

## TRANSFORMATIONS OF THE PARENT FUNCTION $f(x)$

### SHIFT (TRANSLATION)

$f(x + c)$	$c > 0$	horizontal shift left by $c$ units.
$f(x - c)$	$c > 0$	horizontal shift right by $c$ units.
$f(x) + c$	$c > 0$	vertical shift up by $c$ units.
$f(x) - c$	$c > 0$	vertical shift down by $c$ units.

### REFLECTION

$f(-x)$		reflection about the $y$ -axis.
$-f(x)$		reflection about the $xa$ -axis.

### STRETCH/SHRINK (DILATION)

$f(cx)$	$0 < c < 1$	horizontal stretch
$f(cx)$	$c > 1$	horizontal shrink
$cf(x)$	$0 < c < 1$	vertical shrink
$cf(x)$	$c > 1$	vertical stretch