Transformations of Functions

Viviana C. Castellón

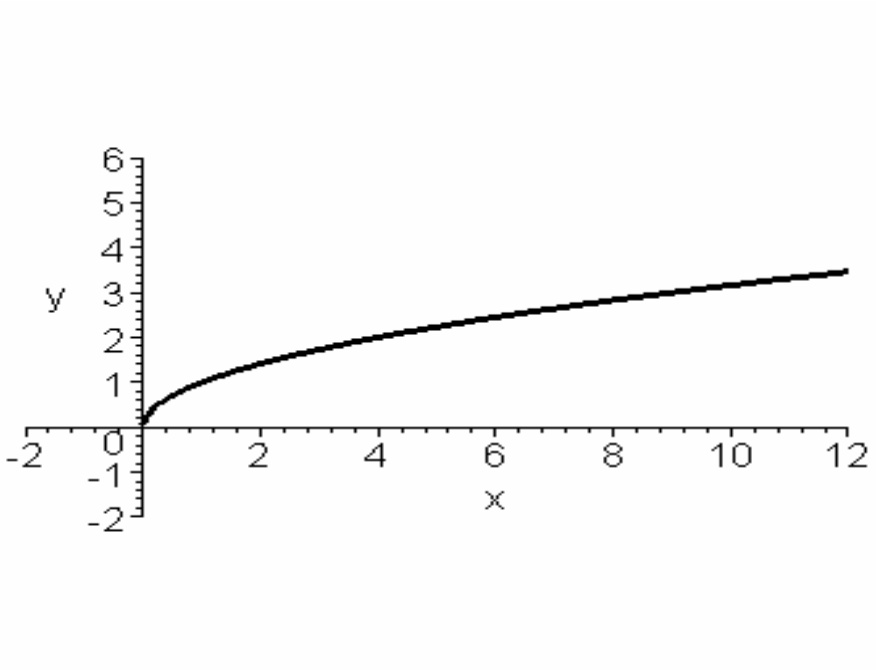
East Los Angeles College

MEnTe

Mathematics Enrichment through Technology

Graphing

$$y = \sqrt{x}$$



Given the following function,

$$y = \sqrt{x} + a$$

If: a > 0, then shift the graph "a" units up

If: a<0, then shift the graph "a" units down

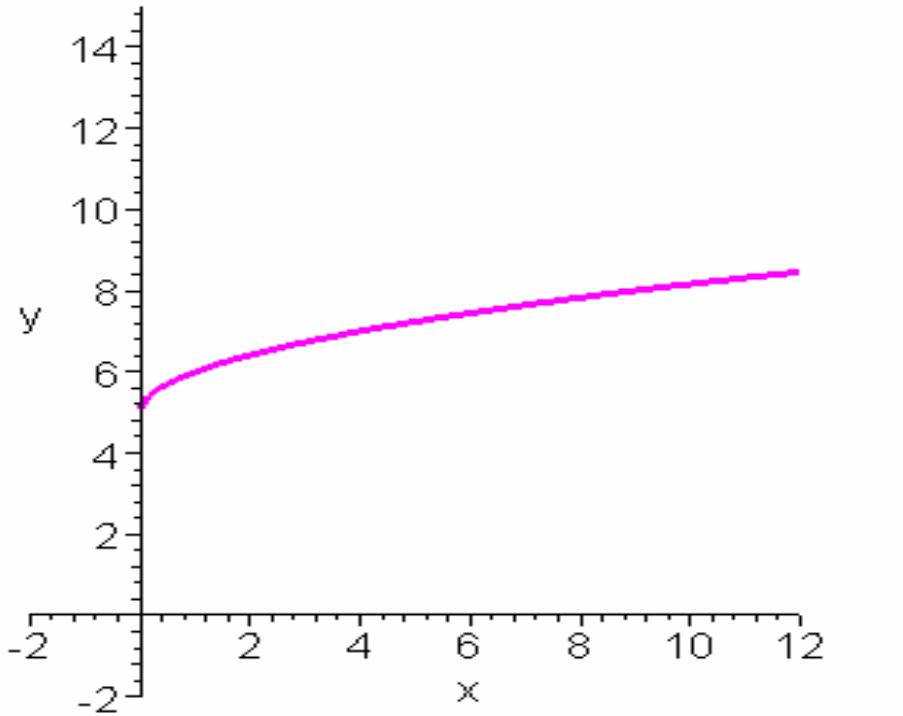
Given the following function,

$$y = \sqrt{x} + 5$$

Since a > 0, then the graph will be shift up “5” units

Let's Graph

$$y = \sqrt{x} + 5$$



Given the following function,

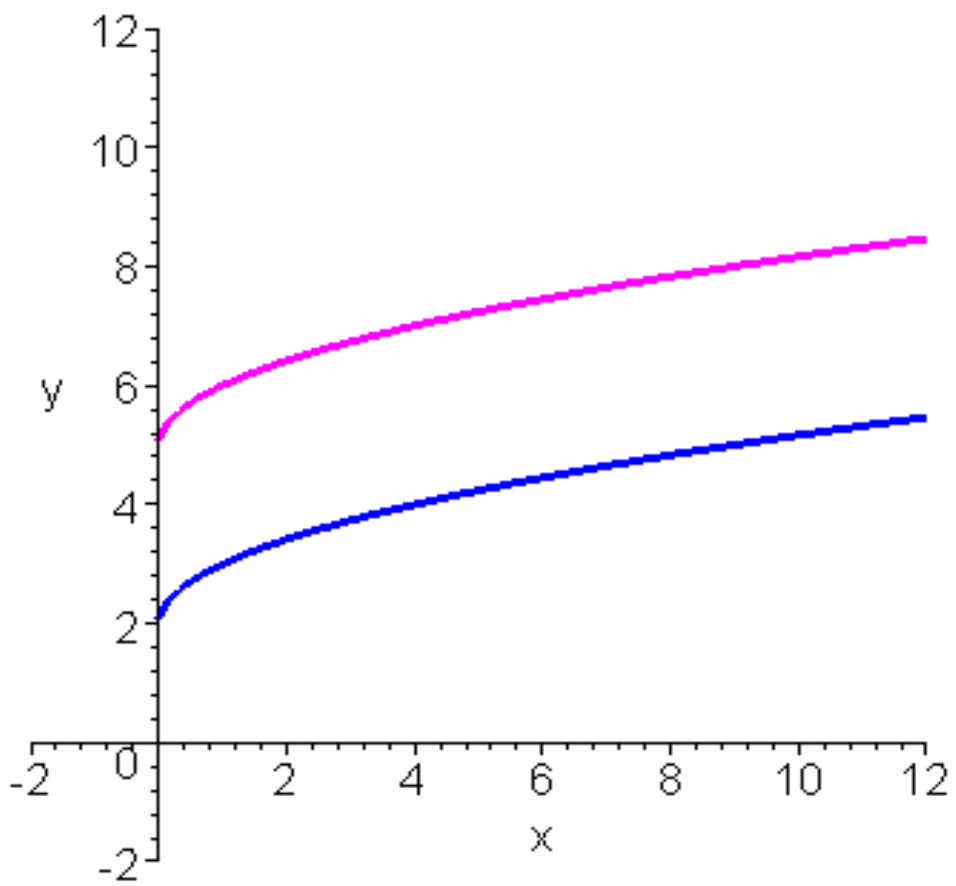
$$y = \sqrt{x} + 2$$

How will the graph look?

