

Objectives: I can solve multi-step equations with variables on both sides with the distributive property and identify equations with no solution or all real numbers.

**NO SOLUTION AND ALL REAL NUMBERS**

Examples:

$$\begin{array}{r}
 1. \quad 4(2n+5) = 3n+10 \\
 8n+20 = 3n+10 \\
 -3n \quad -3n \\
 \hline
 5n+20 = 10 \\
 +20 \quad +20 \\
 \hline
 5n = 30 \\
 \frac{5n}{5} = \frac{30}{5} \\
 n = 6
 \end{array}$$

ONE SOLUTION

$$\begin{array}{r}
 2. \quad 2(4x+7) + 10 = 3x+5x \\
 8x+14+10 = 8x \\
 8x+24 = 8x \\
 -8x \quad -8x \\
 \hline
 24 = 0 \\
 4 \neq 0 \\
 \boxed{\text{No Solution}}
 \end{array}$$

$$\begin{array}{r}
 3. \quad 5(x+8) + 46 = 2x+3(x+2) \\
 5x+40+46 = 2x+3x+6 \\
 5x+86 = 5x+6 \\
 -5x \quad -5x \\
 \hline
 86 = 6 \\
 -80 \quad -80 \\
 \hline
 6 = -6 \\
 \boxed{\text{ALL REAL \#s}}
 \end{array}$$

Infinite Many Solutions

$$\begin{array}{r}
 4. \quad 2(4x+7) + 2x = 8x+14 \\
 8x+14+2x = 8x+14 \\
 10x+14 = 8x+14 \\
 -8x \quad -8x \\
 \hline
 2x+14 = 14 \\
 -14 \quad -14 \\
 \hline
 2x = 0 \\
 \frac{2x}{2} = \frac{0}{2} \\
 x = 0
 \end{array}$$

<p>If you get a FALSE statement...like <math>5=2</math>, then no solution would satisfy the equation...write <b>NO SOLUTION</b></p>	<p>If you get a TRUE statement...like <math>5=5</math>, then all real numbers would satisfy the equation...write <b>ALL REAL #s</b></p>
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Practice:

$$\begin{array}{r}
 1. \quad 8(k+3) = 12k-4 \\
 8k+24 = 12k-4 \\
 -8k \quad -8k \\
 \hline
 24 = 4k-4 \\
 +4 \quad +4 \\
 \hline
 28 = 4k \\
 \frac{28}{4} = \frac{4k}{4} \\
 \boxed{k=7}
 \end{array}$$

$$\begin{array}{r}
 2. \quad -3(5+9c) = 25+27c \\
 -15+27c = 25+27c \\
 -27c \quad -27c \\
 \hline
 -15 = 25 \\
 \boxed{\text{No Solution}}
 \end{array}$$

$$\begin{array}{r}
 3. \quad 6x+5 = 5(3x+1) + 9x \\
 6x+5 = 15x+5+9x \\
 6x+5 = 24x+5 \\
 -6x \quad -6x \\
 \hline
 5 = 5 \\
 \boxed{\text{All Real \#s}}
 \end{array}$$

$$\begin{array}{r}
 4. \quad 5+11t = 7(5+2t) \\
 5+11t = 35+14t \\
 -11t \quad -11t \\
 \hline
 5 = 35+3t \\
 -35 \quad -35 \\
 \hline
 -30 = 3t \\
 \frac{-30}{3} = \frac{3t}{3} \\
 \boxed{t=-10}
 \end{array}$$

$$\begin{array}{r}
 5. \quad -2(18+3y) = 7y+2y \\
 -36+6y = 9y \\
 -6y \quad -6y \\
 \hline
 -36 = 3y \\
 \frac{-36}{3} = \frac{3y}{3} \\
 \boxed{y=-12}
 \end{array}$$

$$\begin{array}{r}
 6. \quad 2(4a+12) = 6a+1 \\
 8a+24 = 6a+1 \\
 -6a \quad -6a \\
 \hline
 2a+24 = 1 \\
 -24 \quad -24 \\
 \hline
 2a = -23 \\
 \frac{2a}{2} = \frac{-23}{2} \\
 \boxed{a = -23/2 = -11\frac{1}{2}}
 \end{array}$$