



Steps to 1) Plot y-intercept on y-axis
Graph a Line:
2) Move slope rise = m on x-axis
3) Plot Next point

$$2x + 3y = 7$$

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$$13x - 3y = 8$$

$$15x = 15$$

$$x = 1$$

$$-3y = -5$$

$$y = \frac{5}{3}$$

$(1, \frac{5}{3})$

1 Define Variables
X: # of? price of?
Look at question at the end of the word problem

2 Write Equations money Total
Look for Totals: object Total
Relationship: Ask which is bigger (it will be) and

The Solution is: the Point where both lines cross each other (intersect)

$y = -\frac{3}{2}x$ & $y = 1x + 5$
Solution: $(-2, 3)$

Parallel Lines - No solution
Same Lines - Infinitely many solutions

Use when: a variable has the same number in front but opposite signs

- Step 1 Make sure equations are in standard form $Ax + By = C$
- Step 2 Add Equations together to Eliminate a variable
- Step 3 Solve for leftover variable
- Step 4 Plug value in to one of the original equations to solve
- Step 5 Write answers as (x, y)

- Step 1 Substitute expression in for variable
- Step 2 Distribute combine like terms solve for variable
- Step 3 Plug in answer to other equation
- Step 4 Solve for second variable
- Step 5 Write answer (x, y) as a coordinate

$y = 3x - 1$ $x - 2y = 5$

$$y = 3x - 1$$

$$x - 2(3x - 1) = 5$$

$$x - 6x + 2 = 5$$

$$-5x + 2 = 5$$

$$-5x = 3$$

$$x = -\frac{3}{5}$$

$$y = -2.8$$

$(-0.6, -2.8)$

- Use when: none of the variables have the same number in front
- Step 1 Pick a variable to get a LCM for. Multiply entire equation for both by the number to get that
- Step 2 rewrite equations. add and cancel a variable. Complete steps 2-5

$4x + 5y = 12$

$$4(3x + 6y) = 4(9) + 24y = 36$$

$$-3(4x + 5y) = -3(12) = -36$$

$$12x + 24y = 36$$

$$-12x - 15y = -36$$

$$9y = 0$$

$$y = 0$$

$$4x + 0 = 12$$

$$4x = 12$$

$$x = 3$$

$(3, 0)$

If you get $0 = 0$

Infinitely Many Solutions

Why? Because the lines are the same, just multiples of each other.
 $x + y = 7$
 $3x + 3y = 21$ (multiples)

If you get $0 = a \neq 0$

No Solution False statement $0 = 5$

Why? Because lines are parallel
 $x + y = 7$ not multiplied by 3
 $3x + 3y = 25$