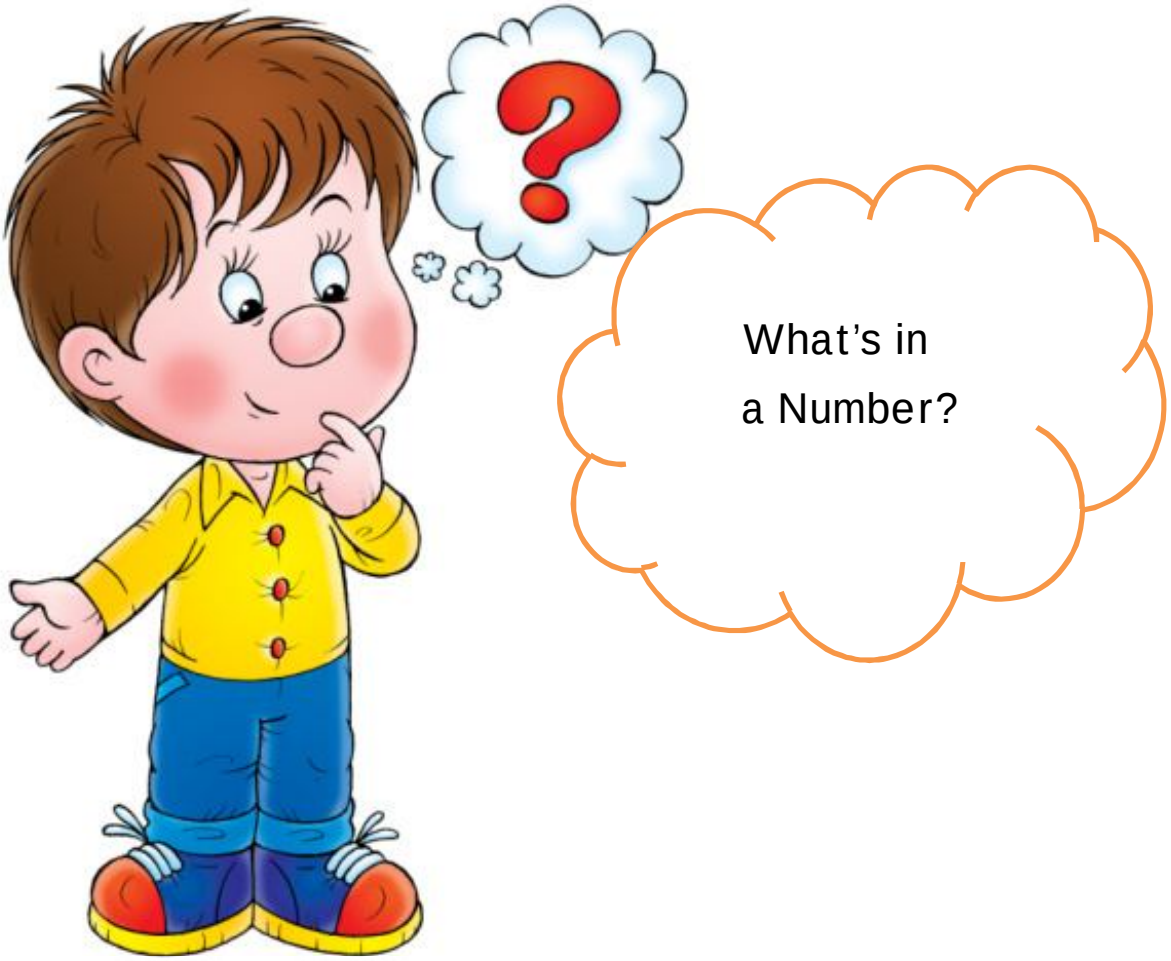
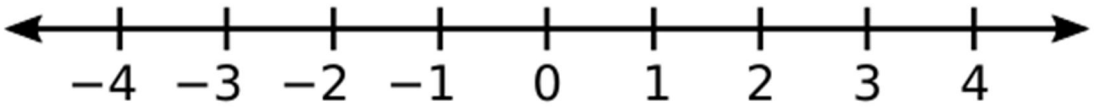
Name _____ .

