End of Chapter Test

Name ______________________________ Date ____________

1. Finest Cooks offers a membership to take cooking classes for an initial fee of \$60 plus \$20 for each lesson. Professional Cooks offers a membership to take cooking classes for an initial fee of \$15 plus \$35 for each lesson. After how many cooking classes will the cost at both companies be the same?

$$\begin{cases} y = 60 + 20x \\ y = 15 + 35x \end{cases}$$

$$60 + 20x = 15 + 35x$$
$$45 = 15x$$
$$3 = x$$

After 3 cooking classes, the cost at both companies will be the same.

2. Tell whether each system of equations would best be solved using the substitution method or the linear combinations method.

a. $\begin{cases} -5x + 8y = 40 \\ y + 3x = 20 \end{cases}$

substitution

b. $\begin{cases} 35 - 7x = 5y \\ 14x + 15y = 10 \end{cases}$

linear combinations

c. $\begin{cases} 9x + 12 = 4y \\ 8y - 3x = 6 \end{cases}$

linear combinations

3. Determine the solution to each system of equations.

a. $\begin{cases} -3x + y = 10 \\ 2x - 7y = 6 \end{cases}$

$$y = 3x + 10$$
$$2x - 7(3x + 10) = 6$$
$$2x - 21x - 70 = 6$$
$$-19x = 76$$
$$x = -4$$
$$y = 3(-4) + 10 = -2$$
$$(-4, -2)$$

b. $\begin{cases} x - y = 2 \\ y - 3x = -20 \end{cases}$

$$y = 3x - 20$$
$$x - (3x - 20) = 2$$
$$x - 3x + 20 = 2$$
$$-2x = -18$$
$$x = 9$$
$$y = 3(9) - 20 = 7$$
$$(9, 7)$$

4. Determine the solution to each system of equations.

a. $\begin{cases} 3x = 8y - 4 \\ 6x + 2y = 28 \end{cases}$

$3x - 8y = -4$
$4(6x + 2y = 28)$
$27x = 108$
$x = 4$

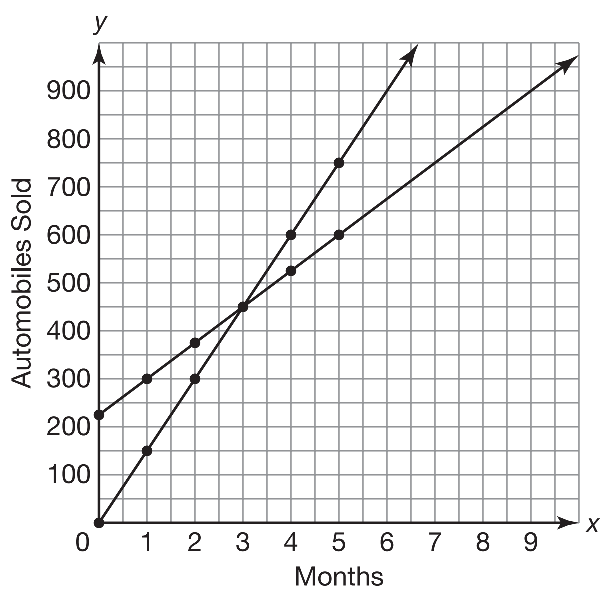
$3(4) = 8y - 4$
$12 = 8y - 4$
$16 = 8y$
$2 = y$
$(4, 2)$

b. $\begin{cases} \frac{1}{10}x + \frac{3}{8}y = 1 \\ \frac{1}{4}y + 1 = -\frac{2}{5}x \end{cases}$

$\frac{1}{10}x + \frac{3}{8}y = 1$
$-\frac{1}{4}\left(\frac{1}{4}y + 1 = -\frac{2}{5}x\right)$
$\frac{5}{16}y = \frac{5}{4}$
$y = 4$

$\frac{1}{10}x + \frac{3}{8}(4) = 1$
$\frac{1}{10}x = -\frac{1}{2}$
$y = -5$
$(-5, 4)$

5. The graph shows the number of automobiles sold by two companies over the first five months of the year. What does the solution $x = 3$ represent?



After 3 months, both companies sold 450 automobiles.

6. A sports ticketing company offers two ticket plans. One plan costs \$110 plus \$25 per ticket. The other plan costs \$40 per ticket. How many tickets must Gloria buy in order for the first plan to be the better buy?

$\begin{cases} y = 110 + 25x \\ y = 40x \end{cases}$

$110 + 25x = 40x$
$110 = 15x$
$7\frac{1}{3} = x$

Gloria must buy at least 8 tickets for the first plan to be the better buy.

