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Real Numbers and the Number Line

Unit 1 Lesson 3

REAL NUMBERS AND THE NUMBER LINE

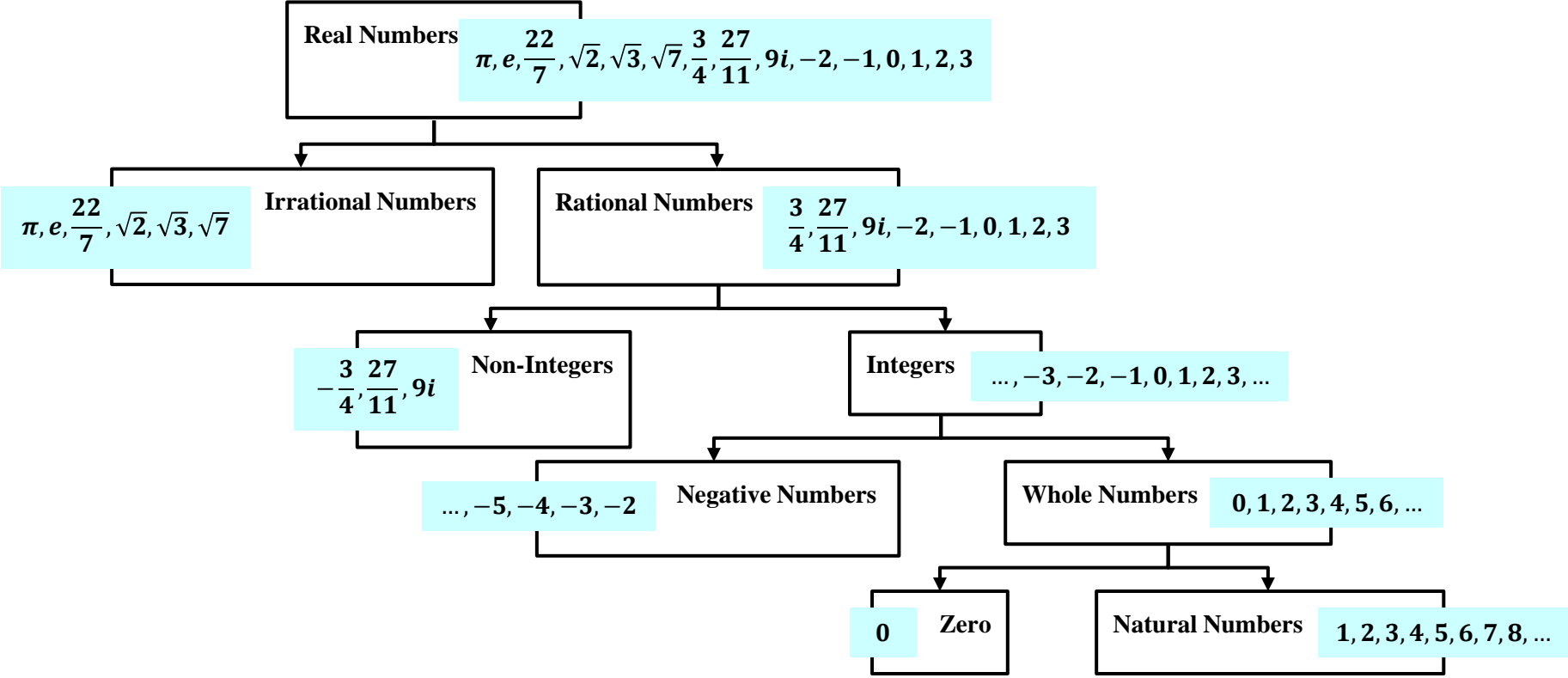
Students will be able to:

graph and compare real numbers using the number line.

Key Vocabulary:

- Real Number
- Non-Integers
- Numbers
- Natural Numbers
- Plot
- Rational Number
- Integers
- Whole Numbers
- Number line
- Absolute Value
- Irrational number
- Negative Numbers
- Zero
- Graph

REAL NUMBERS AND THE NUMBER LINE



REAL NUMBERS AND THE NUMBER LINE

REAL NUMBERS are the set of numbers that is formed by combining the rational numbers and the irrational numbers.

