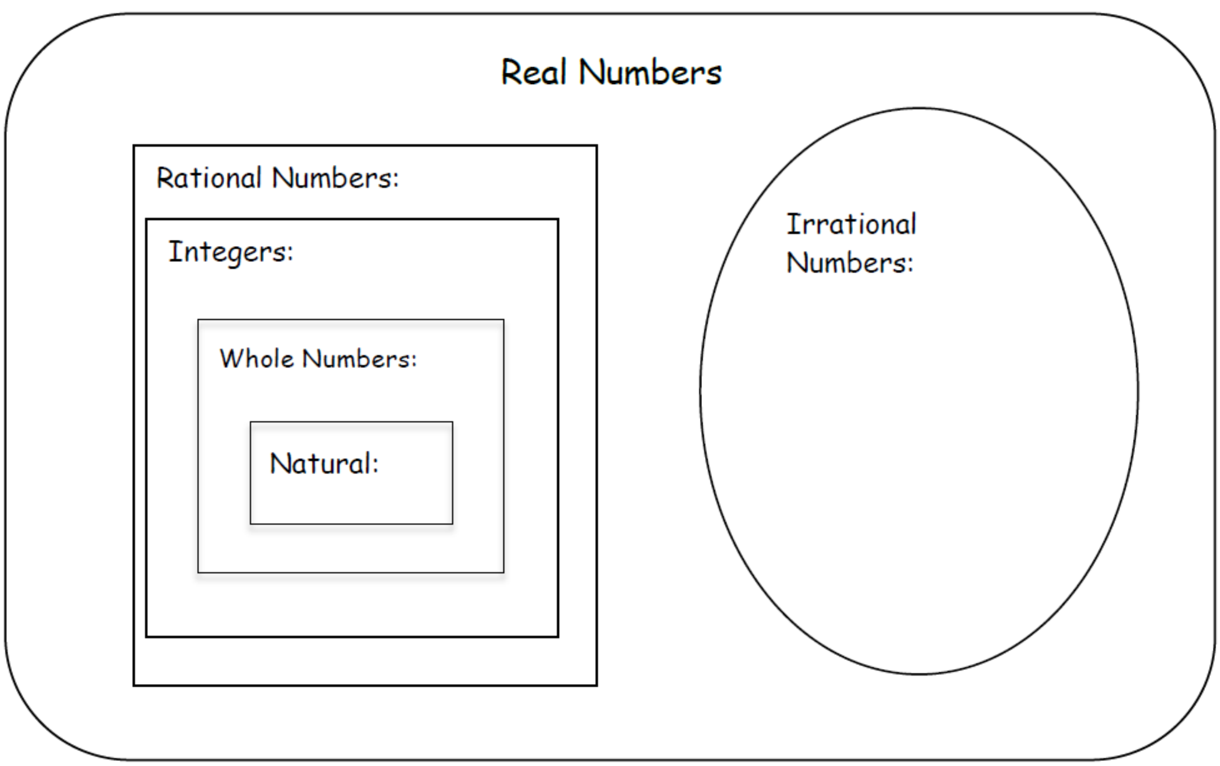
1.1– INTRODUCTION TO RATIONAL NUMBERS

Classification of Numbers (Natural, Whole, Integers, Rational, Irrational, Real) – Nerdstudy
https://www.youtube.com/watch?v=vbPUS-0Wbv4

While watching the video ⇑ , complete the following table:

	Definition	Example
Natural numbers $\mathbb{N}$		
Whole numbers $\mathbb{W}$		
Integers $\mathbb{Z}$		
Real numbers $\mathbb{R}$		
Rational numbers $\mathbb{Q}$		
Irrational number $\mathbb{R}$		



For each of the numbers below <u>check all the boxes that describe the number:</u>

	8	-100	$4.\overline{31}$	$\frac{2}{3}$	0	π	-1.7	$-5\frac{1}{4}$
Natural Number								
Whole Number								
Integers								
Rational Number								
Real Number								
Irrational Number								

Remember the analogy from the video…

If a person is in Tokyo, does that mean that person is also in Japan?

And if this person is in Japan, does that mean they are also in Asia?

This means that numbers in a *<u>smaller set</u>* are always included in the *<u>larger set</u>*
Ex. A natural number like 3, is also an integer.

Again…remember the analogy from the video…

If a person is in Japan, does that mean they are <u>only</u> in Tokyo? No, they could be in Osaka, or anywhere else!

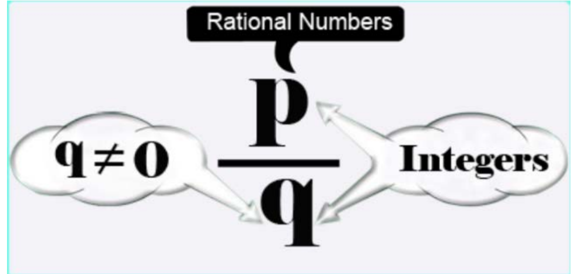
BUT! A number in the *<u>larger set</u>* is NOT necessarily included in the *<u>smaller set</u>*.
Ex. And rational number like $\frac{2}{3}$ is NOT an integer.

