

## Definitions for Properties of Mathematics

### Associative Property of Addition

When three or more numbers are added, the sum is the same regardless of the grouping of the addends. For example  $(a + b) + c = a + (b + c)$

### Associative Property of Multiplication

When three or more numbers are multiplied, the product is the same regardless of the order of the multiplicands. For example  $(a \times b) \times c = a \times (b \times c)$

### Commutative Property of Addition

When two numbers are added, the sum is the same regardless of the order of the addends. For example  $a + b = b + a$

### Commutative Property of Multiplication

When two numbers are multiplied together, the product is the same regardless of the order of the multiplicands. For example  $a \times b = b \times a$

### Distributive Property

The sum of two numbers times a third number is equal to the sum of each addend times the third number. For example  $a \times (b + c) = a \times b + a \times c$

### Identity Property of Addition

The sum of any number and zero is the original number. For example  $a + 0 = a$ .

### Identity Property of Multiplication

The product of any number and one is that number. For example  $a \times 1 = a$ .

### Additive Inverse of a Number

The additive inverse of a number,  $a$  is  $-a$  so that  $a + -a = 0$ .

### Multiplicative Inverse of a Number

The multiplicative inverse of a number,  $a$  is  $\frac{1}{a}$  so that  $a \times \frac{1}{a} = 1$ .

## Definitions for Properties of Mathematics

### Addition Property of Zero

Adding 0 to any number leaves it unchanged. For example  $a + 0 = a$ .

### Multiplication Property of Zero

Multiplying any number by 0 yields 0. For example  $a \times 0 = 0$ .

### Property of Equality

The equals sign in an equation is like a scale: both sides, left and right, must be the same in order for the scale to stay in balance and the equation to be true.

### Property of Equality for Addition

Property of Equality for Addition says that if  $a = b$ , then  $a + c = b + c$ .

If you add the same number to both sides of an equation, the equation is still true.

### Property of Equality for Subtraction

Property of Equality for Subtraction says that if  $a = b$ , then  $a - c = b - c$ .

If you subtract the same number from both sides of an equation, the equation is still true.

### Property of Equality for Multiplication

Property of Equality for Multiplication says that if  $a = b$ , then  $a \times c = b \times c$ .

If you multiply the same number to both sides of an equation, the equation is still true.

### Property of Equality for Division

Property of Equality for Division says that if  $a = b$ , then  $a / c = b / c$ .

If you divide the same number to both sides of an equation, the equation is still true.

### Reflexive Property of Equality

Reflexive Property of Equality says that if  $a = a$ : anything is congruent to itself.

The equals sign is like a mirror, and the image it "reflects" is the same as the original.

### Symmetric Property of Equality

Symmetric Property of Equality says that if  $a = b$ , then  $b = a$ .

### Transitive Property of Equality

Transitive Property of Equality says that if  $a = b$  and  $b = c$ , then  $a = c$ .