Let's Graph

$$y = \sqrt{x} + 5$$

$$y = \sqrt{x} + 2$$



Given the following function,

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

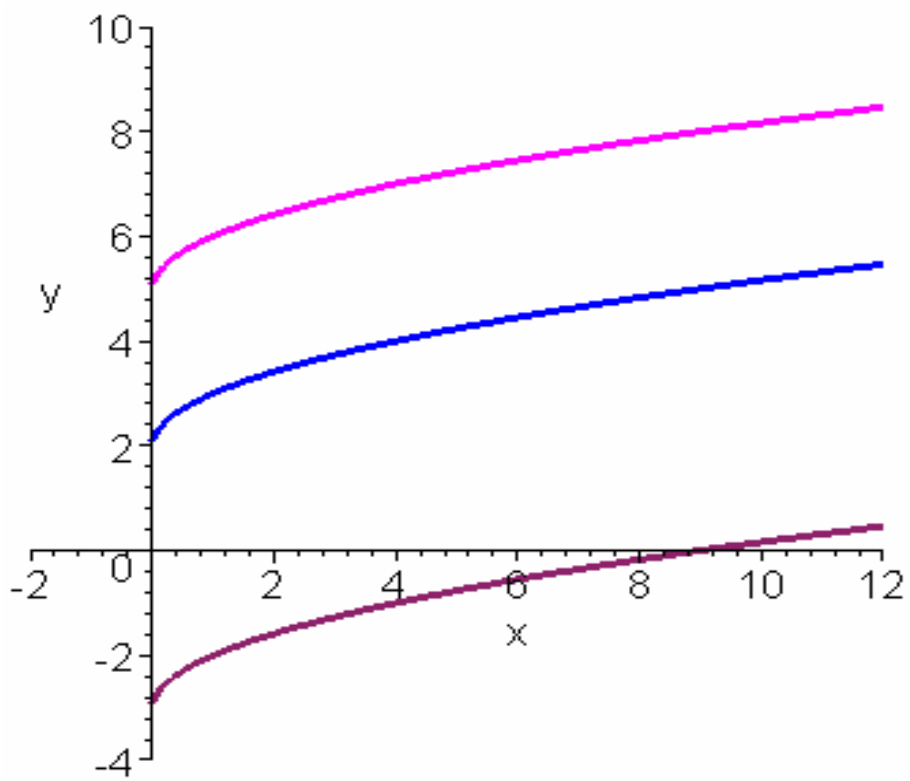
Since a < 0, then the graph will be shift down “3” units

Let's Graph

$$y = \sqrt{x} + 5$$

$$y = \sqrt{x} + 2$$

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



Given the following function,

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

How will the graph look?

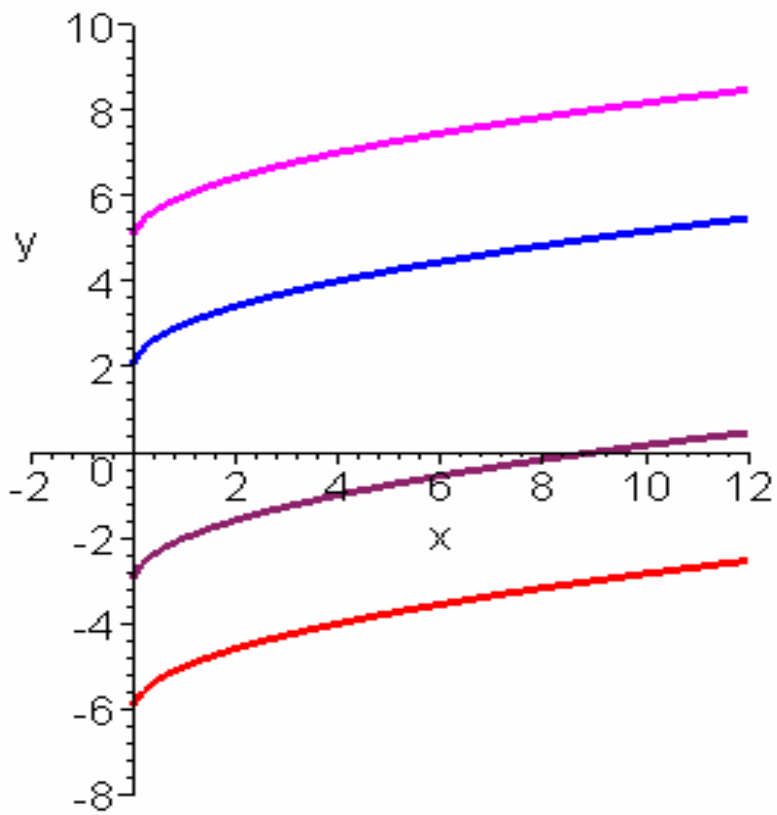
Let's Graph

$$y = \sqrt{x} + 5$$

$$y = \sqrt{x} + 2$$

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

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



Given the following function

$$y = \sqrt{(x - b)}$$

For this equation, b is inside the square root.

We get the expression and equal it to zero.

$$x - b = 0$$

$$x = b$$

If: b > 0, then shift the graph "b" units right

If: b < 0, then shift the graph "b" units left

Given the following function,

$$y = \sqrt{x + 2}$$

We get the expression and equal it to zero.

