Math 9 – Unit 1: Real Numbers

Lesson #1: Rational and Irrational Numbers

Learning Goal: We are learning to relate rational numbers to decimals, fractions, and integers.

Welcome to the wonderful and beautiful world of Mathematics. Math is a language with its own syntax, grammar, and rules. Also, for Math to be readable and elegant (yes, it can be elegant), it needs to be written in a certain way. It is essential that you learn and adapt to this structure. First, we begin by looking at real numbers.

A real number is any number that you can think of.

$$ex: 6.989$$
, 21 , 0 , $M = 3.19159...$
Another set of numbers of interests are integers. Integers are non decimal
 $ex: -8$, 10 , 101 ...
Within the real numbers are two different sets (or types) of numbers:
A rational number is: a number which can be written $\sqrt{9} = 3$
 as the ratio of two integers, a and b, $-3x-3=9$
but b cannot equal zero. $\frac{a}{b}$
 \Rightarrow A rational number is a number which can be written as a fraction
An irrational number is: a number which can be written as a fraction
An irrational number is a number which cannot be written as a fraction
 $ex: R = 3.19157...$ with no pattern.

State if the following are rational or irrational: or neither.

a)
$$\frac{1}{2}$$
 b) $\frac{-3}{0}$ c) $\frac{-0}{4}$
Rational neither, not att of the second seco

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Rational numbers can be represented as fractions or decimals. In decimal form, it can <u>terminate</u> ___.A <u>repeating</u> _____ decimal has a period and a length of period. repeat to what is repeating show many digits gits of period: are repeating. Write the fraction as a decimal, then state the period and length of period: b) $\frac{10}{7} = 1.928571$ c) $\frac{5}{12} = 0.976$ a) $\frac{2}{3} = O.6$ Period: 6 P: 428571 Length of Period: 1 LOP: 6 LoP:

If the decimal is a terminating decimal, it can be quickly converted to a fraction. (Repeating decimals can be converted, but it can be more complicated and we will not do it here.) The denominator is the place value of the right-most digit. The numerator is the number without the decimal. To finish it off, simplify the fraction to lowest terms.

Write the decimal as a fraction in lowest terms:

a)
$$0.6^{-1} + 145$$

 $= \frac{6+2}{10+2}$

 $= \frac{142+2}{10+2}$

 $= \frac{142+2}{100+2}$

 $= \frac{-875+5}{1000+5}$

 $= \frac{-875+5}{1000+5}$

 $= \frac{-175+5}{200+5}$

 $= -\frac{13}{5}$

 $= -\frac{35+5}{8}$

 $= -\frac{7}{8}$

Put the following numbers in order from lowest to highest:

$$\frac{1}{3}, 0.33, \frac{9}{24}, \sqrt{10}, \frac{3}{10}$$

$$0.3, 0.33, 0.375, 3.16, 0.3$$

$$0.3, 0.33, 0.375, 3.16, 0.3$$

Success Criteria:

- I can identify rational and irrational numbers
- I can convert between decimals and fractions
- I can state the period and length of period of a repeating decimal

 $l(=0,\overline{1})$ $O,\overline{9} = \frac{9}{9} = 1$