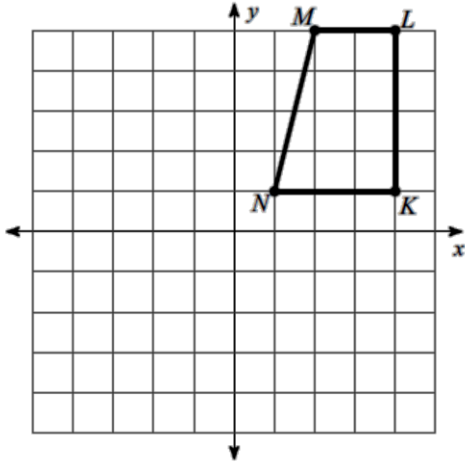


FIGURE IT OUT

Name _____

Use matrices to transform the polygons. Be sure to graph each image.

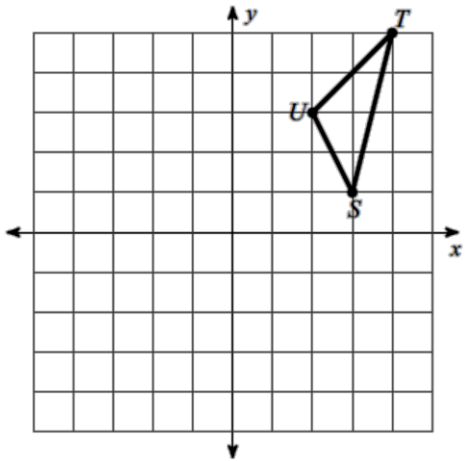
#1) Translate MLKN 2 units left and 4 units down. Vertex Matrix for MLKN:



Translation Matrix:

Vertex Matrix for M'L'K'N':

#2) Rotate UTS 180° about the origin.

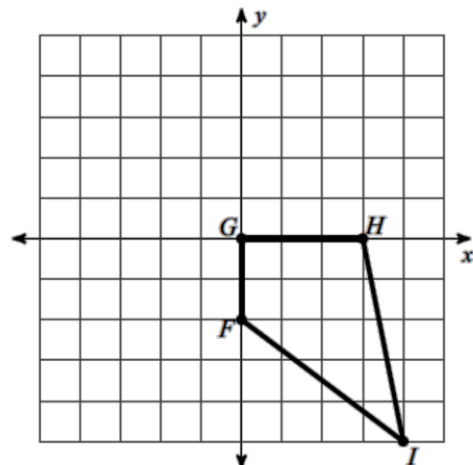


Vertex Matrix for UTS:

Rotation Matrix:

Vertex Matrix for U'T'S':

#3) Reflect FGHI across the y-axis

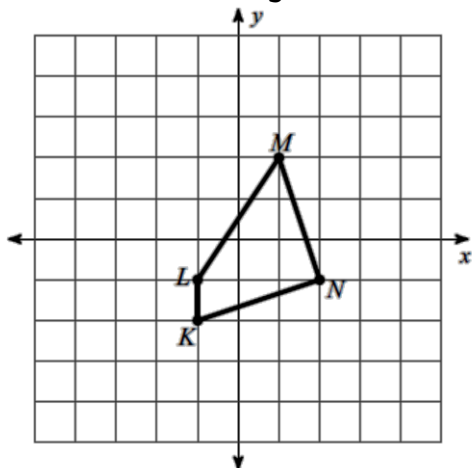


Vertex Matrix for FGHI:

Reflection Matrix:

Vertex Matrix for F'G'H'I':

#4) Dilate KLMN by a factor of 2.

