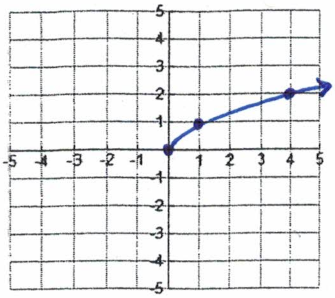
-Graphing Radical (Square Root) Functions Using Transformations

Characteristics of Parent Radical (Sq Root) Function

Parent Function of a Square Root: $y = \sqrt{x}$ $x \geq 0$



x	y
0	0
1	1
4	2

$y = a\sqrt{x \pm c} \pm d$

- Starting Point: (0,0) (c,d) starting point
  take opposite of what is under √
- Domain: [0, ∞)
- Range: [0, ∞)

Transformation # 1 – Vertical Translations

If have $y = \sqrt{x} \pm d$ then you can have ..."Changes Y"

- + d which means translates UP d units
- – d which means translates down d units

Transformation # 2 – Horizontal Translations

If have $y = \sqrt{x \pm c}$ then you can have ..."Changes X"

- + c which means translates LEFT c units
- – c which means translates RIGHT c units

Transformation # 3 – Reflection

If have $y = -\sqrt{x}$ then you have...

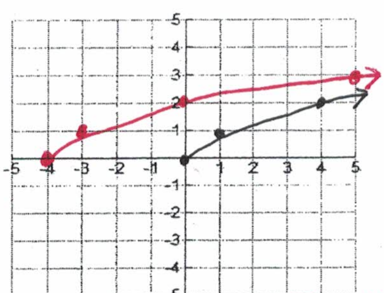
a Reflects over x-axis causing function to flip down

Example 1: Do the following – a.) Draw in the original and transformed square root function.
b.) State the domain and range of the transformed function.

Parent function: $y = \sqrt{x}$

a.) Given Function: $y = \sqrt{x+4}$ c

Transformations: left 4 units

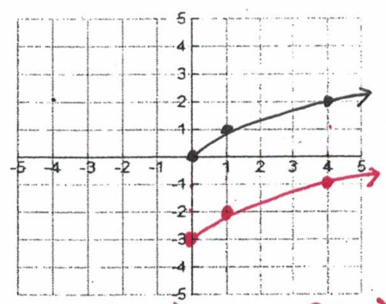


Domain: [-4, ∞) Range: [0, ∞)

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

b.) Given Function: $y = \sqrt{x} - 3$ d

Transformations: Down 3 units



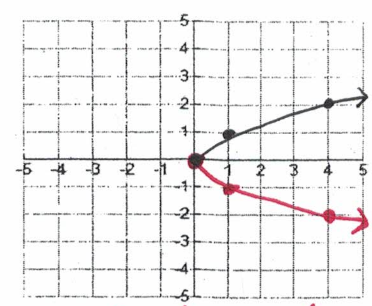
Domain: [0, ∞) Range: [-3, ∞)

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

a

c.) Given Function: $y = -\sqrt{x}$

Transformations: reflects x-axis

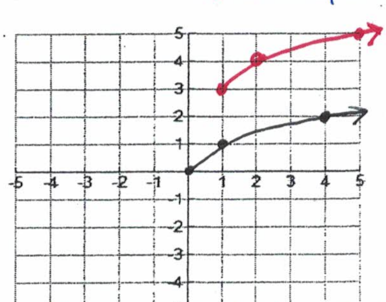


Domain: [0, ∞) Range: (-∞, 0]

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

d.) Given Function: $y = \sqrt{x-1} + 3$

Transformations: Right 1 unit Up 3 units

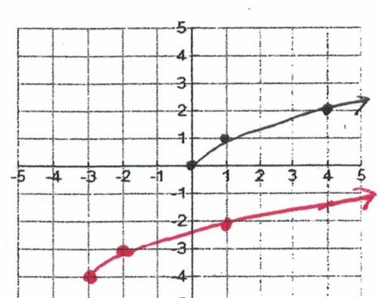


Domain: [1, ∞) Range: [3, ∞)

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

e.) Given Function: $y = \sqrt{x+3} - 4$

Transformations: Left 3 units Down 4 units

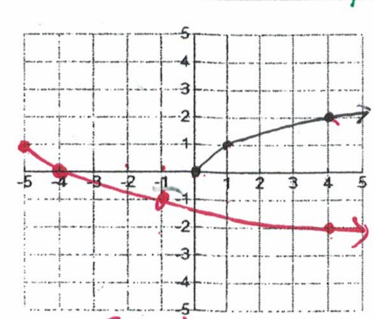


Domain: [-3, ∞) Range: [-4, ∞)

Parent Function $y = \sqrt{x}$

f.) Given Function: $y = -\sqrt{x+5} + 1$

Transformations: Reflect x-axis, left 5, Up 1



Domain: [-5, ∞) Range: (-∞, 1]