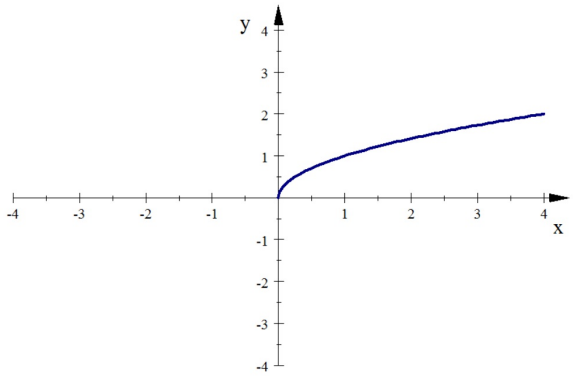
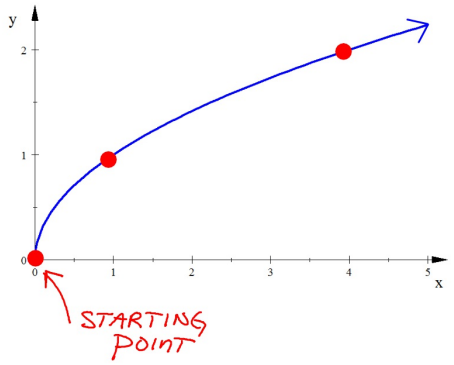
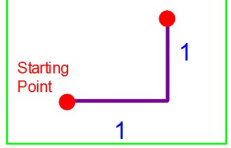
Parent Square Root Function: $y = \sqrt{x}$



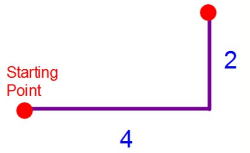
$y = \sqrt{x}$



First "Good Point"



Second "Good Point"



$y = a\sqrt{x-h}+k$

h: Horizontal Translation

k: Vertical Translation

a: a>1 Vertical Stretch

0<a<1 Vertical Shrink

a is neg: x-axis reflection (upside down)

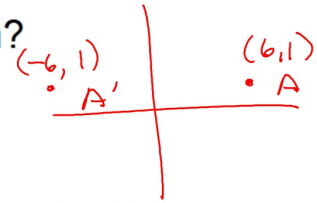
The "vertex"

(h,k)

The new starting point
or
The new origin

Since $y = \sqrt{x}$ isn't symmetric about the y-axis you can make it backwards.

How do you do a y-axis reflection?



$y = \sqrt{-x}$

Make x the opposite and it will be reflected over the y-axis

Write the equation of the parent square root function after a y-axis reflection and moving it 3 left.

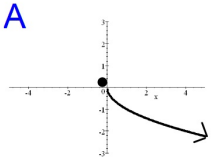
Test your equation by graphing it.

When you have both a Horizontal Translation and a y-axis reflection you must use PARENTHESES to separate the two transformations

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

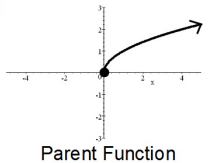
The shapes of the square root function:

A



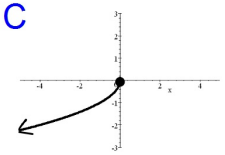
x-axis reflection

B



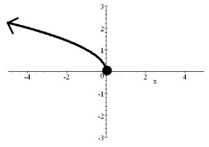
Parent Function

C



x & y axis reflection

D



y-axis reflection

Match the graphs with the equations

1. $y = -\sqrt{-x}$ C
2. $y = \sqrt{x}$ B
3. $y = -\sqrt{x}$ A
4. $y = \sqrt{-x}$ D

Graph this square root function using three points.

$y = 2\sqrt{x+3} - 5$

2x taller

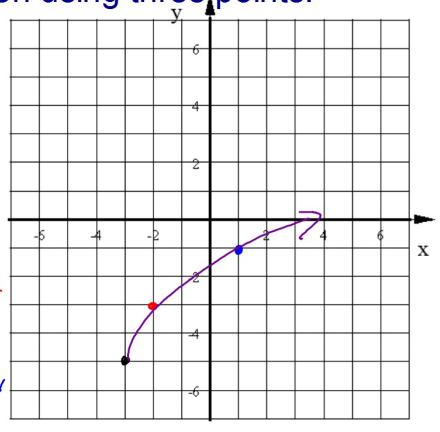
3 left

5 down

Starting Point: (-3, -5)