# Math 9

# (MTH1W)

## Unit 1: Real Numbers



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**Math 9 – Unit 1: Real Numbers**

Name: Mr. Hagen

**Lesson #1: Rational and Irrational Numbers**

Date: Sept 10, 2021

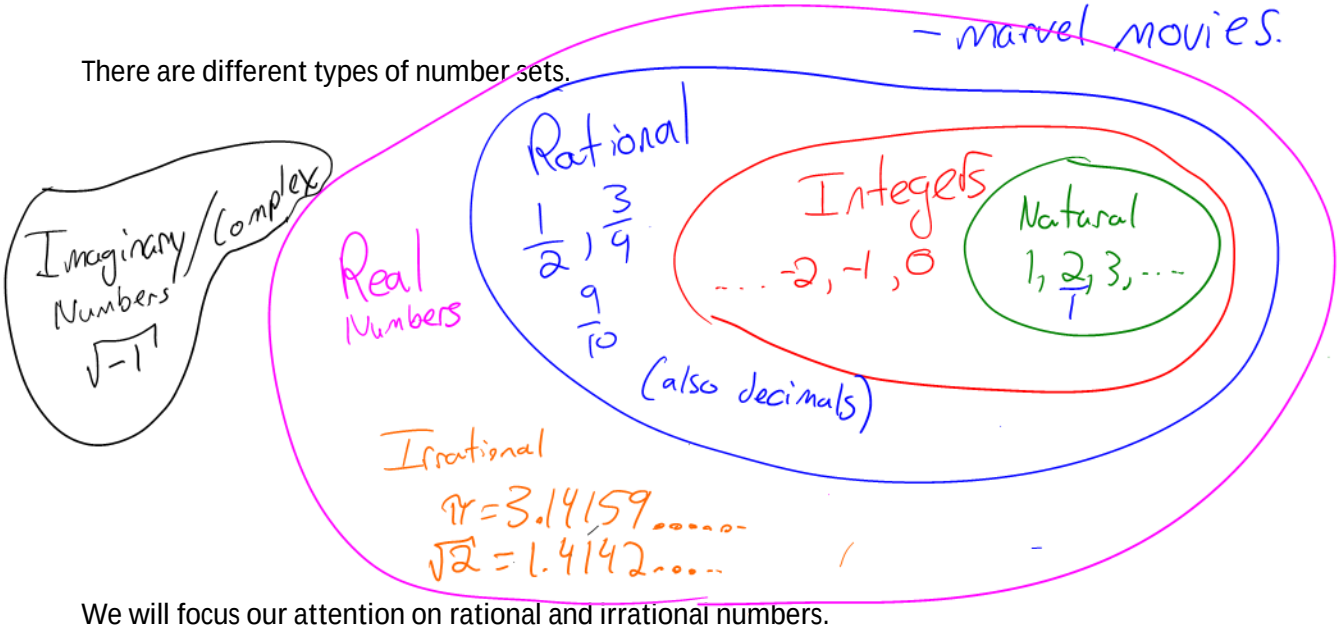
**Learning Goal**: We are learning to relate rational numbers to decimals, fractions, and integers.

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 objects.

ex: - math students
- your family
- marvel movies.

There are different types of number sets.




We will focus our attention on rational and irrational numbers.

A rational number is: a ratio of two integers, a and b, where b cannot equal zero.

$\rightarrow \frac{a}{b}$ ex: $\frac{1}{2}$, $\frac{-5001}{2006}$,

$\frac{5}{0}$ = undefined.
Cannot divide by zero

An irrational number is: a number which cannot be written as a fraction.

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$\sqrt{25} = 5$


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

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

b) $\frac{-3}{0}$ 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 (stop) or repeat.

**Write the fraction as a decimal:**

a) $\frac{2}{3}$ $2 \div 3 = 0.6666\ldots = 0.\overline{6}$

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)

$= \frac{142 \div 2}{100 \div 2} = \frac{71}{50} = 1\frac{21}{50}$

c) −0.875 (thousandths)

$= \frac{-875 \div 5}{1000 \div 5} = \frac{-175 \div 5}{200} = \frac{-35}{40} \div 5 = -\frac{7}{8}$

d) −3.25

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

a) 0.32 $\times 100$ → 32%

32%

b) 1.045 $\times 100$ → 104.5%

105%

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

d) $\frac{23}{32}$ 100% = whole, 50% = half

$= 0.71.875 \times 100$

$= 71.875\%$

$= 72\%$

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Complete the chart:

| FRACTION | DECIMAL | PERCENT |
|---|---|---|
| $^3/_5$ | 0.60 | 60% |
| $\frac{64}{100} = \frac{32}{50} = \frac{16}{25}$ | 0.64 | 64% |
| $\frac{55}{100} = \frac{11}{20}$ | 0.55 | 55% |
| | 0.16 | |
| $^{17}/_{100}$ | | |
| | 0.35 | |
| | | 28% |

**Success Criteria**:

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