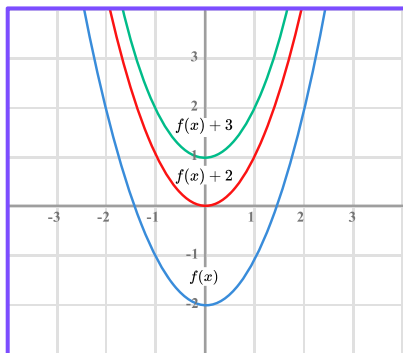


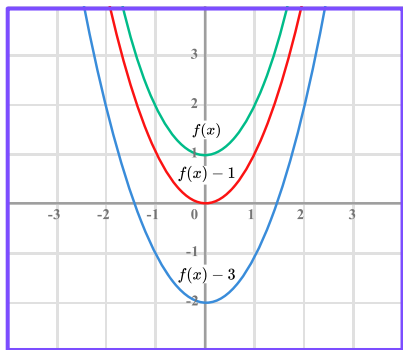
Graph Transformations - Translations

Vertical translations



$f(x) + a$
Translation by
vector $\begin{pmatrix} 0 \\ a \end{pmatrix}$ ↑

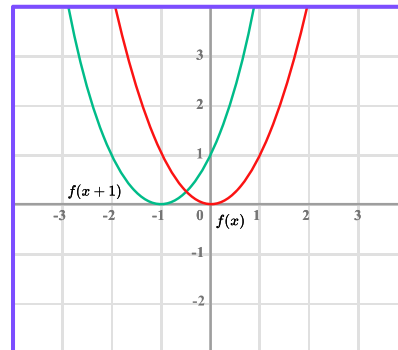
Add a to the y
coordinate



$f(x) - a$
Translation by
vector $\begin{pmatrix} 0 \\ -a \end{pmatrix}$ ↓

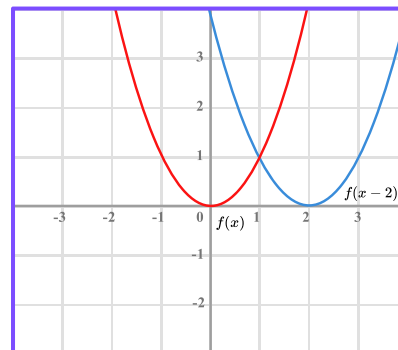
Subtract a from
the y coordinate

Horizontal translations



$f(x + a)$
Translation by
vector $\begin{pmatrix} -a \\ 0 \end{pmatrix}$ ←

Subtract a from
the x coordinate



$f(x - a)$
Translation by
vector $\begin{pmatrix} a \\ 0 \end{pmatrix}$ →

Add a to the
 x coordinate