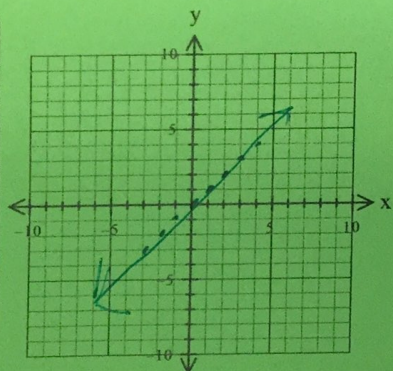


## Parent Functions #1

Name of Graph: linear

Equation:  $y=x$      $f(x)=x$

x	f(x)
-2	-2
-1	-1
0	0
1	1
2	2



### Key Features

Domain:  $(-\infty, \infty)$

Range:  $(-\infty, \infty)$

x-intercept(s):  $(0, 0)$

y-intercept:  $(0, 0)$

Increasing:  $(-\infty, \infty)$

Decreasing: N/A

Constant: N/A

Positive:  $(0, \infty)$

Negative:  $(-\infty, 0)$

Maximums / Minimums: N/A

Symmetry: odd

End Behavior:

$$\lim_{x \rightarrow -\infty} f(x) = -\infty$$

$$\lim_{x \rightarrow \infty} f(x) = \infty$$

Slope Formula:  $\frac{y_2 - y_1}{x_2 - x_1}$

Slope-Intercept Form:  $y = mx + b$

Transformation general equation:

Midpoint Formula:  $\left( \frac{x_2 + x_1}{2}, \frac{y_2 + y_1}{2} \right)$

Point-Slope Form:

$$y_1 - y = m(x_1 - x)$$

Distance Formula:

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

Standard Form:

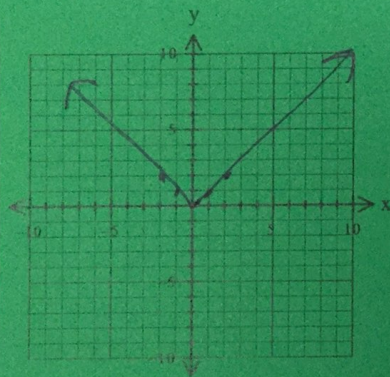
$$Ax + By = C$$

## Parent Functions #2

Name of Graph: absolute value

Equation:  $y = |x|$   $f(x) = |x|$

x	f(x)
-2	2
-1	1
0	0
1	1
2	2



### Key Features

Domain:  $(-\infty, \infty)$

Range:  $[0, \infty)$

x-intercept(s):  $(0, 0)$

y-intercept:  $(0, 0)$

Increasing:  $(0, \infty)$

Decreasing:  $(-\infty, 0)$

Constant: N/A

Positive:  $(-\infty, 0) \cup (0, \infty)$

Negative: N/A

Maximums / Minimums: 0

Symmetry: even

End Behavior:

$$\lim_{x \rightarrow -\infty} f(x) = \infty$$

$$\lim_{x \rightarrow \infty} f(x) = \infty$$

Vertex:  $(0, 0)$

where graph changes  
directions

Transformation general equation:

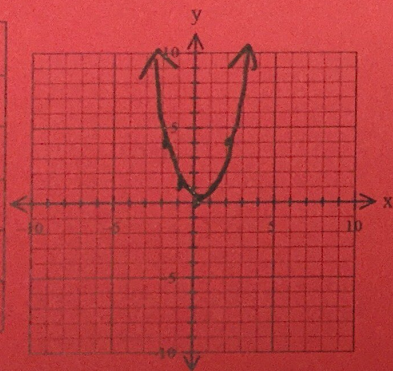


Parent Function #3

Name of Graph: quadratic

Equation:  $y = x^2$   $f(x) = x^2$

x	f(x)
-2	4
-1	1
0	0
1	1
2	4



Key Features

Domain:  $(-\infty, \infty)$

Range:  $[0, \infty)$

x-intercept(s):  $(0, 0)$

y-intercept:  $(0, 0)$

Increasing:  $(0, \infty)$

Decreasing:  $(-\infty, 0)$

Constant:  $N/A$

Positive:  $(-\infty, 0) \cup (0, \infty)$

Negative:  $N/A$

Maximums / Minimums: 0

Symmetry: even

End Behavior:

$$\lim_{x \rightarrow -\infty} f(x) = \infty$$

$$\lim_{x \rightarrow \infty} f(x) = \infty$$

Shape of Graph: parabola

Vertex:  $(0, 0)$

Standard form:  $ax^2 + bx + c = y$

Inverse function: square root

Transformation general equation:

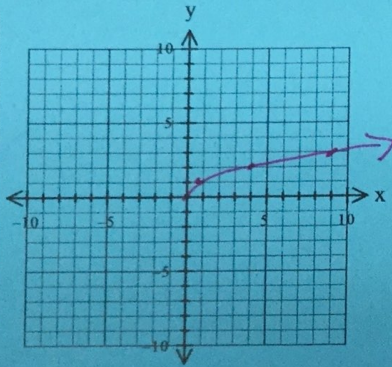
Vertex form:  $y = a(x-h)^2 + k$

### Parent Functions #4

Name of Graph: square root

Equation:  $y = \sqrt{x}$   $f(x) = \sqrt{x}$

x	f(x)
0	0
1	1
4	2
9	3
16	4



### Key Features

Domain:  $[0, \infty)$

Range:  $[0, \infty)$

x-intercept(s):  $(0, 0)$

y-intercept:  $(0, 0)$

Increasing:  $(0, \infty)$

Decreasing: *N/A*

Constant: *N/A*

Endpoint:  $(0, 0)$

Positive:  $(0, \infty)$

Negative: *N/A*

Maximums / Minimums : 0

Symmetry: *N/A*

End Behavior:

$$\lim_{x \rightarrow -\infty} f(x) = \text{N/A}$$

$$\lim_{x \rightarrow \infty} f(x) = \infty$$

Steps to find domain algebraically:

