Number Properties

Property	*Definition*	*Example*
Identity Property of Addition	The sum of a number and 0 (the additive identity) is the number.	$-3 + 0 = -3$
Inverse Property of Addition	The sum of a number and its opposite (additive inverse) is 0	$5+(-5)=0$
Properties of Subtraction	Subtraction is the same as adding the opposite	$7-3=7+(-3)$ and $7-(-3)=7+3$
Multiplication Property of Zero	The product of a number and zero is zero	$-4 \bullet 0=0$
Identity Property of Multiplication	The product of a number and 1 (the multiplicative identity) is the number	$4(1) = 4$
Inverse Property of Multiplication	The product of a nonzero number and its multiplicative inverse (reciprocal) is 1.	$\frac{2}{3} \bullet \frac{3}{2}=1$
Commutative Property	You can add the numbers of a sum in any order. You can multiply the factors of a product in any order.	$3+(-8)=-8+3$ $5(-6)=-6(5)$
Associative Property	Changing the grouping of numbers will not change their sum. Changing the grouping of factors will not change their product.	$2+(3+-4)=(2+3)+-4$ $(7 \bullet -4) \bullet 5=7 \bullet (-4 \bullet 5)$
Distributive Property	The product of the sum of two numbers is the same as the sum of their products	$6(4+3)=6(4)+6(3)$
Property of Equality	"Whatever you do to one side of the equation you must do to the other." Works for ALL operations.	If $x+5=7$ then $x+5+-5=7+-5$
Addition & Subtraction Properties of ***In***equalities	You can or subtract the same number from each side and make an equivalent inequality	If $6>3$ then $6+-2>3+-2$
Multiplication & Division Properties of ***In***equalities	Multiplying or dividing each side of an inequality produces an equivalent inequality. When you multiply or divide by a negative number you must *reverse* the inequality to make an equivalent inequality	If $2x \le -10$ then $\frac{2x}{2} \le \frac{-10}{2}$ If $-2x \le 10$ then $\frac{-2x}{-2} \ge \frac{10}{-2}$
Product of Powers Property	To multiply powers with the same base, add their exponents	$7^9 \bullet 7^{-4}=7^{9+-4}=7^5$
Quotient of Powers Property	To divide powers with the same base, subtract their exponents	$\frac{5^6}{5^2}=5^{6-2}=5^{6+-2}=5^4$