

Lesson 5.1
Solving Systems of Equations

Your Name

Mrs. T

1/8/2021

Notes

By Graphing

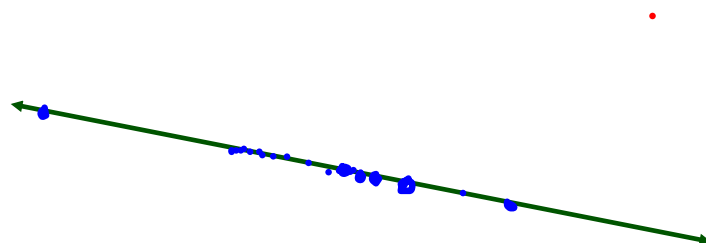
pg. 236-240

Objective: To be able to determine the solution types of a system of equations as well as what the solutions are using graphing.

Virtue: If a solution works for you and it works for some one else then it works for both of you and is THE solution to your problem.

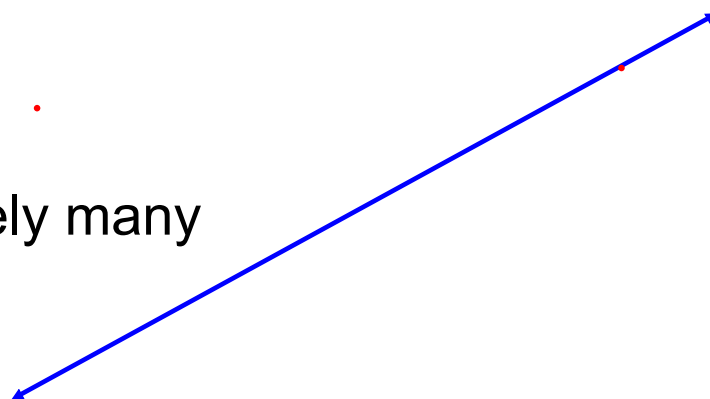
Skill: Many real world problems can be solved by a system of equations and if you are good at them then you can bust it out to easily find the solution. The more variables that you must solve for, the more equations you need to solve them with, and they can be linear, quadratic, cubic, or anything.

How many solutions does this have?



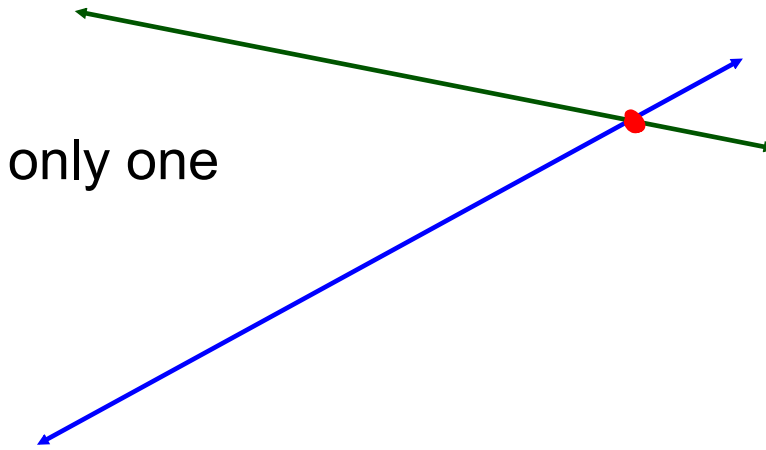
infinitely many

How many solutions does this have?



infinitely many

Is there any solution that works for both?



System of Equations

Two or more linear equations involving the same variables.

Solution to the System of Equations

Is an ordered pair that satisfies both equations (a point that is on both lines).

Type of System

Slopes: different
Intersect at 1 point
1 solution
Lines are different
Consistent and Independent
there is a solution
solution points of one line, do not depend on another

Slopes: same
Y-intercept at different locations
No Solution
Lines are parallel
Inconsistent
no consistency
no solution or point that works for both

Slopes: same
Y-intercepts the same
Intersects Everywhere
every point is a shared solution
Lines are the same
Consistent and Dependent
there is a solution
solution points of one line depend on the other

Checking if a point is the solution

The point must work for both equations to be a solution

Plug in to both and see if you get a True statement

x, y
Is (5, -8) a solution to this system?

$$y = -x - 3 \rightarrow -8 = -(5) - 3 \quad -8 = (5) - 1$$

$$y = x - 1 \rightarrow -8 = 5 - 1 \quad -8 = 5 - 1$$

$$-8 = -8 \checkmark \quad -8 = 4 \times$$

True False

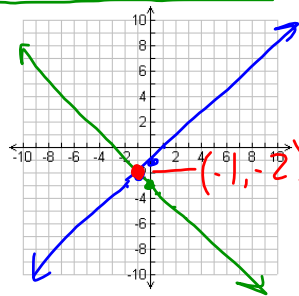
(5, -8) is not a solution to the system

Solving a system by Graphing

Graph both lines

The (x,y) point where they intersect is the solution to the system

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



The solution to this system is (-1, -2)

2. $x = 2$ vertical line at $x = 2$
 $2x + y = 1$
turn into $y = mx + b$ form to graph
 $-2x \quad -2x$
 $y = -2x + 1$
 $m = -2 = \frac{-2}{1} = -2$
 $b = 1$
 $(0, 1)$

3. $y = -x - 3$ $b = -3$
 $2x + 2y = 4$ $m = -1 = \frac{-1}{1} = -1$
 $-2x \quad -2x$
 $2y = -2x + 4$
 $\frac{2y}{2} = \frac{-2x + 4}{2}$
 $y = -x + 2$
 $b = 2$
 $m = -1$

$2x + 2y = -6 \rightarrow 2x + 2y = -6$
 $y = -x - 3$
 $-2x \quad -2x$
 $2y = -2x - 6$
 $\frac{2y}{2} = \frac{-2x - 6}{2}$
 $y = -x - 3$
They are the same line.

