

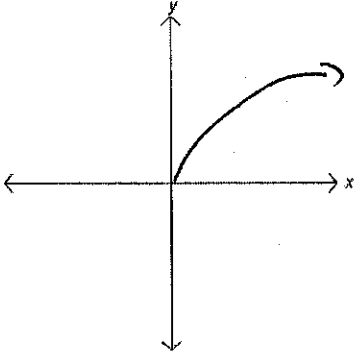
Graphing with Technology

Login to your computer and go to: www.desmos.com/calculator

1) Start by graphing the functions:

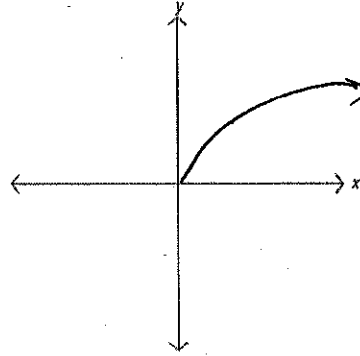
$$f(x) = \sqrt{x}$$

Sketch the graph below



$$g(x) = x^{1/2}$$

Sketch the graph below



2) You should have two graphs that look the same, explain why this makes sense.

\sqrt{x} is the same thing as $x^{1/2}$

3) Complete the table of values using the function you graphed above: $f(x) = \sqrt{x}$

4) What is $f(100)$? $f(100) = \sqrt{100} = 10$

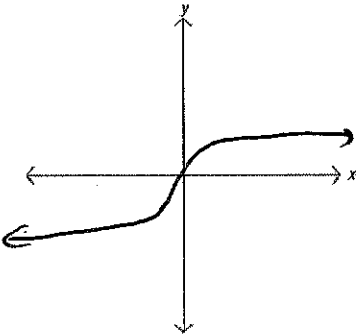
5) What is the **domain** of this graph? Why does this make sense?

$x \geq 0$ you can't take the square root of a negative number

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

6) Now graph the function: $h(x) = \sqrt[3]{x}$

Sketch the graph



Complete the table of values for $h(x)$:

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

7) What is the **domain** of this graph? Why does this make sense?

all real numbers

you can take the cube root of anything

$f(x)=\sqrt{x}$ and $h(x)=\sqrt[3]{x}$ are **parent functions**, we can shift a graph around the coordinate plane by changing the equation slightly. Fill in the chart to describe the **translations** (shifts) that happen to the parent functions when we change the equation slightly.

Parent function: $f(x)=\sqrt{x}$

Parent function: $h(x)=\sqrt[3]{x}$

Graph	Translation
$f(x) = \sqrt{x+2}$	Left 2
$f(x) = \sqrt{x-3}$	right 3
$f(x) = \sqrt{x} + 4$	up 4
$f(x) = \sqrt{x} - 6$	down 6

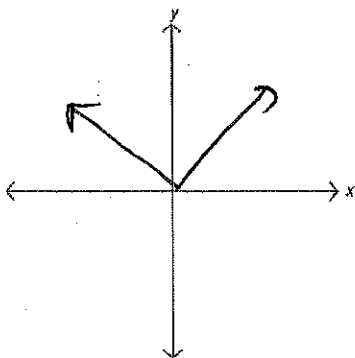
Graph	Translation
$h(x) = \sqrt[3]{x+4}$	Left 4
$h(x) = \sqrt[3]{x-2}$	right 2
$h(x) = \sqrt[3]{x} + 3$	up 3
$h(x) = \sqrt[3]{x} - 2$	down 2

8) **Make a prediction:** How will the graph of $f(x) = \sqrt{x}$ shift for the equation $f(x) = \sqrt{x-2} + 3$? Check your prediction.

right 2 and up 3

9) Finish by graphing: $f(x) = |x|$

Sketch the graph below



Complete the table of values

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

10) What is the **domain** of this graph?

all real #'s

range?
 $y \geq 0$

11) Predict how the equations will shift the parent function $f(x) = |x|$. Check your prediction and make corrections if needed.

Equation	Prediction	Check/ correct mistakes
$f(x) = x+2 - 4$	Left 2, down 4	✓
$f(x) = x-4 + 10$	right 4 up 10	✓
$f(x) = x+5 + 2$	left 5 up 2	✓

11) Write an equation to shift the absolute value function up 1 and right 3.

$$y = |x-3| + 1$$

12) Write an equation of an absolute value function with a vertex located at (-2, -5).

$$y = |x+2| - 5$$