

1-2 Solving Linear Equation

⊙ * ISOLATING THE VARIABLE.

e.g. $7x + 2 = 23$

$7x = 21$

$x = 3$

e.g. $5y + 1 = 8y - 5 + 6y$

$5y + 1 = 14y - 5$; $1 = 8y - 5 + 6y - 5y$

$5y - 14y = -5 - 1$; $1 + 5 = 9y$

$-9y = -6$; $6 = 9y$

$y = \frac{2}{3}$; $\frac{2}{3} = y$

• Conditional Equation.

- An equation that is true for one or no values.

e.g. $2x + 6 = 2(x + 4)$

$2x + 6 = 2x + 8$

$6 = 8$

NEVER TRUE

→ 1) variable disappear

2) result in a false statement.

Therefore, this equation has no solution.

⊙ e.g. $9x - 10 = 5x + 2(2x - 5)$

$9x - 10 = 5x + 4x - 10$

$9x - 10 = 9x - 10$

$-10 = -10$

ALWAYS TRUE

→ 1) variable disappear

2) result in a true statement

Therefore, everything works.

→ • Identity (one side is identical to the other)

- An equation that is true for all real numbers.

Three Types of Solutions to a Linear Equation.

(1) one thing works

(2) nothing works

(3) everything works - identity.

> conditional equation

Equations with Fractions:

e.g. $\frac{10x+3}{5x+6} = \frac{1}{2}$

$$\Rightarrow (1)(5x+6) = (2)(10x+3)$$

$$\Rightarrow 5x+6 = 20x+6$$

$$\Rightarrow 5x = 20x$$

$$\Rightarrow -15x = 0$$

$$\Rightarrow \boxed{x = 0}$$

e.g. $\frac{5x-4}{5x+4} = \frac{2}{3}$

$$\Rightarrow 2(5x+4) = 3(5x-4)$$

$$\Rightarrow 10x+8 = 15x-12$$

$$\Rightarrow 8 = 5x-12$$

$$\Rightarrow 20 = 5x$$

$$\Rightarrow \boxed{4 = x}$$

→ cross multiply when you have a fraction = a fraction

→ ~~CAREFUL~~ HERE! DO NOT!!
CANCEL THE x because you do not know if it's zero yet!!
if you do $\frac{5x}{x} = \frac{20x}{x} \Rightarrow 5=20$, this will not be the right answer.