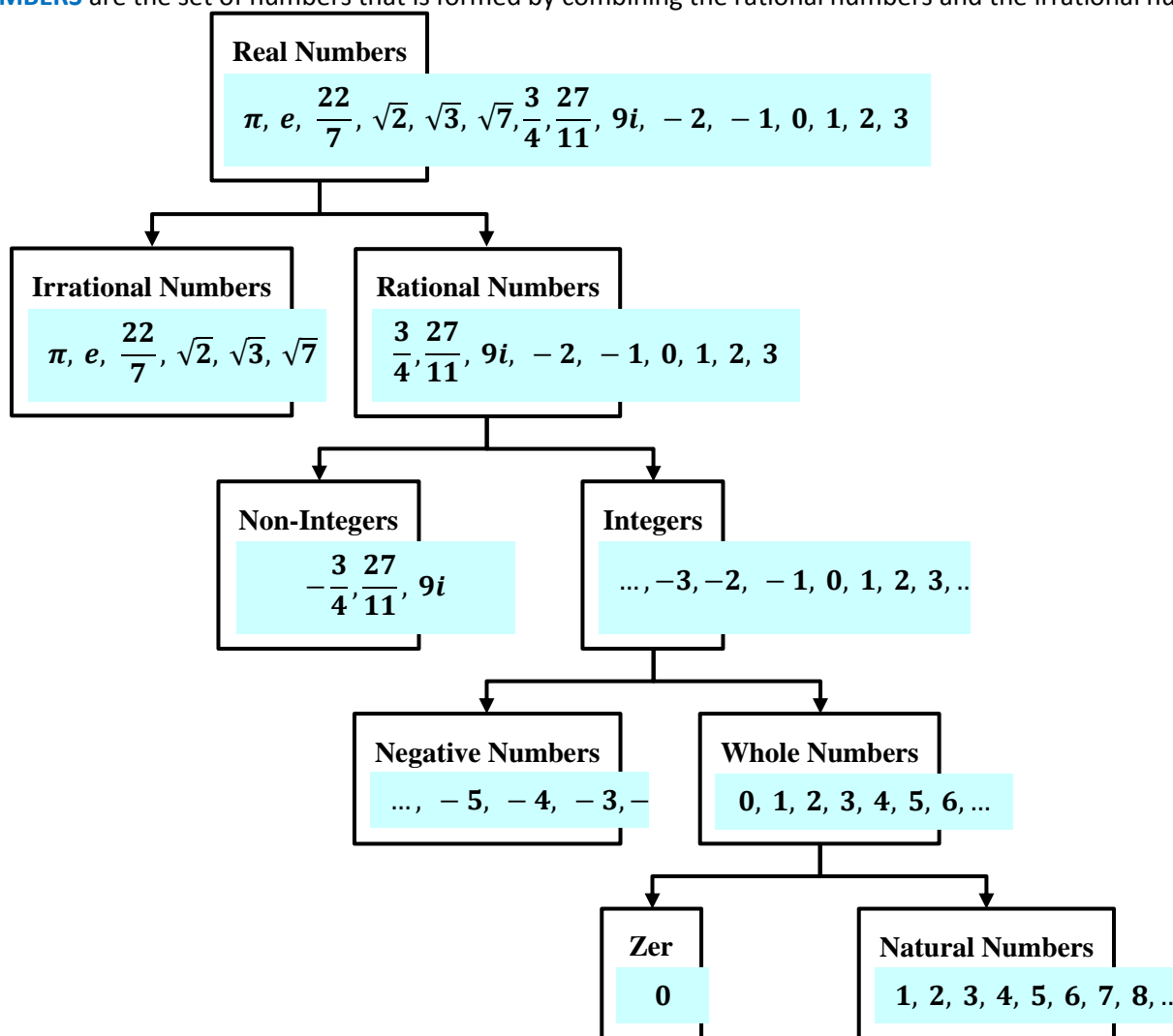


# Real Numbers and the Number Line Guide Notes

**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.

**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.

**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.

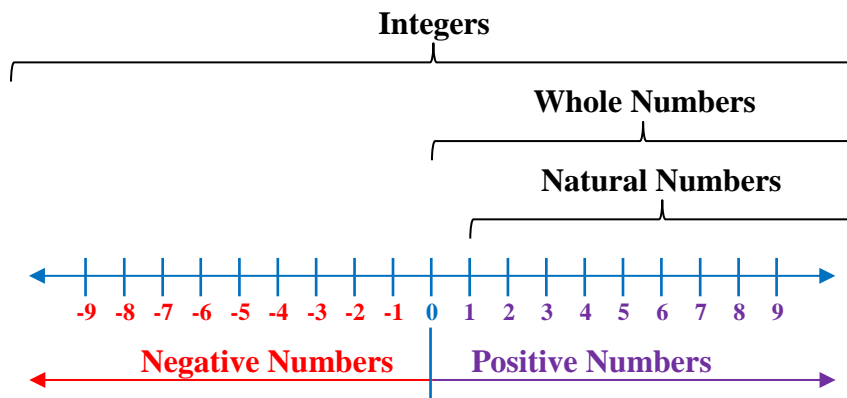
# Real Numbers and the Number Line Guide Notes

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

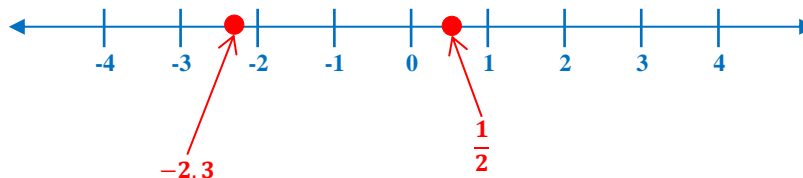
$-0.2$      $0$      $0.\overline{3}$      $0.71771777177771\dots$      $\pi$      $6$      $7$      $41$      $51$

- 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                **$-0.2, 0.3$**

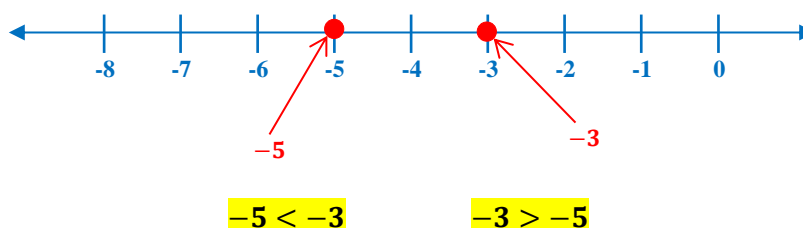