*ex. square root*  $\geq 0$  + solve  
 $f(x) = \sqrt{3x-1} + 8$      $3x-1 \geq 0$      $3x > 1$      $x > \frac{1}{3}$

Transformation general equation:

$[\frac{1}{3}, \infty)$

Inverse Function:

*quadratic*

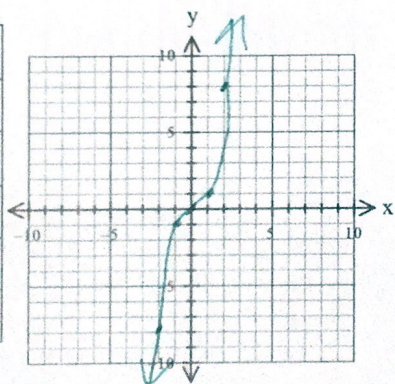


Parent Functions #5

Name of Graph: Cubic

Equation:  $y = x^3$   $f(x) = x^3$

x	f(x)
-2	-8
-1	-1
0	0
1	1
2	8



Key Features

Domain:  $(-\infty, \infty)$

Range:  $(-\infty, \infty)$

x-intercept(s):  $(0, 0)$

y-intercept:  $(0, 0)$

Increasing:  $(-\infty, \infty)$

Decreasing: N/A

Constant: N/A

Positive:  $(0, \infty)$

Negative:  $(-\infty, 0)$

Maximums / Minimums N/A

Symmetry: odd

End Behavior:

$$\lim_{x \rightarrow -\infty} f(x) = -\infty$$

$$\lim_{x \rightarrow \infty} f(x) = \infty$$

Transformation general equation:

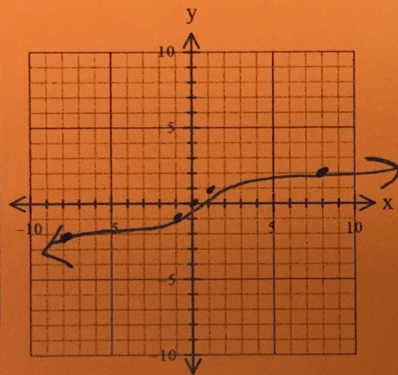
Inverse function: Cube root

Parent Functions #6

Name of Graph: cube root

Equation:  $y = \sqrt[3]{x}$  or  $f(x) = \sqrt[3]{x}$

x	f(x)
-8	-2
-1	-1
0	0
1	1
8	2



**Key Features**

Domain:  $(-\infty, \infty)$

Range:  $(-\infty, \infty)$

x-intercept(s):  $(0, 0)$

y-intercept:  $(0, 0)$

Increasing:  $(-\infty, \infty)$

Decreasing: N/A

Constant: N/A

Positive:  $(0, \infty)$

Negative:  ~~$(-\infty, 0)$~~   $(-\infty, 0)$

Maximums / Minimums N/A

Symmetry: odd

End Behavior:

$$\lim_{x \rightarrow -\infty} f(x) = -\infty$$

$$\lim_{x \rightarrow \infty} f(x) = \infty$$

Transformation general equation:

Inverse Function: cube

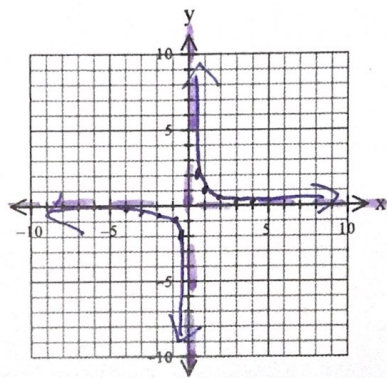
$$y = x^3$$

### Parent Functions #7

Name of Graph: rational or reciprocal **Key Features**

Equation:  $y = \frac{1}{x}$   $f(x) = \frac{1}{x}$

x	f(x)
-4	-1/4
-3	-1/3
-2	-1/2
-1	-1
0	undef
1	1
2	1/2
3	1/3
4	1/4



Vertical Asymptote:  $x = 0$

Horizontal Asymptote:  $y = 0$

Domain:  $(-\infty, 0) \cup (0, \infty)$  Positive:  $(0, \infty)$

Range:  $(-\infty, 0) \cup (0, \infty)$  Negative:  $(-\infty, 0)$

x-intercept(s): N/A Maximums / Minimums N/A

y-intercept: N/A Symmetry: odd

Increasing: N/A End Behavior:

Decreasing:  $(-\infty, 0) \cup (0, \infty)$   $\lim_{x \rightarrow -\infty} f(x) = 0$

Constant: N/A  $\lim_{x \rightarrow \infty} f(x) = 0$

$\lim_{x \rightarrow 0^-} f(x) = -\infty$

$\lim_{x \rightarrow 0^+} f(x) = \infty$