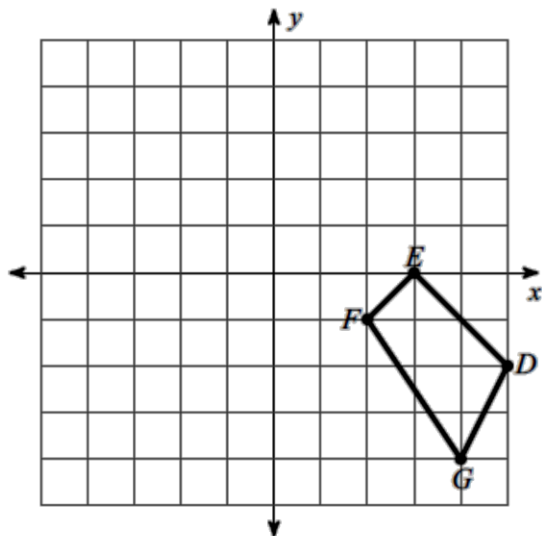


Vertex Matrix for KLMN:

Dilation Factor:

Vertex Matrix for K'L'M'N':

#5) Reflect GFED over the x-axis.

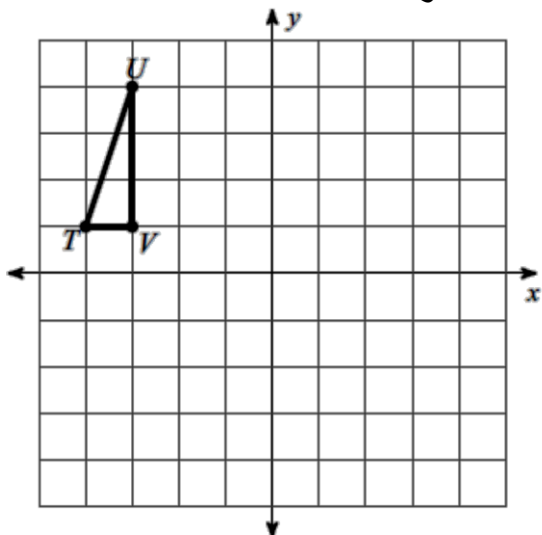


Vertex Matrix for GFED:

Reflection Matrix:

Vertex Matrix for G'F'E'D':

#6) Translate TUV 1 unit right and 4 units down.



Vertex Matrix for TUV:

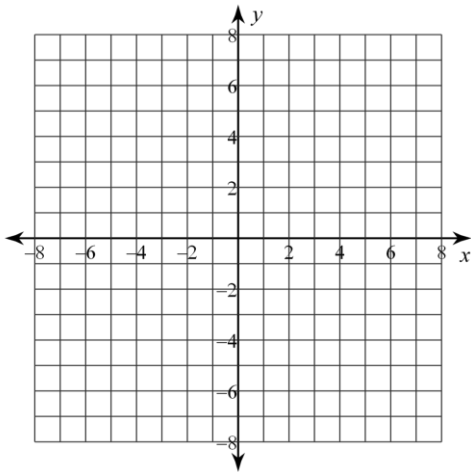
Translation Matrix:

Vertex Matrix for T'U'V':

FIGURE IT OUT

Graph each preimage. Complete each transformation and graph the image.

#7) Reflect VUT over the line $y=x$.



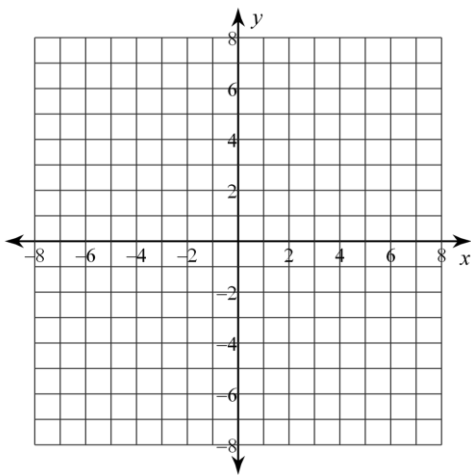
Vertex Matrix for VUT:

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

Reflection Matrix:

Vertex Matrix for $V'U'T'$:

#8) Dilate KJ by a factor of $\frac{1}{2}$.



