The set of numbers used most often in Algebra is the Real Number Set. Real Numbers have several subsets

Natural Numbers: 1, 2, 3, 4,...

Whole Numbers: 0, 1, 2, 3, 4,...

Integers: -3, -2, -1, 0, 1, 2, 3...
Rational Numbers: Numbers written as a ratio of 2 integers. When written as a decimal, the numbers will either terminate or repeat.

Examples:

$$\frac{5}{8} =$$

$$\frac{-1}{3} =$$
Irrational Numbers: Real Numbers that are not rational (when written as decimals they will not terminate or repeat)

Example:

\[ \pi \]

\[ \sqrt{2} \]
Properties of Real Numbers

Closure: The sum or product of 2 real numbers is a real number

Identity: Additive (add zero)
Multiplicative (multiply by 1)
Inverse: Additive (add the opposite)
Mult: (mult by reciprocal)

Commutative: Switch the order
Associative: Move grouping symbols

Distributive: Distribute the outside into grouping symbols by multiplying
Properties of Eqality/Inequality

For the following properties let $a, b, \text{ and } c$ be real numbers.

Reflexive: Equal to itself

Symmetric:
If $a = b$ then $b = a$
Transitive: if \( a = b \) and \( b = c \), then \( a = c \)

Substitution: Replacement Value