Properties, continued

Closure

A set is closed under an operation if and only if the operation on any two elements of the set produces another element on the same set.

$3+5=8$ (real numbers; also a real number)	$3 \cdot 5 = 15$ (real numbers)
$a+b$ is a real number	$a \cdot b$ is a real number

* All subsets of real numbers are also closed under + & x.

The Distributive Property of Multiplication over Addition

1 $a(b+c)$	4 $(b-c)a$
$ab+ac$	$ab-ac$

2 $a(b-c)$	3 $(b+c)a$ → $a(b+c)$
$ab-ac$	$ab+ac$

Ex:
① $3(2x+3) = 6x+9$
② $(-5)(x-5) = -5x+25$ $\quad -5\cdot x-(-5)(5)$ OR $-5\cdot x-5(-5)$
③ $(x-2)5 = 5x-10$
④ $(x+3)(-2) = -2x-6$

* ⑤ $-1(x+7) = -x-7$

"$-$" = the opposite of

⑥ $-(3x-4) = -3x+4$

* ⑦ $\frac{2x+7}{5} \rightarrow \frac{1}{5}(2x+7) = \frac{1}{5}\cdot\frac{2x}{1}+\frac{1}{5}\cdot\frac{7}{1}$

$\frac{2x}{5}+\frac{7}{5}$

$\frac{2}{5}x+\frac{7}{5}$

⑧ $\frac{17x+5m}{4}$

$\frac{17x}{4}+\frac{5m}{4}$

$\frac{17}{4}x+\frac{5}{4}m$

$\frac{1}{3}+\frac{5x}{3} = \frac{1+5x}{3}$

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