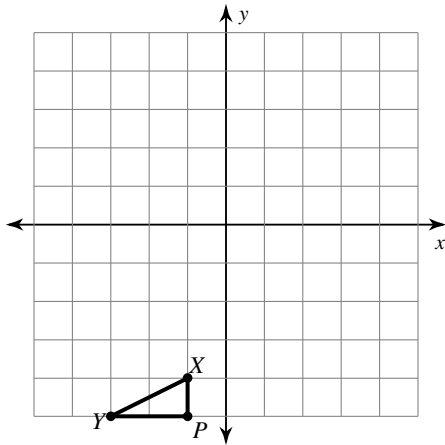


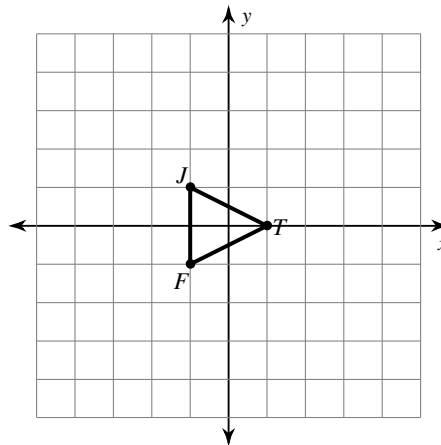
# Transformations Using Matrices

**Graph the image of the figure using the transformation given.**

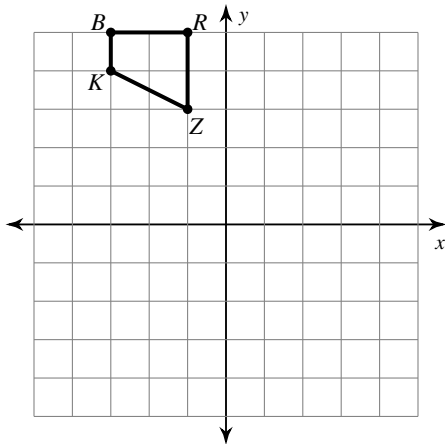
1) translation: 2 units left and 7 units up



