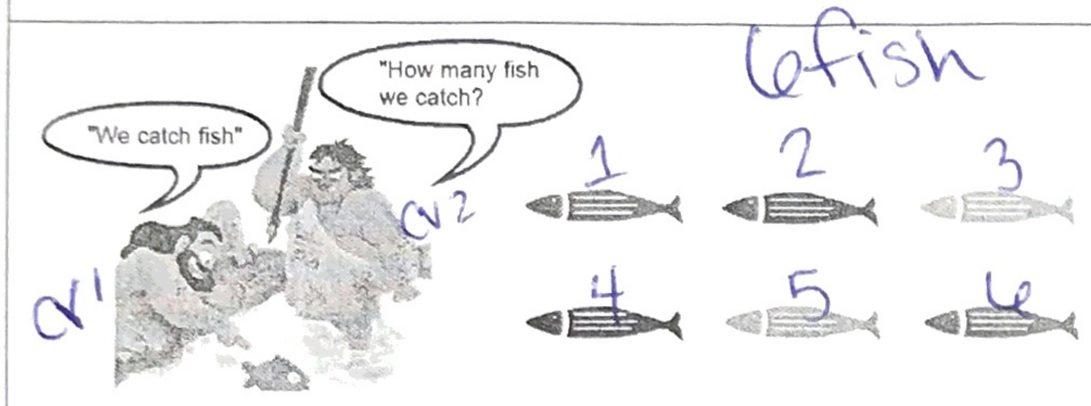
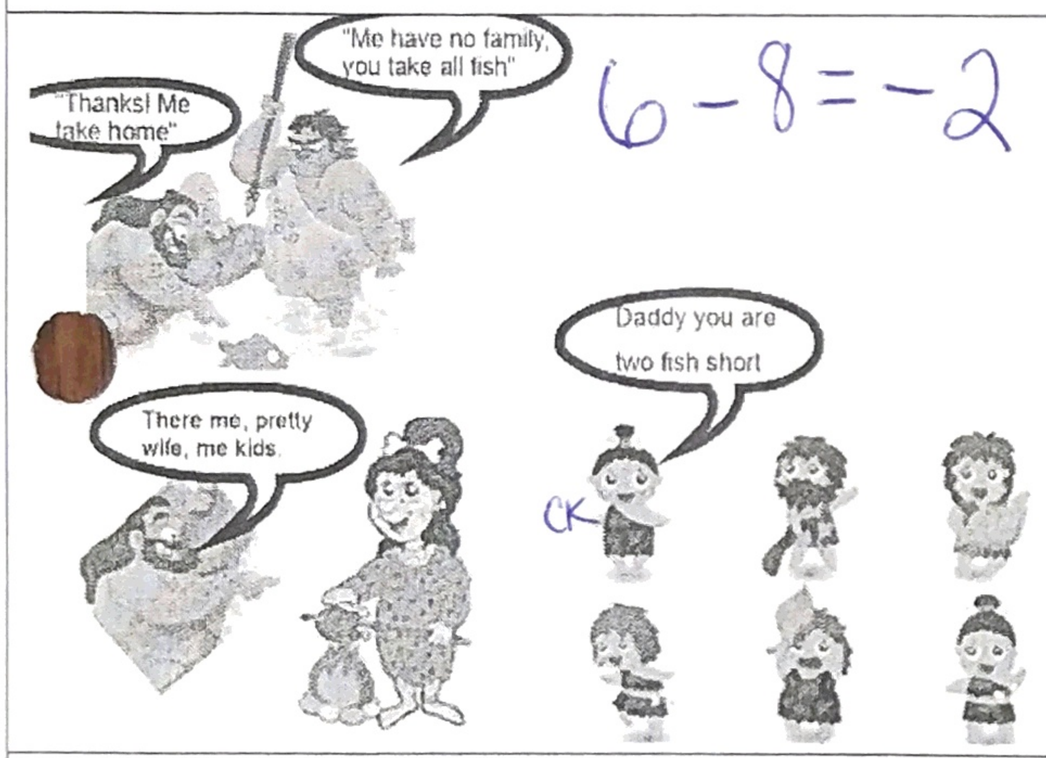
Name: _____ Date: Jan 7 Hour: 7th

