

Warm Up

3/21

Get out your work from yesterday.
Figure out what questions you may have.

**Questions were asked about 8 and 9.
Check out the notes.**

Homework Questions?

What Do You Get When You Cross a Monastery With a Lion?

1. The sum of two numbers is 92. Their difference is 20.
Find the numbers.

Let x = the first number
Let y = the second number

$$\begin{array}{r}
 x + y = 92 \\
 + \quad x - y = 20 \\
 \hline
 2x = 112 \\
 \frac{2x}{2} = \frac{112}{2} \\
 x = 56
 \end{array}$$

$$\begin{array}{r}
 x + y = 92 \\
 56 + y = 92 \\
 -56 \quad -56 \\
 \hline
 y = 36
 \end{array}$$

(56, 36)

The numbers are 36 and 56

2. The difference of two numbers is 16. The greater number is 5 less than 4 times the smaller number. Find the numbers.

Let x = the greater number
Let y = the smaller number

using elimination ←

$$\begin{array}{r}
 x - y = 16 \\
 x = 4y - 5 \\
 \leftarrow \text{rewrite} \\
 x - y = 16 \\
 - \quad x - 4y = -5 \\
 \hline
 3y = 21 \\
 \frac{3y}{3} = \frac{21}{3} \\
 y = 7
 \end{array}$$

using substitution →

$$\begin{array}{r}
 x - y = 16 \\
 4y - 5 - y = 16 \\
 3y - 5 = 16 \\
 \quad +5 \quad +5 \\
 \hline
 3y = 21 \\
 \frac{3y}{3} = \frac{21}{3} \\
 y = 7
 \end{array}$$

$$\begin{array}{r}
 x - y = 16 \\
 x - 7 = 16 \\
 \quad +7 \quad +7 \\
 \hline
 x = 23
 \end{array}$$

The numbers are 7 and 23

3. A 100-foot cable is cut into two pieces. The first piece is 18 ft longer than the second. How long is each piece?

Let x = length of 1st piece
 Let y = length of 2nd piece

$$\begin{array}{l} \text{elimination} \swarrow \\ x + y = 100 \\ x = y + 18 \end{array} \xrightarrow{\text{substitute}}$$

$$\begin{array}{r} + \\ x + y = 100 \\ x - y = 18 \\ \hline 2x = 118 \\ \frac{2x}{2} = \frac{118}{2} \\ x = 59 \end{array}$$

The pieces are 41 and 59 feet long.

$$\begin{array}{r} x + y = 100 \\ 59 + y = 100 \\ -59 \quad -59 \\ \hline y = 41 \end{array}$$

$$\begin{array}{r} x + y = 100 \\ y + 18 + y = 100 \\ 2y + 18 = 100 \\ -18 \quad -18 \\ \hline 2y = 82 \\ \frac{2y}{2} = \frac{82}{2} \\ y = 41 \end{array}$$

$$\begin{array}{r} x + y = 100 \\ x + 41 = 100 \\ -41 \quad -41 \\ \hline x = 59 \end{array}$$

4. Three apples and four bananas cost \$4.85. Three apples and ten bananas cost \$8.75. Find the cost of an apple.

x = cost of an apple
 y = cost of a banana

$$\begin{array}{r} - \\ 3x + 4y = 4.85 \\ 3x + 10y = 8.75 \\ \hline -6y = -3.9 \\ -6 \quad -6 \\ \hline y = 0.65 \end{array}$$

$$\begin{array}{r} 3x + 4y = 4.85 \\ 3x + 4(0.65) = 4.85 \\ 3x + 2.6 = 4.85 \\ -2.6 \quad -2.6 \\ \hline 3x = 2.25 \\ \frac{3x}{3} = \frac{2.25}{3} \\ x = 0.75 \end{array}$$

An apple costs \$0.75.