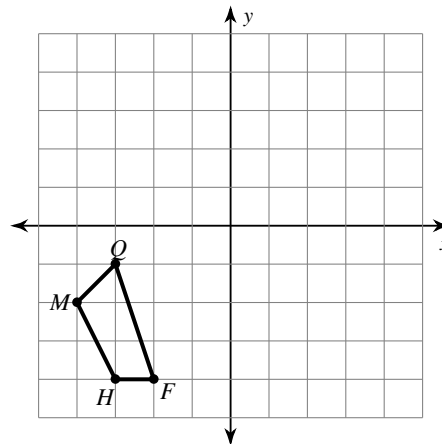
2) dilation of 2.5



3) rotation 180° about the origin



4) reflection across the y-axis



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

5) rotation 90° clockwise about the origin

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

6) translation: 5 units left and 5 units up

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

7) dilation of 0.25

$$\begin{bmatrix} -1 & 2 & -1 \\ 1 & 2 & -1 \end{bmatrix}$$

8) reflection across  $y = x$

$$\begin{bmatrix} -5 & -2 & -1 \\ -2 & 0 & -3 \end{bmatrix}$$

9) rotation  $180^\circ$  about the origin

$$\begin{bmatrix} 0 & 2 & 5 \\ -3 & -1 & -5 \end{bmatrix}$$

10) dilation of 0.5

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

**Write a rule to describe each transformation.**

11)  $\begin{bmatrix} 1 & 1 & 4 & 5 \\ 2 & 3 & 2 & 1 \end{bmatrix}$

to

$$\begin{bmatrix} 0.5 & 0.5 & 2 & 2.5 \\ 1 & 1.5 & 1 & 0.5 \end{bmatrix}$$

12)  $\begin{bmatrix} -4 & -3 & -1 \\ -3 & 1 & 0 \end{bmatrix}$

to

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

13)  $\begin{bmatrix} 1 & 3 & 4 & 5 \\ 0 & 3 & 2 & -3 \end{bmatrix}$

to

$$\begin{bmatrix} -1 & -3 & -4 & -5 \\ 0 & 3 & 2 & -3 \end{bmatrix}$$

14)  $\begin{bmatrix} -3 & 1 & 0 \\ 2 & 5 & 3 \end{bmatrix}$

to

$$\begin{bmatrix} 2 & 5 & 3 \\ 3 & -1 & 0 \end{bmatrix}$$

15)  $\begin{bmatrix} -3 & -1 & 0 \\ -5 & -2 & -3 \end{bmatrix}$

to

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

16)  $\begin{bmatrix} -3 & -4 & -1 & 1 \\ -4 & -1 & 3 & -2 \end{bmatrix}$

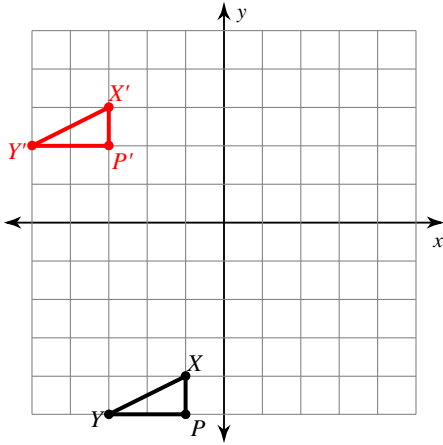
to

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

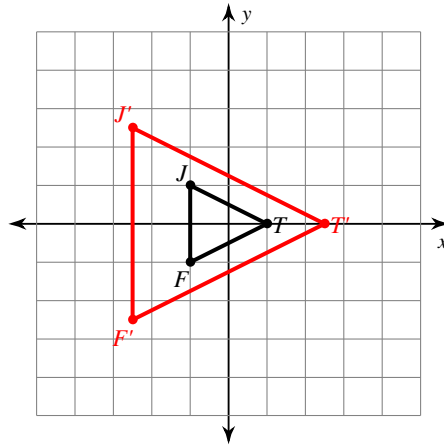
# Transformations Using Matrices

**Graph the image of the figure using the transformation given.**

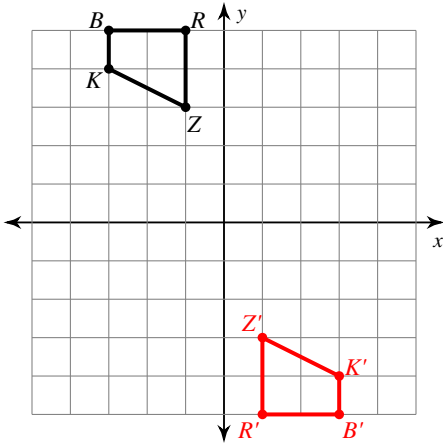
1) translation: 2 units left and 7 units up



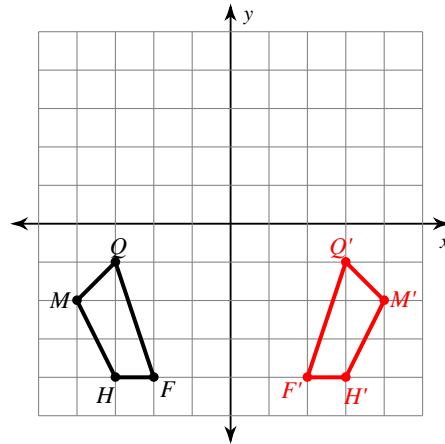
2) dilation of 2.5



3) rotation 180° about the origin



4) reflection across the y-axis



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

5) rotation 90° clockwise about the origin

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

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

6) translation: 5 units left and 5 units up

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

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

7) dilation of 0.25

$$\begin{bmatrix} -1 & 2 & -1 \\ 1 & 2 & -1 \end{bmatrix}$$

$$\begin{bmatrix} -0.25 & 0.5 & -0.25 \\ 0.25 & 0.5 & -0.25 \end{bmatrix}$$

8) reflection across  $y = x$

$$\begin{bmatrix} -5 & -2 & -1 \\ -2 & 0 & -3 \end{bmatrix}$$

$$\begin{bmatrix} -2 & 0 & -3 \\ -5 & -2 & -1 \end{bmatrix}$$

9) rotation  $180^\circ$  about the origin

$$\begin{bmatrix} 0 & 2 & 5 \\ -3 & -1 & -5 \end{bmatrix}$$

$$\begin{bmatrix} 0 & -2 & -5 \\ 3 & 1 & 5 \end{bmatrix}$$

10) dilation of 0.5

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

$$\begin{bmatrix} -0.5 & 0.5 & 1 \\ 0 & 0.5 & -0.5 \end{bmatrix}$$

**Write a rule to describe each transformation.**

11)  $\begin{bmatrix} 1 & 1 & 4 & 5 \\ 2 & 3 & 2 & 1 \end{bmatrix}$

to

$$\begin{bmatrix} 0.5 & 0.5 & 2 & 2.5 \\ 1 & 1.5 & 1 & 0.5 \end{bmatrix}$$

dilation of  $\frac{1}{2}$

12)  $\begin{bmatrix} -4 & -3 & -1 \\ -3 & 1 & 0 \end{bmatrix}$

to

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

translation: 3 units right

13)  $\begin{bmatrix} 1 & 3 & 4 & 5 \\ 0 & 3 & 2 & -3 \end{bmatrix}$

to

$$\begin{bmatrix} -1 & -3 & -4 & -5 \\ 0 & 3 & 2 & -3 \end{bmatrix}$$

reflection across the y-axis

14)  $\begin{bmatrix} -3 & 1 & 0 \\ 2 & 5 & 3 \end{bmatrix}$

to

$$\begin{bmatrix} 2 & 5 & 3 \\ 3 & -1 & 0 \end{bmatrix}$$

rotation  $90^\circ$  clockwise about the origin

15)  $\begin{bmatrix} -3 & -1 & 0 \\ -5 & -2 & -3 \end{bmatrix}$

to

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

translation: 1 unit right and 3 units up

16)  $\begin{bmatrix} -3 & -4 & -1 & 1 \\ -4 & -1 & 3 & -2 \end{bmatrix}$

to

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

rotation  $180^\circ$  about the origin