Warmup

1) On day 4, we started measuring the amount of bacteria growing in your book bag from when you spilled lotion in it. You measure it for 50 days. The bacteria is doubling in size each day.
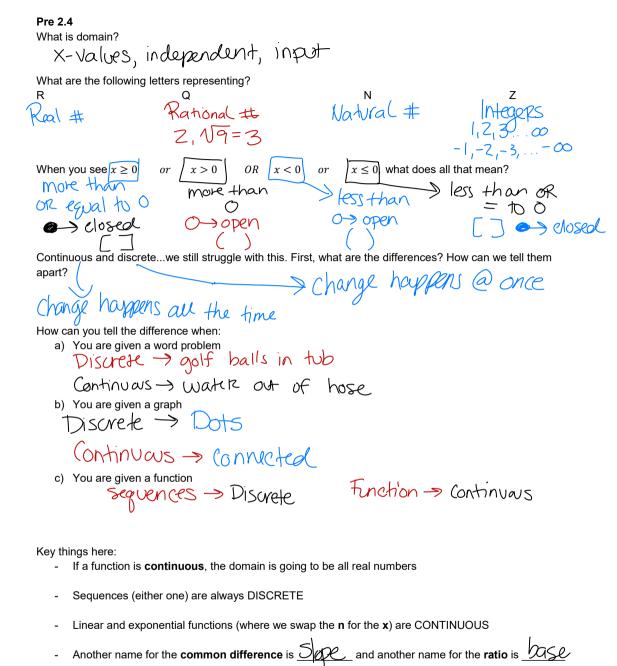
Domain (words, set, interval, inequality   Range (words, set, interval, inequality)

Days   Bacteria
$\{4, 5, 6 \ldots 50\}$ $x < \infty$ $\{2, 4, 8, \ldots 1.41 \times 10^{14}\}$
$[4, 50]$ $[5, \infty)$ $[2, 1.41 \times 10^{14}]$
$4 \le x \le 50$ $5 \le x < \infty$ $2 \le y \le 1.41 \times 10^{14}$

Pre 2.4

What is domain?

X-values, independent, input

What are the following letters representing?

R

Real #

Q

Rational #
2, $\sqrt{9} = 3$

N

Natural #

Z

Integers
1, 2, 3... ∞
-1, -2, -3, ... -∞

When you see $x \geq 0$ or $x > 0$ OR $x < 0$ or $x \leq 0$ what does all that mean?

more than
OR equal to 0
● → closed
[ ]

more than
0
○ → open
( )

less than
○ → open
( )

less than OR
= to 0
[ ] ● → closed

Continuous and discrete...we still struggle with this. First, what are the differences? How can we tell them apart?

→ change happens @ once

Change happens all the time

How can you tell the difference when:

a) You are given a word problem

Discrete → golf balls in tub
Continuous → water out of hose

b) You are given a graph

Discrete → Dots
Continuous → connected

c) You are given a function

Sequences → Discrete   Function → Continuous

Key things here:

- If a function is **continuous**, the domain is going to be all real numbers

- Sequences (either one) are always DISCRETE

- Linear and exponential functions (where we swap the **n** for the **x**) are CONTINUOUS

- Another name for the **common difference** is Slope and another name for the **ratio** is base

- Arithmetic sequences ~ Linear   Geometric sequences ~ exponential

So let's look at the following word problem and see what we can figure out.

Every day you are adding 3 golf balls to a bin that has an infinite amount of space.

1) Continuous or discrete? *(discrete circled)*

2) What would be the domain?

Days $\{0, 1, 2 \dots \infty\}$
$0 \leq x < \infty$

3) Would this be arithmetic or geometric? So is that linear or exponential? How do you know? *(arithmetic and linear circled)*

Add 3 every Day

Let's think back to the leaves that we were raking last week. What were the two options that we could do?

So for the first one where you made $2 a bag, what kind of function is that? Linear
  Would it be continuous or discrete? *(discrete circled)*

    What would be the domain?
      Bags → $\{0, 1, 2 \dots \infty\}$

What did you like about this plan?

  More $ @ the Start

The 2nd option you made $0.02, then $0.04 then $0.08 and so on such that the amount kept doubling.
  Would this be continuous or discrete? *(discrete circled)*   exponential

    What would be the domain?
      Bags

What did you like about this plan?
  Way more $ @ end

Over time, which plan was better? Why?
  B → more $

Sketch a picture of what the two graphs would look like.

same $
same bags
Intersect
A
+2
B
x2