

1.2 Solving Multistep Equations NOTES

It All +
ADDS UP!

Solving Multistep Equations

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$$5 - n = \frac{-(n-2) + 3}{2}$$

Rid the equation of any
"funky fractions"

Remember: multiply by the denominator on each side of the equation

$$2(5 - n) = \frac{-(n-2) + 3}{2} \cdot 2$$

$$10 - 2n = -(n-2) + 3$$

Use the **distributive property**, if applicable (see parentheses)

Remember: $-(n + 3)$ is the same as $-1(n + 3)$

$$10 - 2n = -1(n-2) + 3$$

$$10 - 2n = -n + 2 + 3$$

Combine like terms on each side of the equation, if applicable

$$10 - 2n = -n \text{ (2) } \text{ (3)}$$

$$10 - 2n = -n + 5$$

Move variable terms to one side of the equation, and **constant terms** to the other side of the equation.

Remember: add or subtract **entire term** from each side of the equation to move it

$$\begin{aligned} 10 - 2n &= -n + 5 \\ 10 - n &= 5 \\ -n &= -5 \end{aligned}$$

Isolate the variable to solve the equation.

$$\begin{aligned} -n &= -5 \\ \frac{-n}{-1} &= \frac{-5}{-1} \\ n &= 5 \end{aligned}$$

Check your solution by plugging it back into the equation.

Is your equation balanced? (One side of the equation should equal the other.)

Examples

$$\textcircled{1} 2(4x-3) - 8 = 2(x+2)$$

$$8x - \underline{6} - \underline{8} = 2x + 4$$

$$8x - 14 = 2x + 4$$

$$\begin{array}{r} -2x \qquad -2x \\ \hline \end{array}$$

$$6x - 14 = 4$$

$$\begin{array}{r} +14 \qquad +14 \\ \hline \end{array}$$

$$\frac{6x}{6} = \frac{18}{6}$$

$$\boxed{x = 3}$$

$$\textcircled{2} -1(1+7y) - 6(-7-y) = 36$$

$$\underline{-1} - \underline{7y} + \underline{42} + \underline{6y} = 36$$

$$-1y + 41 = 36$$

$$\begin{array}{r} -41 \qquad -41 \\ \hline \end{array}$$

$$-1y = -5$$

$$\begin{array}{r} \div 1 \qquad \div 1 \\ \hline \end{array}$$

$$\boxed{y = 5}$$

$$\textcircled{4} -3(4x+3) + 4(6x+1) = 43$$

$$\underline{-12x} - \underline{9} + \underline{24x} + \underline{4} = 43$$

$$12x - 5 = 43$$

$$\begin{array}{r} +5 \qquad +5 \\ \hline \end{array}$$

$$12x = 48$$

$$\begin{array}{r} \div 12 \qquad \div 12 \\ \hline \end{array}$$

$$\boxed{x = 4}$$

$$\textcircled{3} 6\left(\frac{1}{2}x + \frac{5}{3}\right) = (9)6$$

$$\begin{array}{r} 6 \div \\ \hline \end{array} \frac{1}{2}x + \begin{array}{r} 6 \div \\ \hline \end{array} \frac{5}{3} = 54$$

$$3x + 10 = 54$$

$$\begin{array}{r} -10 \qquad -10 \\ \hline \end{array}$$

$$\frac{3x}{3} = \frac{44}{3}$$

$$\boxed{x = \frac{44}{3}}$$

2 & 3 both go into 6. Multiply by 6 on both sides

$$\textcircled{5} 5\left(12 - \frac{5(x+15)}{5}\right) = (4)5$$

$$60 - \begin{array}{r} 5 \div \\ \hline \end{array} \frac{5(x+15)}{5} = 20$$

$$60 - 5(x+15) = 20$$

$$\underline{60} - 5x - \underline{75} = 20$$

$$-15 - 5x = 20$$

$$\begin{array}{r} +15 \qquad +15 \\ \hline \end{array}$$

$$-5x = 35$$

$$\begin{array}{r} \div -5 \qquad \div -5 \\ \hline \end{array}$$

$$\boxed{x = -7}$$