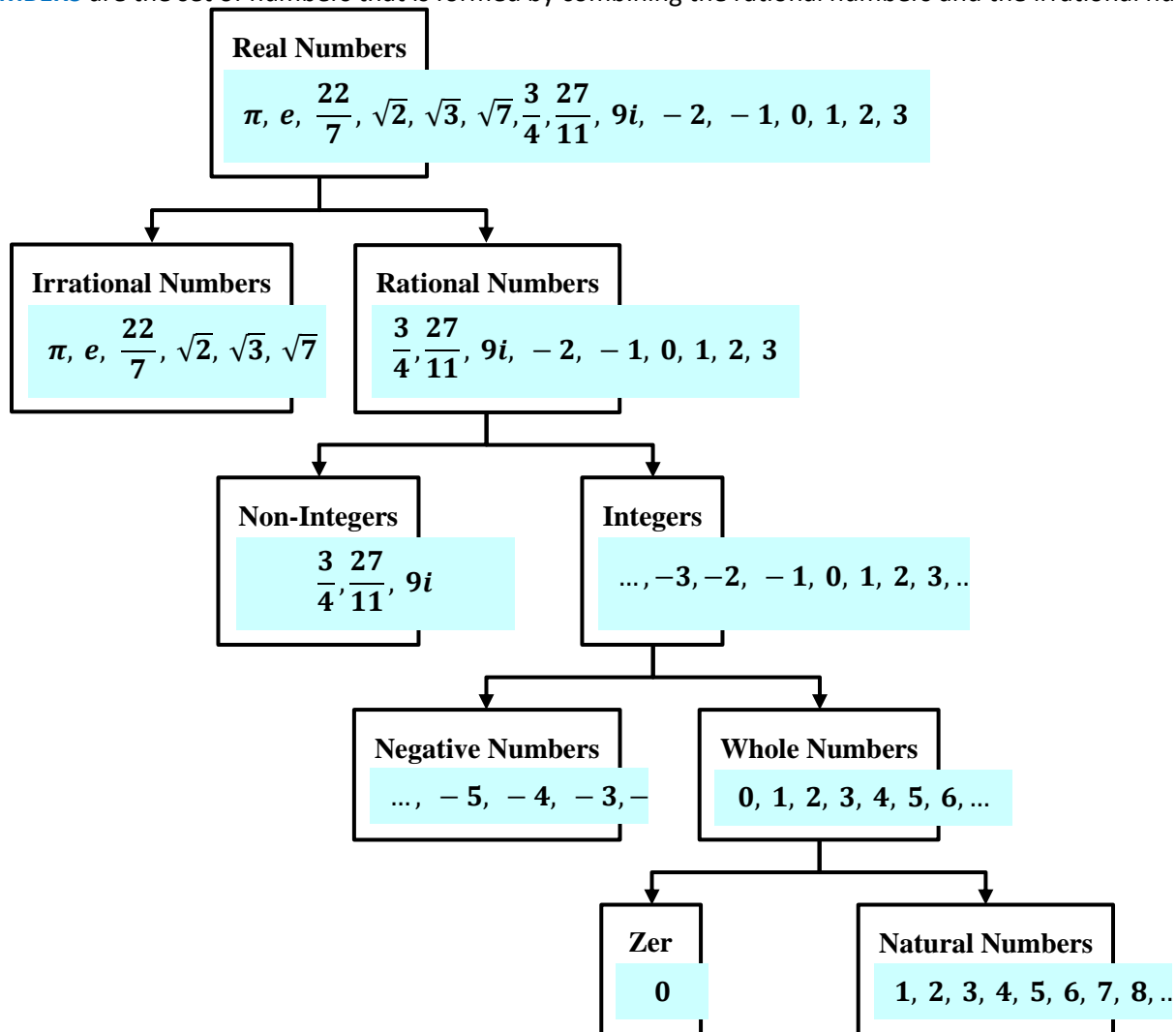


# Real Numbers and the Number Line Guide Notes

**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.

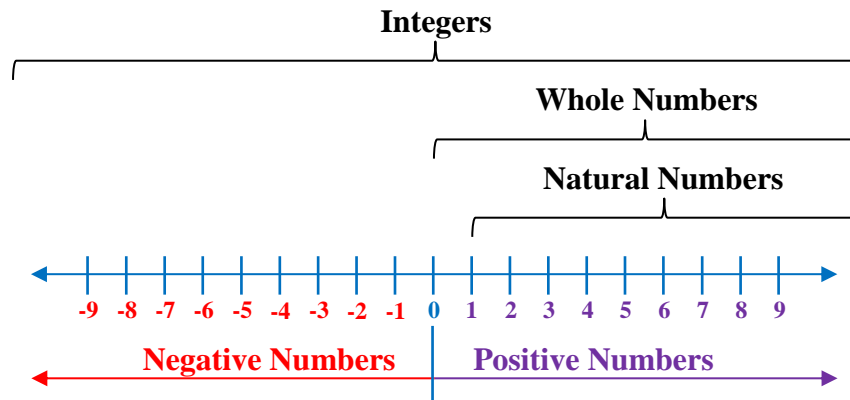
# Real Numbers and the Number Line Guide Notes

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

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

- A. Integers
- B. Rational Numbers
- C. Irrational Numbers
- D. Real Numbers
- E. Natural Numbers
- F. Non-integers

**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.

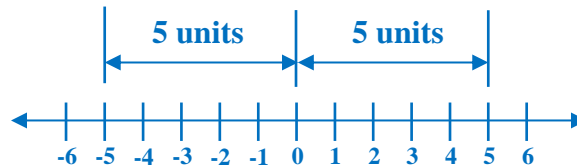


# Real Numbers and the Number Line Guide Notes

**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  $x$ .



$$|-5| = 5$$

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

$$|5| = 5$$

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.

