

3.4 Substitution Method

Name: _____

Write your questions
and thoughts here!**Notes****Writing Equations****Example 1:**

Monica built a porch that contained 2 different colors of bricks to create a nice pattern. She purchased the red bricks at \$2 each and the gray bricks for \$3 each. How many red bricks did Monica purchase if she spent \$160 on 60 bricks?

_____ = # of red bricks

_____ = # of gray bricks

Equation 1: _____

Equation 2: _____

Example 2:

A boat traveled 144 miles downstream and back. The trip downstream took 4 hours. The trip back took 8 hours. What is the speed of the boat in still water?

_____ = speed of the boat

_____ = speed of the river's current

Equation 1: _____

Equation 2: _____

Recall:

Three types of solutions to a system of equations:

- 1.
- 2.
- 3.

Solve by Substitution

1.

2.

3.

ONE SOLUTION**Example 3:**

$$4x - 3y = -11$$

$$x + 6y = 4$$

Example 4:

$$2a + b = -8$$

$$4a - b = -4$$

Example 5:

$$7x + 4y = 16$$

$$7x + y = 4$$

Write your questions and thoughts here!

NO SOLUTION	INFINITE SOLUTIONS
<p>Example 6: $6x - 2y = 3$ $-3x + y = 4$</p>	<p>Example 7: $3x + 6y = -15$ $x + 2y = -5$</p>

Now summarize what you learned!

3.4 Substitution Method – Solving Systems of Equations

Practice

Algebra 1

Create a system of equations for each problem, but don't solve. Identify each variable's meaning.

1. Maria and Carlos are selling wrapping paper for a school fundraiser. Customers can buy rolls of plain wrapping paper and rolls of shiny wrapping paper. Maria sold 9 rolls of plain wrapping paper and 6 rolls of shiny wrapping paper for a total of \$204. Carlos sold 1 roll of plain wrapping paper and 8 rolls of shiny wrapping paper for a total of \$140.

_____ = _____
 (variable) (what the variable represents)

_____ = _____
 (variable) (what the variable represents)

Equation 1: _____

Equation 2: _____

2. A plane traveled 900 miles to Cleveland and back. (900 miles each way for a total of 1800 miles.) The trip there was with the wind and it took 9 hours. The trip back was into the wind and took 18 hours.

_____ = _____
 (variable) (what the variable represents)

_____ = _____
 (variable) (what the variable represents)

Equation 1: _____

Equation 2: _____

Solve each system of equations using substitution.

3. $2x + 8y = -16$
 $y = x - 12$

4. $C = 4r - 3$
 $2C - 8r = -6$

5. $-y = -3x + 2$
 $6x + 3y = 14$

6. $4l + w = -2$
 $4l = -8 - 4w$

7. $c - 3d = 1$
 $-3c = -9d$

8. $4m + 4n = -12$
 $2n = -2 - m$

9. $3x + 6y = -15$
 $x = -5 - 2y$

10. $-a = 1 - 2h$
 $8h + 4a = 6$

11. $y = 4 + 2x$
 $4x - 2y = 0$

3.4 Substitution Method – Solving Systems of Equations

Wrap up

Practice check: The next two questions are just like the practice, but we provide no answers. If you can't do these problems, then you're definitely not ready for a Mastery Check!

12. The perimeter of a rectangular parking lot is 190 meters. The width is one-fourth the length. Write a system of equations for this scenario, **but do not solve**.

13. Solve $x - 4y = -4$
 $-3x + 12y = -4$

14. Remember Mr. Bean riding his motor scooter and lawn mower? Assume Hill-Billie Bean is on his lawnmower at his farmhouse. 1 kilometer away is Biker Bean riding his motor scooter towards Hill-Billie Bean to play chicken. Assume the lawnmower is traveling at 5 km/hour, and the scooter is traveling at 15 km/h.

a. You are going to use the formula $d = rt$. For this situation, the two variables are d and t . Define the following variables and include units.

d represents _____ measured in _____.
(units)

t represents _____ measured in _____.
(units)

EXAMPLE of using $d = rt$. Micah is running away from his house at 11 km/hour. If he starts 2 km from his house, then the distance from his house can be represented by $d = 11t + 2$. Now answer parts b and c.

b. Create an equation that represents the distance Hill-Billie Bean has traveled from his farmhouse. Use the example above to help.

c. Create an equation that represents the distance Biker Bean is from the farmhouse. *Hint: this equation contains +1 because he starts 1 km away from the farm house. Also, the distance from the farmhouse is DECREASING, so this will change your rate.*

d. Solve these two equations by using the substitution method. Check with your teacher to see if your equations are correct before you start solving them.

e. Using your answer from part d, how long does it take until they run into each other?

f. Using your answer from part d, how far will the lawnmower travel?