

Course: Geometry
Unit: Introduction to Proof
Section: Informal and Two Column Proofs

Example: Other Algebraic Properties

Other properties

The first property is the additive identity. It states that adding zero to any number does not change the number, so $a + 0$ still equals a .

For example, zero plus four still equals four.

The multiplicative identity states that multiplying a number by one does not change the number, so one times a equals a .

This would also mean that one time x equals x .

The commutative property applies to both addition and multiplication. It states that you can switch the order of the elements being added or multiplied, and the result will be the same. So $a + b$ equals $b + a$ or $a \times b$ equals $b \times a$.

Examples include three plus two equals two plus three and two times three equals three times two.

The associative properties of addition and multiplication state that you can change the location of parentheses within a series of sums or products and the result will be the same. $a + (b + c)$ equals the quantity $a + b + c$. Similarly, $a \times (b \times c)$ equals the quantity $a \times b \times c$.

So, one plus the quantity four plus nine equals the quantity one plus four plus nine. Or two times the quantity $a \times b$ is the same as the quantity two $a \times b$.

Notice that you can't mix the addition and multiplication, though. There is a special property for relating those operations.

The distributive property states that multiplying the sum or difference of two or more elements by a term is the same as multiplying each of those elements by the term, then adding or subtracting them. $a \times (b + c)$ equals $a \times b + a \times c$.

For example, four times the quantity x minus five equals four times x minus four times five, or twenty.