$$x + 2 = 0$$

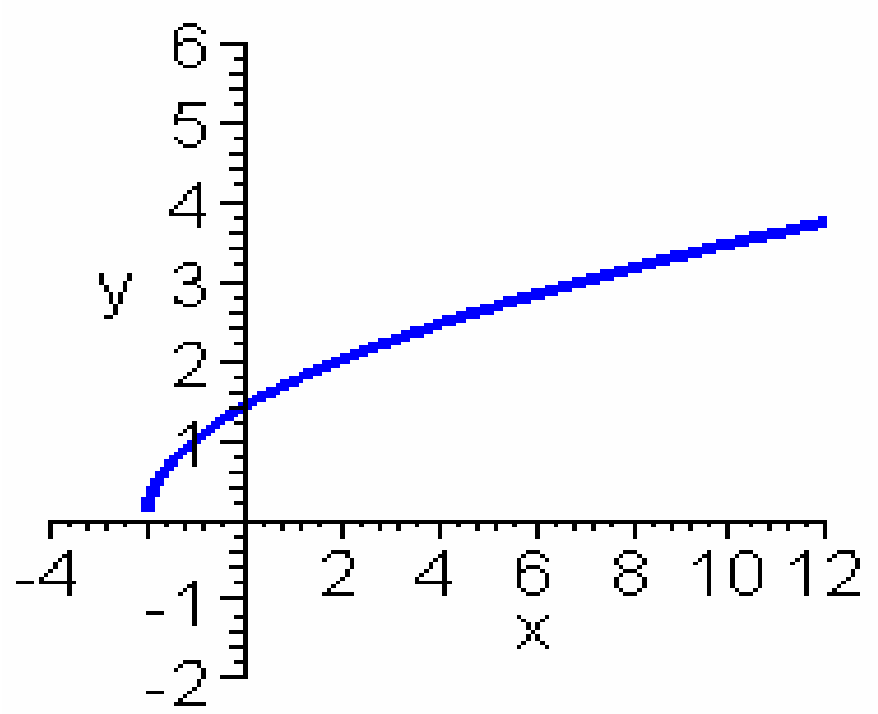
$$x = -2$$

Since b < 0, then shift the graph

"2" units left

Let's Graph

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



Given the following function,

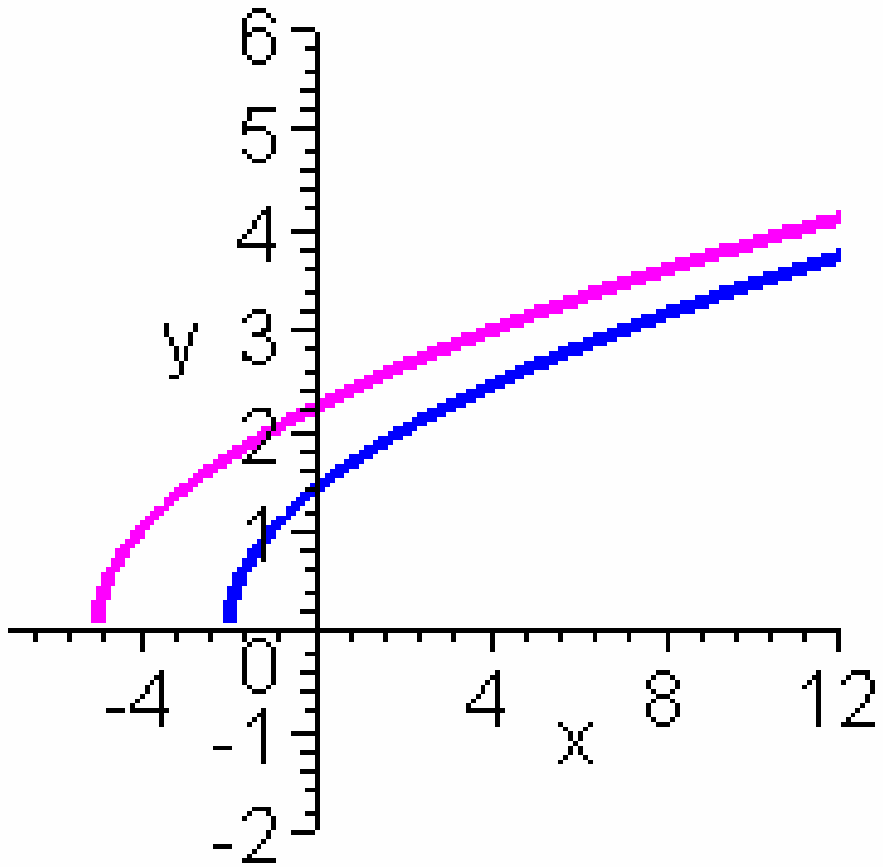
$$y = \sqrt{(x+5)}$$

How will the graph look?

Let's Graph

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

$$y = \sqrt{(x+5)}$$



Given the following function,

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

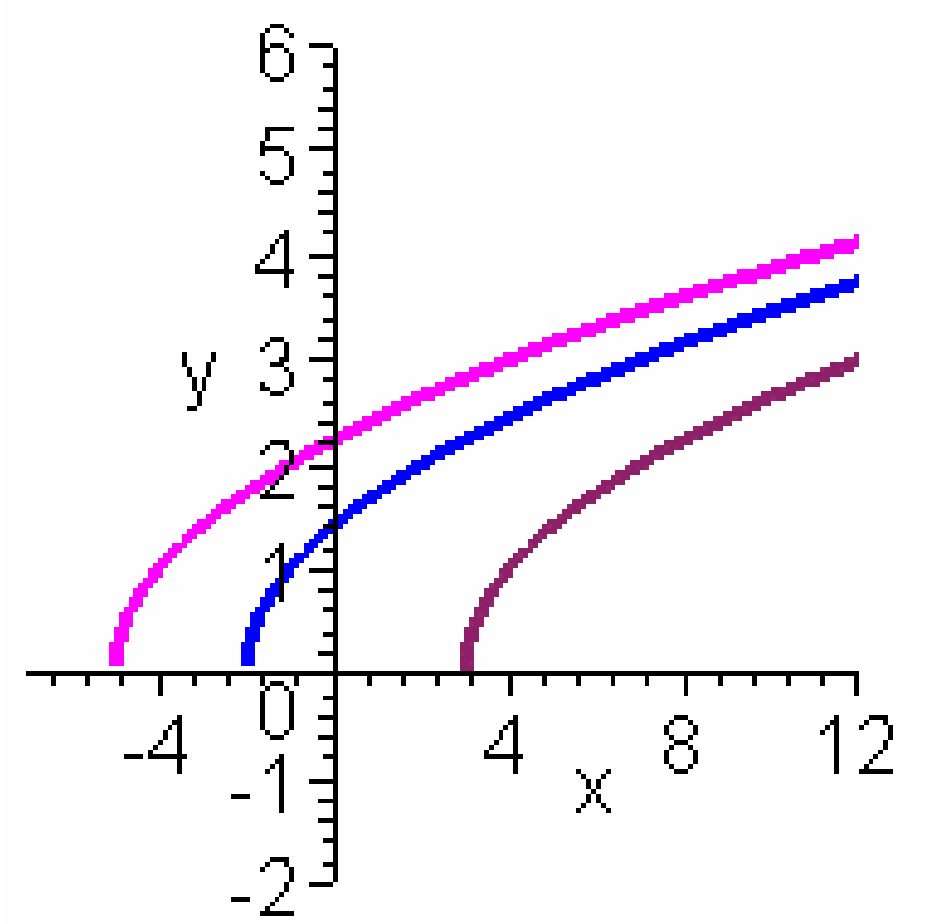
How will the graph look?

Let's Graph

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

$$y = \sqrt{(x+5)}$$

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



Given the following function,

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

How will the graph look?