$b = -3$
 $m = -1$

Solution of the System
 $(2, -3)$
 (x, y)

No Solution

Infinitely Many Solutions
I.M.S.

Summary

Objective: To be able to determine the solution types of a system of equations as well as what the solutions are using graphing.

Virtue: If a solution works for you and it works for some one else then it works for both of you and is THE solution to your problem.

Skill: Many real world problems can be solved by a system of equations and if you are good at them then you can bust it out to easily find the solution. The more variables that you must solve for the more equations you need to solve them with, and they can be linear, quadratic, cubic, or anything.

Assignment:

pg. 239 #3,5,7,9,11,

pg. 239 #12, 13,14,15,18

Workbook 5-1

Homework: Use the straight line tool to graph the following systems and find the solution.

1. $y = -2$
 $y = 3x + 1$

$(-1, 2)$

2. $x = 2$
 $y = -2x + 1$

$(2, -3)$

3. $y = \frac{1}{2}x$
 $x + y = 3$

$(2, 1)$

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

$(1, 4)$

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

no solution

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

I.M.S.

In Exercises 3–8, tell whether the ordered pair is a solution of the system of linear equations. (See Example 1.)

3. $(2, 6)$; $x + y = 8$
 $3x - y = 0$ 4. $(8, 2)$; $x - y = 6$
 $2x - 10y = 4$

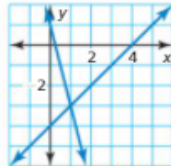
5. $(-1, 3)$; $y = -7x - 4$
 $y = 8x + 5$

6. $(-4, -2)$; $y = 2x + 6$
 $y = -3x - 14$

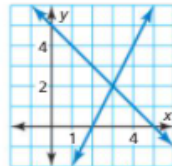
7. $(-2, 1)$; $6x + 5y = -7$ 8. $(5, -6)$; $6x + 3y = 12$
 $2x - 4y = -8$ $4x + y = 14$

In Exercises 9–12, use the graph to solve the system of linear equations. Check your solution.

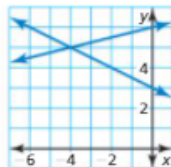
9. $x - y = 4$
 $4x + y = 1$



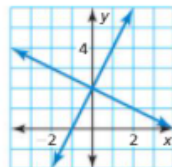
10. $x + y = 5$
 $y - 2x = -4$



11. $6y + 3x = 18$
 $-x + 4y = 24$



12. $2x - y = -2$
 $2x + 4y = 8$



Homework Key:

pg. 239 #3-12

3. yes

4. no

5. no

6. yes

7. yes

8. yes

9. $(1, -3)$

10. $(3, 2)$

11. $(-4, 5)$

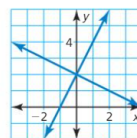
12. $(0, 2)$

Homework

In Exercises 9–12, use the graph to solve the system of linear equations. Check your solution.

pg. 239 #12,
 13, 14, 15, 18

12. $2x - y = -2$
 $2x + 4y = 8$



Homework Key:

12. $(0, 2)$

13. $(3, 4)$

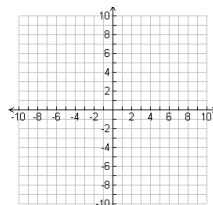
14. $(4, 0)$

15. $(-9, -1)$

18. $(0, -5)$

In Exercises 13–20, solve the system of linear equation by graphing. (See Example 2.)

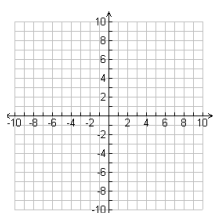
13. $y = -x + 7$
 $y = x + 1$



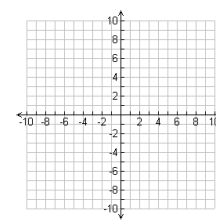
14. $y = -x + 4$
 $y = 2x - 8$



15. $y = \frac{1}{3}x + 2$
 $y = \frac{2}{3}x + 5$

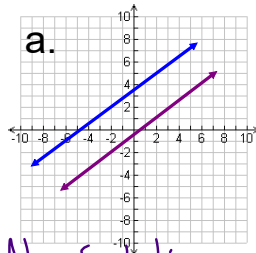


18. $4x - 4y = 20$
 $y = -5$

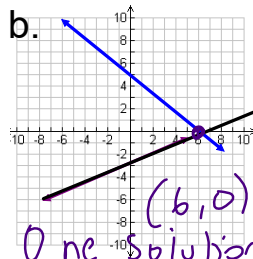


Warm Up Question

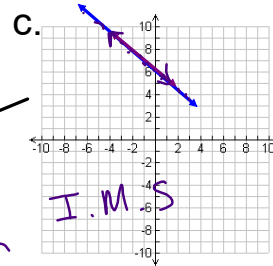
How many solutions does each system have?



No Solution



(6, 0)
One solution



I.M.S

Homework Key:
pg. 239 #3-12

3. yes

9. (1, -3)

5. no

11. (-4, 5)

7. yes

9. (1, -3)

11. (-4, 5)