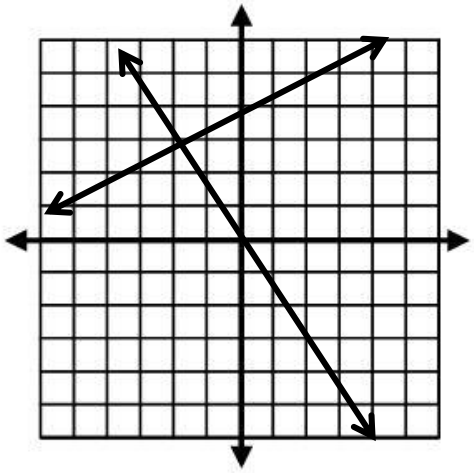
Competency 1: Solving Linear Systems (Graphically)

1. Determine whether the ordered pair (2, 4) is a solution to the system:

$$\begin{cases} 3x - y = 2 \\ 2x + y = 0 \end{cases}$$

2. Use the given graph to solve the system of equations represented by the graph.



3. Solve this system of equations by graphing. Use the graph provided. What is the solution?

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

4. Determine the number of solution(s). Justify your answer.

(a) $\begin{cases} y = -2x + 4 \\ y = \frac{1}{2}x + 3 \end{cases}$ (b) $\begin{cases} y = 3x - 7 \\ y = -3x + 7 \end{cases}$

For problem 5a and 5b, write a system of equations that models the situation. Using technology, solve by graphing.

5. (a) The cost of admission to the Spring Carnival was \$50 for a group of 9 children and 2 adults. The admission was \$61 for another group of 10 children and 3 adults. What was the admission price for each child? What was the admission price for each adult?

(b) Towing Company A charges \$50 plus additional \$1 per mile. Towing Company B charges \$80 plus \$0.10 per mile. After approximately how many miles will the cost be the same? What is the approximate cost?

Competency 2: Solving Linear Systems (Algebraically)

Solve each system of linear equations.

6. $\begin{cases} x = y + 2 \\ 2x + y = 1 \end{cases}$

7. $\begin{cases} 3x + 5y = 3 \\ \frac{1}{2}x - \frac{5}{3}y = 0 \end{cases}$

8. $\begin{cases} -9x - 3y = -7 \\ 3x + y = -5 \end{cases}$

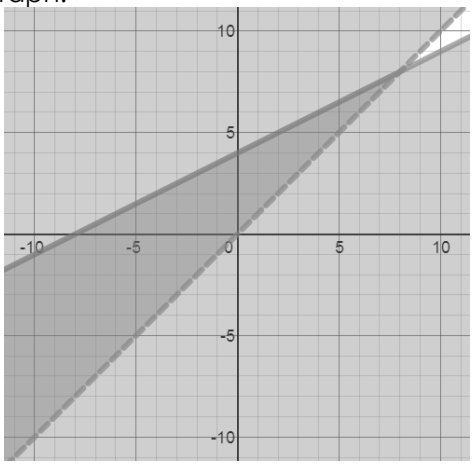
For problems 9-10, define the variables and write a system of equations that models the situation. Then solve algebraically.

9. David has 24 coins that are all dimes and quarters. The value of the coins is \$3.75. How many dimes and how many quarters does David have?

10. Leighton's Cycle Shop sells bicycles and tricycles. The number of bicycles is 1 less than 4 times the number of tricycles. All the bicycles and tricycles together have a total of 174 wheels. How many bicycles are there?

Competency 3: Solving Systems of Linear Inequalities

11. Construct a system of inequalities for the graph:



12. Graph to show the solution to this system of linear inequalities given.

$$\begin{cases} -3x + y > -5 \\ 6x + 2y \leq 2 \end{cases}$$

13. Kayla is planning on building a rectangular dog pen for her dog. She can use no more than 80 feet of fencing, as that is all she has. She read that her dog should have a space where the width is at least 8 feet and the length is at least 14 feet.

    Let ***x*** = width of dog pen (ft)
    Let ***y*** = length of dog pen (ft)

    *R*epresent <u>all</u> constraints using equations or inequalities.

14. Graph your inequalities from #13 on the graph provided.

15. Which of the following are solutions? There may be more than one!

    A. (12,17) B. (7,20) C. (15, 20)

    D. (25, 30) E. (10, 10)

Competency 5: Distributed Practice

21. Find the first five terms of the sequence described below.

    $a_1 = -1, \quad a_{n+1} = 3a_n + n$

22. Given the following function, evaluate $f(-4)$.

    $$f(x) = \begin{cases} 2 & if\ x > -1 \\ x + 4 & if\ x \le -1 \end{cases}$$

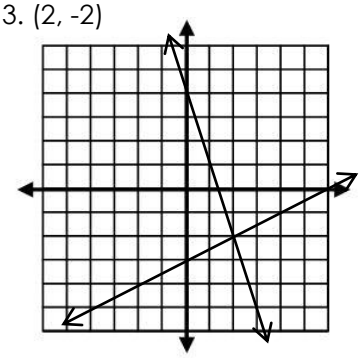
23. Simplify: $4\sqrt{18} \cdot 3\sqrt{8}$

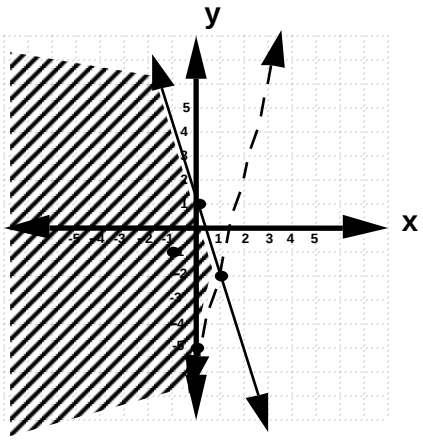
24. An ATV costs $8,000 and depreciates at a rate of 18% per year. Construct an exponential function to model this situation.

25. Find the y-intercept of $f(x) = \frac{1}{8}3^x + 2$.

ANSWERS

1. no, $2 * 2 + 4 \neq 0$
2. (-2, 3)
3. (2, -2)



4. (a) 1 solution, the lines are perpendicular and therefore intersect at one point
   (b) 1 solution, the lines have different slopes are will therefore interest at one point
5. (a) $\begin{cases} 9x + 2y = 50 \\ 10x + 3y = 61 \end{cases}$
   children's price: $4, adult price: $7
   (b) $\begin{cases} y = 50 + 1x \\ y = 80 + 0.1x \end{cases}$
   after approximately 33 miles the cost will be the same at $83.
6. (1, -1)
7. $\left(\frac{2}{3}, \frac{1}{5}\right)$
8. No solution
9. x=number of dimes, y=number or quarters
   $\begin{cases} x + y = 24 \\ 0.10x + 0.25y = 3.75 \end{cases}$
   David has 15 dimes and 9 quarters
10. x=number of bicycles, y=number of tricycles
    $\begin{cases} x = 4y - 1 \\ 2x + 3y = 174 \end{cases}$
11. $\begin{cases} y \le \frac{1}{2}x + 4 \\ y > x \end{cases}$
12. 

13. $\begin{cases} 2x + 2y \le 80 \\ x \ge 8 \\ y \ge 14 \end{cases}$
14. check with graphing calculator
15. A and C
16. -1, -2, -4, -10, -28
22. f(4)=0
23. 144
24. $f(x) = 8000(0.82)^x$
25. $2\frac{1}{8}$