

Activity 30 Translations

1. The object is slid along. It can be described by a vector or as a slide of x units across and y units up.

2.

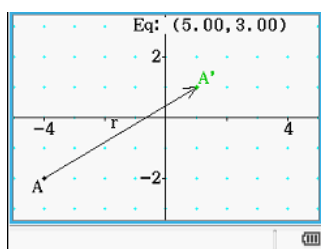
a)

$$\begin{aligned} \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} + \begin{bmatrix} a \\ b \end{bmatrix} &= \begin{bmatrix} x \\ y \end{bmatrix} + \begin{bmatrix} a \\ b \end{bmatrix} \\ &= \begin{bmatrix} x+a \\ y+b \end{bmatrix} \end{aligned}$$

b) Multiplying by the identity matrix leaves $\begin{bmatrix} x \\ y \end{bmatrix}$ unchanged.

c) a is the number of units across and b is the number of units up.

3.



4.

a) $\begin{bmatrix} 1 \\ -2 \end{bmatrix}$

b) $\begin{bmatrix} 5 \\ 1 \end{bmatrix}$

5. Many answers are possible. The sum of the vectors should be the same as overall translation.

a) E.g. $\begin{bmatrix} 2 \\ 21 \end{bmatrix}$ followed by $\begin{bmatrix} -2 \\ 0 \end{bmatrix}$

b) E.g. $\begin{bmatrix} 2a \\ a \end{bmatrix}$ and $\begin{bmatrix} -3b \\ b \end{bmatrix}$ or $\begin{bmatrix} 2a-3b \\ 0 \end{bmatrix}$ and $\begin{bmatrix} 0 \\ a+b \end{bmatrix}$

$\begin{bmatrix} a \\ a \end{bmatrix}$ and $\begin{bmatrix} a-b \\ a+b \end{bmatrix}$ and $\begin{bmatrix} -2b \\ b-a \end{bmatrix}$