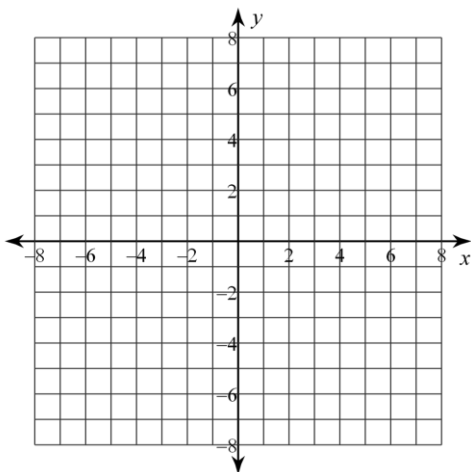
Vertex Matrix for KJ:

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

Dilation Factor:

Vertex Matrix for $K'J'$:

#9) Translate IKJ 5 units left and 5 units up.



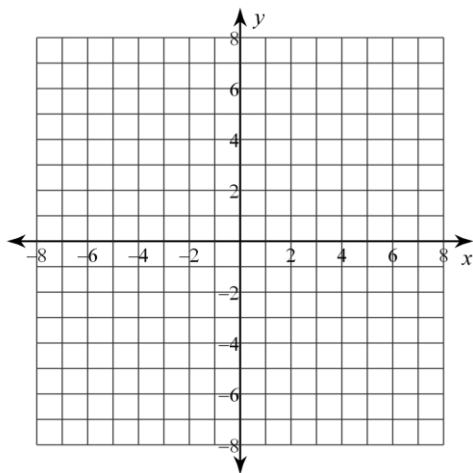
Vertex Matrix for IKJ:

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

Translation Matrix:

Vertex Matrix for $I'K'J'$:

#10) Rotate VWXY 180° about the origin.



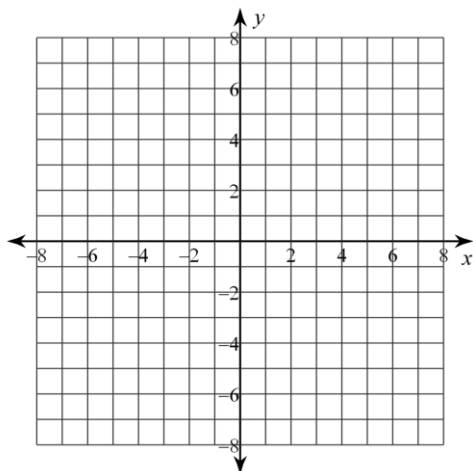
Vertex Matrix for VWXY:

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

Rotation Matrix:

Vertex Matrix for V'W'X'Y':

#11) Dilate QTSR by a factor of 1.5.



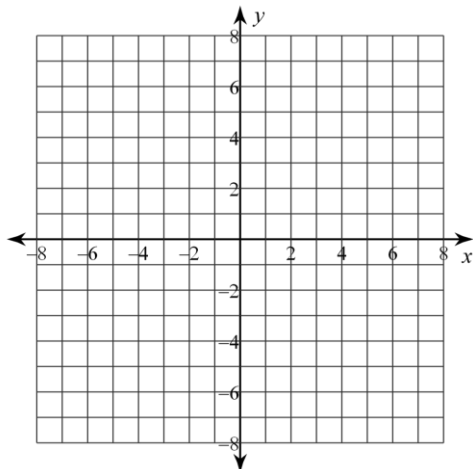
Vertex Matrix for QTSR:

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

Dilation Factor:

Vertex Matrix for Q'T'S'R':

#12) Rotate KLM 90° counterclockwise about the origin



Vertex Matrix for KLM:

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

Rotation Matrix:

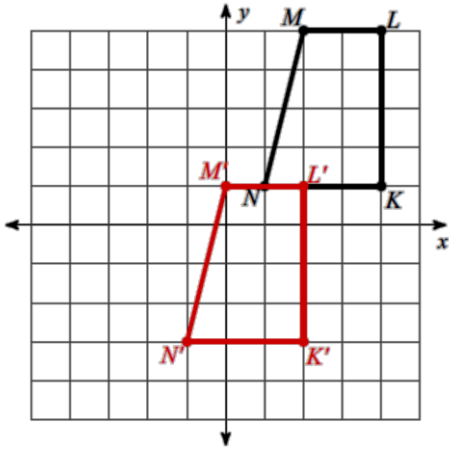
Vertex Matrix for K'L'M':

FIGURE IT OUT

Name ANSWER KEY

Use matrices to transform the polygons. Be sure to graph each image.

