

Your Name

Mrs. Theo

3/28/22

Notes

1.1 and 5.3

Square Root and Cubic Root Functions

Function	Parent Function	Graph	Table	Effects of Parameter a	Effects of Parameter h	Effects of Parameter k
Constant	$y = k$		x y	N/A	N/A	$y = 3$ $y = -5$
Linear	$y = x$ $y = a(x-h) + k$ $mx + b$		x y	$y = 0.5x$	N/A	$y = x + 6$
Absolute Value	$y = x $ $y = a(x-h) + k$		x y	$y = 0.5 x $	$y = x - 3 $	$y = x - 3$
Quadratic	$y = x^2$ $y = a(x-h)^2 + k$		x y	$y = 0.5x^2$	$y = (x - 3)^2$	$y = x^2 - 3$
Square Root	$y = \sqrt{x}$ $y = a\sqrt{x-h} + k$		x y	$y = \sqrt{-1x}$	$y = \sqrt{x - .2}$	$y = \sqrt{x} - .2$
Cubic	$y = x^3$ $y = a(x-h)^3 + k$		x y	$y = 3x^3$	$y = (x+3)^3$	$y = x^3 + 3$
Cubic Root	$y = \sqrt[3]{x}$ $y = a\sqrt[3]{x-h} + k$		x y	$y = \sqrt[3]{-1x}$	$y = \sqrt[3]{x - .2}$	$y = \sqrt[3]{x} - .2$
Exponential			x y	$y = -1(3)^x$	$y = 3^{x-1}$	$y = 3^x - 1$

Square Root Function

$f(x) = \sqrt{x}$ or $x^{1/2}$

x-intercept: $(0,0)$ where crosses x-axis $y=0$
 y-intercept: $(0,0)$ where cross y-axis $x=0$
 Extremes: absolute min at $(0,0)$

Domain: $\{x | 0 \leq x < \infty\}$ $[0, \infty)$
 all x values
 Range: $\{y | 0 \leq y < \infty\}$ $[0, \infty)$
 all y values
 Interval positive: $\{x | 0 < x < \infty\}$ $(0, \infty)$
 x values where y is positive
 Interval negative: None

Increasing or Decreasing? $\{x | 0 < x < \infty\}$ $(0, \infty)$
 from left to right

Cubic Root Function

$f(x) = \sqrt[3]{x}$ or $x^{1/3}$

x-intercept: $(0,0)$ $(0)^3 = \sqrt[3]{0}$
 y-intercept: $(0,0)$ $0 = \sqrt[3]{0}$
 Extremes: None

Domain: $\{x | -\infty < x < \infty\}$ $(-\infty, \infty)$
 all x values
 Range: $\{y | -\infty < y < \infty\}$ $(-\infty, \infty)$
 all y values
 Interval positive: $\{x | 0 < x < \infty\}$ $(0, \infty)$
 Interval negative: $\{x | -\infty < x < 0\}$ $(-\infty, 0)$

Increasing or Decreasing? $\{x | -\infty < x < \infty\}$ $(-\infty, \infty)$

<p>$f(x) = \sqrt{x-4} + 3$</p> <p>x-intercept: None y-intercept: None Extremes: abs. min at $(4,3)$ Domain: $x \in [4, \infty)$ Range: $y \in [3, \infty)$ Increasing or Decreasing? $x \in [4, \infty)$ Interval positive: $x \in [4, \infty)$ Interval negative: None</p> <p>Circle the transformation from the parent Function Left or Right: (4) Up or Down: (3) Vert. Refl or Horiz. Refl: None</p> <p>$f(x) = \sqrt[3]{-3x} + 1$</p> <p>x-intercept: $(\frac{1}{3}, 0)$ y-intercept: None Extremes: None Domain: $x \in (-\infty, \infty)$ Range: $y \in (-\infty, \infty)$ Increasing or Decreasing? $x \in (-\infty, \infty)$ Interval positive: None Interval negative: $x \in (-\infty, \infty)$</p> <p>Circle the transformation from the parent Function Left or Right: Up or Down: Vert. Refl or Horiz. Refl:</p>	<p>$f(x) = \sqrt{x}$</p> <p>x-intercept: $(-2, 0)$ y-intercept: $(0, -1)$ Extremes: abs. max at $(-2, 0)$ Domain: $x \in [-2, \infty)$ Range: $y \in (-\infty, 0]$ Increasing or Decreasing? Dec. $x \in [-2, \infty)$ Interval positive: None Interval negative: $x \in [-2, \infty)$</p> <p>Circle the transformation from the parent Function Left or Right: (2) Up or Down: Vert. Refl or Horiz. Refl:</p>	<p>$f(x) = -\sqrt[3]{x-2} + 0$</p> <p>x-intercept: $(2, 0)$ y-intercept: $(0, -1)$ Extremes: None Domain: $x \in [2, \infty)$ Range: $y \in (-\infty, 0]$ Increasing or Decreasing? Dec. $x \in [2, \infty)$ Interval positive: None Interval negative: $x \in [2, \infty)$</p> <p>Circle the transformation from the parent Function Left or Right: Up or Down: Vert. Refl or Horiz. Refl:</p>
--	--	--

Key

Square Root and Cubic Root Key Features Homework Header:

$f(x) = \sqrt{x-4} + 3$

x-intercept: None
y-intercept: $(0, 2c+3)$
Extrema: abs min $(4, 3)$

Domain: $x \in [4, \infty)$
Range: $y \in [3, \infty)$
Increasing or Decreasing? $x \in [4, \infty)$