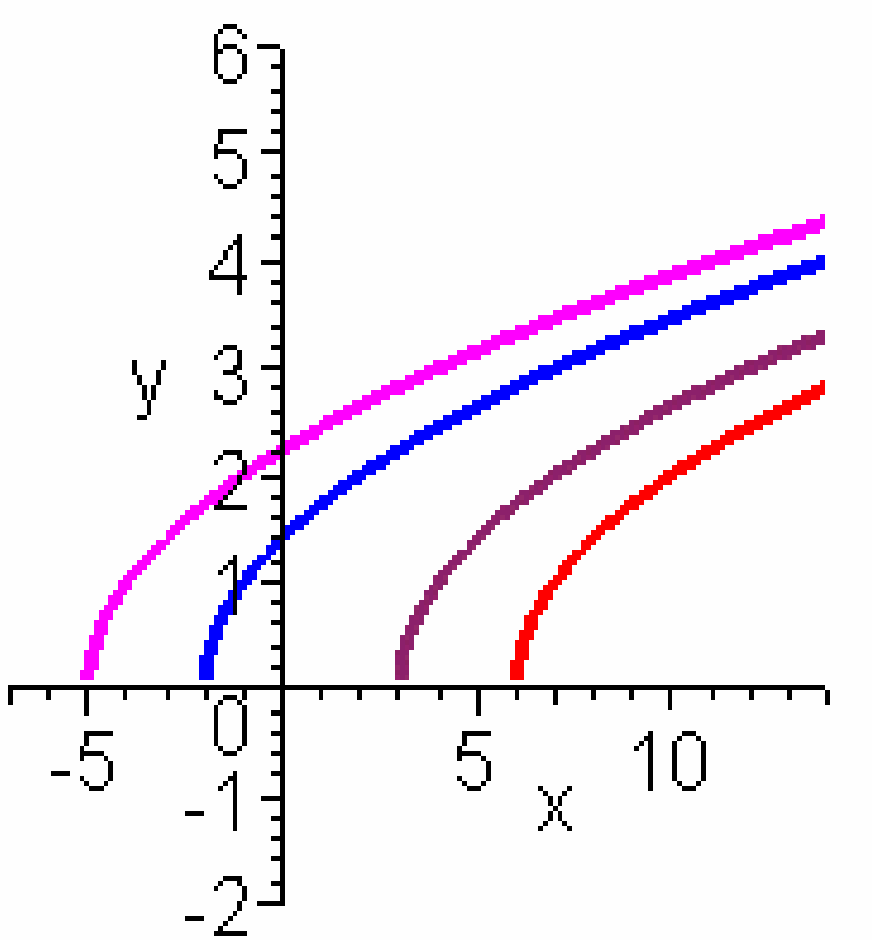
Let's Graph

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

$$y = \sqrt{(x+5)}$$

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

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



Recall: $y = \sqrt{(x-b)} + a$

a > 0 then shift up

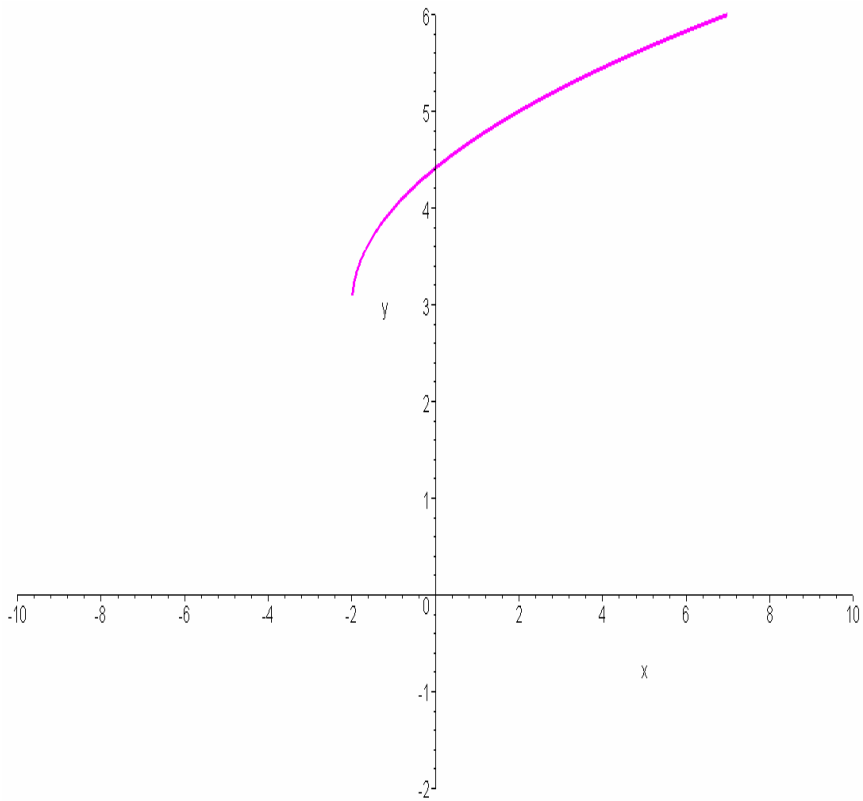
a < 0 then shift down

Equal the expression to zero $(x + 2) = 0$

b > 0 then shift to the right

b < 0 then shift to the left

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



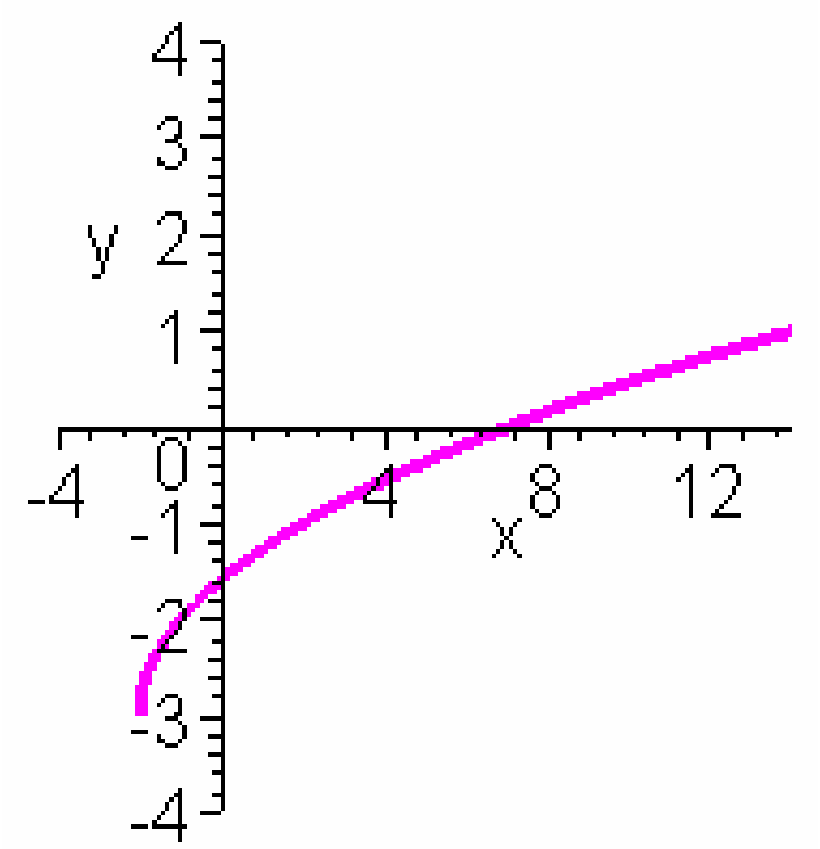
Given the following function,

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

How will the graph look?

