Section 2.3

Solving Multi-Step Equations

A multi-step equation is an equation that uses more than one property of equality to solve it. To solve this type of equation, you can undo each operation using properties of equality. Working backward in the order of operations makes this process simpler. Each step in this process results in equivalent equations.

You need to identify the operation used in the equation and undo it by doing the opposite operation.

Examples:

1. $2a - 6 = 4$

$$+6 \quad +6$$
$$\frac{2a}{2} = \frac{10}{2}$$
$$a = 5$$

2. $\dfrac{n + 1}{-2} = 15 \quad \cdot -2$

$$n + 1 = -30$$
$$-1 \qquad -1$$
$$n = -31$$

3. $11x - 24 = 9$

   $+24 \quad +24$

   $\dfrac{11x}{11} = \dfrac{33}{11}$

   $\boxed{x = 3}$

4. $\dfrac{a + 7}{8} = 5 \quad \cdot 8 \quad \cdot 8$

   $a + 7 = 40$

   $-7 \quad -7$

   $\boxed{a = 33}$

5. The student council raised $\frac{2}{5}$ of the money they need to cover the cost of the school dance with a bake sale. They raised an additional $150 selling raffle tickets. If the student council has raised $630, what is the cost of the dance? Write an equation for the problem. Then solve the equation.

$$\frac{2}{5}x + 150 = 630$$
$$\phantom{\frac{2}{5}x}\; -150 \qquad -150$$
$$\overline{}$$
$$5 \cdot \frac{2}{5}x = 480 \cdot 5$$

$$\frac{2x}{2} = \frac{2400}{2}$$
$$\boxed{x = 1200}$$

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