Interval positive: $x \in [4, \infty)$
Interval negative: None

Circle the transformation from the parent Function
Left or Right: (4) Up or Down: (3) Vert. Refl or Horiz. Refl: None

X	Y
0	2c+3
4	3
5	4
8	5

$f(x) = \sqrt[3]{-3x} + 1$

x-intercept: $(\frac{1}{3}, 0)$
y-intercept: $(0, 1)$
Extrema: None

Domain: $x \in (-\infty, \infty)$
Range: $y \in (-\infty, \infty)$
Increasing or Decreasing? $x \in (-\infty, \infty)$

Interval positive: $x \in (-\infty, \frac{1}{3})$
Interval negative: $x \in (\frac{1}{3}, \infty)$

Circle the transformation from the parent Function
Left or Right: (1/3) Up or Down: (1) Vert. Refl or Horiz. Refl: None

X	Y
0	2c+3
4	3
5	4
8	5

Square Root and Cubic Root Key Features Homework Header:

$f(x) = -\sqrt{x+2}$

x-intercept: $(-2, 0)$
y-intercept: $(0, -1.647)$
Extrema: abs max $(-2, 0)$

Domain: $x \in [-2, \infty)$
Range: $y \in (-\infty, 0]$
Increasing or Decreasing? $x \in [-2, \infty)$

Interval positive: None
Interval negative: $x \in (-2, \infty)$

Circle the transformation from the parent Function
Left or Right: (2) Up or Down: (None) Vert. Refl or Horiz. Refl: None

X	Y
-2	0
-1	-1
0	-1.647
2	-2
7	-3

$0 = \sqrt{2x+2} - \sqrt{x+4}$

x-intercept: $(2, 0)$
y-intercept: $(0, -0.816)$
Extrema: abs max $(-1, 1.732)$

Domain: $x \in [1, \infty)$
Range: $y \in [-1.732, \infty)$
Increasing or Decreasing? $x \in [1, \infty)$

Interval positive: $x \in (2, \infty)$
Interval negative: $x \in [1, 2)$

Solutions: $x = 2$

$0 = \sqrt{9-x^2}$

x-intercept: $(-3, 0)$
y-intercept: $(0, 3)$
Extrema: abs Max $(0, 3)$, abs Min $(-3, 0)$

Domain: $x \in [-3, 3]$
Range: $y \in [0, 3]$
Increasing or Decreasing? Inc. $x \in (-3, 0)$, Dec. $x \in (0, 3)$

Interval positive: $x \in (-3, 0)$
Interval negative: $x \in (0, 3)$

Solutions: $x = -3$ and $x = 3$

$f(x) = 2\sqrt{x-5} - 4$

x-intercept: $(13, 0)$
y-intercept: None
Extrema: None

Domain: $x \in (5, \infty)$
Range: $y \in (-\infty, \infty)$
Increasing or Decreasing? $x \in (5, \infty)$

Interval positive: $x \in (13, \infty)$
Interval negative: $x \in (5, 13)$

Circle the transformation from the parent Function
Left or Right: (5) Up or Down: (4) Vert. Refl or Horiz. Refl: None

X	Y
0	2c+3
4	3
5	4
8	5

$0 = \sqrt{3x^2+1}$

x-intercept: $(2, 0)$
y-intercept: $(0, 1)$
Extrema: abs max $(-1.75, 2.25)$

Domain: $x \in (-\infty, \infty)$
Range: $y \in (0, 2.25]$
Increasing or Decreasing? Inc. $x \in (-\infty, -1.75)$, Dec. $x \in (-1.75, \infty)$

Interval positive: $x \in (-\infty, 2)$
Interval negative: $x \in (2, \infty)$

Solutions: $x = 2$

$f(x) = \sqrt[3]{-3x} + 1$

x-intercept: $(-\frac{1}{3}, 0)$
y-intercept: $(0, 1)$
Extrema: None

Domain: $x \in (-\infty, \infty)$
Range: $y \in (-\infty, \infty)$
Increasing or Decreasing? $x \in (-\infty, \infty)$

Interval positive: $x \in (-\infty, -\frac{1}{3})$
Interval negative: $x \in (-\frac{1}{3}, \infty)$

Circle the transformation from the parent Function
Left or Right: (1/3) Up or Down: (1) Vert. Refl or Horiz. Refl: None

X	Y
0	2c+3
4	3
5	4
8	5

$f(x) = 2\sqrt{x-5} - 4$

x-intercept: $(13, 0)$
y-intercept: None
Extrema: None

Domain: $x \in (5, \infty)$
Range: $y \in (-\infty, \infty)$
Increasing or Decreasing? $x \in (5, \infty)$

Interval positive: $x \in (13, \infty)$
Interval negative: $x \in (5, 13)$

Circle the transformation from the parent Function
Left or Right: (5) Up or Down: (4) Vert. Refl or Horiz. Refl: None

X	Y
0	2c+3
4	3
5	4
8	5

x.int $0 = \sqrt[3]{3x} + 1$
 $-1 = \sqrt[3]{3x}$
 $(-1)^3 = (\sqrt[3]{3x})^3$
 $-1 = 3x$
 $-1 = -3x \Rightarrow \frac{1}{3} = x$

j.int $y = 2\sqrt{x-5} - 4$
 $y = -7.414$