Let's Graph

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



Given the following function,

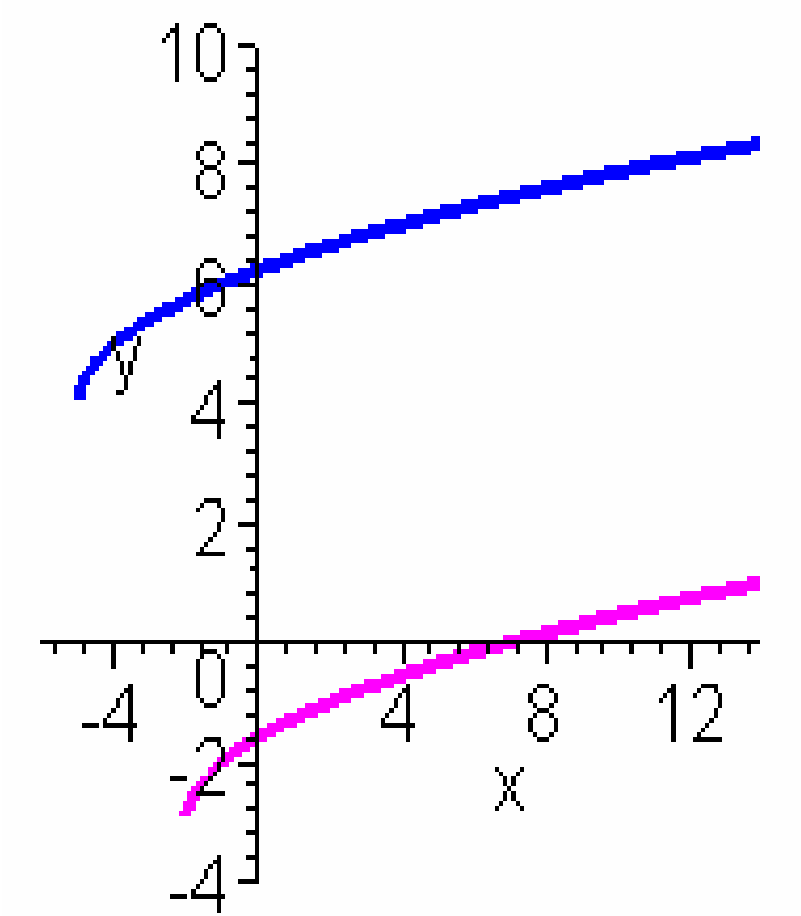
$$y = \sqrt{(x+5)} + 4$$

How will the graph look?

Let's Graph

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

$$y = \sqrt{(x+5)} + 4$$



Given the following function,

$$y = \sqrt{(x-3)} - 7$$

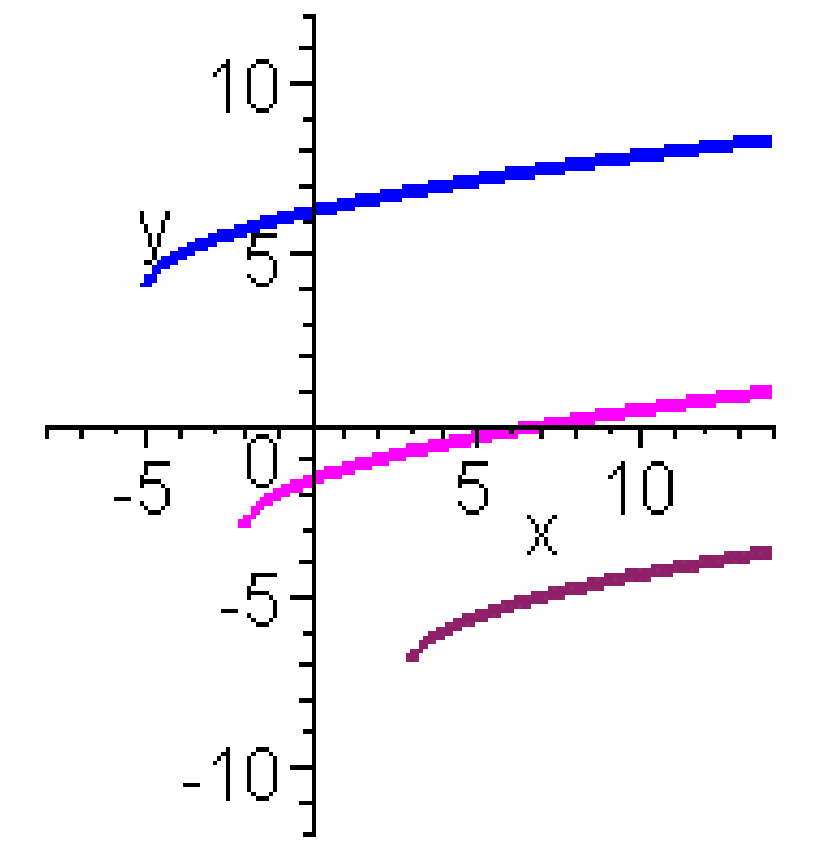
How will the graph look?

Let's Graph

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

$$y=\sqrt{(x+5)}+4$$

$$y=\sqrt{(x-3)}-7$$



Given the following function,

$$y = \sqrt{(x-6)} + 8$$

How will the graph look?