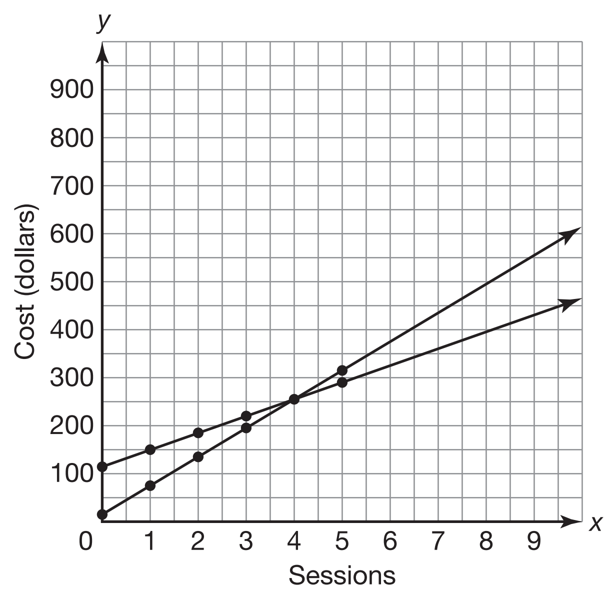
6

Name ____________________ Date __________

7. Explain when each method (graphing, substitution, linear combinations) is a good method to find a solution to a system of equations.

Graphing is a good method when the numbers are easy to graph. Substitution is a good method when one variable can be easily isolated. Linear combinations is a good method when the numbers are not easy to graph and one variable cannot be easily isolated.

8. Keith and Adam are personal trainers. Keith offers personal training sessions for $35 each plus a $115 start up fee. Adam offers personal training sessions for $60 each plus a $15 start up fee. Write and graph a system of linear equations that represents this situation. Determine the number of sessions at which both trainers will cost the same amount.



$$\begin{cases} y = 35x + 115 \\ y = 60x + 15 \end{cases}$$

The graphs intersect at $x = 4$, so at 4 sessions, Keith and Adam will cost the same amount.

9. Dawn and Claire both earn a base salary plus commission. Dawn earns $1000 plus 25% of her sales each month. Claire earns $2000 plus 10% of her sales each month. Write a system of equations that represents this situation. Let *x* represent the amount in sales each month.

$$\begin{cases} y = 1000 + 0.25x \\ y = 2000 + 0.1x \end{cases}$$

10. Tell whether each system of equations would best be solved using the substitution method or the linear combinations method. Then solve the system of equations.

a. $\begin{cases} 8x = 3y - 11 \\ -4x - 6 = -2y \end{cases}$ linear combinations

$$\begin{array}{r} 8x - 3y = -11 \\ \underline{2(-4x + 2y = 6)} \\ y = 1 \end{array}$$

$$\begin{array}{c} -4x - 6 = -2(1) \\ -4x = 4 \\ x = -1 \\ (-1, 1) \end{array}$$

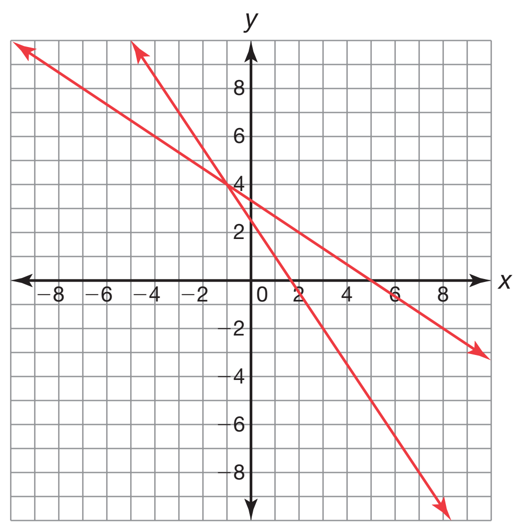
b. $\begin{cases} -3x - 1 = 2y \\ 2x + y = 2 \end{cases}$ substitution

$$\begin{array}{c} y = 2 - 2x \\ -3x - 1 = 2(2 - 2x) \\ -3x - 1 = 4 - 4x \\ x = 5 \end{array}$$

$$\begin{array}{c} 2(5) + y = 2 \\ y = 2 - 10 \\ y = -8 \\ (5, -8) \end{array}$$

11. Graph the system of equations. Determine the solution.

$\begin{cases} 2x = 10 - 3y \\ 3x + 2y = 5 \end{cases}$



(−1, 4)

12. How many solutions does each system of equations have?

a. $\begin{cases} 3x - y = 1 \\ 3y + 3 = 9x \end{cases}$

infinitely many solutions

b. $\begin{cases} y + 4x = 7 \\ -2y - 4 = 8x \end{cases}$

0 solutions

c. $\begin{cases} 4y = 3x + 4 \\ 8y - 6x = 8 \end{cases}$

infinitely many solutions

6