Transformations Summary Worksheet

The following is a list of functions and their respective **transformation** of the graph of a function $f(x)$ (assume $k > 0$). For each example, use $f(x) = \sqrt{x}$ to help sketch the graph of the given example. Then identify the domain, range, and any intercepts.

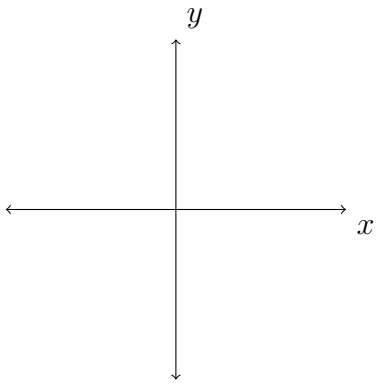
$f(x) = \sqrt{x}$

Domain: $x \geq 0$ or $[0, \infty)$

Range: $y \geq 0$ or $[0, \infty)$

$x-$intercept at $(0, 0)$

$y-$intercept at $(0, 0)$



Function	Transformation	Example	Graph
$-f(x)$	Reflection about the $x-$axis $(y = 0)$	$-\sqrt{x}$	
$f(-x)$	Reflection about the $y-$axis $(x = 0)$	$\sqrt{-x}$	

Function	Transformation	Example	Graph
$f(x)+k$	Vertical shift up k units	$\sqrt{x}+3$	
$f(x)-k$	Vertical shift down k units	$\sqrt{x}-3$	

Function	Transformation	Example	Graph
$f(x-k)$	Horizontal shift right k units	$\sqrt{x-3}$	
$f(x+k)$	Horizontal shift left k units	$\sqrt{x+3}$	

Function	Transformation	Example	Graph
$kf(x)$, $k > 1$	Vertical stretch by a factor of k	$3\sqrt{x}$	
$kf(x)$, $0 < k < 1$	Vertical shrink by a factor of $\frac{1}{k}$	$\frac{\sqrt{x}}{3}$	

Function	Transformation	Example	Graph
$f(kx)$, $k > 1$	Horizontal shrink by a factor of k	$\sqrt{3x}$	
$f\left(kx\right)$, $0 < k < 1$	Horizontal stretch by a factor of $\frac{1}{k}$	$\sqrt{\frac{x}{3}}$	