5. Stilt scored 5 points less than twice the number scored by Dunk. Together they scored a total of 43 points. How many points were scored by each player?

x = # of points Stilt scored
 y = # of points Dunk scored

$$x = 2y - 5$$

$$x + y = 43$$

$$2y - 5 + y = 43$$

$$3y - 5 = 43$$

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

$$\begin{array}{r} 3y = 48 \\ \hline 3 \quad 3 \end{array}$$

$$y = 16$$

$$x + y = 43$$

$$x + 16 = 43$$

$$\begin{array}{r} -16 \quad -16 \\ \hline \end{array}$$

$$x = 27$$

Stilt scored 27 pts.
 Dunk scored 16 pts.

6. Bert's age plus twice Ernie's age is 30. Three times Bert's age plus 8 times Ernie's age is 108. How old are Bert and Ernie?

x = Bert's age

y = Ernie's age

$$-3[x + 2y = 30]$$

$$3x + 8y = 108$$

$$\begin{array}{r} \rightarrow -3x - 6y = -90 \\ + 3x + 8y = 108 \\ \hline \end{array}$$

$$\begin{array}{r} 2y = 18 \\ \hline 2 \quad 2 \end{array}$$

$$y = 9$$

$$x + 2y = 30$$

$$x + 2(9) = 30$$

$$x + 18 = 30$$

$$\begin{array}{r} -18 \quad -18 \\ \hline \end{array}$$

$$x = 12$$

Bert is 12
 Ernie is 9

7. The Rocket Coaster has 15 cars, some that hold 4 people and some that hold 6 people. There is room for 72 people altogether. How many 4-passenger cars are there? How many 6-passenger cars are there?

$x = \#$ of 4 passenger cars
 $y = \#$ of 6 passenger cars

$$\begin{array}{r} -4[x+y=15] \rightarrow -4x-4y=-60 \\ 4x+6y=72 \\ \hline \end{array}$$

$$\begin{array}{r} 2y=12 \\ \frac{2y}{2}=\frac{12}{2} \\ y=6 \end{array}$$

9 4-passenger cars
 6 6-passenger cars

$$\begin{array}{r} x+y=15 \\ x+6=15 \\ \underline{-6 \quad -6} \\ x=9 \end{array}$$

8. Tickets to the Valentine Dance cost \$3 per person or \$5 per couple. If \$475 worth of tickets were sold and 180 people attended the dance, how many couples were there?

2 people
 per couple

$x = \#$ of couples
 $y = \#$ of singles

units are # of people

$$\begin{array}{r} 3[2x+y=180] \rightarrow 6x+3y=540 \\ 5x+3y=475 \\ \hline \end{array}$$

$$x=65$$

There were
 65 couples.

$$\begin{array}{r} 2x+y=180 \\ 2(65)+y=180 \\ 130+y=180 \\ \underline{-130 \quad -130} \\ y=50 \end{array}$$

9. Pi High School ordered 40 science books. The next week, the school ordered 30 algebra books. The bill for the first order was \$360 greater than the bill for the second order. The two bills together totaled \$3960. Find the price of an algebra book.

x = price of Science book
 y = Price of Algebra book

Bill for 1st week

$$\begin{array}{r}
 40x - 30y = 360 \\
 + \quad 40x + 30y = 3960 \\
 \hline
 80x = 4320 \\
 \underline{80} \quad \underline{80} \\
 x = 54
 \end{array}$$

An Algebra book costs \$60

Bill for 2nd week

$$\begin{array}{r}
 40x + 30y = 3960 \\
 40(54) + 30y = 3960 \\
 2160 + 30y = 3960 \\
 - 2160 \qquad \qquad - 2160 \\
 \hline
 30y = 1800 \\
 \underline{30} \quad \underline{30} \\
 y = 60
 \end{array}$$

Substitution for 40x:

$$\begin{array}{l}
 40x - 30y = 360 \\
 40x + 30y = 3960
 \end{array}
 \longrightarrow
 \begin{array}{l}
 40x = 360 + 30y \\
 40x + 30y = 3960
 \end{array}$$

There are all kinds of ways to solve!

$$\begin{array}{r}
 360 + 30y + 30y = 3960 \\
 360 + 60y = 3960 \\
 - 360 \qquad \qquad - 360 \\
 \hline
 60y = 3600 \\
 \underline{60} \quad \underline{60} \\
 y = 60
 \end{array}$$

What Do You Get When You Cross a Monastery With a Lion?

