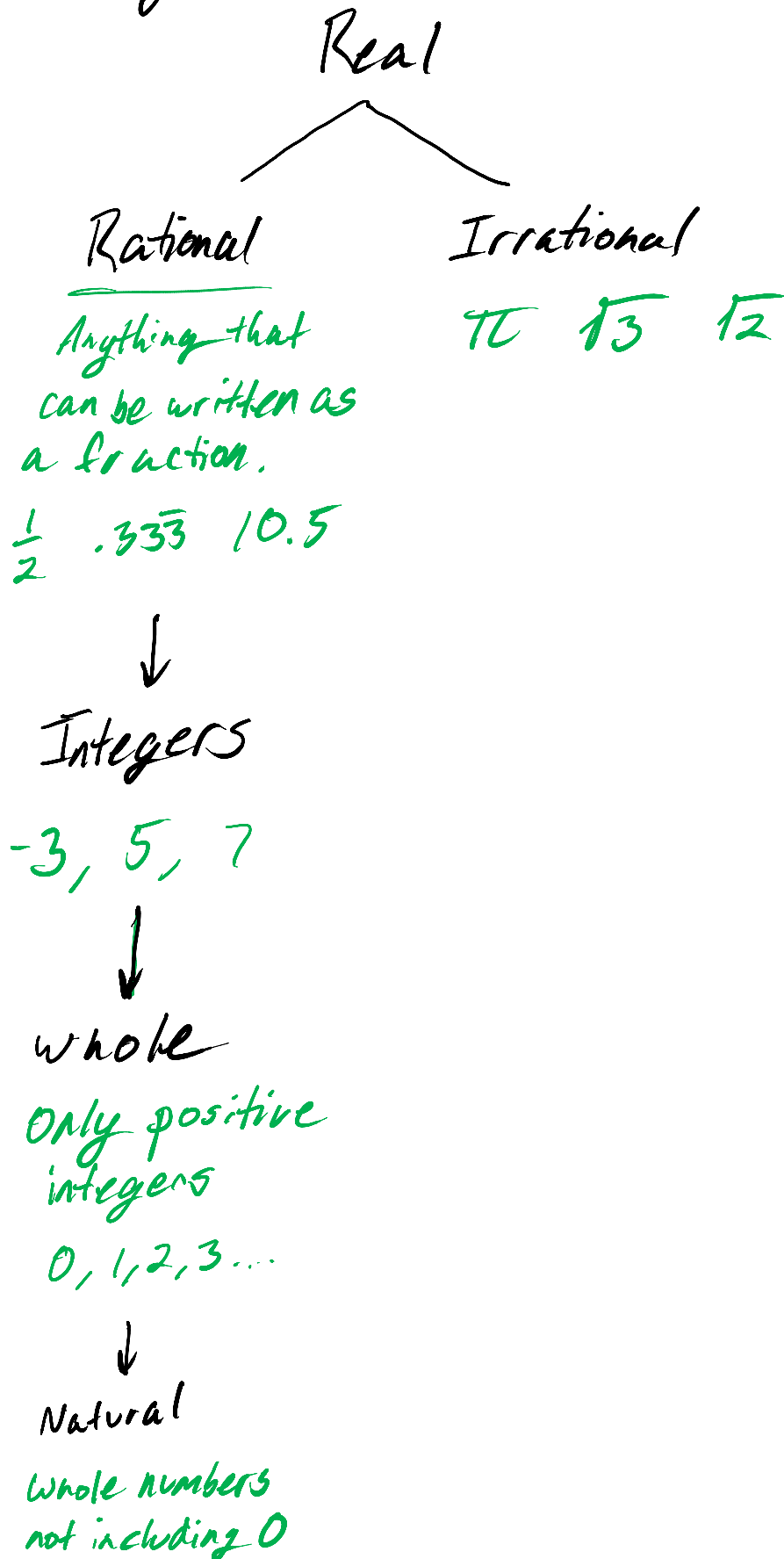


Algebra 2 Midterm

+Classifying Real Number



+ Properties

- Associative Property - groups change

$$4 \cdot (2x) = (4 \cdot 2)x$$

- Commutative Prop - order changes

$$3(x + 1) = 3(1 + x)$$

- Distributive Prop - gets rid of parenthesis

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

- Identities - terms don't change

- Additive - $2x + 0 = 2x$

- Multiplicative - $3 \cdot 1 = 3$

- Inverse

- Additive - $5 + (-5) = 0$

- Multiplicative - $\frac{5}{11} \cdot \frac{11}{5} = 1$

+ Evaluate Expressions

If $a = 3.5$ and $b = -10$

Find $-|b + 2a|$

$$\rightarrow -|-10 + 2(3.5)| = -|-3| = -3$$

+ Combining Like Terms

$$\frac{1}{2}(4x - 8) + 5x(3)^2$$

$$2x - 4 + 5x(9)$$

$$2x - 4 + 45x$$

$$47x - 4$$

+ Solving Equations + Inequalities

* Multiply or divide
by a negative
 $\rightarrow$ flip the sign

* Solving Absolute Value Equations

- ① Isolate Absolute Value part
- ② Split into two equations
(one positive, one negative)
- ③ Solve both.

