2-7-1 Number Properties

Properties are the rules of the game. If the rules are changed a different kind of math is played. These properties are for everyday math.

Commutative property of addition.	**a + b = b + a**	7 + 8 = 8 + 7 (-3)+4=4+(-3)	The commutative property says the order doesn't matter for addition.
Commutative property of multiplication.	**a x b = b x a**	7 x 8 = 8 x 7 (-3)4=4(-3)	The commutative property says the order doesn't matter for multiplication.

Associative property of addition.	**(a+b)+c = a+(b+c)**	(7+8)+2=7+(8+2) 15+2 = 7 + 10	The associative property says the grouping doesn't matter for addition.
Associative property of multiplication.	**(axb)xc=ax(bxc)**	(7x8)x2=8x(7x2) 56x2=8x14	The associative property says the grouping doesn't matter for multiplication.

An identity for a particular operation doesn't change the identity of the number when the operation is done.

Additive Identity	**a+0=a**	7 + 0 =7	Zero plus a number is that number.
Multiplicative Identity	**1xa=a**	8x1=8	One times a number is that number.

An inverse for a particular operation is the number that returns the identity.

Additive inverse	**a + (-a) =0**	7 + (-7) =0 -7 is the additive inverse of 7	The additive inverse is the negative of the number.
Multiplicative inverse	$a \cdot \left(\frac{1}{a}\right) = 1$	3 x 1/3 = 1	The multiplicative inverse of a rational number is it's reciprocal.

$3x(4x)=3(4)xx=12x^2$ using both the commutative and associative properties of multiplication.

Distributive property	**a(b+c)=ab+ac**	$5(3+4) = 5 \cdot 3 + 5 \cdot 4$ $3x(2x-8) = 6x^2 - 24x$	Multiplying a sum by some number is the same as multiplying each term by that same number.

Practice: List the property illustrated by the following example.

a) 5+0=5 R+6=6+R 3+(7+8)=(3+7)+8 8+(-8)=0

b) 4t(7t8t)= (4t7t)8t $4(-9+2) = 4 \cdot (-9) + 4 \cdot 2$ 0+t=t 2z+7=7+2z

c) xy=yx 3x=3x+0 1x=x 7(2x-8)=14x-56

d) $\left(\frac{4}{4}\right)m = m$ $\frac{2}{3}\left(2\frac{3}{4}+1\frac{4}{5}\right) = 1\frac{5}{6}+1\frac{1}{5}$ $9t-12 = \frac{3}{4}(12t-16)$ $4 \cdot \left(\frac{1}{4}\right) = 1$

e) -8d+8d=0 0-7y=-7y 15y+10=5(3y+2) $-2e(3e-7)=-6e^2+14e$