Write the two letters for each correct answer in the two boxes with the exercise number.

- The sum of two numbers is 92. Their difference is 20. Find the numbers.
- The difference of two numbers is 16. The greater number is 5 less than 4 times the smaller number. Find the numbers.
- A 100-foot cable is cut into two pieces. The first piece is 18 ft longer than the second. How long is each piece?
- Three apples and four bananas cost \$4.85. Three apples and ten bananas cost \$8.75. Find the cost of an apple.
- Stilt scored 5 points less than twice the number scored by Dunk. Together they scored a total of 43 points. How many points were scored by each player?
- Bert's age plus twice Ernie's age is 30. Three times Bert's age plus 8 times Ernie's age is 108. How old are Bert and Ernie?
- The Rocket Coaster has 15 cars, some that hold 4 people and some that hold 6 people. There is room for 72 people altogether. How many 4-passenger cars are there? How many 6-passenger cars are there?
- Tickets to the Valentine Dance cost \$3 per person or \$5 per couple. If \$475 worth of tickets were sold and 180 people attended the dance, how many couples were there?
- Pi High School ordered 40 science books. The next week, the school ordered 30 algebra books. The bill for the first order was \$360 greater than the bill for the second order. The two bills together totaled \$3960. Find the price of an algebra book.

- | | |
|----|--------------|
| OF | 14, 10 |
| LA | 9, 6 |
| AR | 59 ft, 41 ft |
| EN | \$0.82 |
| IA | \$60 |
| NG | 56, 36 |
| SO | 25, 18 |
| FR | 12, 9 |
| ED | 62 |
| TH | 57 ft, 43 ft |
| RP | 23, 7 |
| EE | \$57 |
| OA | 65 |
| RI | 27, 16 |
| ST | 58, 38 |
| CE | \$0.75 |
| EA | 8, 7 |



Systems of Linear Equations: Solving Problems Using Systems of Equations PUNCHLINE • Algebra • Book A ©2006 Marcy Mathworks

Classwork

For each problem, your set up should look like this:

Let $x =$

Let $y =$

{

$$8x + 7y = 337 \quad \text{and} \quad 5x + 11y = 310$$

1. The sum of two numbers is -11. Twice the first number minus the second number is 32. Find the numbers.
2. A collection of nickels and dimes is worth \$3.30. There are 42 coins in all. How many of each kind of coin are there?
3. One night a theater sold 548 movie tickets. An adult's ticket cost \$6.50, and a child's ticket cost \$3.50. In all, \$2881 was taken in. How many of each kind of ticket were sold?
4. The perimeter of a rectangular field is 110 feet. The length is 7 feet more than twice the width. Find the dimensions of the field.
5. A second run movie theater charges \$4 for an adult ticket and \$2 for a child's ticket. One night, 380 tickets were sold for a total of \$1320. How many children attended the movie that night?
6. The state fair is a popular field trip destination. This year the senior class at High School A and the senior class at High School B both planned trips there. High School A rented and filled 8 vans and 8 buses with 240 students. High School B rented and filled 4 vans and 1 bus with 54 students. Every van had the same number of students in it as did every bus. Find the number of students in each van and each bus.
7. An orange has 20 fewer calories than a banana. If 7 bananas have the same number of calories as 9 oranges, how many calories are there in a banana?
8. Alexis bought pizza and soda for the ski club meeting. For one meeting she bought 4 pizzas and 10 sodas for \$63. The next meeting she bought 3 pizzas and 8 sodas for \$48. What is the cost of one pizza?

Homework

Finish classwork