TRANSLATIONS For $c > 0$, the following translations shift the original graph $y = f(x)$ as indicated.

Translation	Shift	Example	Graph
$y = f(x) + c$		$y = x^2 + 2$	
$y = f(x) - c$		$y = x^2 - 3$	
$y = f(x - c)$		$y = (x - 4)^2$	
$y = f(x + c)$		$y = (x + 1)^2$	

Ex: Sketch $y = \sqrt{x + 2} + 3$

REFLECTIONS

$y = f(-x)$

$y = -f(x)$

$y = |f(x)|$

Ex: Sketch $y = |x^3 + 1|$

Ex: Sketch $y = \dfrac{-1}{x-1}$

DILATIONS For $c > 0$, the following dilations stretch or compress the original graph $y = f(x)$ as indicated.

$y = cf(x)$

For $c > 1$, _____ the graph of $y = f(x)$ _____ by a factor of c

For $0 < c < 1$, _____ the graph of $y = f(x)$ _____ by a factor of c

$y = f(cx)$

For $c > 1$, _____ the graph of $y = f(x)$ _____ by a factor of $\dfrac{1}{c} < 1$

For $0 < c < 1$, _____ the graph of $y = f(x)$ _____ by a factor of $\dfrac{1}{c} > 1$

Ex: Given the following graph of $y = f(x)$,

Sketch

(a). $y = 2f(x)$

(b). $y = \dfrac{1}{3}f(x)$

(c). $y = f(4x)$

(d). $y = f\left(\dfrac{1}{2}x\right)$