Properties of Equality		Properties of negation	
$a = b \Leftrightarrow a + c = b + c$	*add c on both sides*	$-a = -1 \cdot a$	$a \cdot 0 = 0$
$a = b \Leftrightarrow a - c = b - c$	*subtract c on both sides*	$-a = -(-a)$	$0 \div a = 0$
$a = b \Leftrightarrow ac = bc,\ if\ c \neq 0$	*multiply by c on both sides*	$(-a) \cdot b = -(ab)$	$a \div 0$ *is* ***undefined****. It breaks math.*
$a = b \Leftrightarrow \frac{a}{c} = \frac{b}{c},\ if\ c \neq 0$	*divide by c on both sides*	$(-a) \cdot b = a \cdot (-b)$	

Working with Fractions		Properties of Addition	
$\frac{a}{b} = \frac{c}{d} \Leftrightarrow ad = bc$	*cross multiply*	$a + b = b +$	$a + (-a) = 0$
$-(\frac{a}{b}) = \frac{-a}{b} = \frac{a}{-b}$, ***but*** $\frac{-a}{-b} = \frac{a}{b}$	*cancel negatives*	$a + 0 = a$	$a + (b + c) = (a + b) + c$
$\frac{a}{b} = \frac{ac}{bc},\ if\ c \neq 0$	*multiply top and bottom*	**Properties of Multiplication**	
$\frac{a}{b} + \frac{c}{b} = \frac{a+c}{b}$, and $\frac{a}{b} - \frac{c}{b} = \frac{a-c}{b}$	*adding same denominator*	$ab = ba$	$a \cdot (\frac{b}{a}) = b$
$\frac{a}{b} + \frac{c}{d} = \frac{ad+bc}{bd}$, $\frac{a}{b} - \frac{c}{d} = \frac{ad-bc}{bd}$	*find common denominator*	$a \cdot 1 = a$	$a \cdot (bc) = (ab) \cdot c$
$\frac{a}{b} \cdot \frac{c}{d} = \frac{ac}{bd}$	*multiply straight across*	$a \cdot (b + c) = ab + bc$	
$\frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \cdot \frac{d}{c},\ if\ c \neq 0$	*multiply by reciprocal*	$(a + b)(c + d) = ac + ad + bc + bd$	

Inequalities	When multiplying or dividing both sides by a negative number, reverse the direction of all <'s and >'s in the equasion.
if $a < b$, then $-a > b$, and $b > a$	
if $a < b$ and $b < c$, then $a < c$	**Order of Operations**
if $a < b$ and $c < d$, then $a + c < b + d$	1. Parentheses 2. Exponents and Roots 3. Multiply and Divide 4. Add and Subtract
if $a < b$ and $c > 0$, then $ac < bc$	
if $a < b$ and $c < 0$, then $ac > bc$	

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SEPT 20 2017

Properties of Exponents and Roots		
$a^0 = 1$	$a^n \cdot a^m = a^{n+m}$	$(a^n)^m = a^{n \cdot m}$
$a^1 = a$	$a^n \div a^m = a^{n-m}$	$a^{n^m} = a^{(n^m)}$
$1^n = 1$	$a^n \cdot b^n = (ab)^n$	$\sqrt[m]{a^n} = a^{n/m} = a^n \cdot a^{1/m}$
$0^n = 0,\ if\ n > 0$	$a^n \div b^n = (\frac{a}{b})^n$	when n is even, $(-a)^n = a^n$
$a^{-n} = \frac{1}{a^n}$	$a^{1/n} = \sqrt[n]{a}$	when n is odd, $(-a)^n = -(a^n)$