

# Math 112

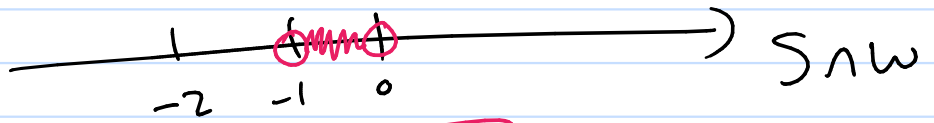
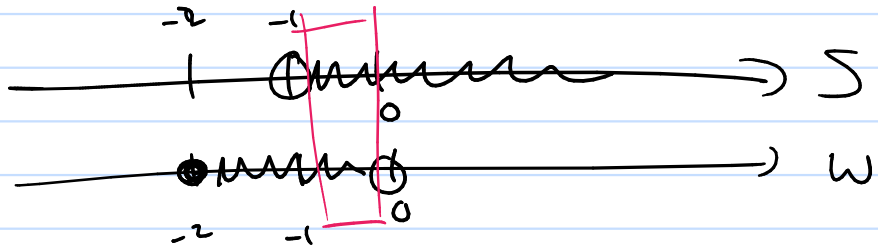
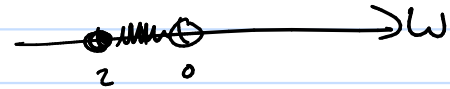
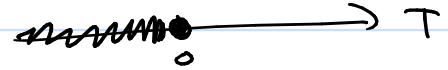
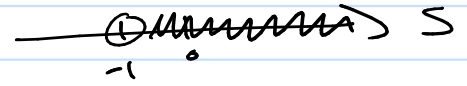
Q's

Let  $S = (-1, \infty)$ ,  $T = (-\infty, 0]$ , and  $W = [-2, 0)$ .

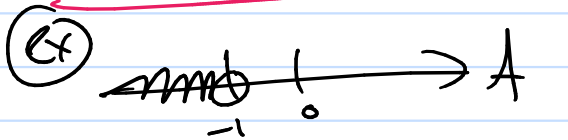
For each intersection or union, choose the correct notation for the resulting interval.

<input type="checkbox"/>	1. $S \cup W$
<input checked="" type="checkbox"/>	2. $S \cap W$
<input type="checkbox"/>	3. $T \cup W$
<input type="checkbox"/>	4. $S \cap T$

- A.  $(-\infty, 0]$
- B.  $(-\infty, \infty)$
- C.  $(-1, 0)$
- D.  $[-2, \infty)$



