Warm Up

Solve each system. Explain why you chose the method you used.

14. $4x + 5y = 3$
$3x - 2y = 8$

15. $2x + 7y = -20$
$y = 3x + 7$

16. $5x + 2y = 17$
$x - 2y = 8$

Announcements

1. Review Day Thursday, Test Wednesday
   a. Test covers systems of equations - you should be able to solve all three ways
2. We've had a lot of absences recents for sickness or school trips or family reasons… please do your best to stay on top of things! Come talk to me if you need to make things up or you need extra tutoring - I can't help you if you don't ask!
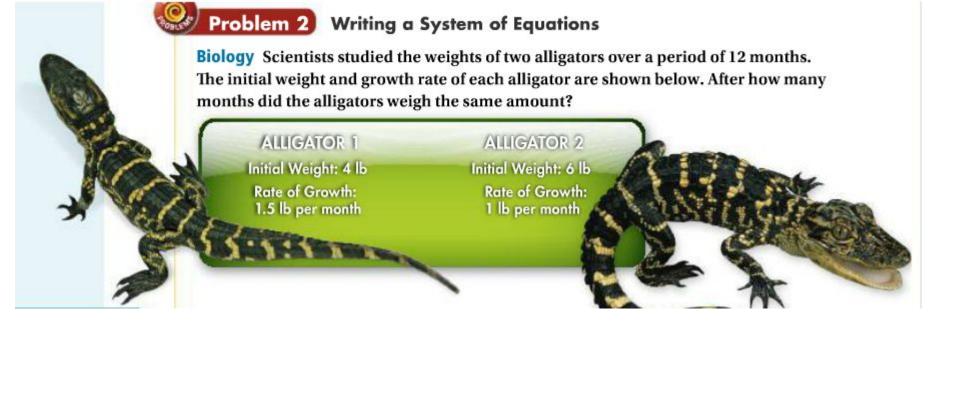
Systems of Equations Word Problems

12/5/2018

Steps for solving systems of equation word problems

1. Read the whole problem once.
2. Look back at the question to define the variables - write them down!
3. Reread the problem again to write two equations.
4. Solve using the assigned method. If no method is assigned, pick the easiest one for the equations you created.
5. Read over the question again. Make sure you answer it in context of the problem.

Solve the following with graphing

Problem 2 Writing a System of Equations

Biology Scientists studied the weights of two alligators over a period of 12 months. The initial weight and growth rate of each alligator are shown below. After how many months did the alligators weigh the same amount?

ALLIGATOR 1

Initial Weight: 4 lb

Rate of Growth:
1.5 lb per month

ALLIGATOR 2

Initial Weight: 6 lb

Rate of Growth:
1 lb per month

One satellite radio service charges $10 per month plus an activation fee of $20. A second service charges $11 per month plus an activation fee of $15. In what month was the cost of the service the same?

Student Statistics The number of right-handed students in a mathematics class is nine times the number of left-handed students. The total number of students in the class is 30. How many right-handed students are in the class? How many left-handed students are in the class?

Plants A plant nursery is growing a tree that is 3 ft tall and grows at an average rate of 1 ft per year. Another tree at the nursery is 4 ft tall and grows at an average rate of 0.5 ft per year. After how many years will the trees be the same height?

Fitness At a local fitness center, members pay a $20 membership fee and $3 for each aerobics class. Nonmembers pay $5 for each aerobics class. For what number of aerobics classes will the cost for members and nonmembers be the same?

Cell Phone Plans A cell phone provider offers a plan that costs $40 per month plus $.20 per text message sent or received. A comparable plan costs $60 per month but offers unlimited text messaging.

a. How many text messages would you have to send or receive in order for the plans to cost the same each month?

b. If you send or receive an average of 50 text messages each month, which plan would you choose? Why?

Solve the following with substitution

Snack Bar A snack bar sells two sizes of snack packs. A large snack pack is $5, and a small snack pack is $3. In one day, the snack bar sold 60 snack packs for a total of $220. How many small snack packs did the snack bar sell?

You pay $22 to rent 6 video games. The store charges $4 for new games and $2 for older games. How many new games did you rent?

Theater Tickets Adult tickets to a play cost $22. Tickets for children cost $15. Tickets for a group of 11 people cost a total of $228. Write and solve a system of equations to find how many children and how many adults were in the group.

Transportation A school is planning a field trip for 142 people. The trip will use six drivers and two types of vehicles: buses and vans. A bus can seat 51 passengers. A van can seat 10 passengers. Write and solve a system of equations to find how many buses and how many vans will be needed.

Geometry The measure of one acute angle in a right triangle is four times the measure of the other acute angle. Write and solve a system of equations to find the measures of the acute angles.

Geometry The rectangle shown has a perimeter of 34 cm and the given area. Its length is 5 more than twice its width. Write and solve a system of equations to find the dimensions of the rectangle.

ℓ

w | $A = 52 \text{ cm}^2$

Solve the following with elimination

Multiple Choice The theater club sells a total of 101 tickets to its first play. A student ticket costs $1. An adult ticket costs $2.50. Total ticket sales are $164. How many student tickets were sold?