Ex: $2|3x+1| - 3 = 1$

$+3 \quad +3$

$$\frac{2}{2}|3x+1| = \frac{4}{2}$$

$$|3x+1| = 2$$

$$\textcircled{A} \quad 3x+1 = 2$$

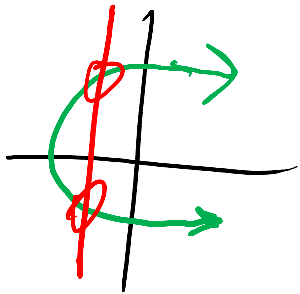
$$x = \frac{1}{3}$$

$$\textcircled{B} \quad 3x+1 = -2$$

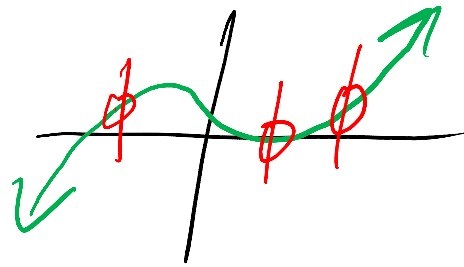
$$x = -1$$

+ Functions - every input (x) only has one output (y)

① Graph - Needs to pass Vertical Line Test

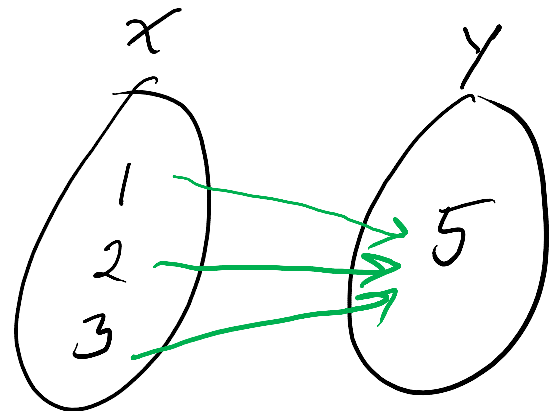
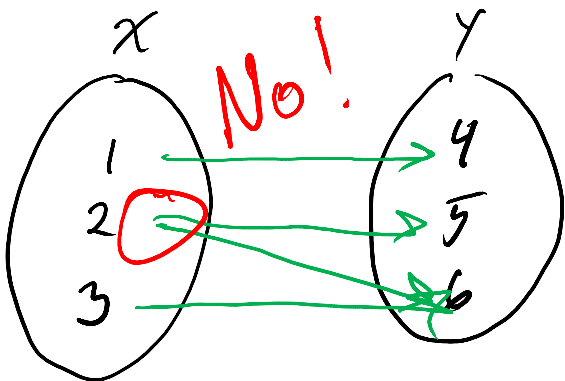


No!



YES!!
😊

② Diagram: Each x can only have one arrow.



YES!!
😊

③ Table/ordered Pair

- x values can't repeat

+ Domain - All possible x -values

+ Range - All possible y -values

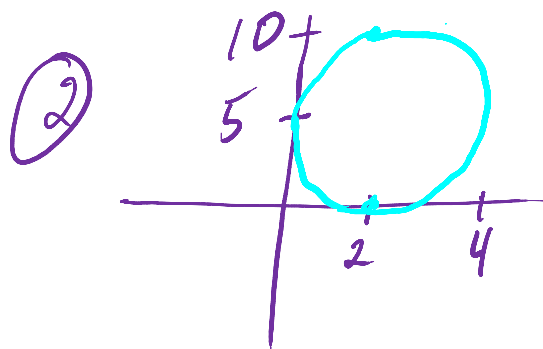
Ex: Find Domain + Range

①

x	y
1	4
2	5
3	4

$$D: \{1, 2, 3\}$$

$$R: \{4, 5\}$$



left to right

$$D: [0, 4]$$

or

$$0 \leq x \leq 4$$

$$R: [0, 10] \text{ or}$$

$$0 \leq y \leq 10$$

+ Function Notation

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

output $\nearrow$

$\nwarrow$ input

$$f(3) = 2 + (3)^2 = 11$$

+ Piecewise Functions

$$f(x) = \begin{cases} 2x & , x < 0 \text{ ①} \\ x^2 & , x \geq 0 \text{ ②} \end{cases}$$

$$f(-5) = 2(-5) = -10$$

$$f(10) = (10)^2 = 100$$

$$f(0) = 0^2 = 0$$

+ Linear Functions

① Point-Slope: $y - y_1 = m(x - x_1)$

② Slope-Intercept: $y = mx + b$

③ Standard Form: $Ax + By = C$

→ NO Fractions

→ A has to be positive

→ $GCF = 1$

+ Slope: $m = \frac{y_2 - y_1}{x_2 - x_1}$

+ x-intercepts: Set $y = 0$

+ y-intercepts: Set $x = 0$

+ Parallel Lines

- same slope

+ Perpendicular

- opposite and reciprocal slopes
(diff signs) (flipped)

+ Transformations

$$y = a(x \pm h) \pm k$$

stretches
($a > 1$)

compresses
($a < 1$)

moves
right (-)

moves
left (+)

moves
up (+)

moves
down (-)

+ Systems AND Matrices

Matrix

- Dimensions (rows by columns)
- Operations
(Add, Sub, Mult)
- Determinant - Down minus Up

2x2

$$\begin{vmatrix} 1 & 0 \\ 5 & 7 \end{vmatrix} = 1(7) - 5(0) = 7$$

3x3

$$\begin{vmatrix} 1 & 0 & 2 \\ 0 & 3 & 4 \\ 5 & 0 & 6 \end{vmatrix}$$

$30 + 0 + 0 = 30$

$18 + 0 + 0 = 18$

$$18 - 30 = \boxed{-12}$$

