Properties

Properties of Addition and Multiplication

Commutative Properties (pp. 75, 89)	
The order in which you add two numbers does not change the sum.	$a + b = b + a$
The order in which you multiply two numbers does not change the product.	$a \cdot b = b \cdot a$
Associative Properties (pp. 75, 89)	
The way you group three numbers in a sum does not change the sum.	$(a + b) + c = a + (b + c)$
The way you group three numbers in a product does not change the product.	$(a \cdot b) \cdot c = a \cdot (b \cdot c)$
Identity Properties (pp. 75, 89)	
The sum of a number and the additive identity, 0, is the number.	$a + 0 = 0 + a = a$
The product of a number and the multiplicative identity, 1, is the number.	$a \cdot 1 = 1 \cdot a = a$
Inverse Properties (pp. 75, 103)	
The sum of a number and its additive inverse, or opposite, is 0.	$a + (-a) = -a + a = 0$
The product of a nonzero number and its multiplicative inverse, or reciprocal, is 1.	$a \cdot \frac{1}{a} = \frac{1}{a} \cdot a = 1 \ (a \neq 0)$
Distributive Property (p. 96) You can multiply a number and a sum by multiplying each term of the sum by the number and then adding these products. The same property applies to the product of a number and a difference.	$a(b + c) = ab + ac$ $(b + c)a = ba + ca$ $a(b - c) = ab - ac$ $(b - c)a = ba - ca$

Properties of Equality

Addition Property of Equality (p. 134) Adding the same number to each side of an equation produces an equivalent equation.	If $x - a = b$, then $x - a + a = b + a$, or $x = b + a$.
Subtraction Property of Equality (p. 134) Subtracting the same number from each side of an equation produces an equivalent equation.	If $x + a = b$, then $x + a - a = b - a$, or $x = b - a$.
Multiplication Property of Equality (p. 135) Multiplying each side of an equation by the same nonzero number produces an equivalent equation.	If $\frac{x}{a} = b$ and $a \neq 0$, then $a \cdot \frac{x}{a} = a \cdot b$, or $x = ab$.
Division Property of Equality (p. 135) Dividing each side of an equation by the same nonzero number produces an equivalent equation.	If $ax = b$ and $a \neq 0$, then $\frac{ax}{a} = \frac{b}{a}$, or $x = \frac{b}{a}$.