

Summary of Transformations

Graph	Draw the graph of f(x) and:	Changes in f(x)
Vertical shift		
y = f(x) + c	Raise the graph of f(x) by c units	c is added to each y
y = f(x) - c	Lower the graph of f(x) by c units	coordinate of f(X)
		<i>c</i> is subtracted from each <i>y</i> coordinate of f(x)
Horizontal shift		
y = f(x + c)	Shift the graph f(x) to the left c units	c is subtracted from each x
y = f(x - c)	Shift the graph f(x) to the right c units	coordinate of f(x)
		c is added to each x
		coordinate of f(x)
Reflection about the x-axis	Reflect the graph of f(x) about the x-axis	Multiply each y coordinate
y = -f(x)		of f(x) by -1
Reflection about the y-axis	Reflect the graph of f(x) about the y-axis	Multiply each x coordinate
y = f(-x)		of f(x) by -1
Vertical stretching		
y = cf(x), c > 1	Vertically stretching the graph of f(x)	Multiply each y coordinates
		of $f(x)$ by $c, c > 1$
Vertical shrinking	Vertically shrinking the graph of f(x)	Multiply each y coordinates
y = cf(x), 0 < c < 1		of f(x) by <i>c</i> , 0 < c < 1
y = f(cx)		Divide each x coordinate of
$v = \frac{1}{1}$		t(x) by <i>c</i>
f(X)		Take the reciprocal of each
		y coordinate of f(x)