

## 1.6 Graphical Transformations

Target 1D: Rigid and non-rigid transformations of parent functions (focus on quadratic, cubic, square root, and absolute value functions)

In your Laptop, open the file: 1.6.1 Graphical Transformations Sliders Activity  
Change the sliders on each page to fill in the information below.

### Vertical/Horizontal Translations

General Form	Translation Direction	Sample Function
$y = f(x) + k$	<u>up</u> $k$ units	$y = x^2 + 3$
$y = f(x) - k$	<u>down</u> $k$ units	$y =  x  - 2$
$y = f(x + h)$	<u>left</u> $h$ units	$y = \sqrt{x+2}$
$y = f(x - h)$	<u>right</u> $h$ units	$y = e^{x-3}$

### Vertical/Horizontal Stretches and Shrinks (Dilations)

General Form	Dilation Description	Sample Function
$y = af(x)$	if $a > 1$ , vertical <u>stretch</u> by a factor of $a$	$y = 5\sqrt{x}$
	if $0 < a < 1$ , vertical <u>shrink</u> by a factor of $a$ .	$y = \frac{1}{5}\sin x$
$y = f(ax)$	if $0 < a < 1$ , horizontal <u>stretch</u> by a factor of $\frac{1}{a}$ .	$y = \cos(\frac{1}{2}x)$
	if $a > 1$ , horizontal <u>shrink</u> by a factor of $\frac{1}{a}$ .	$y = (4x)^3$

### Reflections

General Form	Reflection Description	Sample Function
$y = -f(x)$	across the $x$ -axis	$y = -\ln x$
$y = f(-x)$	across the $y$ -axis	$y = e^{-x}$

**More Practice**

**Graphical Transformations**

<http://www.regentsprep.org/regents/math/algtrig/atp9/funclesson1.htm>

<https://www.mathsisfun.com/sets/function-transformations.html>

<https://www.khanacademy.org/math/algebra2/manipulating-functions/stretching-functions/v/shifting-and-reflecting-functions>

[https://academics.utep.edu/Portals/1788/CALCULUS%20MATERIAL/1\\_7%20TRANSFORMATION%20OF%20FNS.pdf](https://academics.utep.edu/Portals/1788/CALCULUS%20MATERIAL/1_7%20TRANSFORMATION%20OF%20FNS.pdf)

<https://www.youtube.com/watch?v=0a-AjP4UdnY>

<https://www.youtube.com/watch?v=3Q5Sy034fok>

**Homework Assignment**

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