IRRATIONAL NUMBERS are the set of all numbers whose decimal representation are neither terminating nor repeating. It cannot be expressed as a quotient of integers.

RATIONAL NUMBERS are the set of all numbers which can be expressed in the form: $\frac{a}{b}$, where a and b are integers and b is not equal to 0 , written $b \neq 0$. It can be expressed as terminating or repeating decimals.

REAL NUMBERS AND THE NUMBER LINE

NON-INTEGERS are the set of all numbers that is neither a positive whole number, nor a negative whole number, nor zero. These include decimals, fractions, and imaginary numbers.

INTEGERS are the set of numbers formed by positive whole numbers, negative whole numbers, and zero.

NEGATIVE NUMBERS are numbers less than zero and usually mean a value that is a deficit or shortage.

REAL NUMBERS AND THE NUMBER LINE

WHOLE NUMBERS are the set of numbers formed by adding 0 to the set of natural numbers.

ZERO denotes the absence of all magnitude or quantity.

NATURAL NUMBERS are used for counting.

REAL NUMBERS AND THE NUMBER LINE

Sample Problem 1: Determine which of the numbers given below are:

-0.2 0 $0.\overline{3}$ $0.71771777177771\dots$
 π 6 7 41 51

- a. Integers
- b. Rational Numbers
- c. Irrational Numbers
- d. Real Numbers
- e. Natural Numbers
- f. Non-integers

REAL NUMBERS AND THE NUMBER LINE

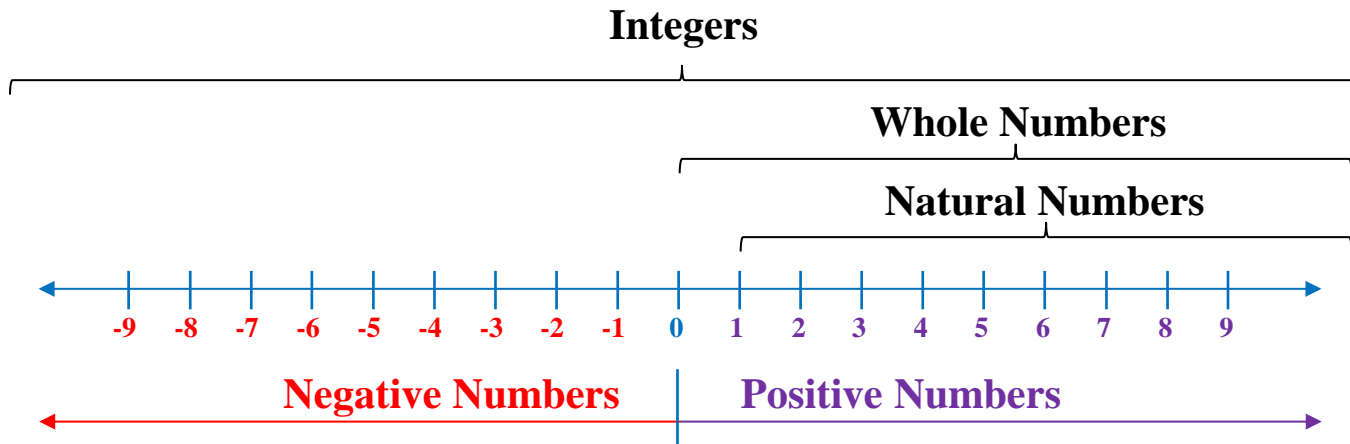
Sample Problem 1: Determine which of the numbers given below are:

-0.2 0 $0.\overline{3}$ $0.71771777177771 \dots$
 π 6 7 41 51

- a. Integers $0, 6, 7, 41, 51$
- b. Rational Numbers $-0.2, 0, 0.\overline{3}, 6, 7, 41, 51$
- c. Irrational Numbers $0.71771777177771 \dots, \pi$
- d. Real Numbers $-0.2, 0, 0.\overline{3}, 6, 7, 41, 51, 0.71771777177771 \dots, \pi$
- e. Natural Numbers $6, 7, 41, 51$
- f. Non-integers $-0.2, 0.\overline{3}$

REAL NUMBERS AND THE NUMBER LINE

NUMBER LINE is used to show the sets of natural numbers, whole numbers, and integers. Also, it can be used to show the set of rational numbers. The point that corresponds to a number is the **graph** of the number, and drawing the point is called **graphing** the number or **plotting** the point.

