

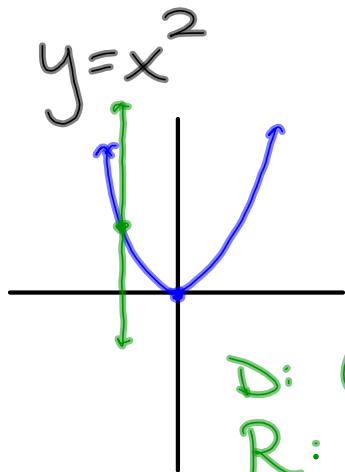
## 1.2 Functions & Their Properties

- Obj:
1. Domain & Range
  2. Identify asymptotes
  3. Continuity

Function: for every  $x$  value there is only one  $y$  value

\* Pass VLT

Sep 10-8:58 AM



Function!

Passes VLT

D:  $(-\infty, \infty)$

R:  $y \geq 0$   $[0, \infty)$

D: all possible  $x$  values

R: " "  $y$  values

Sep 10-9:41 AM

Find domain & range: *know what the graph looks like*

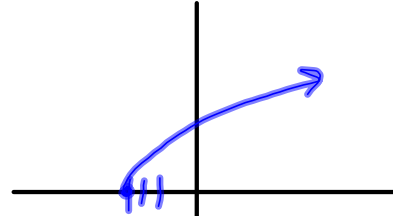
$$f(x) = \sqrt{x+3}$$

$$D: x+3 \geq 0$$

$$-3 \quad -3$$

$$x \geq -3$$

$$[-3, \infty)$$



$$R: [0, \infty)$$

Sep 10-9:44 AM

Find domain:  $f(x) = \frac{1}{x-5}$

$$D: x-5 \neq 0$$

$$+5 \quad +5$$

$$* x \neq 5$$

$$* (-\infty, 5) \cup (5, \infty)$$

Sep 10-9:47 AM

Find domain:  $f(x) = \frac{\sqrt{x}}{x-5}$

numerator:  $x \geq 0$

denom:  $x \neq 5$

$$[0, 5) \cup (5, \infty)$$

Sep 10-9:49 AM

Find domain:  $g(x) = \frac{1}{x^2 - 5x}$

D:  $x^2 - 5x \neq 0$

$x(x-5) \neq 0$

$x \neq 0$   $x-5 \neq 0$

$x \neq 5$

$$(-\infty, 0) \cup (0, 5) \cup (5, \infty)$$

Sep 10-9:51 AM

Asymptotes :Vertical Asymptotes:

Set the denominator equal to zero & solve for  $x$ .

Find the VA:  $f(x) = \frac{x}{x^2 - x - 2}$

$$x^2 - x - 2 = 0$$

$$(x-2)(x+1) = 0$$

$$x-2=0 \quad x+1=0$$

VA  $x=2 \quad x=-1$

FYI:

$$D: x^2 - x - 2 \neq 0$$

⋮

$$x \neq 2 \quad x \neq -1$$

Sep 10-9:58 AM

Horizontal Asymptotes:

1. If the degree of the numerator  $<$  deg of denom

$$HA @ y=0.$$

2. If deg. of num. = deg of denom

$$HA @ y = \frac{a}{b}$$

\* If  $a, b$  are leading coefficients.

3. If deg. of num.  $>$  deg. of denom.

no HA.

Sep 10-10:01 AM

Find the HA of:  $f(x) = \frac{2x^2}{4-x^2}$  deg 2  
deg 2

degree: highest exponent

$$y = \frac{a}{b} = \frac{2}{-1}$$

$$y = -2$$

$$\text{VA: } 4 - x^2 = 0$$

$$x = \pm 2$$

Sep 10-10:04 AM

Find VA & HA:  $f(x) = \frac{x^1}{x^2 - 3x - 4}$  deg 1  
deg 2

$$\text{VA: } x^2 - 3x - 4 = 0$$

$$(x-4)(x+1) = 0$$

$$x-4=0 \quad x+1=0$$

$$x=4 \quad x=-1$$

HA:

deg. of num. < deg. of denom

$$y = 0$$

Sep 10-10:07 AM