Name ______________________ Class ____________ Date ____________

6-1 Reteaching

Solving Systems by Graphing

Graphing is useful for solving a system of equations. Graph both equations and look for a point of intersection, which is the solution of that system. If there is no point of intersection, there is no solution.

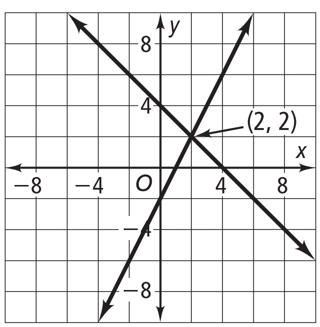
Problem

What is the solution to the system? Solve by graphing. Check.

$x + y = 4$
$2x - y = 2$

Solution

$y = -x + 4$ $y = 2x - 2$	Put both equations into y-intercept form, $y = mx + b$.
$y = -x + 4$	The first equation has a y-intercept of (0, 4).
$0 = -x + 4$	Find a second point by substituting in 0 for y and solve for x.
$x = 4$	You have a second point (4, 0), which is the x-intercept.
$y = 2x - 2$	The second equation has a y-intercept of (0, −2).
$0 = 2(x) - 2$	Find a second point by substituting in 0 for y and solve for x.
$2 = 2x,\ x = 1$	You have a second point for the second line, (1, 0).



Plot both sets of points and draw both lines. The lines appear to intersect (2, 2), so (2, 2) is the solution.

Check

If you substitute in the point (2, 2), for x and y in your original equations, you can double-check your answer.

$x + y = 4 \qquad 2 + 2 \stackrel{?}{=} 4, \qquad 4 = 4$ ✓

$2x - y = 2 \qquad 2(2) - 2 \stackrel{?}{=} 2, \qquad 2 = 2$ ✓

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6-1 Reteaching (continued)

Solving Systems by Graphing

If the equations represent the same line, there is an infinite number of solutions, the coordinates of any of the points on the line.

Problem

What is the solution to the system? Solve by graphing. Check.

$2x - 3y = 6$

$4x - 6y = 18$

Solution

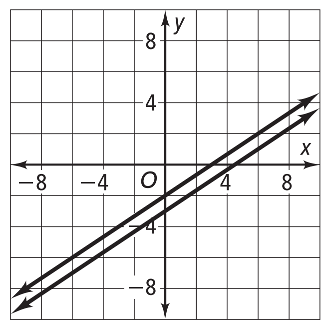
What do you notice about these equations? Using the y-intercepts and solving for the x-intercepts, graph both lines using both sets of points.

$y = \frac{2}{3}x - 2$

$y = \frac{2}{3}x - 3$

Graph equation 1 by finding two points: (0, −2) and (3, 0). Graph equation 2 by finding two points (0, −3) and (4.5, 0).

Is there a solution? Do the lines ever intersect? Lines with the same slope are parallel. Therefore, there is no solution to this system of equations.



Exercises

Solve each system of equations by graphing. Check.

1. $2x = 2 - 9y$
$21y = 4 - 6x$
$\left(-\frac{1}{2}, \frac{1}{3}\right)$

2. $2x = 3 - y$
$y = 4x - 12$
$\left(\frac{5}{2}, -2\right)$

3. $y = 1.5x + 4$
$0.5x + y = -2$
$\left(-3, -\frac{1}{2}\right)$

4. $6y = 2x - 14$
$x - 7 = 3y$
infinitely many solutions

5. $3y = -6x - 3$
$y = 2x - 1$
(0, −1)

6. $2x = 3y - 12$
$\frac{1}{3}x = 4y + 5$
(−9, −2)

7. $2x + 3y = 11$
$x - y = -7$
(−2, 5)

8. $3y = 3x - 6$
$y = x - 2$
infinitely many solutions

9. $y = \frac{1}{2}x + 9$
$2y - x = 1$
no solution