

Algebra 1

2.2 part 2 Solve Equations with Variables on Both Sides.

Variables on both sides:

- move the like terms to the same side of the equation
- combine the like terms

$$\begin{aligned} \text{ex) } 13 + 5x &= 2x - 8 \\ &\quad -2x \quad -2x \\ \hline 13 + 3x &= -8 \\ &\quad -13 \quad -13 \\ \hline 3x &= -21 \\ \frac{3x}{3} &= \frac{-21}{3} \\ x &= -7 \end{aligned}$$

$$\begin{aligned} \text{ex) } 8t + 5 &= 6t + 1 \\ &\quad -6t \quad -6t \\ \hline 2t + 5 &= 1 \\ &\quad -5 \quad -5 \\ \hline 2t &= -4 \\ \frac{2t}{2} &= \frac{-4}{2} \\ t &= -2 \end{aligned}$$

$$\text{ex) } 8c + 5 = 4c - 11$$

Try this:

$$\begin{aligned} 24 - 3m &= 5m \\ + 3m &\quad + 3m \\ \hline 24 &= 8m \\ \frac{24}{8} &= \frac{8m}{8} \\ m &= 3 \end{aligned}$$

$$\begin{aligned} 9 - 3k &= 17 - 11 \\ + 2k &\quad + 2k \\ \hline 9 - 1k &= 17 \\ \frac{9}{9} - \frac{1k}{9} &= \frac{17}{9} \\ -\frac{1k}{9} &= \frac{8}{9} \\ k &= -8 \end{aligned}$$

Solving equations with grouping symbols

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

$$\begin{array}{r} 36x - 20 = 16x + 60 \\ -16x \quad -16x \end{array}$$

$$\begin{array}{r} 20x - 20 = 60 \\ +20 \quad +20 \end{array}$$

$$\frac{20x}{20} = \frac{80}{20}$$

$$x = 4$$

$$\begin{array}{r} 9x - 5 = 4x + 15 \\ -4x \quad -4x \end{array}$$

$$\begin{array}{r} 5x - 5 = 15 \\ +5 \quad +5 \end{array}$$

$$5x = 20$$

$$x = 4$$

ex) $9a = 6(a + 4)$

$$\begin{array}{r} 9a = 6a + 24 \\ -9a \quad -9a \end{array}$$

don't do

$$\begin{array}{r} 0 = -3a + 24 \\ -24 \quad -24 \end{array}$$

$$\begin{array}{r} -24 = -3a \\ \frac{-24}{-3} = \frac{-3a}{-3} \end{array}$$

$$a = 8$$

$$\begin{array}{r} 9a = 6a + 24 \\ -6a \quad -6a \end{array}$$

$$\frac{3a}{3} = \frac{24}{3}$$

$$a = 8$$

ex) $3(d + 12) = 8 - 4d$

$$\begin{array}{r} 3d + 36 = 8 - 4d \\ +4d \quad +4d \end{array}$$

$$\begin{array}{r} 7d + 36 = 8 \\ -36 \quad -36 \end{array}$$

$$\frac{7d}{7} = \frac{-28}{7}$$

$$d = -4$$

Try this:

4. $5z - 2 = 2(3z - 4)$

$$\begin{array}{r} 5z - 2 = 6z - 8 \\ -5z \quad -5z \end{array}$$

$$\begin{array}{r} -2 = z - 8 \\ +8 \quad +8 \end{array}$$

$$6 = z$$

6. $8y - 6 = \frac{2}{3}(6y + 15)$

$$\begin{array}{r} 8y - 6 = 4y + 10 \\ -4y \quad -4y \end{array}$$

$$\begin{array}{r} 4y - 6 = 10 \\ +6 \quad +6 \end{array}$$

$$\frac{4y}{4} = \frac{16}{4}$$

$$y = 4$$

2.2 part 2 Solving Equations with Variables on both sides 7th hr.notebook October 06, 2016

- (A) Janine has job offers at two companies. One company offers a starting salary of \$28,000 with a raise of \$3000 each year. The other company offers a starting salary of \$36,000 with a raise of \$2000 each year. In how many years would Janine's salary be the same with both companies? What will the salary be?

yrs = X

8 yrs

\$ 52,000

$$28,000 + 3000X - 2000X = 36,000 + 2000X - 2000X$$

$$28,000 + 1000X = 36,000 - 28,000$$

$$+1000X = 8,000 \quad X = 8$$

- (B) One moving company charges \$800 plus \$16 per hour. Another moving company charges \$720 plus \$21 per hour. At what number of hours will the charge by both companies be the same? What is the charge?

16 hrs ; \$ 1056

of hrs = y

$$800 + 16y - 16y = 720 + 21y - 16y$$

$$800 = 720 + 5y - 720 - 720$$

$$80 = 5y \quad y = 16$$

hrs	\$ 800	720
1	816	741
2	832	762
16	1056	1056
17	1072	1077

Try this:

A veterinarian is changing the diets of two animals, Simba and Cuddles. Simba currently consumes 1200 Calories per day. That number will increase by 100 Calories each day. Cuddles currently consumes 3230 Calories a day. That number will decrease by 190 Calories each day. The patterns will continue until both animals are consuming the same number of Calories each day. In how many days will that be? How many Calories will each animal be consuming each day then?

$$x = \# \text{ days}$$

Simba	Cuddles
$1200 + 100x$	$= 3230 - 190x$
	-1200

$$\frac{290x = 2030}{290}$$

$$x = 7 \text{ days}$$

$$1900 \text{ cal/day}$$

Identify the number of solutions of an equation
some equations have no solution (\emptyset)

identity - an equation that is true for all values of the variable. So a solution for an identity is \mathbb{R} .

$$x = x$$

$$\text{ex) } 3x = 3(x+4)$$

$$-3x = -3x + 12$$

$$0 = 12$$

False

No sol'n \emptyset

$$\text{ex) } 2x + 10 = 2x + 10$$

$$-2x = -2x$$

$$10 = 10$$

Identity or \mathbb{R}

Try this:

$$1. 9z + 12 = 9(z + 3)$$

$$\cancel{9z} + 12 = \cancel{9z} + 27$$

$$12 = 27 \text{ F}$$

$$\boxed{\emptyset}$$

$$2. \underset{-7w}{7w} + 1 = \underset{-7w}{8w} + 1$$

$$\underset{-1}{-1} = \underset{-1}{w} + \underset{-1}{1}$$

$$\boxed{0 = w}$$

$$3. 3(2a + 2) = 2(3a + 3)$$

$$\cancel{6a} + 6 = \cancel{6a} + 6$$

$$6 = 6$$

All Real #'s = \mathbb{R}
or
Identity

Home Work

3.4 B Worksheet