1ST GOOD PT: 1 → 1x2=2

2nd Good PT: 4 → 2x2=4



Graph this square root function

$y = -3\sqrt{x-1} + 3$

upside down

3x taller

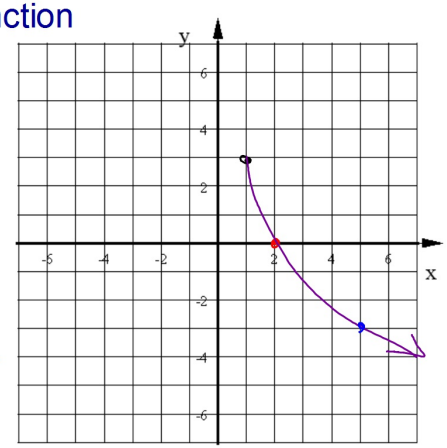
1 RT

3 up

starting point (1, 3)

1 PT: 1 → 1, -3

2 PT: 4 → 2, -6



Graph this square root function

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

2 DOWN

5 RT

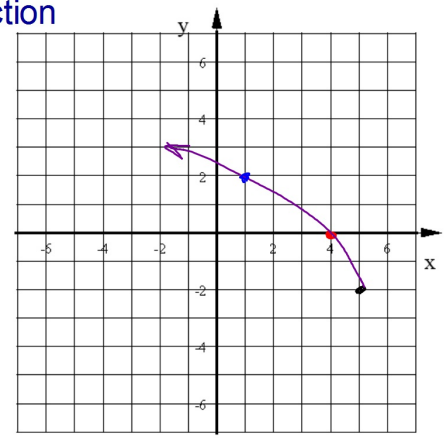
2x taller

STARTING PT

(5, -2)

1ST PT = ↓1 → 2

2nd PT = → 4 ↓4



Graph this square root function

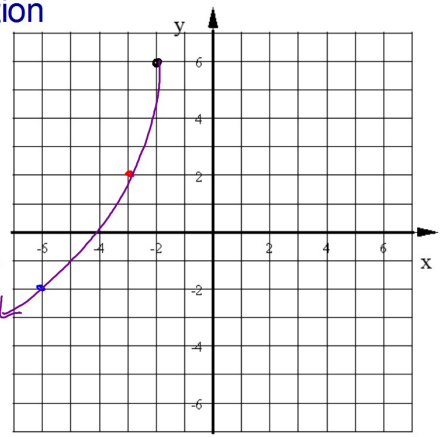
$y = -4\sqrt{-(x+2)} + 6$

4x taller

ST. POINT (-2, 6)

