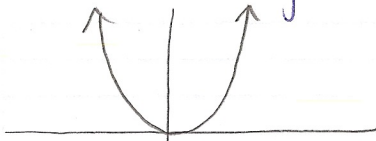


# Chapter 2 Study Guide

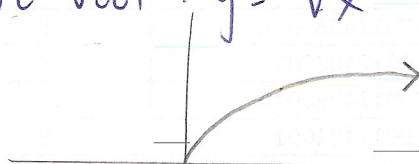
## General shapes of Graphs:

a.) Parabola :  $y = x^2$



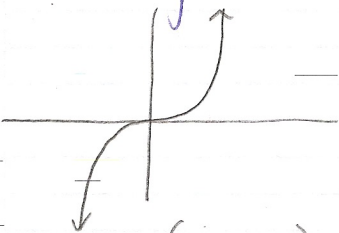
Domain:  $(-\infty, \infty)$  or  $\mathbb{R}$   
Range:  $[0, \infty)$

b.) Square root :  $y = \sqrt{x}$



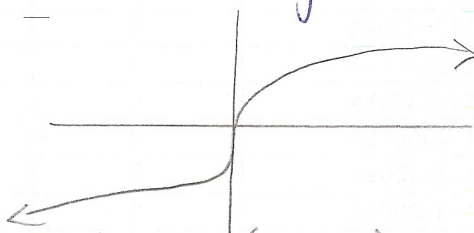
Domain:  $[0, \infty)$   
Range:  $[0, \infty)$

c.) Cubic :  $y = x^3$



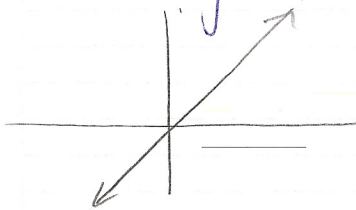
Domain:  $(-\infty, \infty)$  or  $\mathbb{R}$   
Range:  $(-\infty, \infty)$  or  $\mathbb{R}$

d.) Cube root :  $y = \sqrt[3]{x}$



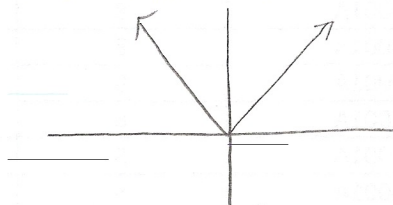
Domain:  $(-\infty, \infty)$  or  $\mathbb{R}$   
Range:  $(-\infty, \infty)$  or  $\mathbb{R}$

e.) Linear :  $y = mx + b$



Domain:  $(-\infty, \infty)$   
Range:  $(-\infty, \infty)$

f.) Absolute Value :  $y = |x|$



Domain:  $(-\infty, \infty)$   
Range:  $[0, \infty)$

## Finding the Domain of Square Root Functions

Example 1:  $f(x) = \sqrt{x+3}$

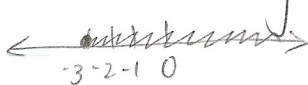
Step 1: Set the equation inside the square root, greater than or equal to zero

$$x+3 \geq 0$$

Step 2: solve  $\Rightarrow x + 3 \geq 0 \Rightarrow x \geq -3$

Step 3: Write the answer using Interval Notation

$$x \geq -3$$



$$[-3, \infty)$$

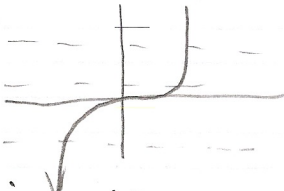
Determining if a Function Has an Inverse Function (One-to-One)

A function,  $f(x)$ , has an inverse function if  $f(x)$  is one-to-one.

### The Horizontal Line Test

→ If a horizontal line on the graph hits more than one spot, then it is NOT one-to-one.

Example:  $f(x) = x^3$



$f(x) = x^3$  has an inverse function and thus is one-to-one.

Determining if a Graph is a Function.

### The Vertical Line Test

→ Indicates if a relation is a function.

Determining the Vertex of a Graph (Examples)

Example 1:  $y = 3(x+4)^2 - 6$

Vertex is  $(-4, -6)$

\* notice we take the opposite sign of the # indicated in the squared portion of the equation.

Example 2:  $y = -4\sqrt{x+4} - 2$

Vertex:  $(-4, -2)$

Composition of Functions

$$(f \circ g)(x) = f(g(x))$$

Operations of Functions

Example:  $f(x) = 2x$     $g(x) = x + 4$

$$(f+g)(a) \Rightarrow f(a) + g(a)$$

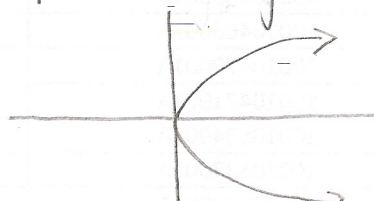
More on Graphs

$$y = 2x^2$$

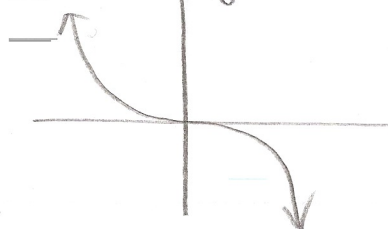
$$y = x^2$$

$$y = \frac{1}{2}x^2$$

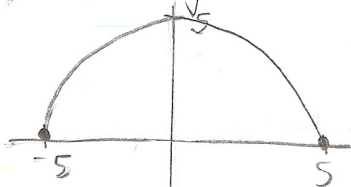
Graph of  $x = y^2$



Graph of  $y = -x^3$



Graph of  $y = \sqrt{25-x^2}$



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

