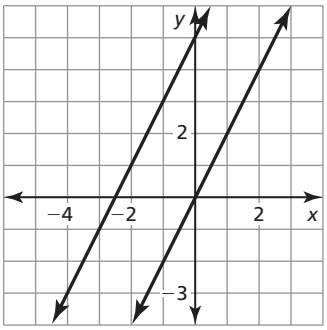
5.4 Start Thinking



Find an equation for each line. Is there anything special about the comparison of each line's slope? Is there a point of intersection? If so, what is it? How can you tell when a system of equations will intersect at one point? How can you tell when a system will not intersect?

5.4 Warm Up

Solve the equation for *y*, so it is in slope-intercept form.

1. $x + y = 4$

2. $-2x + y = 10$

3. $-3x + y = 12$

4. $2x - 5y = -1$

5. $6x - y = 11$

6. $-\frac{2}{5}x + y = -2$

5.4 Cumulative Review Warm Up

Describe the transformation from the graph of *f* to the graph of *g*.

1. $f(x) = -\frac{1}{5}x - 2;\ g(x) = f(x) + 4$

2. $f(x) = -4x - 5;\ g(x) = f(x) - 1$

3. $f(x) = x + 1;\ g(x) = f(x - 6)$

Name_____ Date _____

5.4 Practice A

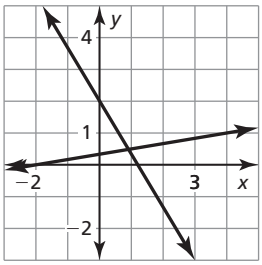
In Exercises 1–3, match the system of linear equations with its graph. Then determine whether the system has *one solution, no solution,* or *infinitely many solutions.*

1. $x + y = 0$
$3x + 3y = 6$

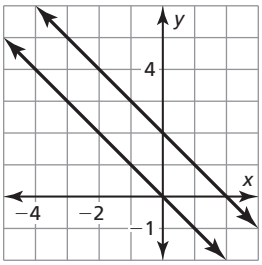
2. $5x + 3y = 6$
$x - 6y = -2$

3. $-2x + 2y = -8$
$x - y = 4$

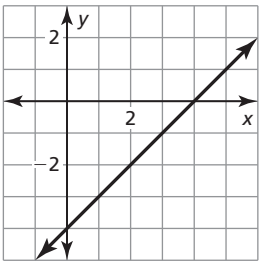
A.



B.



C.



In Exercises 4–6, solve the system of linear equations.

4. $y = 5x + 1$
$y = 5x - 1$

5. $y = 3x + 7$
$y = -3x + 7$

6. $-x - 4y = 10$
$x + 4y = -10$

In Exercises 7–9, use only the slopes and *y*-intercepts of the graphs of the equations to determine whether the system of linear equations has *one solution, no solution,* or *infinitely many solutions*. Explain.

7. $y = 2x - 5$
$4x - 2y = 10$

8. $y = -5x + 3$
$15x + 3y = -3$

9. $-x + 2y = 4$
$2x + y = 3$

10. Describe and correct the error in solving the system of linear equations.

✗ $y = -2x + 5$
$2x + y = 5$

The lines have different slopes.
So, the system has one solution.

11. You downloaded 2 DVDs and 10 songs for $18. Your friend downloaded 3 DVDs and 15 songs for $27. Write a system of linear equations that represents this situation. Can you determine the price of each DVD and each song? Explain.

