MTH1W

Math 9 – Unit 1: Real Numbers

Name: Mr. Hagen

Lesson #1: Rational and Irrational Numbers

Date: Nov 16, 2022

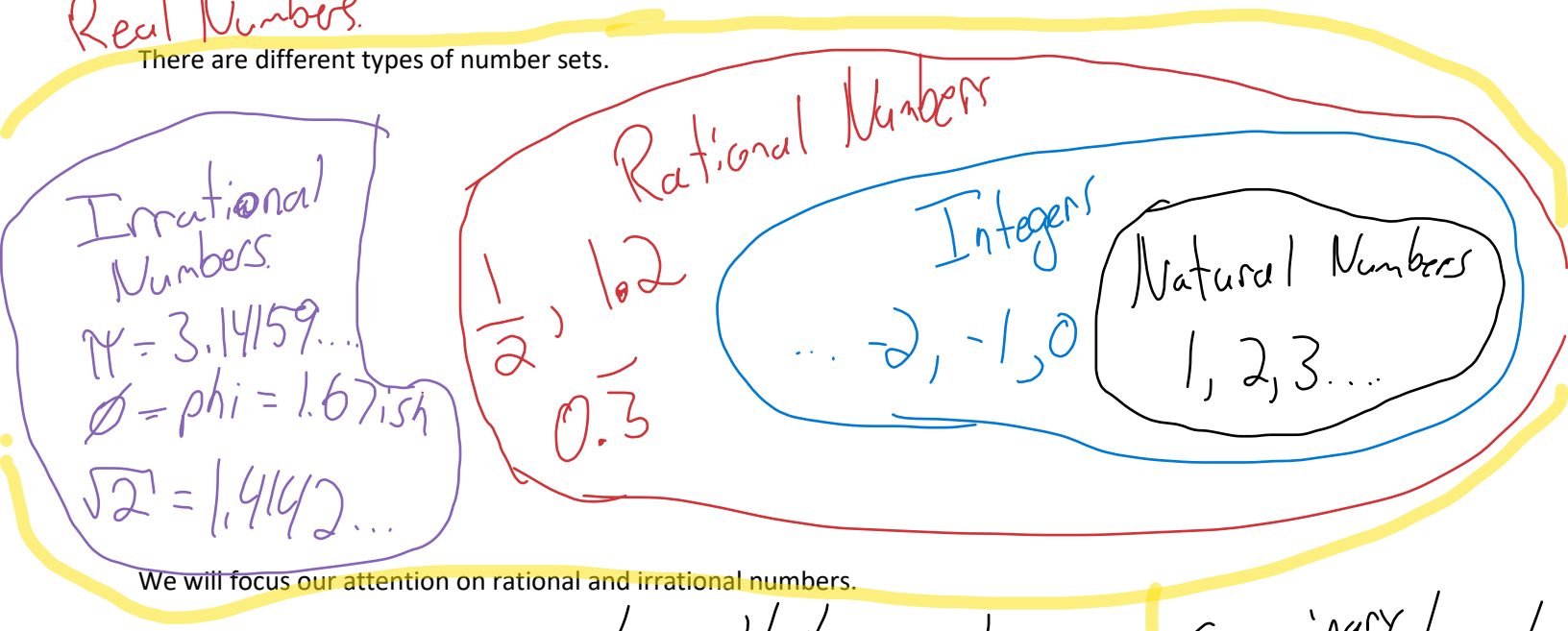
Learning Goal: We are learning to relate rational numbers to decimals, fractions, and integers.

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 sets of numbers.

A set is a collection of things ex: this math class, Stamp collection

Real Numbers.

There are different types of number sets.



We will focus our attention on rational and irrational numbers.

A rational number is: any number that can be written as a ratio/fraction of two integers, but the denominator cannot equal zero.

→ $\frac{a}{b}$, $b \neq 0$

Imaginary Numbers/complex

$\sqrt{-1}$ $\sqrt{-3}$ $\sqrt{-9}$

An irrational number is:

→ a number which cannot be written as a fraction.

MTH1W

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

cannot have a negative square root.

a) $\frac{1}{2}$ R

b) $\frac{-3}{0}$ = undefined N

c) $\frac{-0}{4}$ = 0 R

d) $\sqrt{5}$ I

e) $\sqrt{-9}$ N

Rational numbers can be represented as fractions or decimals. In decimal form, it can terminate or repeats.

Write the fraction as a decimal:

a) $\frac{2}{3}$ = top ÷ bottom ÷ = $0.\overline{6}$ repeating

b) $\frac{3}{8}$ = 0.375

c) $\frac{10}{7}$ = $1.\overline{428571}$

d) $\frac{5}{12}$ = $0.41\overline{6}$

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 tenths

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

$= \frac{3}{5}$

b) 1.42 hundredths

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

$= \frac{71}{50} = 1\frac{21}{50}$

proper fraction, mixed fraction

c) −0.875 thousandths

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

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

$= \frac{-35 \div 5}{40 \div 5} = \frac{-7}{8}$

d) −3.25 hundredths

$= \frac{-325 \div 5}{100 \div 5}$

$= \frac{-65 \div 5}{20 \div 5}$

$= \frac{-13}{4}$

Finally, rational numbers can also be written as a percent. Convert the following to a percent.

a) 0.32 × 100 (when you have a decimal) = 32%

b) 1.045 × 100 = 104.5%

c) $\frac{7}{25} \times \frac{4}{4}$ = 0.28 × 100 = 28%

$= \frac{28}{100}$

= 28%

d) $\frac{23}{32}$ = 0.71875 × 100 (out of 100)

= 71.875%

≈ 72%

MTH1W

Complete the chart:

FRACTION	DECIMAL	PERCENT
$^3/_5$	0.6	60%
$\frac{64}{100} \div 2 = \frac{32}{50} \div 2 = \frac{16}{25}$	0.64	64%
$\frac{55}{100} \div 5 = \frac{11}{20}$	0.55	55%
$\frac{16}{100} \div 2 = \frac{8}{50} \div 2 = \frac{4}{25}$	0.16	16%
$^{17}/_{100}$	0.17	17%
$\frac{35}{100} \div 5 = \frac{7}{20}$	0.35	35%
$\frac{28}{100} \div 2 = \frac{14}{50} \div 2 = \frac{7}{25}$	0.28	28%

Success Criteria:

- I can identify rational and irrational numbers
- I can convert between decimals, fractions and percents