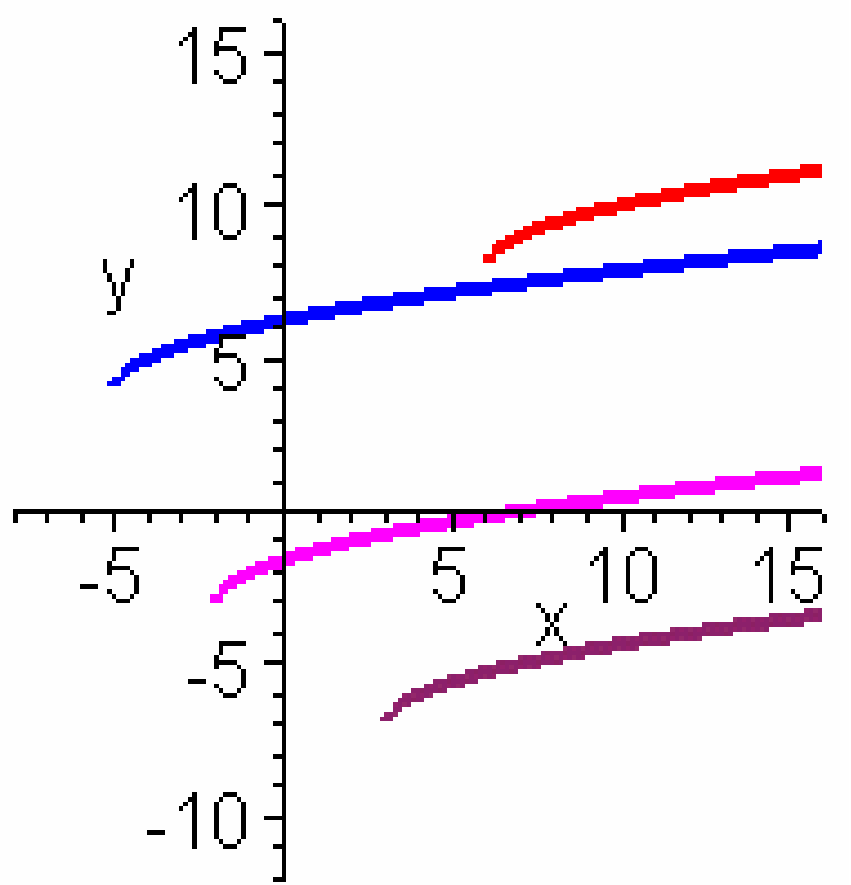
Let's Graph

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

$$y=\sqrt{(x+5)}+4$$

$$y=\sqrt{(x-3)}-7$$

$$y=\sqrt{(x-6)}+8$$



Given the following function,

$$y = c\sqrt{x}$$

For this equation, c determines how wide or thin half of the parabola will be.

if: $|c|>1$, then the graph is closer to the y-axis

if: $|c|=1$, then the graph remains the same

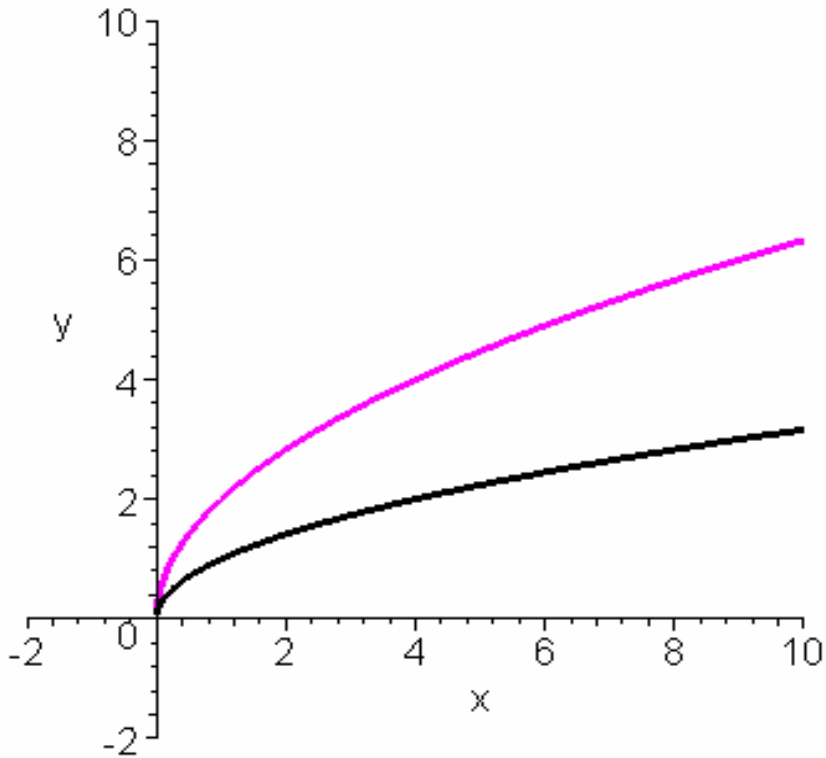
if: $0<|c|<1$, then the graph is further from the y-axis

