Warm Up

What is the slope of the following linear equation?

$$3(3x - 7) = 2y$$

$$\frac{9x - 21 = 2y}{2}$$

$$4.5x - 10.5 = y$$

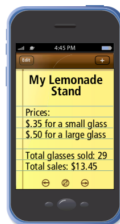$$y = 4.5x - 10.5$$

$$y = \frac{9}{2}x - \frac{21}{2}$$

18. On a hot summer day, Jay set up a lemonade stand. He kept track of how many glasses he sold on his phone.

   a. Write two equations that relate the number of large glasses sold l and the number of small glasses sold s.

   b. Solve the system of equations.

   c. How many small glasses were sold?

   d. How many large glasses were sold?

4:45 PM

My Lemonade Stand

Prices:
$.35 for a small glass
$.50 for a large glass

Total glasses sold: 29
Total sales: $13.45

Let s =   Let x = # of small glasses

Let l =   Let y = # of large glasses

Solving using Equivalent Equations

$$x + y = 29 \rightarrow y = -x + 29$$

$$0.35x + 0.5y = 13.45$$

$$\underline{-0.35x \qquad\qquad -0.35x}$$

$$2[\,0.5y = -0.35x + 13.45\,]$$

$$y = -0.7x + 26.9$$

$$-x + 29 = -0.7x + 26.9$$

$$\underline{+x \qquad\qquad +x}$$

$$29 = 0.3x + 26.9$$

$$\underline{-26.9 \qquad\quad -26.9}$$

$$\frac{2.1}{0.3} = \frac{0.3x}{0.3}$$

$$7 = x$$

$$x + y = 29$$
$$7 + y = 29$$
$$\underline{-7 \quad -7}$$
$$y = 22$$

7 small glasses

22 large glasses

Solving using Substitution

$$x + y = 29 \longrightarrow y = \boxed{29 - x}$$

$$0.35x + 0.5y = 13.45$$

$$35x + 50y = 1345$$

$$35x + 50(29 - x) = 1345$$

$$35x + 1450 - 50x = 1345$$

$$\underline{-1450 \qquad\qquad -1450}$$

$$\frac{-15x}{-15} = \frac{-105}{-15}$$

$$x = 7$$

Pablo and Jasmine decide to try some other food trucks after eating at the taco truck in Problem 2.2. For Exercises 19–22, do the following.

a. Write two equations based on the information.

b. Solve the system of equations to determine the price of 1 serving of food and the price of 1 drink or bag of chips.

19. Pablo buys 3 servings of jambalaya and 2 drinks for $18.00. Jasmine buys 1 serving of jambalaya and 2 drinks for $9.00.

Recap

1. $\begin{cases} 3x + y = 4 \\ x + y = 5 \end{cases}$

$$2x = -1$$

2. $\begin{cases} 3x + 2y = 4 \\ x + 2y = 6 \end{cases}$

$$2x = -2$$

Method from page 30:

If $2x - y = 4$ and $x + y = 5$, then

$$(2x - y) + (x + y) = 4 + 5 \qquad (1)$$
$$3x = 9 \qquad (2)$$
$$x = 3 \qquad (3)$$
$$3 + y = 5 \qquad (4)$$
$$y = 2 \qquad (5)$$

Why can we add the two equations?

$$+ \begin{cases} 2x - y = 4 \\ x + y = 5 \end{cases}$$
$$3x = 9$$

Same as adding "5" to both sides

Why do you think this "Combination" method is also called Elimination?

$$+\begin{cases} 2x - y = 4 \\ x + y = 5 \end{cases}$$

$$3x = 9$$

Eliminate

y

Combination/Elimination works if we have the same coefficient for a variable in BOTH equations.

$$2.5x + y = 10.7$$
$$2.5x + 2y = 12.9$$

$$\begin{cases} 4a + b = 2 \\ 4a + 3b = 10 \end{cases}$$

$$-2b = -8$$

Eliminate: a

Operation: subtraction

$$\begin{cases} \dfrac{3}{4}x - \dfrac{1}{2}y = 8 \\ \dfrac{3}{2}x + \dfrac{1}{2}y = 19 \end{cases}$$

Eliminate: y

Operation: addition

$$2x + 4y = 10$$
$$x - 4y = -2.5$$

Eliminate: y

Operation: addition

$$6m - 8n = 3$$
$$2m - 8n = -3$$

Eliminate: n

Operation: subtraction

Classwork - 2.3 A and C

Problem 2.3

Ⓐ Use the methods of Pablo and Jasmine, and Samantha to solve each system.

1. $\begin{cases} -x + 4y = 2 \\ x + 2y = 5 \end{cases}$

2. $\begin{cases} 2x + 3y = 4 \\ 5x + 3y = -8 \end{cases}$

3. $\begin{cases} 2x - 3y = 4 \\ 5x - 3y = 7 \end{cases}$

4. $\begin{cases} 3x + 2y = 10 \\ 4x - y = 6 \end{cases}$

© **1.** Is System B below equivalent to System A? Explain.

System A	System B
$\begin{cases} 3x + 2y = 10 \\ 4x - y = 6 \end{cases}$	$\begin{cases} 3x + 2y = 10 \\ 8x - 2y = 12 \end{cases}$

2. Use the combination method to solve System B.

3. Check that your solution also satisfies System A.

Homework

Page 34, #'s 23-26