Unit 4B Day 14: The Types of Numbers

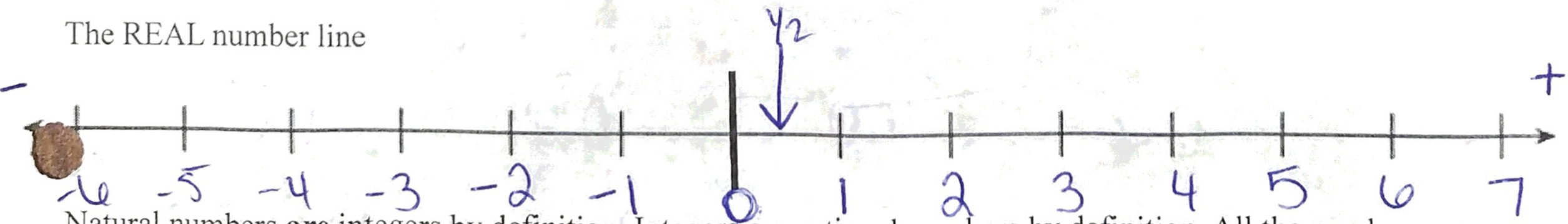
Focus Question: What are the types of numbers that exist?

A. The Story of Numbers:

1. Fill in the number line as the story progresses. Once upon a time…

The Story	The Type of Number	Definition	Examples
 6 fish	Natural:	The #'s you use to count	6 100 2,000,600 1,629
When you started Counting you started at what number? 1 You don't actually count with the number zero.	Whole:	The natural #'s and zero	6 0
 6 - 8 = -2	Integer:	Any positive or negative whole #	-2 -4 -100 -2,000,600 -101 -200
 6 fish / 8 people	Rational:	A # that can be written as a ratio of 2 integers	6/8 100/100 16/29 9/900

The REAL number line



Natural numbers **are** integers by definition. Integers **are** rational numbers by definition. All the numbers you ever knew before this year are rational numbers except for one: π.

2. Show how all of the numbers below meet the definition of rational.

Definition of Rational: A# that can be written as a ratio of 2 integers

Number	Can be re-written as…	Meets the definition of Rational because…
6	$\frac{6}{1}$	6 & 1 are integers written as a ratio
-14	$\frac{-14}{1}$	-14 & 1 are int. written as a ratio
$\sqrt{100}$	10 or $\frac{10}{1}$	10 & 1 are int. wr. as a ratio
$-\sqrt{196}$	-14 or $\frac{-14}{1}$	

B. The number system

At this point you know….

Rational Numbers: $-5,\ 0,\ \frac{8}{3},\ 9$

Integers: $-5,\ 0,\ 9$

Whole Numbers: $0,\ 9$

Natural Numbers: 9

But the Diagram of the REAL Number System actually looks like this….

this yr.

in high school

Complex Numbers

Real Numbers: $-5,\ -\sqrt{3},\ 0,\ \sqrt{5},\ \frac{8}{3},\ 9$

Rational Numbers: $-5,\ 0,\ \frac{8}{3},\ 9$

Integers: $-5,\ 0,\ 9$

Whole Numbers: $0,\ 9$

Natural Numbers: 9

Irrational Numbers: $-\sqrt{3}$, $\sqrt{5}$

Imaginary Numbers: $-4i$, $3+2i$, $2i\sqrt{2}$

1. There are some other numbers you know that do not appear to be on this diagram at all… Decimals

Number	Can be re-written as…	Meets the definition of Rational because…
- 0.5	$-\frac{1}{2}$	-1 & 2 are int. written as ratio
0.8	$\frac{8}{10}$	8 & 10 are….
$0.\overline{3}$	$\frac{1}{3}$	1 & 3 are….
$-0.\overline{1}$	$-\frac{1}{9}$	-1 & 9 are……

2. Decimals are a more easily understood (easier to place on a number line) way to write a rational number. ALL numbers can be written as a decimal.

$2 = 2.0$ $\quad -6 = -6.0$ $\quad \sqrt{16} = 4.0$ $\quad \frac{1}{4} = 0.25$ $\quad \frac{2}{3} = 0.\overline{6}$

An alternate definition of rational number is a # whose decimal repeats or terminates (end).