Linear transformations with Matrices lesson 8 - Reflection in the x axis

Magic Monk Tutorials

1 Reflect the point $P = \begin{pmatrix} -27 \\ -44 \end{pmatrix}$ about the x axis.

Use the general formula for linear transformations with the reflection matrix

$R = \begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix}$.

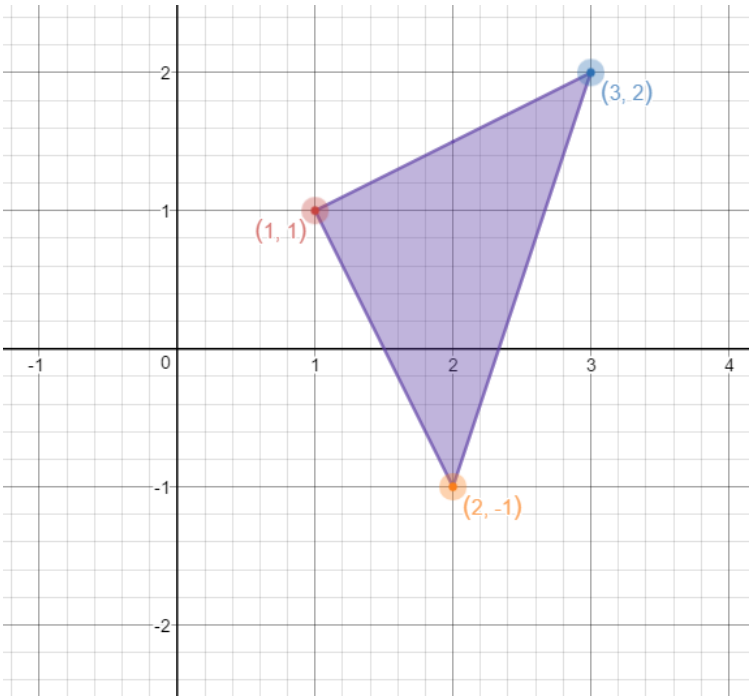
$$\begin{pmatrix} x' \\ y' \end{pmatrix} = R \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix} \begin{pmatrix} -27 \\ -44 \end{pmatrix} = \begin{pmatrix} -27 \\ 44 \end{pmatrix}$$

2 Reflect the point $P = \begin{pmatrix} 1 \\ 2 \end{pmatrix}$ about the x axis.

As above,

$$\begin{pmatrix} x' \\ y' \end{pmatrix} = R \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix} \begin{pmatrix} 1 \\ 2 \end{pmatrix} = \begin{pmatrix} 1 \\ -2 \end{pmatrix}$$

3 Reflect the below triangle about the x axis.



First, we reflect each of the vertices in the x axis.

$(1, 1) \mapsto (1, -1)$
$(3, 2) \mapsto (3, -2)$
$(2, -1) \mapsto (2, 1)$
Now, we can plot these new points and join the points together with straight lines.