**Translation**

This is the act of moving an object from one position to the next without turning. With a plane figure each point moves the same distance and in the same direction. All points undergo the same displacement.

**Image under a translation**

When the (object) point G $(x, y)$ undergoes a translation or displacement T=$\binom{x,}{y,}$ then it is mapped onto G'$(x', y')$ = G'$(x + x, \ , y + y, )$

**Translations as column vectors or matrices**

| G | | T | | G' |
|---|---|---|---|---|
| $\binom{x}{y}$ | + | $\binom{x,}{y,}$ | = | $\binom{x + x,}{y + y,}$ |
| Object | + | Translation | = | Image |
| matrix | | matrix | | matrix |

**And**

| T | | G' | | G |
|---|---|---|---|---|
| $\binom{x,}{y,}$ | = | $\binom{x + x,}{y + y,}$ | − | $\binom{x}{y}$ |
| Translation | = | Image | − | Object |
| matrix | | matrix | | matrix |

**Also**

G G' T

$$\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} x + x, \\ y + y, \end{pmatrix} - \begin{pmatrix} x, \\ y, \end{pmatrix}$$

Object = Image − Translation

matrix matrix matrix