Name _____ Date _____

5.4 Practice B

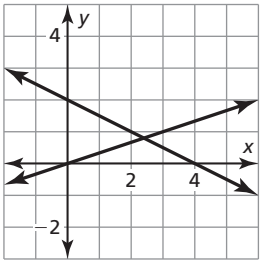
In Exercises 1–3, match the system of linear equations with its graph. Then determine whether the system has *one solution, no solution,* or *infinitely many solutions.*

1. $x - 3y = -3$
$-4x + 12y = 12$

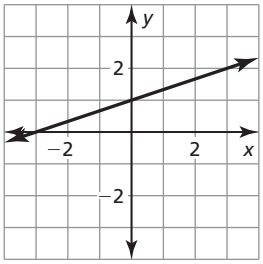
2. $x - 3y = 0$
$x + 2y = 4$

3. $x - 2y = -4$
$3x - 6y = 6$

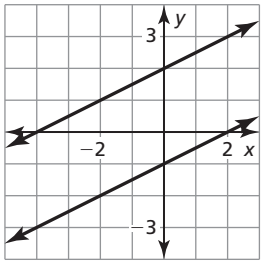
A.



B.



C.



In Exercises 4–9, solve the system of linear equations.

4. $3x - 3y = 6$
$-6x + 6y = -12$

5. $12x - 8y = 10$
$-6x + 4y = 5$

6. $4x - 3y = 16$
$x + y = -3$

7. $6x + 9y = -15$
$4x + 6y = 10$

8. $-x - 4y = 10$
$x + 4y = 10$

9. $-5x + 2y = 3$
$10x - 4y = -6$

In Exercises 10–15, use only the slopes and *y*-intercepts of the graphs of the equations to determine whether the system of linear equations has *one solution, no solution,* or *infinitely many solutions*. Explain.

10. $x - 3y = 9$
$2x - 3y = 9$

11. $-3x + 8y = 32$
$6x - 16y = -64$

12. $2x + 2y = 2$
$9x + 9y = 9$

13. $2x - 4y = -24$
$3x - 6y = -24$

14. $y = -3x + 7$
$3x + 2y = -6$

15. $5x + y = -3$
$2y = -10x - 6$

16. Write a system of three linear equations in two variables so that two of the equations have infinitely many solutions, but the entire system has one solution.

17. Consider the system of linear equations $y = ax + 3$ and $y = \frac{1}{a}x - 2$.

a. If possible, find a value of a so that the system of linear equations has no solution.

b. If possible, find a value of a so that the system of linear equations has one solution.

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5.4 Enrichment and Extension

Different Interpretations

A jar of candy is on the counter. Except for 16 pieces, all are red. Except for 16 pieces, all are blue. Except for 16 pieces, all are green. Except for 18 pieces, all are yellow. How many pieces of each color are there? How many pieces of candy are there in all?

1. Write a system of equations for the situation.
2. Justify your equations.
3. Solve the systems the way you see fit.
4. Explain your steps.
5. Compare your work with others. Did your classmates have the same interpretation of the problem? Is there more than one way to solve the system?
6. Find a different way to solve the same problem.

Name _____ Date _____

5.4 Puzzle Time

What Has Four Legs But Can't Walk?

Write the letter of each answer in the box containing the exercise number.

Solve the system of linear equations.

1. $y = 3x + 8$
$y = -3x + 8$

C. infinitely many solutions **D.** no solution **E.** $(0, 8)$ **F.** $(16, 8)$

2. $4x - 5y = 9$
$-8x + 10y = -18$

A. infinitely many solutions **B.** no solution **C.** $(-27, 0)$ **D.** $(0, 9)$

3. $5x - 5y = 10$
$7x - 14y = -28$

I. infinitely many solutions **J.** no solution **K.** $(-4, 6)$ **L.** $(8, 6)$

4. $-28x + 14y = 42$
$2x - y = 3$

S. infinitely many solutions **T.** no solution **U.** $(3, 3)$ **V.** $(1, 2)$

5. $y = 6x - 17$
$-12x + 2y = -34$

A. infinitely many solutions **B.** no solution **C.** $(17, 0)$ **D.** $(0, -17)$

6. $-4x + 4y = 13$
$3x - 3y = -19$

A. infinitely many solutions **B.** no solution **C.** $(0, 13)$ **D.** $(19, 0)$

5		4	2	6	3	1