Chapter 6 Test  

Do you know HOW?

Solve each system by graphing. Tell whether the system has one solution, infinitely many solutions, or no solution.

1. \(x - 2y = 3\)
   \(y = -2x + 6\)
   \((3, 0);\) one solution

2. \(x + y = 3\)
   \(3x - 2y = 4\)
   \((2, 1);\) one solution

3. \(2x = -4y + 10\)
   \(6y = -3x + 12\)
   no solution

Solve each system using substitution.

4. \(3x - 5y = -1\)
   \(x - y = -1\)
   \((-2, -1)\)

5. \(x + 2y = -1\)
   \(2x - 3y = 12\)
   \((3, -2)\)

6. \(2x + 3y = 9\)
   \(3x + 4y = 5\)
   \((-21, 17)\)

7. \(7x = 2y + 1\)
   \(4y = -3x + 15\)
   \((1, 3)\)

8. \(x + \frac{y}{2} = 4\)
   \(\frac{x}{3} + 2y = 5\)
   \((3, 2)\)

9. \(\frac{x}{2} + \frac{y}{4} = 3\)
   \(2x - y = 4\)
   \((4, 4)\)

Solve each system using elimination.

10. \(x + y = 4\)
    \(x - y = 6\)
    \((5, -1)\)

11. \(-2x + 3y = 9\)
    \(2x - 2y = -4\)
    \((3, 5)\)

12. \(x + y = 7\)
    \(3x - 2y = 11\)
    \((5, 2)\)

13. \(7x - 8y = 11\)
    \(8x - 7y = 7\)
    \((-1.4, -2.6)\)

14. \(0.4x + 0.3y = 1.7\)
    \(0.7x - 0.2y = 0.8\)
    \((2, 3)\)

15. \(3x - 7y + 10 = 0\)
    \(y - 2x - 3 = 0\)
    \((-1, 1)\)

Write a system of equations to model each situation. Solve by any method.

16. Ten years from now, A will be twice as old as B. Five years ago, A was three times as old as B. What are the present ages of A and B?
   
   **A is 50 and B is 20**

17. The ratio of incomes of two persons is 9:7. The difference in their weekly incomes is $200. What are their weekly incomes?
   
   **$900 and $700**

18. A change purse contains a total of 100 nickels and dimes. The total value of the coins is $7. How many coins of each type does the purse contain?
   
   **40 dimes and 60 nickels**
Chapter 6 Test (continued) Form G

Graph each inequality in the coordinate plane.

19. $2x + 3y \leq 6$
20. $2x - y \geq 1$
21. $-3x + 2y < 5$

Solve each system of inequalities by graphing.

22. $2x + 3y \leq 6$
   $3x + 2y \leq 6$
23. $x + y \geq 9$
   $3x + y \geq 12$
24. $5x + y > 10$
   $2x + y < 15$

25. For a party, you can spend no more than $20 on cakes. Egg cake cost $4 and cream cake cost $2. Write the linear inequality that models the situation. Graph the inequality. $4x + 2y \leq 20$

Do you UNDERSTAND?

26. Open-Ended Write a system of linear equations that has infinitely many solutions.
   Answers may vary. Sample: $y = 2x - 5$; $-4x + 2y = -10$

27. Error Analysis A student determined that (1, 1) is one of the solutions of the linear inequality $y \leq 2x - 3$, as shown below. What error did the student make?

   $y \leq 2x - 3$
   $1 \leq 2(1) - 3$
   $1 \leq 1$

   When the student simplified the expression $2(1) - 3$, the student got 1 instead of $-3$. 
Do you know HOW?

Solve each system by graphing. Tell whether the system has one solution, infinitely many solutions, or no solution.

1. \( y = \frac{1}{2}x + 4 \)  
   \( y = -2x - 1 \)  
   \((-2, 3); \) one solution

2. \( y = x + 2 \)  
   \( y = 3x + 6 \)  
   \((-2, 0); \) one solution

3. \( x + y = 2 \)  
   \( x + y = -1 \)  
   no solution

Solve each system using substitution.

4. \( x + y = 1 \)  
   \( 2x + 3y = -4 \)  
   \((7, -6)\)

5. \( x - 4y = 11 \)  
   \( 2y - x = -7 \)  
   \((3, -2)\)

6. \( 2x + y = 1 \)  
   \( x - 2y = 23 \)  
   \((5, -9)\)

Solve each system using elimination.

7. \( 2x + 3y = 10 \)  
   \( 2x - y = -14 \)  
   \((-4, 6)\)

8. \( x + y = -6 \)  
   \( x - y = 6 \)  
   \((0, -6)\)

9. \( 3x = -2y - 5 \)  
   \( 2y = -5x + 5 \)  
   \((5, -10)\)

Solve each problem.

10. The sum of two numbers is 23. If one of the numbers is halved, the sum will become 17. What are the numbers?
   11 and 12

11. The perimeter of a rectangle is 60 cm. The length is four times the width. What are the length and the width of the rectangle?
   length = 24 cm; width = 6 cm

Write a system of equations to model each situation. Solve by any method.

12. Sarah is 25 years older than her son Gavin. In ten years, Sarah will be twice Gavin’s age. How old are Sarah and Gavin now?
   Sarah = 40 yr; Gavin = 15 yr

13. A chemist is mixing a solution that is 2% acid and another solution that is 8% acid. She needs to make 75 mL of a solution that is 5% acid. How much of each solution should she use?
   37.5 mL of the 2% solution and 37.5 mL of the 8% solution
Graph each inequality in the coordinate plane.

14. \( x + 2y \leq 10 \)

15. \( 4x - 2y \geq 3 \)

Solve each system of inequalities by graphing.

16. \( \begin{align*} 4x + y &\geq 1 \\ 3x - y &\leq 6 \end{align*} \)

17. \( \begin{align*} x + 4y &> -2 \\ 5x + 3y &< 7 \end{align*} \)

18. For a work banquet, Jack can spend no more than $200 on dessert. Fruit pies cost $9 each and cakes cost $20 each. Write the linear inequality that models the situation. Graph the inequality.

\[ 9x + 20y \leq 200 \]

Do you UNDERSTAND?

19. **Writing** How do you check to see if an ordered pair satisfies a system of inequalities graphically?

   You can plot the point on the graph and see if it lies within the shaded region.

20. **Open-Ended** Write a system of inequalities in which the shaded region is below both lines. Graph the system.

   Answers may vary. Sample:
   
   \[ \begin{align*} y &\leq x + 2 \\ y &< -x - 1 \end{align*} \]

21. **Open-Ended** Write a system of linear equations that has no solution.

   Answers may vary. Sample:
   
   \[ \begin{align*} y &= 3x + 5 \\ y &= 3x - 1 \end{align*} \]