

Parent Functions & Transformations

Example Parent: $y = \sqrt{x}$	Transformation	Effect on (x,y)
$y = -\sqrt{x}$	Reflect about x -axis Upside down	Reverse sign of y
$y = \sqrt{-x}$	Reflect about y -axis Mirror image	Reverse sign of x
$y = \sqrt{x} + 3$ $y = \sqrt{x} - 3$	Vertical Shift Up Vertical Shift Down	Add or subtract the number from y
$y = \sqrt{x+3}$ $y = \sqrt{x-3}$	Horizontal Shift Left Horizontal Shift Right	Add (right) or subtract (left) the number from x
$y = 3\sqrt{x}$ $y = \frac{1}{3}\sqrt{x}$	Vertical Stretch Vertical Shrink	Multiply y by the number
$y = \sqrt{3x}$ $y = \sqrt{\frac{1}{3}x}$	Horizontal Shrink Horizontal Stretch	Divide x by the number

Notes

- ▶ You should apply these transformations left-to-right:
 - ▶ Flip around x -axis (if any), vertical shrink/stretch, flip around y -axis (if any), horizontal shrink/stretch, shift x , shift y .