if c is a negative number, then the graph will reflect on the x-axis

Let's Graph

$$y = \sqrt{x}$$

$$y = 2\sqrt{x}$$

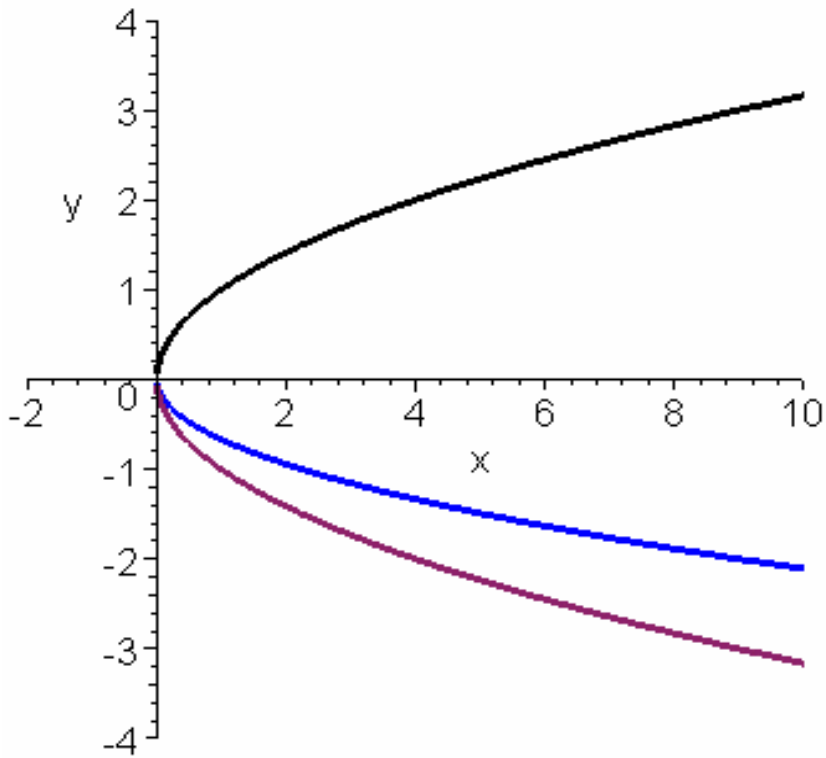


Let's Graph

$$y = \sqrt{x}$$

$$y = -\sqrt{x}$$

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

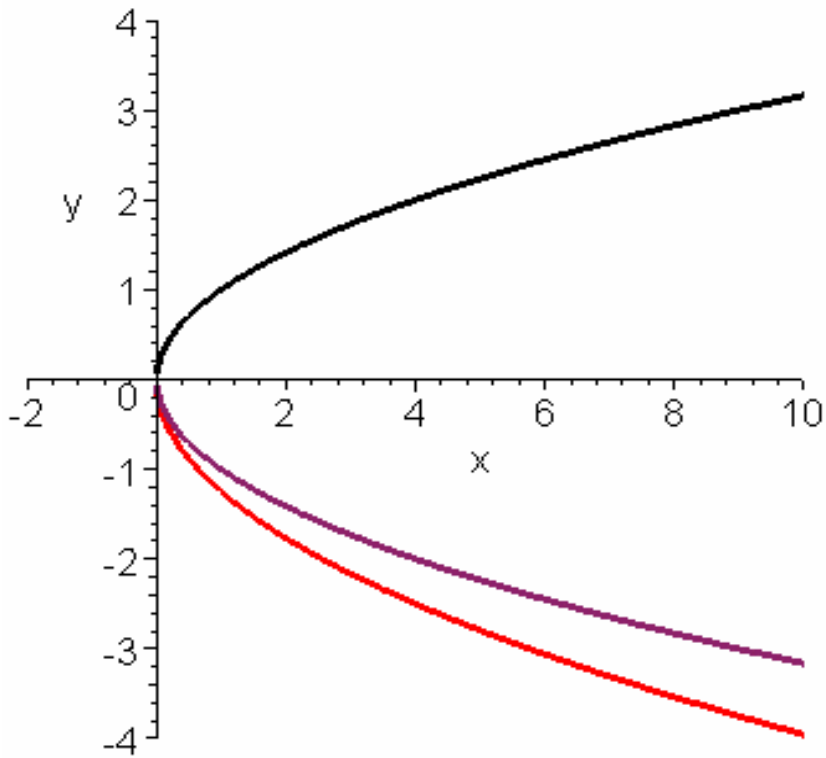


Let's Graph

$$y = \sqrt{x}$$

$$y = -\sqrt{x}$$

$$y = -\frac{5}{4}\sqrt{x}$$



Recall: $y = c\sqrt{(x-b)} + a$

a>0 then shift up

a<0 then shift down

Equal the function to zero

$$(x+2) = 0$$

b>0 then shift to the right

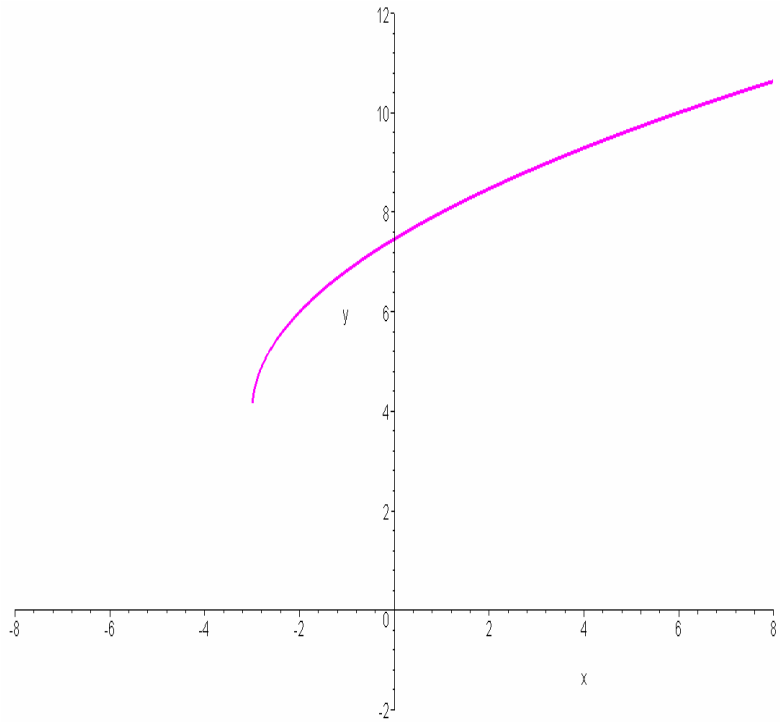
b<0 then shift to the left

if: |c|>1, then the graph is closer to the y-axis

if: |c|=1, then the graph is the same

if: 0<|c|<1, then the graph is further from the y-axis

$$y = 2\sqrt{(x+3)} + 4$$



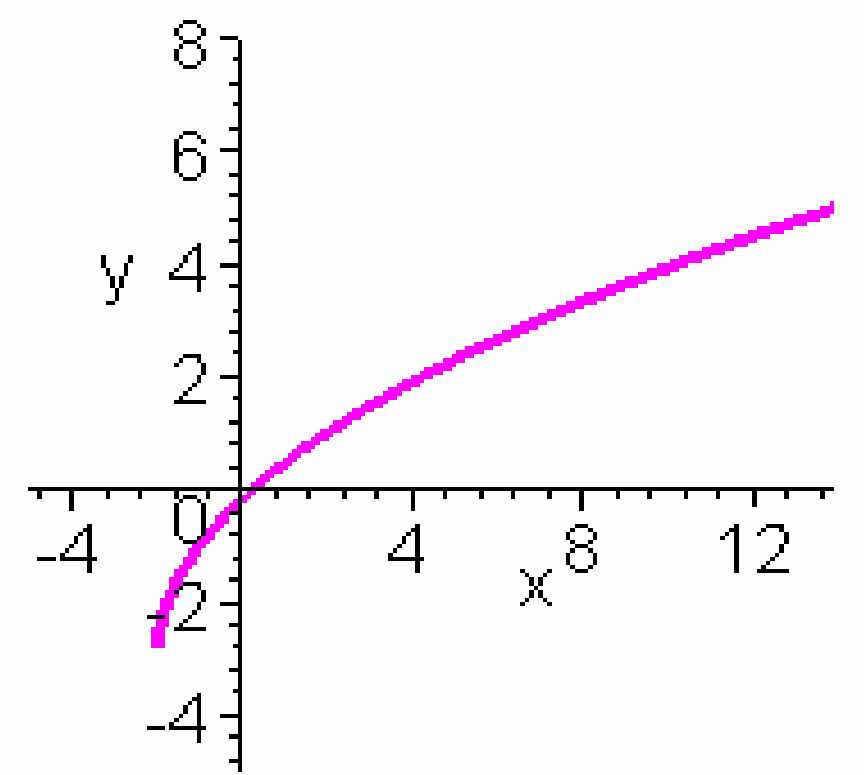
Given the following function,

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

How will the graph look?

