

SOLVING SYSTEMS OF EQUATIONS

EQ: How do we solve system of equations word problems?

Warm-Up: Solve the following system of equation using the substitution method. Show all of your work.

$x = y - 2$
 $y = 10 - 3x$

$y = 10 - 3(y - 2)$
 $y = 10 - 3y + 6 + 3y$

$y = 16 - 3y + 3y$
 $4y = 16$
 $y = 4$

$x = 4 - 2$
 $x = 2$

(2, 4)

The Happy Faces Middle School Math Club sold gift wrap to earn money for a upcoming math competition. The total number of rolls sold was 480. The gift wrap in solid colors sold for \$4.00 per roll, and the print gift wrap sold for \$6.00 per roll. The total amount of money collected was \$2340.

How many rolls of each kind of gift wrap were sold?
Let's do this!

1) What are the unknowns in the word problem?
the # of each type of Roll sold

2) Assign each unknown a variable
Let's make:
x: Solid Roll y: Print Roll

3) Using x and y
Translate (make an equation): The total number of rolls sold was 480
 $x + y = 480$

4) **Translate (make an equation):** The gift wrap in solid colors sold for \$4.00 per roll, and the print gift wrap sold for \$6.00 per roll. The total amount of money collected was \$2340.
 $4x + 6y = 2340$

5) Put both equations together and solve the system:
 $x + y = 480$
 $4x + 6y = 2340$

$x + y = 480$
 $-x - y = -480$
 $x = 480 - y$

$4(480 - y) + 6y = 2340$
 $1920 - 4y + 6y = 2340$
 $1920 + 2y = 2340$
 -1920
 $2y = 420$
 $y = 210$

$x + 2(210) = 480$
 $x + 420 = 480$
 -420
 $x = 60$

x = 270 Solid Rolls **y = 210 Print Rolls**

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Try these below!

- 1) Gina and Tonya both played Pac-Man at the arcade. The difference between Gina's score and Tonya's score is 3 points. Four times Tonya's score plus Gina's score is 7 points. Find Gina's score and Tonya's score.

$x = \text{Gina}$
 $y = \text{Tonya}$

$x - y = 3$
 $4y + x = 7$
 $x = 3 + y$
 $4y + 3 + y = 7$
 $5y + 3 = 7$
 $5y = 4$
 $y = 0.8$
 $x = 3.8$ **Gina Score**

$5y = 4$
 $y = 0.8$ **score Tonya**

- 2) Steven is 7 years younger than 3 times Jane's age. The difference between 6 times Steven's age and Jane's age is 9 years. How old is Steven and Jane?

$x = \text{Steven's age}$
 $y = \text{Jane's age}$

$x = 3y - 7$
 $6x - y = 9$

$6(3y - 7) - y = 9$
 $18y - 42 - y = 9$
 $17y - 42 = 9$
 $17y = 51$
 $y = 3$
 $x = 3(3) - 7 = 2$
X = 2 yrs old Steven

$y = 3$
Y = Jane 3 yrs old

- 3) When Dale baby-sat for 8 hours and worked at a restaurant for 3 hours, he made a total of \$58. When he baby-sat for 2 hours and worked at a restaurant for 5 hours, he made a total of \$40. How much does Dale get paid for each type of work?

$x = \text{baby sit}$
 $y = \text{Restaurant}$

$8x + 3y = 58$
 $2x + 5y = 40$

$6.8x = 34$
 $x = 5$ **baby sit**
 $4 = 6$ **restaurant**

$2x + 5y = 40$
 $-2x \quad 5 \quad 5$

$8x + 3(8 - 0.4x) = 58$
 $8x + 24 - 1.2x = 58$
 $6.8x + 24 = 58$

$2(5) + 5y = 40$
 $10 + 5y = 40$
 $-10 \quad -10$
 $5y = 30$
 $y = 6$

- 4) Find the value of two numbers if their sum is 12 and their difference is 4.

$x + y = 12$

$x - y = 4$
 $+y \quad +y$

$x = 4 + y$

$x = \text{First \#}$
 $y = \text{Second \#}$

$4 + y + y = 12$

$4 + 2y = 12$
 $-4 \quad -4$

$2y = 8$
 $y = 4$

$x + y = 12$
 $-4 \quad -4$

$x = 8$

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Systems of Equations Word Problems Homework

Directions: Solve and CHECK each problem below

<p>1) The difference of two numbers is 3. Their sum is 13. Find the numbers</p>	<p>2) A landscaping company placed two orders with a nursery. The first order was for 13 bushes and 4 trees, and totaled \$487. The second order was for 3 bushes and 1 tree, and totaled \$116. The bills do not list the per-item price. What were the costs of one bush and of one tree?</p>
<p>3) The senior classes at Hauppauge HS and Smithtown HS planned separate trips to NYC. Hauppauge HS rented 1 van and 6 buses for 372 students. Smithtown HS rented 4 vans and 12 buses for 780 students. How many students can a van carry? How many students can a bus carry?</p>	<p>4) Hauppauge Middle School is selling tickets to a spring musical. On the first day school sold 1 senior citizen ticket and 3 child tickets for a total of \$25. The school earned \$67 dollars on the second day by selling 8 senior citizen tickets and 5 child tickets. What was the price for one senior citizen ticket and one child ticket?</p>
<p>5) The difference of two numbers is 4. Their sum is 12. Find the numbers.</p>	<p>6) <i>Candy Mixtures.</i> A bulk wholesaler wishes to mix some candy worth \$.45 per pound and some worth \$.80 per pound to make 350 lb. of a mixture worth \$.65 per pound. How much of each type of candy should be used?</p>

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