Properties of Equality

Name: _____ Class Period_____

Properties of Equality	Property	Example(s)
Addition Property of Equality *What you add to 1 side of the equation, you have to add to the other*	If a = b, then a + c = b + c.	If $x=4$, then $x+3=4+3$
Subtraction Property of Equality *subtract from 1 side, need to subtract from other*	If a = b, then a – c = b – c	If $x=4$, then $x-3=4-3$
Multiplication Property of Equality *multiply on 1 side, multiply to the other*	If a = b, then ac = bc	If $x=4$, then $2 \cdot x = 2 \cdot 4$
Division Property of Equality *divide on 1 side, divide on the other*	If a = b, then a/c = b/c	If $x=4$, then $\frac{x}{2}=\frac{4}{2}$
Reflexive Property of Equality *anything is equal to itself*	a = a	$12=12$
Symmetric Property of Equality	If a = b, then b = a	If $y=8$, then $8=y$
Transitive Property of Equality	If a = b and b = c, then a = c	If $x=5$ & $5=y$ then $x=y$
Substitution Property	If a = b, then b may be substituted for a in any expression containing a	If $x=5$ & $x+y=7$ then $5+y=7$

Properties of Operations and Identities

Properties of Operations and Identities	Property	Example(s)
Commutative Property of Addition * order doesn't matter *	$a + b = b + a$	$2+3=3+2$ $5=5$
Commutative Property of Multiplication	$a \cdot b = b \cdot a$	$2 \cdot 4 = 4 \cdot 2$ $8=8$
Associative Property of Addition * grouping symbols don't matter *	$a + (b + c) = (a + b) + c$	$3+(1+5)=(3+1)+5$ $3+6=4+5$ $9=9$
Associative Property of Multiplication	$a \cdot (b \cdot c) = (a \cdot b) \cdot c$	$2 \cdot (5 \cdot 6) = (2 \cdot 5) \cdot 6$ $2 \cdot 30 = 10 \cdot 6$ $60 = 60$
Distributive Property of Multiplication over Addition	$a \cdot (b + c) = a \cdot b + a \cdot c$ $a \cdot (b - c) = a \cdot b - a \cdot c$	$4(y+6) = 4y+24$
Additive Identity Property * anything plus 0 equals itself *	$a + 0 = a$	$7+0=7$
Multiplicative Identity Property * anything times 1 equals itself *	$a \cdot 1 = a$	$7 \cdot 1 = 7$
Additive Inverse Property * anything plus its opposite equals 0 *	$a + (-a) = 0$	$12+(-12)=0$
Multiplicative Inverse Property * anything times its reciprocal equals 1 *	$\frac{a}{b} \cdot \frac{b}{a} = 1$	$\frac{1}{3} \cdot \frac{3}{1} = 1$
Multiplicative Property of Zero * anything times 0 equals 0 *	$a \cdot 0 = 0$	$3 \cdot 0 = 0$
Exponential Property of Equality * bases are the same *	$a^b = a^c$, then $b = c$	$3^x = 3^2$, $x=2$