Basic Properties of Algebra:

Where a, b, and c can be real numbers, variables, or algebraic expressions.

Property	Example
Commutative Property of Addition $a + b = b + a$	$x + 2x^2 = 2x^2 + x$
Commutative Property of Multiplication $ab = ba$	$(x^2 + 5)x = x(x^2 + 5)$
Associative Property of Addition $(a + b) + c = a + (b + c)$	$(3x + 2) + x^2 = 3x + (2 + x^2)$
Associative Property of Multiplication $(ab)c = a(bc)$	$(2 * 3y)(4x) = (2)(3y * 4x)$
Distributive Properties $a(b + c) = ab + ac$ $(a + b)c = ac + bc$	$2x^2(3 + 4x) = 2x^2(3) + 2x^2(4x) = 6x^2 + 8x^3$ $(5y + 8)y = 5y(y) + 8(y) = 5y^2 + 8y$
Additive Identity Property $a + 0 = a$	$y^2 + 0 = y^2$
Multiplicative Identity Property $a * 1 = a$	$(x^2)(1) = x^2$
Additive Inverse Property $a + (-a) = 0$	$3x + (-3x) = 0$
Multiplicative Inverse Property $a * \frac{1}{a} = 1, a \neq 0$	$(x + 2)\left(\frac{1}{x + 2}\right) = \frac{x + 2}{x + 2} = 1$

Properties of Absolute Values:

1) $\lvert a \rvert \geq 0$
2) $\lvert -a \rvert = \lvert a \rvert$ **and** $-\lvert -a \rvert = -\lvert a \rvert = -a$
3) $\lvert ab \rvert = \lvert a \rvert \lvert b \rvert$
4) $\left\lvert \frac{a}{b} \right\rvert = \frac{\lvert a \rvert}{\lvert b \rvert}, b \neq 0$

Trevor L.A. May 2010