

Real Numbers

Estefany Gebert

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1 Types of Numbers

1.1 Whole Numbers

$(0, 1, 2, 3, 4)$

1.2 Natural Numbers

These are also known as "counting numbers".

$(1, 2, 3, 4...)$

1.3 Integers

Any whole number that does not have decimal or fractional part.

$(-3, -2, -1, 0, 1, 2, 3, 4...)$

1.4 Even Numbers

These numbers can be easily divisible by two.

$(2, 4, 6, 8...)$

1.5 Odd numbers

Number NOT easily divisible by two.

$(1, 3, 5, 7...)$

1.6 Prime Number

Numbers that are not evenly divisible by themselves or one.¹

$(2, 3, 5, 7, 11, 13, 17, 19, 23...)$

1.7 Irrational Number

A decimal number that goes on forever and does not repeat.²

$(3.1415926..., \sqrt{2})$

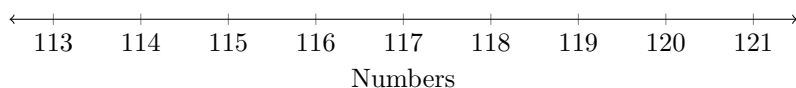
1.8 Rational Number

The opposite of an irrational number. These numbers will eventually end or start repeating.

$(3.5, 3.33333...)$

1.9 Number Line

All real numbers can be found on the number line.



¹Two is the only even prime number.

² π is probably the most famous irrational number.

1.10 Examples of real Numbers

$$\sqrt{81} = 9$$

$$\sqrt{49} = 7$$

$$\sqrt{25} = 5$$

$$\sqrt{\text{NegativeNumber}} = \text{NOTREAL}$$

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2 Word Problems

2.1 Adding

These are words that you will want to recognize as addition when reading a Math problem.

- Add
- Sum
- Total
- Increase
- Plus

2.2 Subtracting

Same as addition, these are words to recognize when reading a word problem dealing with subtraction.

- Subtract
- Minus
- Decrease
- Take Away
- Less than
- from

2.3 Multiply

Words that point to multiplication.

- Product
- Times
- Of

2.4 Dividing

Words to be recognized when one needs to divide.

- Divisible
- Divide
- Division
- Quotient
- Into
- Per

³Imaginary Numbers are for another lesson.

3 Examples

3.1 simplify

$$6 \times (7 - 4) \div 3 + 8 - 3$$

$$6 \times (3) \div 3 + 8 - 3$$

$$18 \div 3 + 8 - 3$$

$$6 \div 3 + 8 - 3$$

$$6 \div 8 - 3$$

$$14 - 3$$

$$11$$

3.2 Round the Numeral

- 85,379
 - Nearest Thousands Place: 85,000
 - Nearest Tens Place: 85,380

3.3 Expanded Notation

- This is the Standard Form: 85,379.
- This is the Expanded Notation:

$$80,000$$

$$5,000$$

$$300$$

$$70$$

$$9$$

3.4 Fractions

These are part of a whole.

$$\frac{3}{5} \tag{1}$$

3.5 Reducing Fractions

Common Multiple.

$$\frac{2 \div 2}{4 \div 2} = \frac{1}{2} \tag{2}$$

- $2 = (2, 4, 6, 8, 10, 12, \dots)$
- $4 = (4, 8, 12, 16, 20, 24, \dots)$

Common Factor.

- $2 = 1, 2$
- $4 = 1, 2, 4$

2 is the Greatest Common Factor.

$$\frac{8}{24} = \frac{8 \div 8}{24 \div 8} = \frac{1}{3} \tag{3}$$

3.6 Simple Fractions

- Proper: Numerator is smaller than denominator.

$$\frac{3}{4} \quad (4)$$

$$\frac{1}{2} \quad (5)$$

- Improper: Numerator is larger than denominator.

$$\frac{4}{3} \quad (6)$$

$$\frac{2}{1} \quad (7)$$

3.7 Complex Fractions

- Mixed Numbers:

$$3\frac{2}{5} \quad (8)$$

- Decimals: 3.5, 5.975

3.8 Dividing Fractions

- Reciprocal "multiplicative inverse"

$$\frac{A}{B} \div \frac{N}{D} = \frac{A}{B} \times \frac{D}{B} \quad (9)$$

3.9 Simplify:

$$\frac{10 + 7}{0} = \frac{17}{0} \quad (10)$$

- Anything Divided by Zero will always be Zero.

3.10 Adding Fractions

•

$$\frac{2}{5} + \frac{3}{5} = 1 \quad (11)$$

•

$$\frac{5}{8} + \frac{1}{8} = \frac{6}{8} = \frac{1}{4} \quad (12)$$