

Name: _____

Date: _____

Notes

Algebra Section 3.4

Pages 154-159



Goal: “I will solve equations with variable on both sides”

“I will decide if an equation has one solution, no solution, or an infinite number of solutions”

Backwards Alphabet

You still follow the backwards alphabet.

When you get to the balancing step, you need to get rid of one of the variables by adding or subtracting it from both sides.

Examples:

$$2x + 6 = 3x + 3$$

$$x = 3$$

$$8 - 2x = 3x - 7$$

$$x = 3$$

$$2x + 5 = -8x - 3$$

$$x = -\frac{4}{5}$$

Try These:

Ex: $7 - 8x = 4x - 17$

$$x = 2$$

Ex: $13 + 5x = 2x - 7$

$$x = -\frac{20}{3} = -6\frac{2}{3}$$

Ex: $3x + 6 = 7x - 10$

$$x = 4$$

Ex: $-2x + 3 = 3(2x - 7)$

$$x = 3$$

Ex: $9x - 5 = \frac{1}{4}(16x + 60)$

$$x = 4$$

Ex: $4x - 5 = \frac{1}{5}(5x + 20)$

$$x = 3$$

Word Problems:

Ex: Sally is a spender. She got \$240 for her birthday. She spends \$15 a week for w weeks. Trevor is a saver. He has \$40 and is saving \$10 a week for w weeks by mowing lawns. In how many weeks will they have the same amount of money?

Expression for Sally: $240 - 15w$

Expression for Trevor: $40 + 10w$

Equation: $240 - 15w = 40 + 10w$

$$\begin{array}{r} \text{Solve:} \\ + 15w + 15w \\ 240 = 40 + 25w \\ \underline{-40 \quad -40} \\ 200 = 25w \\ \underline{25 \quad 25} \\ 8 = w \end{array}$$

Answer (written in a full sentence): In 8 weeks Sally and Trevor will have the same amount of money. They will each have \$120 dollars.

Ex: A car dealership sold 78 new cars and 67 used cars this year. The number of new cars sold by the dealership has been increasing by 6 cars each year. The number of used cars sold by the dealership has been decreasing by 4 cars each year. If these trends continue, in how many years will the number of new cars sold be twice the number of used cars sold?

Expression for new cars: $78 + 6x$

Expression for used cars: $67 - 4x$

Equation: $78 + 6x = 2(67 - 4x)$

$$\begin{array}{r} \text{Solve:} \\ x = 4 \end{array}$$

Answer (written in a full sentence): In four years the number of new cars sold will be twice the number of used cars sold. The number of new cars sold will be 102 and the number of used cars sold will be 51.

Ex: A music website sold 94 single songs and 67 albums today. The number of single downloads has been increasing by 22 each day and the number of album downloads has been decreasing by 5 each day. If these trends continue, in how many days will the number of single downloads be ten times the number of album downloads?

Expression for single songs: $94 + 22d$ Expression for albums: $67 - 5d$

Equation: $94 + 22d = 10(67 - 5d)$

$$\begin{array}{r} \text{Solve:} \\ d = 8 \end{array}$$

Answer (written in a full sentence): In eight days the number of single downloads will be ten times the number of album downloads. The number of single downloads will be 270 and the number of album downloads will be 27.

Solutions

Solve means to find all values that make the equation true.

When solving equations with variable on both sides you can have:

one solution (looks like $x = 4$)

no solution (looks like $4=7$)

all real numbers (looks like $6=6$)

Examples:

$$6x = 3(2x - 1)$$

$$0 = -3$$

No solution

$$4x + 2 = 2(2x + 1)$$

$$0 = 0$$

All Real Numbers

$$2(x - 4) = 6x + 4$$

$$-3 = x$$

One Solution

This means:

No value for x will make this equation true.

This means:

x can be any real number.

This means:

-3 is the only value that will make this equation true.

Try These:

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

$$0 = 12$$

No solution

Ex: $2x + 10 = 2(x + 5)$

$$0 = 0$$

All Real Numbers

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

$$-6 = -5$$

No solution

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

$$8 = 8$$

All Real Numbers

Ex: $3(4x + 6) = 9(2x + 2)$

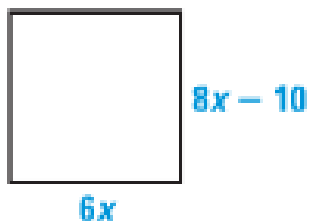
$$x = 0$$

Ex: $-3(2x - 7) = 6(4 - x)$

$$21 = 24$$

No Solution

Find the perimeter of the square.



120 units