Solving Linear Equations

Solve: means to determine a # value for a variable in a way that makes a math sentence (equation) work out.

Ex. $\square + 2 = 7$ algebraically $x + 2 = 7$ (place holder)

Solution: $x = 5$

Harder Questions

* isolate the variable*

Ex. 1 $3x + 7 = 9$

SAMDEB

$3(\square) + 7 = 9$

$3x + 7 - 7 = 9 - 7$

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

$\boxed{x = \frac{2}{3}}$

How?

- Opposite Operations

$\times \leftrightarrow \div$

$+ \leftrightarrow -$

Check: LS: $3x + 7$

$= 3\left(\frac{2}{3}\right) + 7$

$= \frac{6}{3} + 7$

$= 2 + 7$

$= 9$ ✓

RS: 9 ✓

Order?

Reverse BEMAS

SAMDEB

Ex. 2 Solve for x:

$$2(x+4)=10$$

Method 1: SAMDEB

$2 \div 2 : 1$

$$\frac{2(x+4)}{2}=\frac{10}{2}$$

$$(x+4)=5$$

$$x+4=5$$

$$x+4-4=5-4$$

$$x=1 \checkmark$$

method 2: Simpl. then SAMDEB

$$2(x+4)=10$$

① Simplify First:

$$2x+8=10$$

② SAMDEB

$$2x+8-8=10-8$$

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

$$x=1 \checkmark$$

Ex. 3: Solve for y

$$y+3=6y-1$$

$-6y \quad -6y$

$$y+3-6y=6y-6y-1$$

$$-5y+3=-1$$

$$-5y=-1-3$$

$$\frac{-5y}{-5}=\frac{-4}{-5}$$

$$y=\frac{4}{5}$$

$+6y \quad -6y$

SAMDEB

When you bring a # across the = sign, the OPERATION changes!

YOU TRY: Solve for the variable:

① $3y - 4 = 2 + 1$ ans: $y = \frac{7}{3}$

② $-4(x+3) = 5$ ans: $x = -\frac{17}{4}$

③ $3x - 4 = x - 7$ ans: $x = -\frac{3}{2}$

④ $2(x+1) - 3 = -(x+5)$ ans: $x = -\frac{4}{3}$

$2x + 2 - 3 = -x - 5$

$2x - 1 = -x - 5$

$+x \quad +x$

$3x - 1 = -5$

$3x = -5 + 1$

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

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