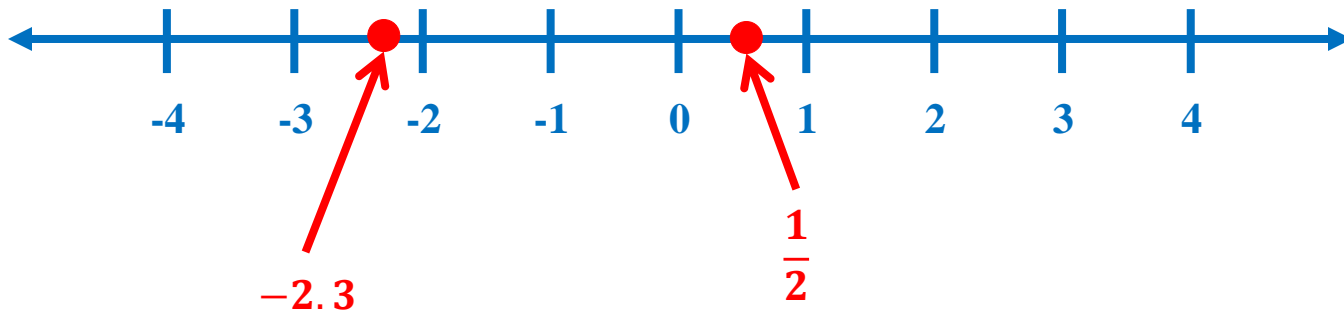


REAL NUMBERS AND THE NUMBER LINE

Sample Problem 2: Graph the numbers -2.3 and $\frac{1}{2}$ on the number line.

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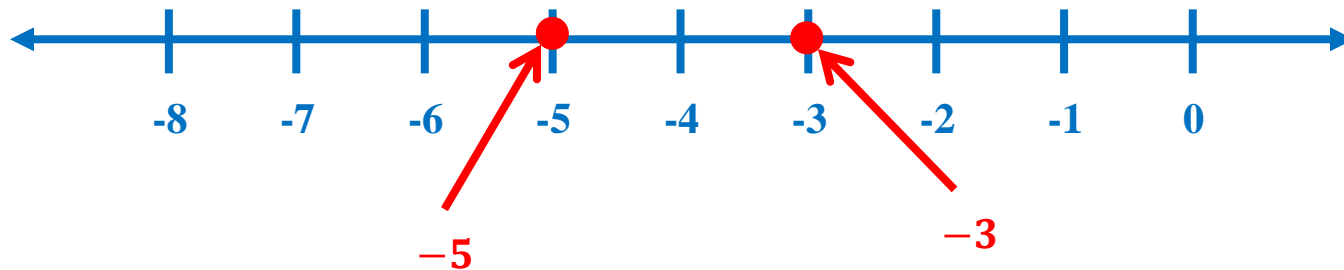


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Sample Problem 3: Graph the numbers -3 and -5 on the number line and write two inequalities that compare the two numbers.