$(-1, 0)$



$A \cap B = \emptyset$

Dunking  
Lecture

5 If  $f(x) = x^2 + 10$ , find and simplify the following:

(a)  $f(t+2) =$

(b)  $f(t^3+2) =$

(c)  $f(3) =$

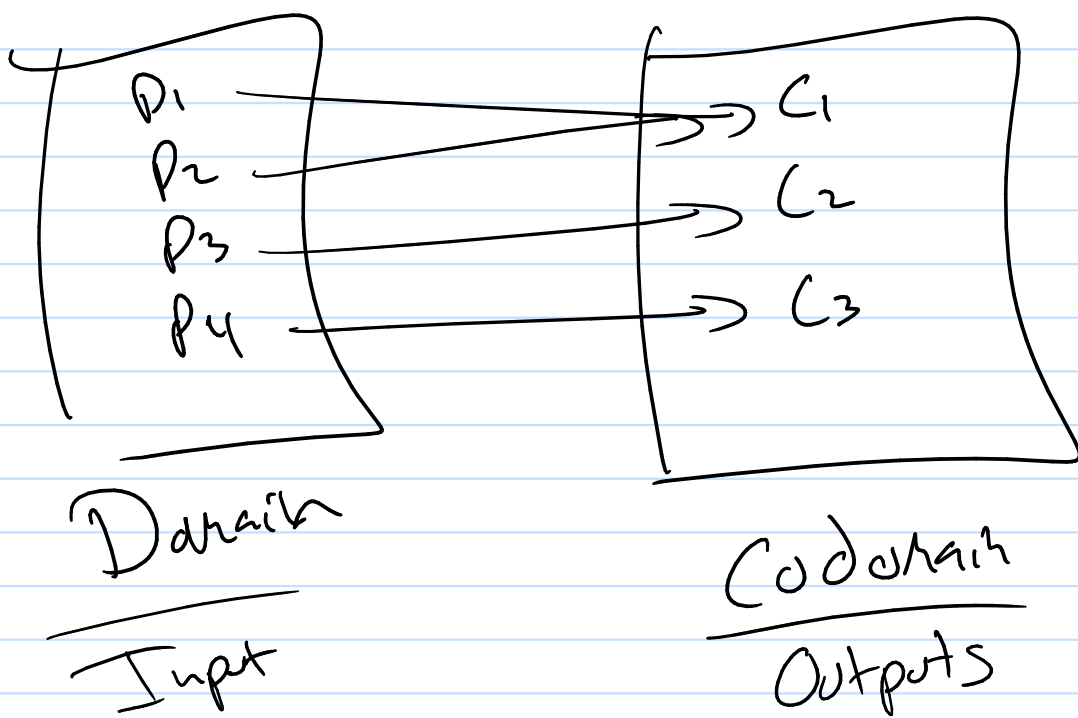
(d)  $3f(t) =$

(e)  $(f(t))^2 + 2 =$

# Function Notation:

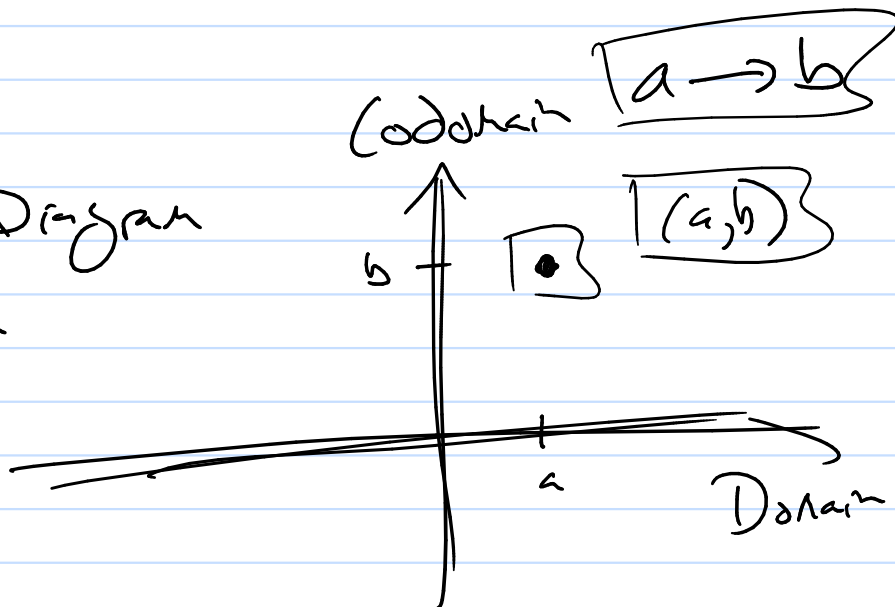
1<sup>st</sup>: Function is a Relation such that...

- ① Every value in the domain gets mapped
- ② When it does get mapped it goes to one value.



