

3.4 Quiz Study Guide

3.4: Solve Equations with Variables on Both Sides

- Be able to solve equations with variables on both sides by moving variable terms together

Ex: $5x - 10 = 2x + 20$

$$\begin{array}{r} -2x \quad -2x \\ 3x - 10 = 20 \\ +10 \quad +10 \\ \hline 3x = 30 \\ \hline 3 \quad 3 \end{array}$$

$$x = 10$$

Ex: $-3x + 6 = -8x + 11$

$$\begin{array}{r} +8x \quad +8x \\ 5x + 6 = 11 \\ -6 \quad -6 \\ \hline 5x = 5 \\ \hline 5 \quad 5 \end{array}$$

$$x = 1$$

Ex: $3m - 25 - 8m = m - 14$

$$\begin{array}{r} -5m - 25 = m - 14 \\ +5m \quad +5m \\ \hline -25 = 6m - 14 \\ +14 \quad +14 \\ \hline -11 = 6m \\ \hline 6 \quad 6 \end{array}$$

$$m = -\frac{11}{6}$$

Ex: $4(m - 3) = 2(6 - 2m)$

$$\begin{array}{r} 4m - 12 = 12 - 4m \\ +4m \quad +4m \\ \hline 8m - 12 = 12 \\ +12 \quad +12 \\ \hline 8m = 24 \end{array}$$

$$m = 3$$

- Be able to identify when an equation has no solution, infinite solutions or 0 as the solution

Ex: $-5(3a - 4) = 7a + 27 - 7$

$$\begin{array}{r} -15a + 20 = 7a + 20 \\ +15a \quad +15a \\ \hline 20 = 22a + 20 \\ -20 \quad -20 \\ \hline 0 = 22a \\ \hline 22 \quad 22 \end{array}$$

$$a = 0$$

Ex: $4(3x + 2) = 2(6x + 4)$

$$\begin{array}{r} 12x + 8 = 12x + 8 \\ -12x \quad -12x \\ \hline 8 = 8 \end{array}$$

any number *don't forget to say what x can be

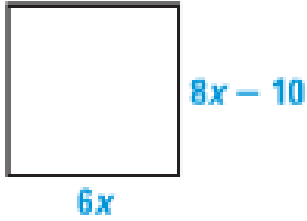
Ex: $5z - 6 = (z - 1)5$

$$\begin{array}{r} 5z - 6 = 5z - 5 \\ -5z \quad -5z \\ \hline -6 = -5 \end{array}$$

No solution

Find the perimeter of the square.

Ex:


$$\begin{array}{r} 8x - 10 = 6x \\ -6x \quad -6x \\ \hline 2x - 10 = 0 \\ +10 \quad +10 \\ \hline 2x = 10 \\ \frac{2x}{2} = \frac{10}{2} \\ x = 5 \end{array}$$

This is because it's a square so sides are equal

Since $x = 5$, then each side is 30 units long. $30(4) = 120$
120 is the perimeter

Ex: Amy wants to join a movie theater club where she would pay \$150 up front and then get to see as many movies as she wants in theaters for \$5 each. A non-member must pay \$12.50 for each movie. Amy wants to set up an equation to figure out when the cost of a member and a non-member would be equal.

- a) Set up and solve an equation to represent the situation. Be sure to identify a variable and what it represents.

x : # movies
 $150 + 5x = 12.5x$

- b) Solve your equation.

$$\begin{array}{r} 150 + 5x = 12.5x \\ -5x \quad -5x \\ \hline 150 = 7.5x \\ \frac{150}{7.5} = \frac{7.5x}{7.5} \\ 20 = x \end{array}$$

- c) Explain the meaning of the solution as well as when Amy should choose to become a member and when she should choose to remain a non-member.

It will take 20 movies for the cost of a member and non-member to be the same. If Amy wants to go to more than 20 movies, she should be a member, and she wants to go to less than 20 movies, she should be a non-member.