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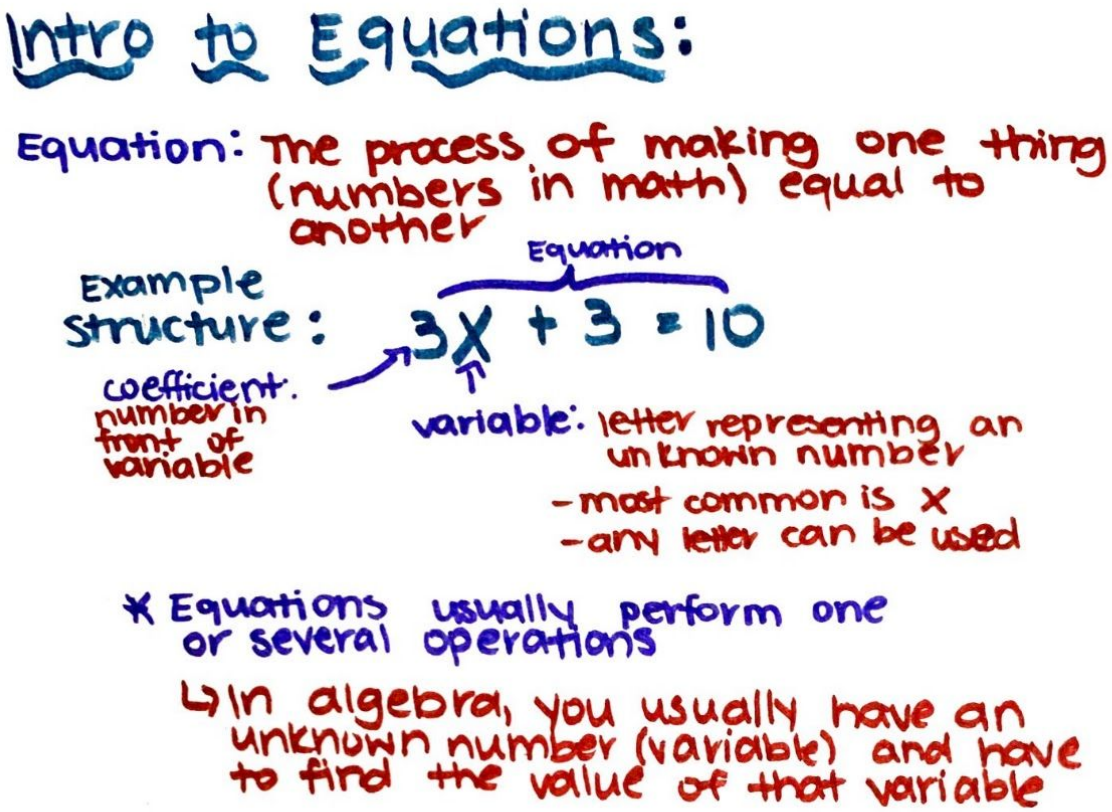
Equations: Notes



One Step Equations:

* Perform only one operation to find value of variable

Addition:

- subtract number being added on both sides to find value of the variable

Remember: you want to isolate the variable!

$$x + 5 = 7$$

$$x + 5 - 5 = 7 - 5$$

$$\boxed{x = 2}$$

Subtraction:

- add number being subtracted on both sides to find value of the variable

Remember to isolate the variable!

$$x - 2 = 9$$

$$x - 2 + 2 = 9 + 2$$

$$\boxed{x = 11}$$

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Multiplication:

- divide coefficient of variable on both sides to find value of the variable

Make sure the variable is isolated!

$3x = 9$

$\frac{3x}{3} = \frac{9}{3}$

$\boxed{x = 3}$

or

$3 \cdot x = 9$

$\frac{3 \cdot x}{3} = \frac{9}{3}$

$\boxed{x = 3}$

Division

- multiply number being divided on both sides to find value of the variable

Isolate the variable

$\frac{h}{3} = 2$

$\frac{h}{3} = 2(3)$

$\boxed{h = 6}$

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Two/Multi Step Equations:

*Equations with 2 or more operations performed

Steps:
- Always multiply first if the division operation is used (unless it is used only for the variable)
- then divide, add, or subtract
- isolate the variable to find the answer

*Make sure to solve the equation in a way that isolating the equation is the last step.

Examples:

$4x + 2 = 10$

$4x + 2 - 2 = 10 - 2$

$4x = 8$

$\frac{4x}{4} = \frac{8}{4}$

$\boxed{x = 2}$

$\frac{3x - 2}{4} = 4$

$4\left(\frac{3x-2}{4}\right) = 4(4)$

$3x - 2 = 16$

$3x - 2 + 2 = 16 + 2$

$3x = 18$

$\frac{3x}{3} = \frac{18}{3}$

$\boxed{x = 6}$

$\frac{3x}{6} + 1 = 5$

$\frac{3x}{6} + 1 - 1 = 5 - 1$

$\frac{3x}{6} = 4$

$6\left(\frac{3x}{6}\right) = 4(6)$

$3x = 24$

$\frac{3x}{3} = \frac{24}{3}$

$\boxed{x = 8}$

*Since it is dividing only the variable by 6, you would get rid of the 1 first

Exponents:

Exponents: number multiplied a certain number of times represented by a number in the corner

$x^2 \rightarrow x \cdot x$

$x^3 \rightarrow x \cdot x \cdot x$

$x^4 \rightarrow x \cdot x \cdot x \cdot x$

Examples:

$4^2 \rightarrow 4 \cdot 4 = \boxed{16}$

$2^3 \rightarrow 2 \cdot 2 \cdot 2 \rightarrow 4 \cdot 2 \rightarrow \boxed{8}$

* with exponents with more than 2 numbers being multiplied with each other, multiply only 2 numbers at a time to avoid mistakes

Negative exponents:

$$x^{-2} = \frac{1}{x^2} = \frac{1}{x \cdot x}$$

Examples:

$4^{-2} \rightarrow \frac{1}{4^2} \rightarrow \frac{1}{4 \cdot 4} \rightarrow \boxed{\frac{1}{16}}$

$2^3 \rightarrow \frac{1}{2^3} \rightarrow \frac{1}{2 \cdot 2 \cdot 2} \rightarrow \boxed{\frac{1}{8}}$

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Square Roots & Cubic Roots:

Roots: numbers multiplied a certain number of times to get the number in the $\sqrt{\ }$ (radical)

Square Root (2): $\sqrt{x} = y \ (y \cdot y)$

Example: $\sqrt{9} = 3$ b/c $3 \cdot 3 = 9$

More:

$\sqrt{49} = 7$ $(7 \cdot 7 = 49)$

$\sqrt{36} = 6$ $(6 \cdot 6 = 36)$

$\sqrt{4} = 2$ $(2 \cdot 2 = 4)$

Cubic Root (3): $\sqrt[3]{x} = y \ (y \cdot y \cdot y)$

Example: $\sqrt[3]{8} = 2$ b/c $2 \cdot 2 \cdot 2 = 8$

More:

$\sqrt[3]{27} = 3$ $(3 \cdot 3 \cdot 3 = 27)$

$\sqrt[3]{64} = 4$ $(4 \cdot 4 \cdot 4 = 64)$

$\sqrt[3]{125} = 5$ $(5 \cdot 5 \cdot 5 = 125)$