

Day 16: Solving Equations with Variables on BOTH sides

Solve each equation. Check your solution. For #1, explain each step in your process.

1)  $5x - 2 = 3x + 4$

Work  $-3x$   $-3x$

$$\begin{array}{r} 2x - 2 = 4 \\ +2 \quad +2 \\ \hline 2x = 6 \\ \frac{2x}{2} = \frac{6}{2} \end{array}$$

$x = 3$

Explain  
Subtract  $3x$   
Add 2  
Divide 2

Check

$$\begin{array}{l} 5(3) - 2 \stackrel{?}{=} 3(3) + 4 \\ 15 - 2 = 9 + 4 \\ 13 = 13 \\ \checkmark \end{array}$$

2)  $5(m - 5) = 10(m - 6)$

$$\begin{array}{r} 5m - 25 = 10m - 60 \\ -5m \quad -5m \\ \hline -25 = 5m - 60 \\ +60 \quad +60 \\ \hline 35 = 5m \\ \frac{35}{5} = \frac{5m}{5} \end{array}$$

$7 = m$

Check

$$\begin{array}{l} 5(7-5) \stackrel{?}{=} 10(7-6) \\ 5(2) = 10(1) \\ 10 = 10 \end{array}$$

3)  $12(6n - 8) = -4(1 + 5n)$

$$\begin{array}{r} 72n - 96 = -4 - 20n \\ +20n \quad +20n \end{array}$$

$$\begin{array}{r} 92n - 96 = -4 \\ +96 \quad +96 \end{array}$$

$$\frac{92n}{92} = \frac{92}{92}$$

$n = 1$

Check ?

$$\begin{array}{l} 12(6(1) - 8) \stackrel{?}{=} -4(1 + 5(1)) \\ 12(6 - 8) = -4(1 + 5) \\ 12(-2) = -4(6) \\ -24 = -24 \end{array}$$

4) **Optional Challenge:**

$$\begin{array}{l} -6(-2m - 8) = -3(-4m - 1) - 6 \\ 12m + 48 = 12m + 3 - 6 \end{array}$$

$$\begin{array}{r} 12m + 48 = 12m - 3 \\ -12m \quad -12m \\ \hline 48 = -3 \end{array}$$

False,  
No Solution

5) Define a variable and write an algebraic equation to model the problem. Then, solve the equation.

Antonio is choosing between two cell phone plans that offer the same amount of free minutes. T-Mobile's plan charges \$39.99 per month with additional data costing \$0.45 per MB (megabyte) used. Verizon's plan costs \$44.99 with additional MB of data at \$0.40. How many additional MB of data,  $d$ , will it take for the two plans to cost the same?

$$\begin{array}{r} 39.99 + .45d = 44.99 + .40d \\ - .40d \quad - .40d \\ \hline 39.99 + .05d = 44.99 \\ -39.99 \quad -39.99 \end{array}$$

$$\frac{.05d}{.05} = \frac{5}{.05}$$

$d = 100$

It takes 100 MB of data.