#1) Translate MLKN 2 units left and 4 units down.



Vertex Matrix for MLKN:

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

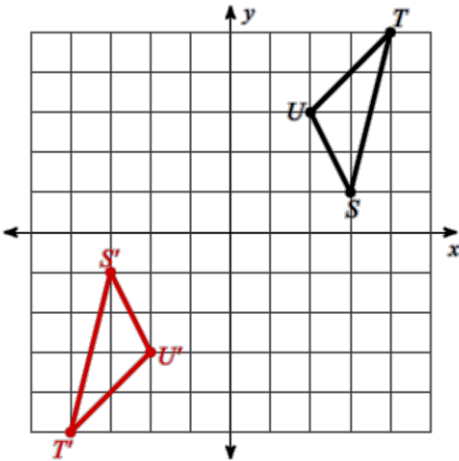
Translation Matrix:

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

Vertex Matrix for M'L'K'N':

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

#2) Rotate UTS 180° about the origin.



Vertex Matrix for UTS:

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

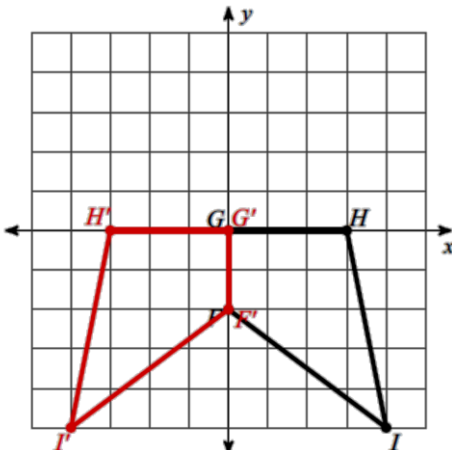
Rotation Matrix:

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

Vertex Matrix for U'T'S':

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

#3) Reflect FGHI across the y-axis.



Vertex Matrix for FGHI:

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

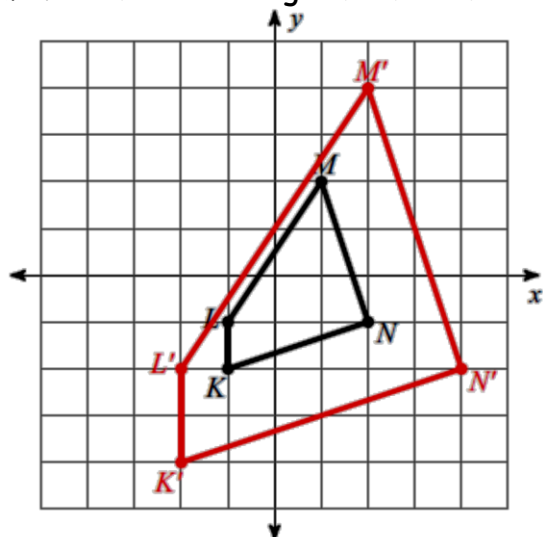
Reflection Matrix:

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

Vertex Matrix for F'G'H'I':

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

#4) Dilate KLMN by a factor of 2.



Vertex Matrix for KLMN:

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

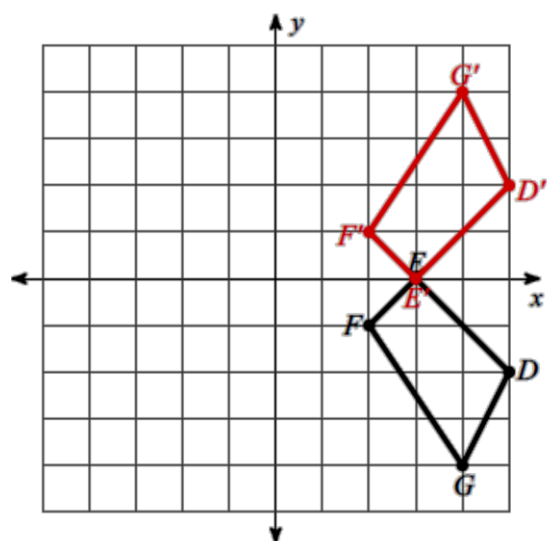
Dilation Factor:

2

Vertex Matrix for K'L'M'N':

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

#5) Reflect GFED over the x-axis.



