

Solving Systems of Equations ... 3 ways

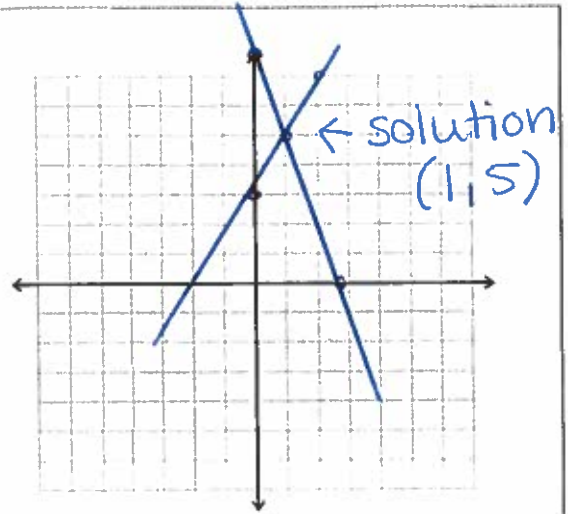
$$\begin{cases} y = 2x + 3 \\ 2y + 6x = 16 \end{cases} \Rightarrow \begin{matrix} (0, 8) \\ (2\frac{2}{3}, 0) \end{matrix}$$

Explanation: Graphing

1. Solve equations for y
2. Graph using slope & y-intercept
3. Note the intersection of the 2 graphs

Three possible solutions

- 1 point of intersection: one solution, consistent, independent
- 2 equations/identical lines: many solutions, consistent, dependent
- Parallel Lines: no solutions, inconsistent



Explanation: Substitution

1. Choose one equation and solve for y (choose the easiest); call this equation "1"
2. Substitute the expression that equals y from equation 1 into equation 2 for the y variable
3. Solve for x in equation 2
4. Substitute the found value for x back into an original equation to solve for y
5. Check your solution (x,y) to be sure it works in both the original equations.

Example

$$\begin{cases} y = 2x + 3 \\ 2y + 6x = 16 \end{cases}$$

$$2(2x + 3) + 6x = 16$$

$$4x + 6 + 6x = 16$$

$$10x + 6 = 16$$

$$10x = 10$$

$$x = 1$$

$$y = 2x + 3$$

$$y = 2(1) + 3$$

$$y = 2 + 3$$

$$y = 5$$

(1, 5)

Explanation: Elimination

1. Put both equations in standards form ($Ax + By = C$) or at least line up the equations in the same order.
2. Determine which variable to eliminate (look for variables with the same coefficient ... or multiply by a factor that creates variables with the same coefficient)
3. Add or subtract the equations to eliminate one variable and solve for the other one.
4. Substitute the found value for x back into an original equation to solve for y
5. Check your solution (x,y) to be sure it works in both the original equations.

Example

$$y = 2x + 3 \rightarrow [-2x + y = 3] \times 3$$

$$2y + 6x = 16 \rightarrow 6x + 2y = 16$$

$$-6x + 3y = 9$$

$$6x + 2y = 16$$

$$0 + 5y = 25$$

$$y = 5$$

$$y = 2x + 3$$

$$5 = 2x + 3$$

$$2 = 2x$$

$$1 = x$$

(1, 5)

We didn't get to this 1st pd - lots of qs on last write + hw, sorry

Solve systems
by Graphing

Solve systems
by Substitution

Solve systems
by Elimination