

January 23, 2017
 * Quiz #2 - Wednesday
 • COX + 1.1
 • Power Tools

Jan 23-9:07 AM

Algebra's Power Tools

① Commutative
 $a + b = b + a$
 Key: Order changes, but result stays the same.

② Associative
 $a + (b + c) = (a + b) + c$
 Key: order does not change, but what is associated changes. The result is the same.

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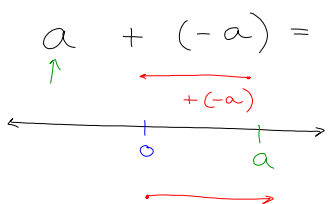
③ Distributive
 $a(b + c) = ab + ac$
 $\mathbb{Z} \longleftarrow \mathbb{R}$
 $4x - 12 = 4(x - 3)$
 $\mathbb{R} \longrightarrow \mathbb{Z}$
 Key: multiplication over addition to clear grouping symbols.

$3[2 + 5(x + 1)]$
 $3[2 + 5x + 5]$
 $3[7 + 5x]$
 $21 + 15x$

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$5(2a - 4b + 3c - d)$
 $10a - 20b + 15c - 5d$

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④ Additive Inverse
 $a + (-a) = 0$

 $x + 5 = 15$
 $+(-5) \quad +(-5)$

 $x + 0 = 10$
 ← Identity
 $x = 10$

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⑤ Additive Identity
 $a + 0 = a$
 $5 + 0 = 5$

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⑥ Multiplicative Inverse

$$\frac{a}{1} \rightarrow \frac{1}{a} = \frac{a}{a} = 1$$

$$\frac{2x}{2} = \frac{8}{2}$$

$$\left[\frac{1}{2} \cdot \frac{2}{1} \right] \cdot \frac{x}{1} = 4$$

$$\frac{2}{2} \cdot \frac{x}{1} = 4$$

Identity $\rightarrow 1 \cdot x = 4$

$$x = 4$$

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$$\frac{4}{13} \cdot \frac{13}{4} y = \frac{5}{1} \cdot \frac{4}{-3}$$

$$y = \frac{20}{-3}$$

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⑦ Multiplicative Identity

$$a \cdot 1 = a$$

$$\frac{11}{3} \cdot 1 = \frac{11}{3}$$

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Absolute Value *greater than or equal to*

$$|a| = \begin{cases} +a & \text{if } a \geq 0 \\ -a & \text{if } a < 0 \end{cases}$$

less than

* Absolute Value is always the positive distance from zero.

$$|5| = 5$$

$$|-5| = -(-5) = 5$$

$a = -5$

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