Vertex Matrix for GFED:

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

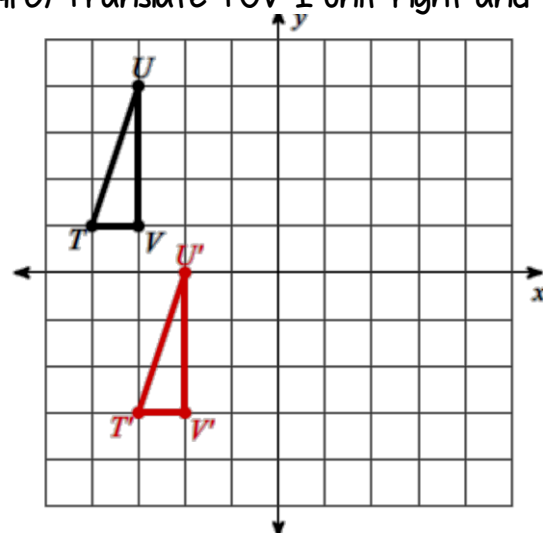
Reflection Matrix:

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

Vertex Matrix for G'F'E'D':

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

#6) Translate TUV 1 unit right and 4 units down.



Vertex Matrix for TUV:

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

Translation Matrix:

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

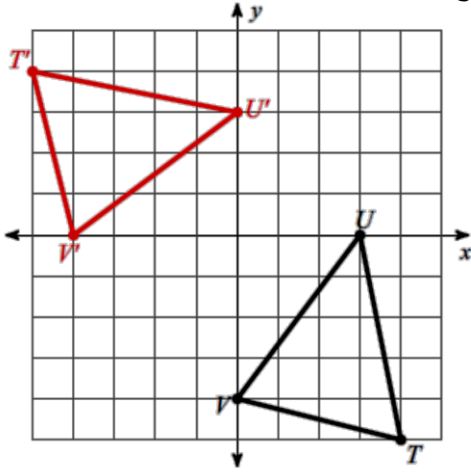
Vertex Matrix for T'U'V':

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

FIGURE IT OUT

Graph each preimage. Complete each transformation and graph the image.

#7) Reflect VUT over the line $y=x$.



Vertex Matrix for VUT:

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

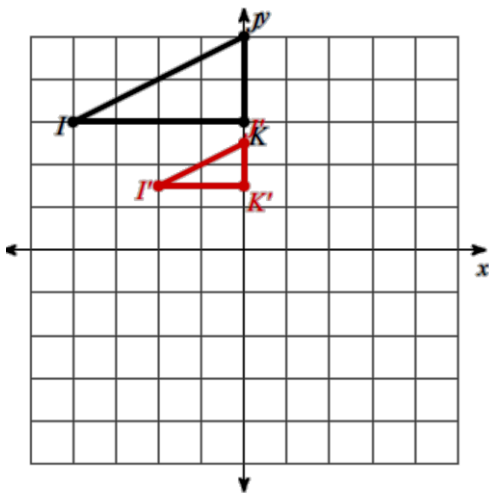
Reflection Matrix:

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

Vertex Matrix for V'U'T':

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

#8) Dilate KJ by a factor of $\frac{1}{2}$.