<u>TRY THIS:</u>

True or False? A real number is always a whole number.
True or False? A natural number is always a rational number.
True or False? An integer is always a rational number.
True or False? A real number is always an integer.
True or False? An integer is always a natural number.
True or False? An irrational number is always a real number.

Rational Numbers:

- *any number that can be written as a fraction with an integer numerator and non-zero integer denominator.*
- *Decimals that repeat or terminate*



⇨ since every ____________________can be written as a fraction with denominator 1, all integers are also considered r___________________n__________________.

Just as ***integers*** have a pairing numbers of ***opposite sign*** (ie. 5 and -5), ***rational numbers*** have pairing numbers (ie. $\frac{1}{3}$ and $-\frac{1}{3}$)

Negative fractions can have the negative sign appear 3 different ways:
$$\frac{-2}{3}, -\frac{2}{3}, \frac{2}{-3}$$

Reviewing Place Value

hundred millions	ten millions	millions	hundred thousands	ten thousands	thousands	hundreds	tens	units (ones)	decimal	tenths	hundredths	thousandths	ten thousandths	hundred thousandths	millionths	ten millionths	hundred millionths
									•								

___________________ show us what each number is worth: a 3 in the tens spot means you have 3 tens, or ____. A 5 in the tenths position means there are 5 tenths, or ______________________. _____________ are used to fill spaces between the digits we have and the decimal place, both before and after the decimal. Notice that going up from zero we have units (ones), tens, hundreds… going down from the decimal there is no “units” place, and all the places end with “____”: tenths, hundredths, thousandths.

Example 1: In the number 63,407.218; find the place value of each of the following digits:

a) 7 ______________________

b) 0 ______________________

c) 1 ______________________

d) 6 ______________________

e) 3 ______________________

f) 8 ______________________

<u>Mixed Fractions ←→ Improper Fractions</u>

<u>Example #1:</u> Write each mixed fraction as an **improper fraction**

a) $3\frac{2}{3}$ b) $4\frac{1}{2}$ c) $2\frac{6}{7}$

How do you convert a fraction to a decimal? (write each number to 3 decimal places)

a) $\frac{7}{16}$ b) $\frac{3}{5}$ c) $\frac{10}{16}$

<u>Example #2:</u> Write each improper fraction as a mixed fraction.

a) $\frac{5}{2}$ b) $\frac{9}{4}$ c) $\frac{17}{3}$

<u>Example #3:</u> Write 3 **rational numbers** between each pair of numbers.

a) 1.25 and -3.26

b) -0.25 and -0.26

c) -½ and ¼

d) –½ and –¼

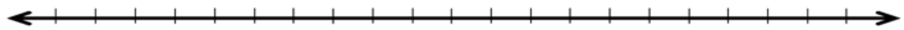
Section 1.1 pg 11
Questions #1-4

Example #4:

How do we calculate the area of a square?

A square trampoline has a **side length of 3.7 m.**

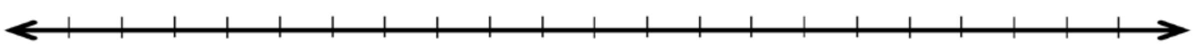
Estimate and then **calculate** the **area of the trampoline**.



If we know the area of a square trampoline, how can we find the length of one side of the trampoline?

$\sqrt{1} = 1$ since $1^2 = 1$
$\sqrt{4} = 2$ since $2^2 = 4$
$\sqrt{9} = 3$ since $3^2 = 9$
$\sqrt{16} = 4$ since $4^2 = 16$
$\sqrt{25} = 5$ since $5^2 = 25$
$\sqrt{36} = 6$ since $6^2 = 36$
$\sqrt{49} = 7$ since $7^2 = 49$
$\sqrt{64} = 8$ since $8^2 = 64$
$\sqrt{81} = 9$ since $9^2 = 81$
$\sqrt{100} = 10$ since $10^2 = 100$

If a square trampoline has an **area of 13.388 m^2,** *what is the length of one side* of the trampoline?

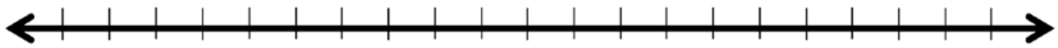


Example #5:

Order the following numbers from **least to greatest**.

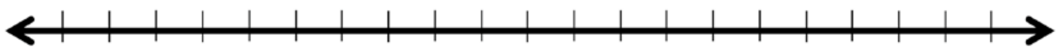
Record the numbers on a number line.

a) 0.35, 2.5, -0.6, 1.7, -3.2, $-0.\overline{6}$



b) $\frac{-3}{8}$, $\frac{5}{9}$, $\frac{-10}{4}$, $-1\frac{1}{4}$, $\frac{7}{10}$, $\frac{8}{3}$

two methods: (i) get common denominator and then compare
(ii) change to decimal form then compare



c) 1.13, $-\frac{10}{3}$, -3.4, $-2.\overline{7}$, $\frac{3}{7}$, $-2\frac{2}{5}$ *(*change fractions to decimals)*

Section 1.1 pg. 11-13
Questions # 5ab, 6cd, 7ab, 8, 9ab, 10a, 13, 18, 20, 21 **extension 23 & 24**