## Represent Functions:

- ① Arrow Diagram
- ② Graph
- ③ Lists & ordered pairs  
 $\{x, y\} \rightarrow (a, b)$



④ Verbal Rules or Equations True if it is in function

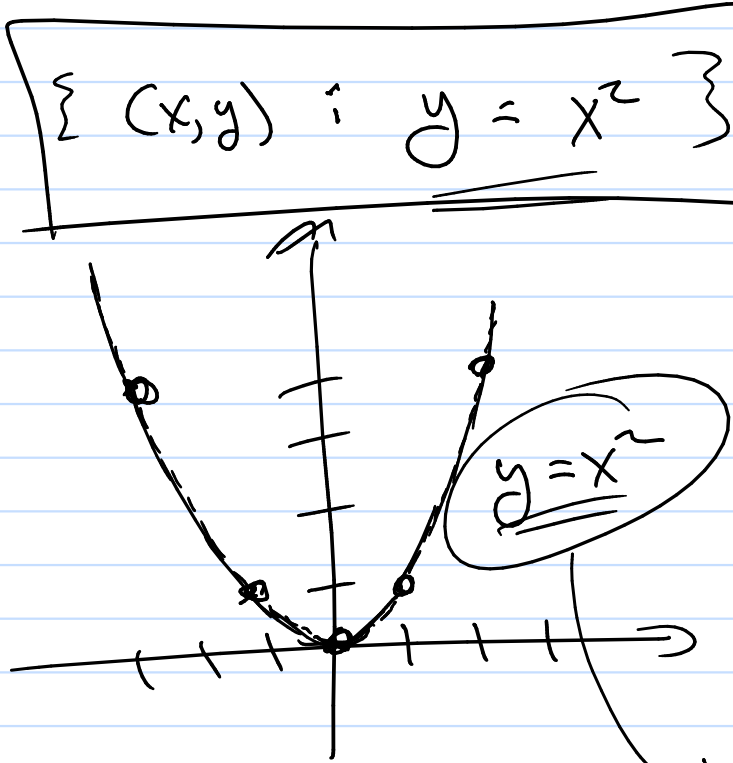
## Set Builder

Function =  $\{ (a,b) : a,b \text{ meet same rule} \}$

(ex) Function =  $\{ (x,y) : y = x^2 \}$

table of values

x	y
-2	4
-1	1
0	0
1	1
2	4



Equation for function.

---

## Equations / Expressions

↙  
expression = expression

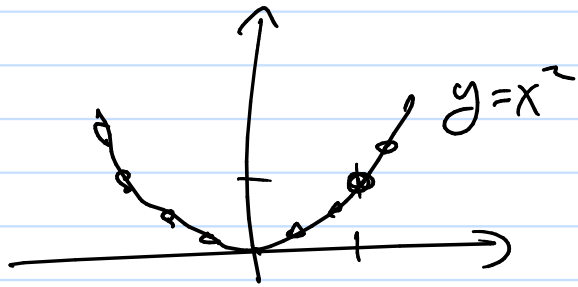
↳ combination of numbers, variables and operators

(ex)  $\sqrt{x} + y^z - 3 / (2x^2 + 1)$

Function Notation:

(ex)

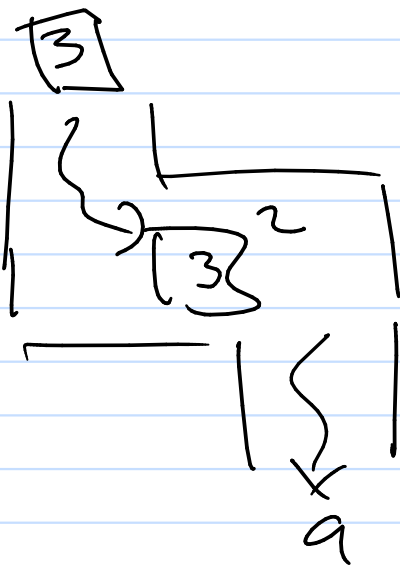
$y = x^2$



long name  $f = \{ (x,y) : \underline{y = x^2} \}$

use Function Notation

$f(x) = x^2$



$f(h+t) = (h+t)^2$

$f(2) = 2^2 = 4$

$f(h+t) = (h+t)^2$   
 $= (h+t)(h+t)$   
 $= h^2 + 2ht + t^2$

5 If  $f(x) = x^2 + 10$ , find and simplify the following:

(a)  $f(t+2) = t^2 + 4t + 14$

(b)  $f(t^3 + 2) =$  [ ]