1ST PT ↓1 → -4

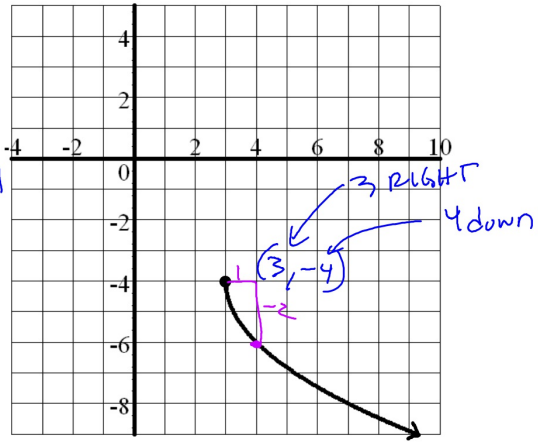
2ND PT → 4 ↓4



Write the equation of this function

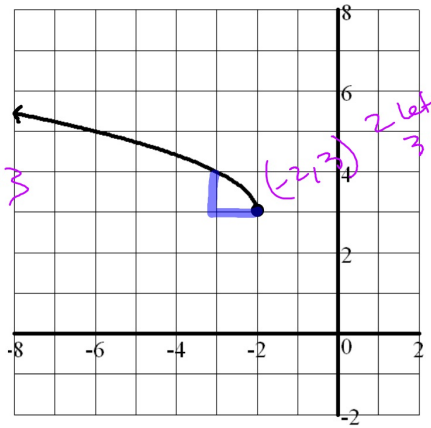
$y = -2\sqrt{x-3} - 4$

↓1 became ↓-2

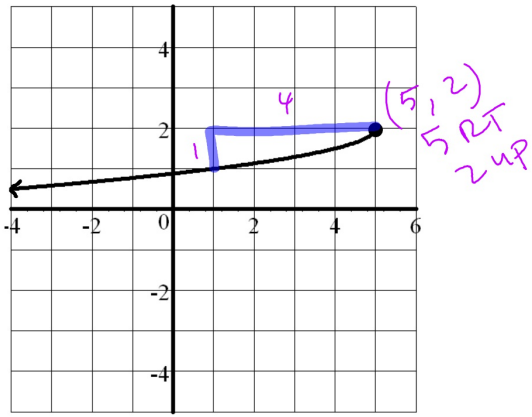


Write the equation function

$y = \sqrt{-(x+2)} + 3$

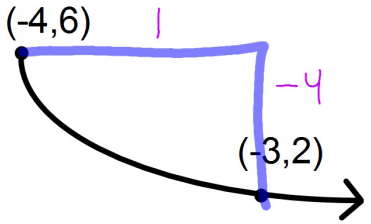


Write the equation function

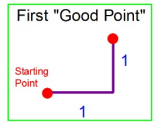


$y = -\frac{1}{2}\sqrt{-(x-5)} + 2$

Write the equation of this function



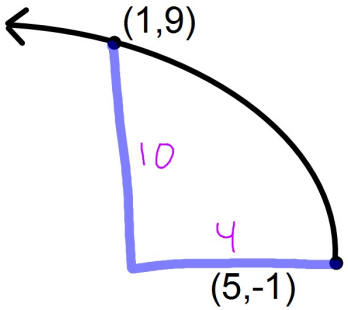
Parent Function:



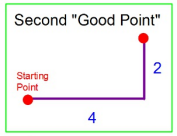
This Function:

$y = -4\sqrt{x+4} + 6$

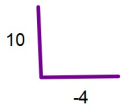
Write the equation of this function



Parent Function:



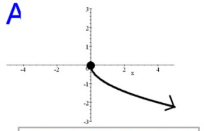
This Function:



$y = 5\sqrt{-(x-5)} - 1$

Domain and Range of Square Root Functions:

A

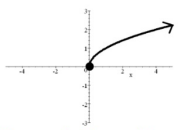


x-axis Reflection

Domain: $x \geq 0$

Range: $y \leq 0$

B

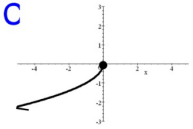


Parent Function

Domain: $x \geq 0$

Range: $y \geq 0$

C

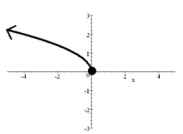


x & y axis Reflection

Domain: $x \leq 0$

Range: $y \leq 0$

D



y-axis Reflection

Domain: $x \leq 0$

Range: $y \geq 0$

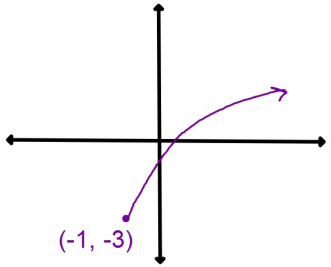
Find the Domain and Range of each.

1. $y = 2\sqrt{x+1} - 3$

1 left 3 down

No Reflection

If you can make a sketch of the graph you can use it to find the Domain and Range:



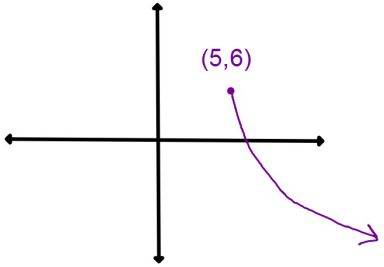
Domain: $x \geq -1$

Range: $y \geq -3$

2. $y = -4\sqrt{x-5} + 6$

5 right 6 up

x-axis reflection



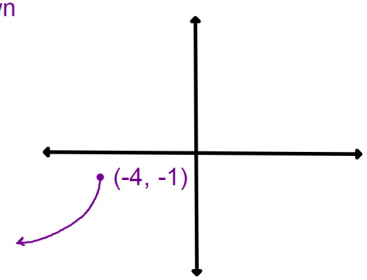
Domain: $x \geq 5$

Range: $y \leq 6$

3. $y = -\sqrt{-(x+4)} - 1$

4 left 1 down

x & y-axis reflections



Domain: $x \leq -4$

Range: $y \leq -1$

Finding Domain and Range algebraically.

1. $y = 2\sqrt{x+1} - 3$

Domain: Since we are not dealing with imaginary numbers, the radicand can't be negative.

To find the domain we write: Radicand ≥ 0 then solve for x

$x + 1 \geq 0$
$-1 \quad -1$

$x \geq -1$

Range: To find the range make a table and input several values for x using the domain from above starting with -1. This result will tell you what the range is.

x	y
-1	-3
0	-1

This indicates that the range starts at -3 and INCREASES after that.

$y \geq -3$