

## 1.3 Basic Identities

Real numbers:  $a, b, c$

**34. Additive Identity**

$$a + 0 = a$$

**35. Additive Inverse**

$$a + (-a) = 0$$

**36. Commutative of Addition**

$$a + b = b + a$$

**37. Associative of Addition**

$$(a + b) + c = a + (b + c)$$

**38. Definition of Subtraction**

$$a - b = a + (-b)$$

**39. Multiplicative Identity**

$$a \cdot 1 = a$$

**40. Multiplicative Inverse**

$$a \cdot \frac{1}{a} = 1, a \neq 0$$

**41. Multiplication Times 0**

$$a \cdot 0 = 0$$

**42. Commutative of Multiplication**

$$a \cdot b = b \cdot a$$



**43.** Associative of Multiplication  
 $(a \cdot b) \cdot c = a \cdot (b \cdot c)$

**44.** Distributive Law  
 $a(b + c) = ab + ac$

**45.** Definition of Division  
 $\frac{a}{b} = a \cdot \frac{1}{b}$