(c)  $f(3) =$  [ ]

(d)  $3f(t) =$  [ ]

(e)  $(f(t))^2 + 2 =$  [ ]

$f(x) = x^2 + 10$

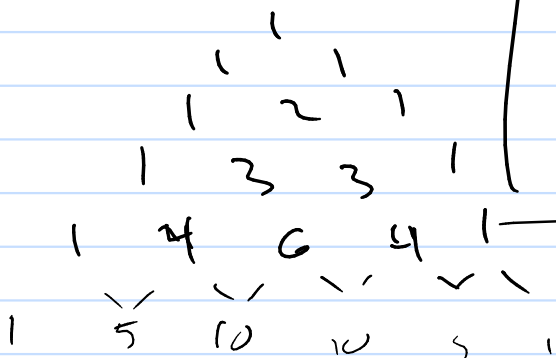
$f(t+2) = (t+2)^2 + 10$   
 $= (t^2 + 4t + 4) + 10$

$(a+b)^0 = 1$

$(a+b)^1 = a+b$

$(a+b)^2 = a^2 + 2ab + b^2$

$(a+b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$



$$\begin{aligned} & \underline{\underline{(t+2)^2 + 10}} \\ &= (t+2)(t+2) + 10 \\ &= t^2 + 2t + 2t + 4 + 10 \\ &= t^2 + 4t + 14 \end{aligned}$$

$$\begin{aligned} & (\sqrt{t} + 2)^2 \rightarrow \\ &= \sqrt{t}^2 + 2\sqrt{t} \cdot 2 + 2^2 \\ &= t + 4\sqrt{t} + 4 \\ & \underline{\underline{\hspace{10em}}} \end{aligned}$$

5 If  $f(x) = x^2 + 10$ , find and simplify the following:

(a)  $f(t+2) =$

(b)  $f(t^3+2) =$

(c)  $f(3) =$

(d)  $3f(t) =$

(e)  $(f(t))^2 + 2 =$

$$\begin{aligned} f(t^3+2) &= (t^3+2)^2 + 10 \\ &= (t^3+2)^2 + 10 \\ &= (t^3)^2 + \underline{\underline{(2)(t^3)(2)}} + \underline{\underline{2^2}} + 10 \\ &= t^6 + \underline{\underline{4t^3}} + 14 \end{aligned}$$

$$\begin{aligned} & (2)(t^3)(2) \\ & \underline{\underline{2 \cdot 2 \cdot t^3}} \\ & 4t^3 \end{aligned}$$

Scetel

types of functions w/ their Domain

↑  
Natural Domain

(ex) Polynomial

$$f(x) = a + bx$$

$$f(x) = a_0 + a_1x + a_2x^2 + a_3x^3$$

terms

↳ term has (number)(variable)<sup>Power</sup>

Power is  $\{0, 1, 2, 3, \dots\}$

(ex)

$$2x^{17} - 3x^2 + 2 \quad \boxed{\text{is}} \text{ polynomial}$$

$$2x^2 + x + 1 \quad \boxed{\text{is}} \text{ polynomial}$$

$$x^{\frac{1}{2}} - 2x^3 \quad \boxed{\text{is not}} \text{ polynomial}$$

$\boxed{\text{rule}}$  largest power = degree of polynomial

Domain = all Reals for Polynomials

---

## ② Rational Functions

a Rational is  $\frac{\text{Polynomial}}{\text{Polynomial}}$

ex

$$f(x) = \frac{x+2}{x^3-3}$$

Domain of a Rational is All reals but exclude and that make denominator equal zero.

ex?

Find all  $x$  such that  $x^3 - 3 = 0$  and exclude them

③ Radicals have  $\sqrt{\quad}$  in them

ex

$$f(x) = \frac{\sqrt{x+1}}{x^3-3}$$