

## Systems of Equations and Inequalities

## Review 6.1 / Systems of Linear Equations

6.1.1 Solving Systems by Graphing

Tell whether the ordered pair is a solution of the given system.

1.  $(1, -4); \begin{cases} x - 2y = 8 \\ 4x - y = 8 \end{cases}$

2.  $(-2, 1); \begin{cases} 2x - 3y = -7 \\ 3x + y = -5 \end{cases}$

3.  $(5, 2); \begin{cases} 2x + y = 12 \\ -3y - x = -11 \end{cases}$

Solve each system by graphing. Check your answer.

4.  $\begin{cases} y = \frac{1}{2}x + 2 \\ y = -x - 1 \end{cases}$

5.  $\begin{cases} y = x \\ y = -x + 6 \end{cases}$

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

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

8. **Multi-Step** Angelo runs 7 miles per week and increases his distance by 1 mile each week. Marc runs 4 miles per week and increases his distance by 2 miles each week. In how many weeks will Angelo and Marc be running the same distance? What will that distance be?

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**6.1.2 Solving Systems by Substitution**

Solve each system by substitution.

9. 
$$\begin{cases} y = x + 3 \\ y = 2x + 4 \end{cases}$$

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

11. 
$$\begin{cases} x + 2y = 8 \\ x + 3y = 12 \end{cases}$$

12. 
$$\begin{cases} 2x + 2y = 2 \\ -4x + 4y = 12 \end{cases}$$

13. 
$$\begin{cases} y = 0.5x + 2 \\ -y = -2x + 4 \end{cases}$$

14. 
$$\begin{cases} -x + y = 4 \\ 3x - 2y = -7 \end{cases}$$

15. 
$$\begin{cases} 3x + y = -8 \\ -2x - y = 6 \end{cases}$$

16. 
$$\begin{cases} x + 2y = -1 \\ 4x - 4y = 20 \end{cases}$$

17. 
$$\begin{cases} 4x = y - 1 \\ 6x - 2y = -3 \end{cases}$$

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18. **Recreation** Casey wants to buy a gym membership. One gym has a \$150 joining fee and costs \$35 per month. Another gym has no joining fee and costs \$60 per month.
- In how many months will both gym memberships cost the same? What will that cost be?
  - If Casey plans to cancel in 5 months, which is the better option for him? Explain.

6.1.3 Solving Systems by Elimination

Solve each system by elimination.

19. 
$$\begin{cases} -x + y = -1 \\ 2x - y = 0 \end{cases}$$

20. 
$$\begin{cases} -2x + y = -20 \\ 2x + y = 48 \end{cases}$$

21. 
$$\begin{cases} 3x - y = -2 \\ -2x + y = 3 \end{cases}$$

22. 
$$\begin{cases} x - y = 4 \\ x - 2y = 10 \end{cases}$$

23. 
$$\begin{cases} x + 2y = 5 \\ 3x + 2y = 17 \end{cases}$$

24. 
$$\begin{cases} 3x - 2y = -1 \\ 3x - 4y = 9 \end{cases}$$

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25. 
$$\begin{cases} x - y = -3 \\ 5x + 3y = 1 \end{cases}$$

26. 
$$\begin{cases} 9x - 3y = 3 \\ 3x + 8y = -17 \end{cases}$$

27. 
$$\begin{cases} 5x + 2y = -1 \\ 3x + 7y = 11 \end{cases}$$

28. **Multi-Step** Mrs. Gonzalez bought centerpieces to put on each table at a graduation party. She spent \$31.50. There are 8 tables each requiring either a candle or vase. Candles cost \$3 and vases cost \$4.25. How many of each type did she buy?

### 6.1.4 Solving Special Systems

Solve each system of linear equations.

29. 
$$\begin{cases} y = 2x - 2 \\ -2x + y = 1 \end{cases}$$

30. 
$$\begin{cases} x + y = 3 \\ y = -x - 1 \end{cases}$$

31. 
$$\begin{cases} x + 2y = -4 \\ y = -\frac{1}{2}x - 4 \end{cases}$$

32. 
$$\begin{cases} -6 + y = 2x \\ y = 2x - 36 \end{cases}$$

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33. 
$$\begin{cases} y = -2x + 3 \\ 2x + y - 3 = 0 \end{cases}$$

34. 
$$\begin{cases} y = x - 2 \\ x - y - 2 = 0 \end{cases}$$

35. 
$$\begin{cases} x + y = -4 \\ y = -x - 4 \end{cases}$$

36. 
$$\begin{cases} -9x - 3y = -18 \\ 3x + y = 6 \end{cases}$$

Classify each system. Give the number of solutions.

37. 
$$\begin{cases} y = -x + 5 \\ x + y = 5 \end{cases}$$

38. 
$$\begin{cases} y = -3x + 2 \\ y = 3x \end{cases}$$

39. 
$$\begin{cases} y - 1 = 2x \\ y = 2x - 1 \end{cases}$$

40. **Sports** Mandy is skating at 5 miles per hour. Nikki is skating at 6 miles per hour and started 1 mile behind Mandy. If their rates stay the same, will Mandy catch up with Nikki? Explain.

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**6.1.5 Applying Systems**

41. **Aviation** With a tailwind, a jet flew 2000 miles in 4 hours. The jet's return trip against the same wind required 5 hours. Find the jet's speed and the wind speed.
42. **Chemistry** A 4% salt solution is mixed with a 16% salt solution. How many milliliters of each solution are needed to obtain 600 milliliters of a 10% salt solution?
43. The sum of the digits of a two-digit number is 10. If 18 is added to the number, the digits will be reversed. Find the number. Check your answer.