

[8.4: SOLVING SPECIAL SYSTEMS] 1

Write your questions here!

We learned 3 different ways to solve linear systems of equations: graphing, substitution and elimination. But sometimes, weird things can happen:

Examples:

Solve each linear system by graphing:

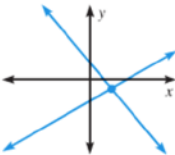
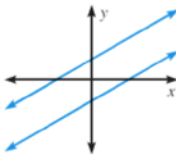
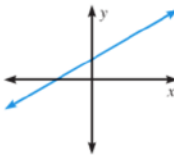
1. $y = \frac{1}{2}x - 4$
 $y = \frac{1}{2}x + 2$

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

Possible Outcomes When Solving by Graphing

CONCEPT SUMMARY *For Your Notebook*

Number of Solutions of a Linear System

| | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>One solution</p>  <p>The lines intersect. The lines have different slopes.</p> | <p>No solution</p>  <p>The lines are parallel. The lines have the same slope and different y-intercepts.</p> | <p>Infinitely many solutions</p>  <p>The lines coincide. The lines have the same slope and the same y-intercept.</p> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

You try! Solve each linear system by graphing. *(Be sure to solve for y first!)*

3. $y = 3x - 6$
 $y - 3x = 1$

4. $y = 4x - 1$
 $-2y = -8x + 2$

Write your questions here!

So what does this look like when solving by substitution and elimination?

Solve by substitution:

$$\begin{aligned} 5. \quad -16x + 2y &= -2 \\ y &= 8x - 1 \end{aligned}$$

Solve by elimination:

$$\begin{aligned} 6. \quad -18x + 6y &= 24 \\ 3x - y &= -2 \end{aligned}$$

| | | POSSIBLE OUTCOMES | | |
|-------------------|-----------------------------|------------------------------------------|---------------------------------------|---------------------------------------------|
| | | No Solution | 1 Unique Solution | Infinitely Many Solutions |
| METHOD OF SOLVING | Graphing | <i>Parallel Lines</i> | <i>Lines Intersect Once</i> | <i>Both Lines are the Same When Graphed</i> |
| | Substitution or Elimination | <i>Variables Cancel; Sides Not Equal</i> | <i>Each Variable Has One Solution</i> | <i>Variables Cancel; Sides are Equal</i> |

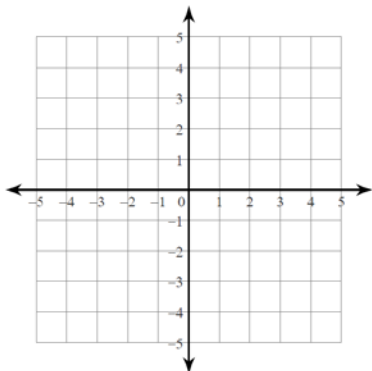
Now, summarize your notes here!

Practice 8.4 Special Systems

Show all of your work!

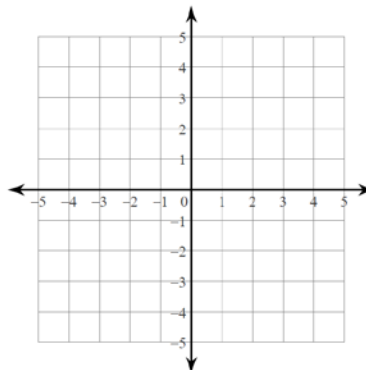
Solve each system by graphing.

1) $y = -x - 4$
 $y = x - 2$

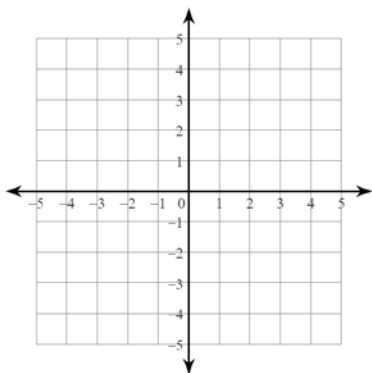


2) $y = \frac{1}{2}x + 2$

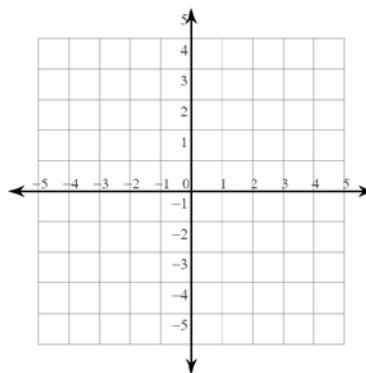
$y = \frac{1}{2}x - 3$



3) $x + y = 3$
 $x + y = -1$



4) $2x - y = -4$
 $2x - y = -2$



Solve each system by elimination.

$$\begin{aligned} 5) \quad & -3x + 7y = -2 \\ & 6x - 14y = 4 \end{aligned}$$

$$\begin{aligned} 6) \quad & 16x - 4y = -4 \\ & -8x + y = -3 \end{aligned}$$

$$\begin{aligned} 7) \quad & 9x + 15y = -12 \\ & -3x - 5y = 7 \end{aligned}$$

$$\begin{aligned} 8) \quad & -5x - 4y = -1 \\ & 10x + 8y = 2 \end{aligned}$$

Solve each system by substitution.

$$\begin{aligned} 9) \quad & 12x - 2y = 3 \\ & y = 6x - 2 \end{aligned}$$

$$\begin{aligned} 10) \quad & y = 3x + 21 \\ & -9x + 3y = 63 \end{aligned}$$

$$\begin{aligned} 11) \quad & 3x - 6y = -6 \\ & y = x - 2 \end{aligned}$$

$$\begin{aligned} 12) \quad & y = -8x - 1 \\ & 24x + 3y = -3 \end{aligned}$$