Vertex Matrix for KJ:

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

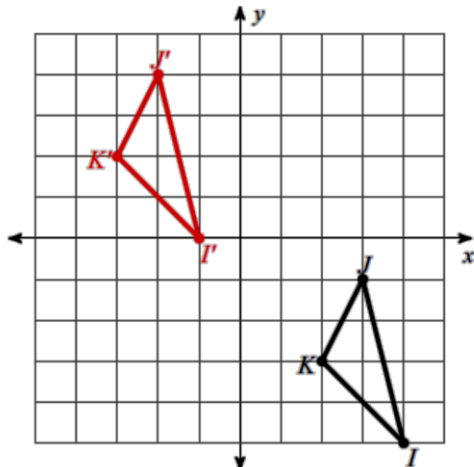
Dilation Factor:

$$\frac{1}{2}$$

Vertex Matrix for K'J':

$$\begin{bmatrix} 0 & -2 & 0 \\ 1.5 & 1.5 & 2.5 \end{bmatrix}$$

#9) Translate IKJ 5 units left and 5 units up.



Vertex Matrix for IKJ:

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

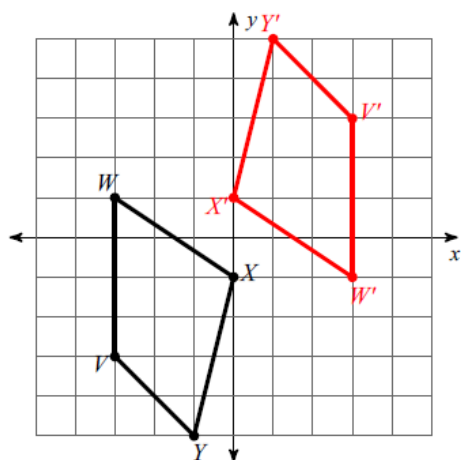
Translation Matrix:

$$\begin{bmatrix} -5 & -5 & -5 \\ 5 & 5 & 5 \end{bmatrix}$$

Vertex Matrix for I'K'J':

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

#10) Rotate VWXY 180° about the origin.



Vertex Matrix for VWXY:

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

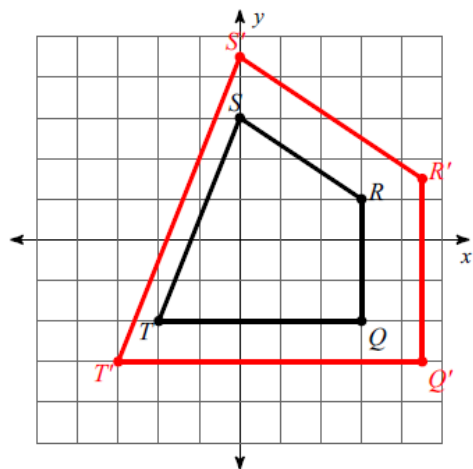
Rotation Matrix:

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

Vertex Matrix for V'W'X'Y':

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

#11) Dilate QTSR by a factor of 1.5.



Vertex Matrix for QTSR:

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

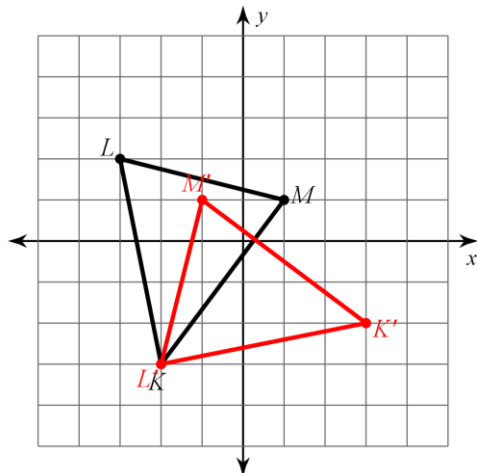
Dilation Factor:

1.5

Vertex Matrix for Q'T'S'R':

$$\begin{bmatrix} 4.5 & -3 & 0 & 4.5 \\ -3 & -3 & 4.5 & 1.5 \end{bmatrix}$$

#12) Rotate KLM 90° counterclockwise about the origin



Vertex Matrix for KLM:

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

Rotation Matrix:

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

Vertex Matrix for K'L'M':

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