Algebra 2
1.2 – Solving Systems of Equations Algebraically
Word Problems

Name: KEY

Date: _____ **Period:** ____

Applications of Linear Systems

Learning Target: Students will be able to interpret word problems to write and solve systems of equations.

Steps:

1. Define <u>two</u> variables. Be specific about the quantity they represent.
2. Write a system of <u>two equations</u>.
3. Solve the system using substitution or elimination.
4. Use units to label both answers and check to make sure the answers make sense!

Set up a system of equations and solve.

1.) 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 = 4-PASSENGER CARS
y = 6-PASSENGER CARS

$x + y = 15 \rightarrow -4x - 4y = -60$
$4x + 6y = 72 \rightarrow 4x + 6y = 72$

$2y = 12$
$y = 6$

$x + 6 = 15$
$x = 9$

NINE 4-PASSENGERS CARS
SIX 6-PASSENGER CARS

2.) 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?

x = INDIVIDUAL
y = COUPLE

$x + y = 180$
$3x + 5y = 475$

3.) 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 = 1ST ORDER
y = 2ND ORDER

$40x = 30y + 360$
$40x + 30y = 3960$

4.) To raise money for new uniforms, the band boosters sell t-shirts and hats. The cost of each t-shirt is \$6.oo and the cost for the hat is \$4.00. The boosters spend a total of \$2,000 on t-shirts and hats. The selling prices of the t-shirts are \$10.00 and the selling prices of the hats are \$7.00. They sell all of the merchandise and their revenue is \$3375. How many t-shirts and hats did they sell?

t = T-SHIRTS
H = HATS

$6t + 4H = 2000$
$10t + 7H = 3375$

5.) Calvin has $8.80 in pennies and nickels. If there are twice as many nickels as pennies, how many pennies does Calvin have? How many nickels?

P = PENNIES

N = NICKELS

$.01P + .05N = 8.80$

$N = 2P$

$.01P + .05(2P) = 8.80$

$.01P + .10P = 8.80$

$.11P = 8.80$

$P = 80$

$N = 2(80)$

$N = 160$

80 PENNIES
160 NICKELS

6.) A total of 78 seats for a concert are sold, producing a total revenue of $483. If seats cost either $2.50 or $10.50, how many $2.50 seats and how many $10.50 seats were sold?

$x =$ # $2.50 SEAT

$y =$ # $10.50 SEAT

$x + y = 78$

$2.50x + 10.50y = 483$

7.) You enroll in a book club in which you can earn bonus points to use towards the purchase of books. Each paperback book you order cost $6.95 and earns you 2 bonus points. Each hardcover book costs $19.95 and earns you 4 bonus points. The first order you place comes to a total of $60.75 and earns you 14 bonus points. How many of each type of book did you order?

P = PAPERBACK BOOK

H = HARDCOVER BOOK

$6.95P + 19.95H = 60.75$

$2P + 4H = 14 \longrightarrow P = -2H + 7$

3 PAPERBACK BOOKS
2 HARDCOVER BOOKS

$6.95(-2H + 7) + 19.95H = 60.75$

$-13.90H + 48.65 + 19.95H = 60.75$

$6.05H = 12.10$

$H = 2$

$P = -2(2) + 7$

$P = -4 + 7$

$P = 3$

8.) Using only 34-cent stamps and 20-cent stamps, Peggy put $3.52 postage on a package. She used twice as many 34-cent stamps as 20-cent stamps. Determine how many of each type of stamp she used.

$x =$ 34-CENT STAMPS

$y =$ 20-CENT STAMPS

$.34x + .20y = 3.52$

$x = 2y$

$.34(2y) + .20y = 3.52$

$.68y + .20y = 3.52$

$.88y = 3.52$

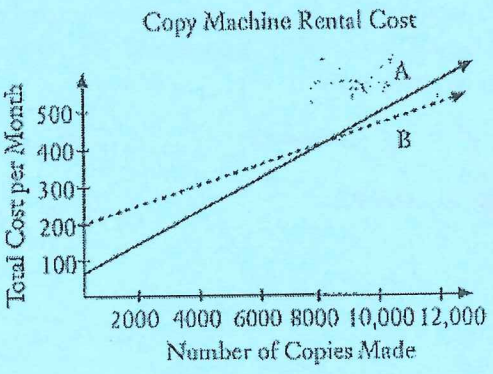
$y = 4$

$x = 2(4)$

$x = 8$

EIGHT 34-CENT STAMPS
FOUR 20-CENT STAMPS

9.) The graph below was made to compare the coasts of renting copy machines from Company A and from Company B. What information is given by the point of intersection of the two lines.



A. The number of copies from which the fixed per-month charge is equal to the cost of copies
B. The price per copy for renting a copier from both companies
C. The fixed per-month charge for renting a copier from both companies
D. The number of copies for which the total cost per month is the same for both companies