**NUMBER LINE** is used to show the sets of natural numbers, whole numbers, and integers. Also, it can be used to show the set of rational numbers. The point that corresponds to a number is the **graph** of the number, and drawing the point is called **graphing** the number or **plotting** the point.



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



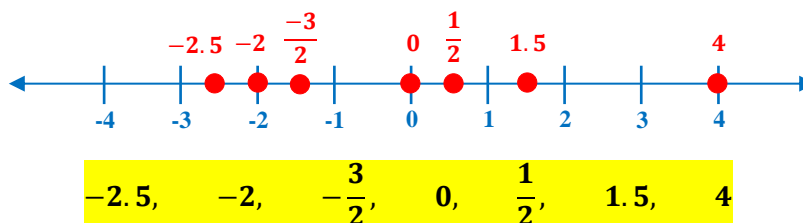
**Sample Problem 3:** Graph the numbers  $-3$  and  $-5$  on the number line and write two inequalities that compare the two numbers.



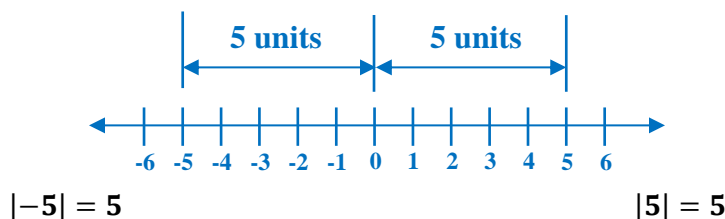
# Real Numbers and the Number Line

## Guide Notes

**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.



**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  $x$ .



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

The distance of 5 to the origin is 5 units.

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