(A) 25   (B) 42   (C) 59   (D) 76

Washing 2 cars and 3 trucks takes 130 min. Washing 2 cars and 5 trucks takes 190 min. How long does it take to wash each type of vehicle?

Talent Show Your school's talent show will feature 12 solo acts and 2 ensemble acts. The show will last 90 min. The 6 solo performers judged best will give a repeat performance at a second 60-min show, which will also feature the 2 ensemble acts. Each solo act lasts x minutes, and each ensemble act lasts y minutes.

a. Write a system of equations to model the situation.

b. Solve the system from part (a). How long is each solo act? How long is each ensemble act?

Vacations A hotel offers two activity packages. One costs $192 and includes 3 h of horseback riding and 2 h of parasailing. The second costs $213 and includes 2 h of horseback riding and 3 h of parasailing. What is the cost for 1 h of each activity?

Nutrition Half a pepperoni pizza plus three fourths of a ham-and-pineapple pizza contains 765 Calories. One fourth of a pepperoni pizza plus a whole ham-and-pineapple pizza contains 745 Calories. How many Calories are in a whole pepperoni pizza? How many Calories are in a whole ham-and-pineapple pizza?

Furniture A carpenter is designing a drop-leaf table with two drop leaves of equal size. The lengths of the table when one leaf is folded up and when both leaves are folded up are shown. How long is the table when no leaves are folded up?

|←———5.5 ft———→| |←———————7 ft———————→|

Break Even Problems

1. A fashion designer makes and sells hats. The material for each hat costs $5.50. The hats sell for $12.50 each. The designer spends $1400 on advertising. How many hats must the designer sell to break even?

Set Up: **Equations:**

Let _____ = _____   _____

Let _____ = _____   _____

SOLVE:

2. A puzzle expert wrote a new Sudoku puzzle book. His initial costs are $864. Binding and packaging each book cost $0.80. The price of the book is $2. How many copies must be sold to break even?

Set Up: **Equations:**

Let _____ = _____   _____

Let _____ = _____   _____

SOLVE:

3. A bicycle store costs $2400 per month to operate. The store pays an average of $60 per bike. The average selling price of each bicycle is $120. How many bicycles must the store sell each month to break even?
?

Set Up: **Equations:**

Let _____ = _____   _____

Let _____ = _____   _____

SOLVE:

4. Producing a musical cost $88,000 plus $5900 per performance. One sold-out performance earns $7500 in revenue. If every performance sells out, how many performances are needed to break even?

Set Up: **Equations:**

Let _____ = _____   _____

Let _____ = _____   _____

SOLVE:

5. A carpenter makes and sells rocking chairs. The material for each chair costs $22.50. The chairs sell for $75 each. If the carpenter spends $420 on advertising, how many chairs must she sell to break even?

Set Up: **Equations:**

Let _____ = _____   _____

Let _____ = _____   _____

SOLVE:

Other Word Problems

The sum of two numbers is 73. When the smaller number is subtracted from twice the greater number, the result is 50. Find the two numbers.

<table>
<tr><td><u>Set Up</u>:</td><td><u>Equations</u>:</td></tr>
</table>

Let _____ = _____

Let _____ = _____

_____

_____

<u>SOLVE:</u>

The length of a rectangle is 5 cm less than three times its width. If the perimeter is 70 cm, find the area of the rectangle.

Set Up:	Equations:

Let _____ = _____   _____

Let _____ = _____   _____

SOLVE:

John has 15 coins, all dimes and quarters, worth $2.55. How many dimes and how many quarters does John have?

Set Up: **Equations:**

Let _____ = _____   _____

Let _____ = _____   _____

SOLVE:

Tickets for the senior play cost $4 for adults and $2 for students. This year there were 600 tickets sold, and the class made $1900. How man7y of each type of ticket was sold?

Set Up: **Equations:**

Let _____ = _____   _____

Let _____ = _____   _____

SOLVE:

Kathleen invested $5000, some at 6% and the rest at 5%. Her annual income from the investments is $280. How much is invested at 5%?

Set Up: **Equations:**

Let _____ = _____   _____

Let _____ = _____   _____

SOLVE:

11. A baseball manager bough 4 bats and 9 balls for $168.75. On another day, he bought 3 bats and 1 dozen balls for $172.50. How much did he pay for each bat and each ball?

Set Up: **Equations:**

Let _____ = _____   _____

Let _____ = _____   _____

SOLVE:

12. CHALLENGE: You want to sell 1 lb jars of mixed peanuts and cashews for $5. You pay $3 per pound for peanuts and $6 per pound for cashews. You plan to combine 4 parts peanuts and 1 part cashews to make your mix. You have spent $70 on materials to get started. How many jars must you sell to break even?

Set Up:

Let _____ = _____

Let _____ = _____

SOLVE:

Equations:

_____

_____

Tonight's Homework: Complete any unfinished word problems. Show all work, including defined variables.