Let's Graph

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



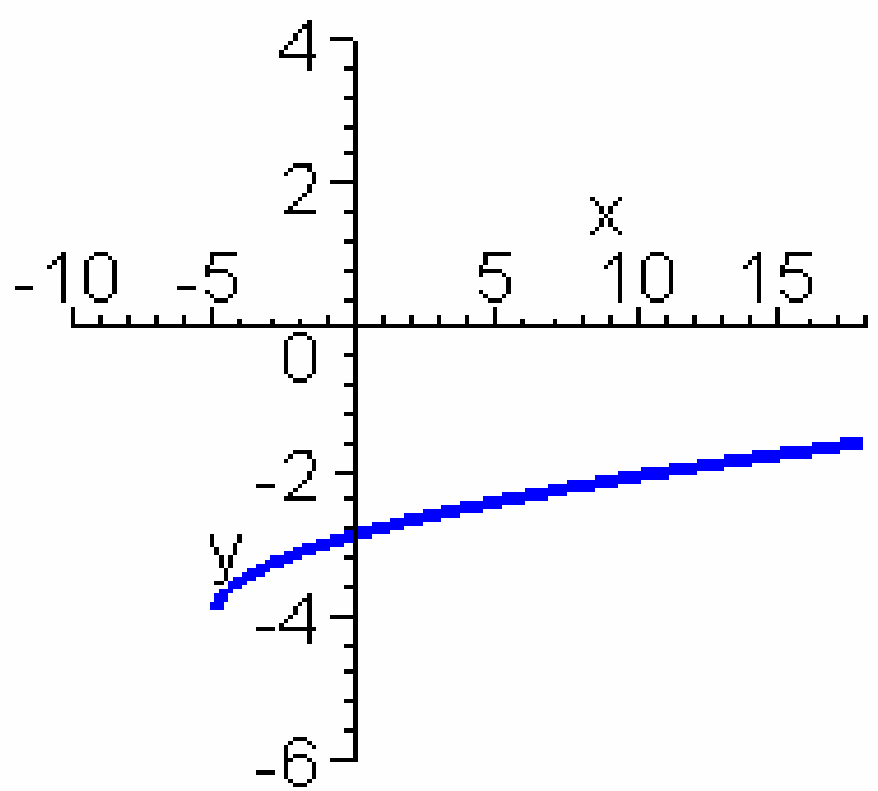
Given the following function,

$$y = \frac{1}{2}\sqrt{(x+5)} + 4$$

How will the graph look?

Let's Graph

$$y = \frac{1}{2}\sqrt{(x+5)} + 4$$



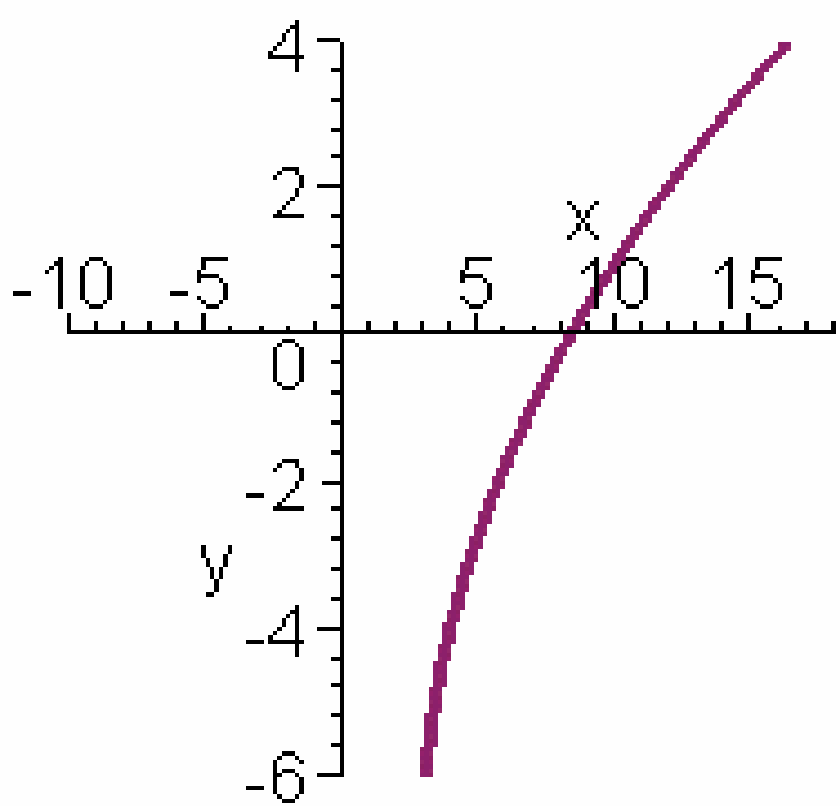
Given the following function,

$$y = 3\sqrt{(x-3)} - 7$$

How will the graph look?

Let's Graph

$$y = 3\sqrt{(x-3)} - 7$$



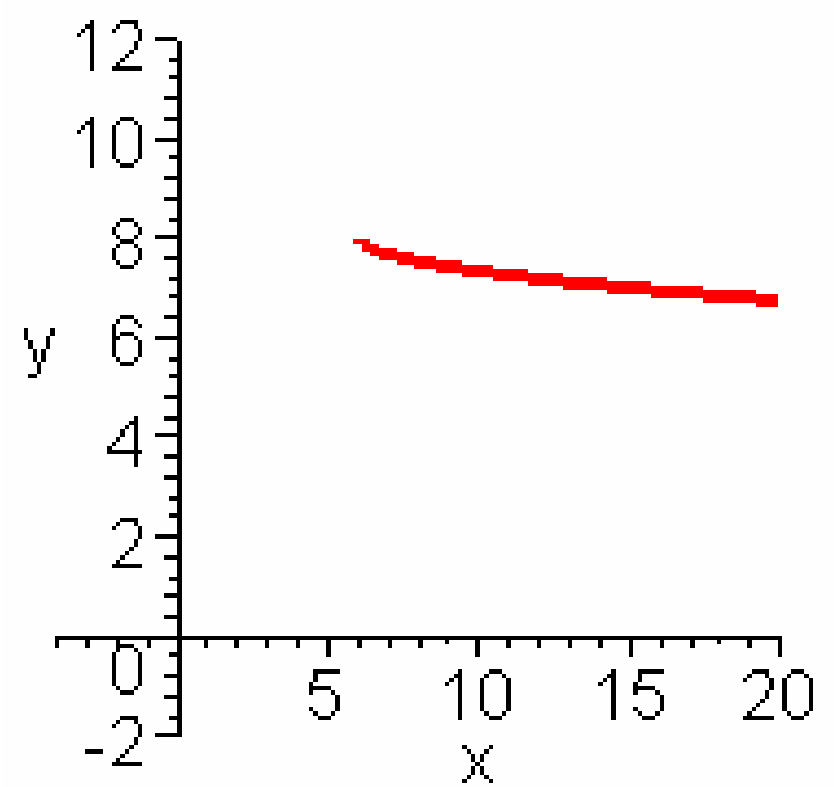
Given the following function,

$$y = -\frac{1}{3}\sqrt{(x-6)} + 8$$

How will the graph look?

Let's Graph

$$y = -\frac{1}{3}\sqrt{(x-6)} + 8$$



Congratulations!!

You just completed the transformation of

$$y = \sqrt{x}$$