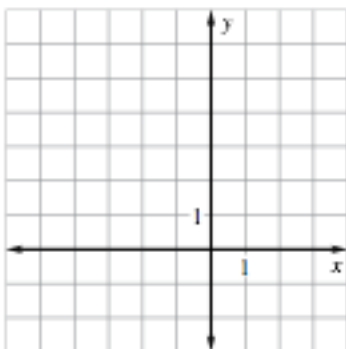


19. y -axis

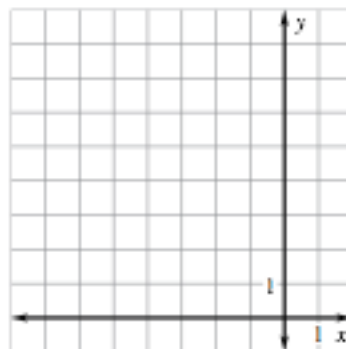


The vertices of $\triangle ABC$ are $A(-4, 4)$, $B(0, 7)$, and $C(-1, 3)$. Reflect $\triangle ABC$ in the first line. Then reflect $\triangle A'B'C'$ in the second line. Graph $\triangle A'B'C'$ and $\triangle A''B''C''$.

20. In $y = 4$, then in $x = -1$



21. In $x = -3$, then in $y = 5$



22. Algebra The line $y = 0.5x - 4$ is reflected in the line $y = -2$. What is the equation of the image?

Define the following terms completely.

image: _____

preimage: _____

isometry: _____

vector: _____

initial point: _____

terminal point: _____

horizontal component: _____

vertical component: _____

component form: _____

translation: _____

matrix: _____

element: _____

dimensions: _____

line of reflection: _____

reflection: _____