

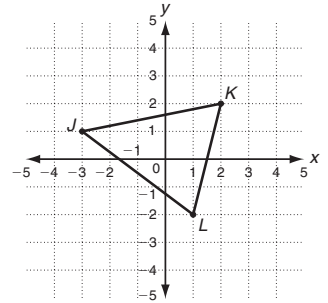


LESSON
4-3

Practice B

Using Matrices to Transform Geometric Figures

Triangle *JKL* has vertices $J(-3, 1)$, $K(2, 2)$, and $L(1, -2)$.

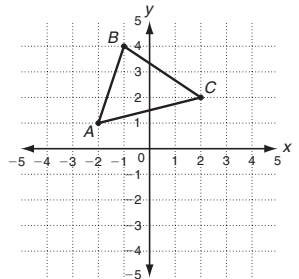


Use a matrix to transform triangle *JKL*. Find the coordinates of the vertices of the image.

1. Translate 5 units right, 6 units down.
2. Translate 2 units left, 4 units up.

3. Enlarge by a factor of 7.
4. Reduce by a factor of 0.25.

Reflect or rotate triangle *ABC* with vertices $A(-2, 1)$, $B(-1, 4)$, and $C(2, 2)$. Find the coordinates of the vertices of the image. Describe the transformation.



5. $\begin{bmatrix} -1 & 0 \\ 0 & 1 \end{bmatrix}$

6. $\begin{bmatrix} 0 & 1 \\ -1 & 0 \end{bmatrix}$

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

8. $\begin{bmatrix} 1 & 0 \\ 0 & -1 \end{bmatrix}$

Solve.

9. a. Natalie drew a figure with vertices $H(-3, -2)$, $O(-3, 3)$, $U(0, 5)$, $S(3, 3)$, $E(3, -2)$ to use as a pattern on a sweatshirt. Write a matrix that defines the figure.

- b. Natalie wants to enlarge the figure by a factor of 5. Describe a method she can use.

- c. What are the coordinates of Natalie's enlarged figure?

H' _____ O' _____ U' _____ S' _____ E' _____

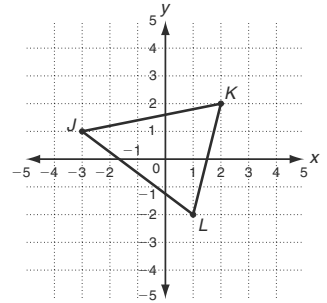


LESSON
4-3

Practice B

Using Matrices to Transform Geometric Figures

Triangle JKL has vertices $J(-3, 1)$, $K(2, 2)$, and $L(1, -2)$.



Use a matrix to transform triangle JKL . Find the coordinates of the vertices of the image.

1. Translate 5 units right, 6 units down.

$J'(2, -5), K'(7, -4), L'(6, -8)$

2. Translate 2 units left, 4 units up.

$J'(-5, 5), K'(0, 6), L'(-1, 2)$

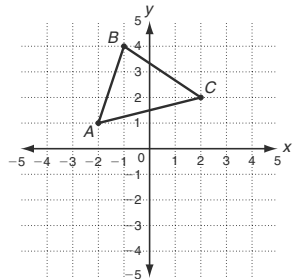
3. Enlarge by a factor of 7.

$J'(-21, 7), K'(14, 14), L'(7, -14)$

4. Reduce by a factor of 0.25.

$J'(-0.75, 0.25), K'(0.5, 0.5), L'(0.25, -0.5)$

Reflect or rotate triangle ABC with vertices $A(-2, 1)$, $B(-1, 4)$, and $C(2, 2)$. Find the coordinates of the vertices of the image. Describe the transformation.



5. $\begin{bmatrix} -1 & 0 \\ 0 & 1 \end{bmatrix}$

$A'(2, 1), B'(1, 4), C'(-2, 2)$;
reflection across the y -axis

6. $\begin{bmatrix} 0 & 1 \\ -1 & 0 \end{bmatrix}$

$A'(1, 2), B'(4, 1), C'(2, -2)$;
 90° clockwise rotation

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

$A'(-1, -2), B'(-4, -1), C'(-2, 2)$;
 90° counterclockwise rotation

8. $\begin{bmatrix} 1 & 0 \\ 0 & -1 \end{bmatrix}$

$A'(-2, -1), B'(-1, -4), C'(2, -2)$;
reflection across the x -axis

Solve.

9. a. Natalie drew a figure with vertices $H(-3, -2)$, $O(-3, 3)$, $U(0, 5)$, $S(3, 3)$, $E(3, -2)$ to use as a pattern on a sweatshirt. Write a matrix that defines the figure.

$\begin{bmatrix} -3 & -3 & 0 & 3 & 3 \\ -2 & 3 & 5 & 3 & -2 \end{bmatrix}$

b. Natalie wants to enlarge the figure by a factor of 5. Describe a method she can use.

Multiply each entry in the matrix by 5.

c. What are the coordinates of Natalie's enlarged figure?

$H'(-15, -10)$ $O'(-15, 15)$ $U'(0, 25)$ $S'(15, 15)$ $E'(15, -10)$