SOLVING WITH VARIABLES ON BOTH SIDES!

<u>AIM:</u> I can find the solution to a linear equation with variables on both sides.

Warm Up: Discuss with your partner what the **next** algebraic step would be to finish solving the equation below-

$$5x - 10 = 3x + 30 \impliedby \text{Original Equation}$$
$$ + 10 + 10 \impliedby \text{Add 10 to both sides of equation}$$
$$\overline{}$$
$$5x = 3x + 40$$

Guided Practice: Solving with equations with variables on both sides

1)
$$2y + 8 = 6y + 20$$
$$-2y -2y$$
$$8 = 4y + 20$$
$$-20 -20$$
$$\frac{-16}{4} = \frac{4y}{4}$$
$$\boxed{y = -4}$$

2)
$$3b - 8 = 14 - 8b$$
$$+8b +8b$$
$$11b - 8 = 14$$
$$+8 +8$$
$$\frac{11b}{11} = \frac{22}{11}$$
$$\boxed{b = 2}$$

Solving Equations:
Don't Call Me
After Midnight

3) Solve for x and show all algebraic steps.

$$2x + 3 = 3(x + 7)$$
$$2x + 3 = 3x + 21$$
$$-2x -2x$$
$$3 = x + 21$$
$$-21 -21$$
$$\boxed{-18 = x}$$

Distribute
Combine Like
Terms
Move variable
Add or
Subtract
Multiply or
Divide
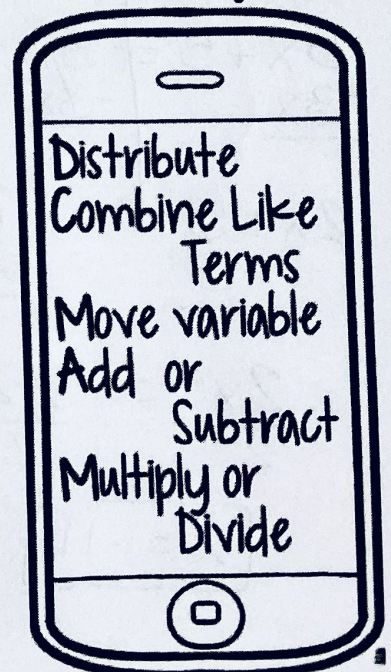
4) $4(2p - 8) - 6p = 20 + 4(p + 6)$

$8p - 32 - 6p = 20 + 4p + 24$

$2p - 32 = 4p + 44$
$-2p \qquad -2p$

$-32 = 2p + 44$
$-44 \qquad -44$

$\dfrac{-76}{2} = \dfrac{2p}{2}$

$\boxed{p = -38}$

Problem Set:

1) $15x = 10x - 30$
$-10x \quad -10x$

$\dfrac{5x}{5} = \dfrac{-30}{5}$

$\boxed{x = -6}$

2) $4(3x - 10) = 10(x - 3)$

$12x - 40 = 10x - 30$
$-10x \qquad -10x$

$2x - 40 = -30$
$+40 \quad +40$

$\dfrac{2x}{2} = \dfrac{10}{2}$

$\boxed{x = 5}$

3) $7x + 5 - 2x = 3x - 17$

$5x + 5 = 3x - 17$
$-3x \qquad -3x$

$2x + 5 = -17$
$-5 \quad -5$

$\dfrac{2x}{2} = \dfrac{-22}{2}$

$\boxed{x = -11}$

4) $\frac{1}{2}(6x + 8) + 3x = 5x + 25$

$3x + 4 + 3x = 5x + 25$

$6x + 4 = 5x + 25$
$-5x \qquad -5x$

$x + 4 = 25$
$-4 \quad -4$

$\boxed{x = 21}$

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