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$$-5 < -3$$

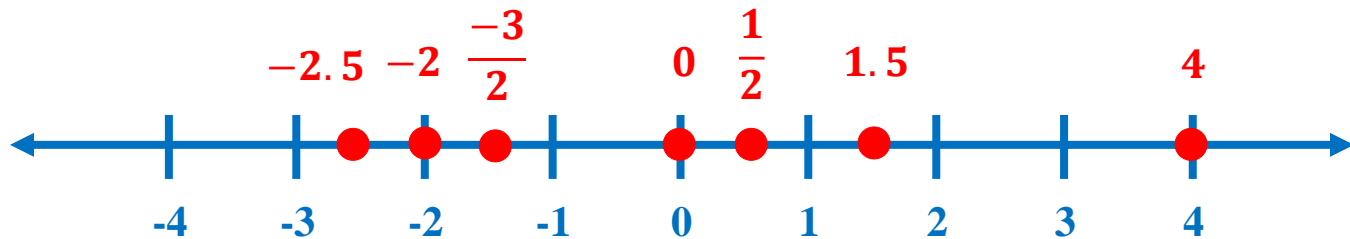
$$-3 > -5$$

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Sample Problem 4: Graph the numbers -2 , 4 , 0 , 1.5 , $\frac{1}{2}$, $-\frac{3}{2}$ and -2.5 on the number line and write the numbers in increasing order.

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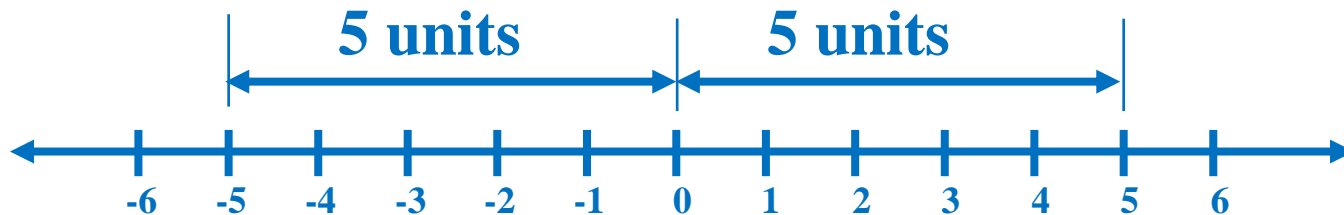
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-2.5 , -2 , $-\frac{3}{2}$, 0 , $\frac{1}{2}$, 1.5 , 4

REAL NUMBERS AND THE NUMBER LINE

ABSOLUTE VALUE of a real number is the distance between the origin and the point representing the real number. The symbol $|x|$ represents the absolute value of a number x .



$$|-5| = 5$$

The distance of -5 to the origin is 5
units.

$$|5| = 5$$

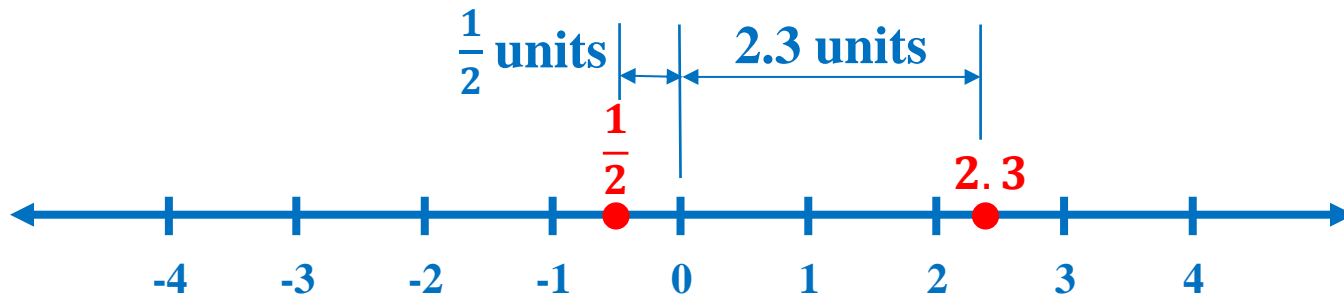
The distance of 5 to the origin is 5
units.

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Sample Problem 5: Evaluate and graph the numbers $|2.3|$ and $\left|-\frac{1}{2}\right|$ on the number line.

REAL NUMBERS AND THE NUMBER LINE

Sample Problem 5: Evaluate and graph the numbers $|2.3|$ and $|\frac{1}{2}|$ on the number line.



$$|2.3| = 2.3 \text{ units}$$

$$|\frac{1}{2}| = \frac{1}{2} \text{ units}$$