

## Substitution Method

Steps: look for a 1x or a 1y

- i) Choose one equation and isolate one variable;  
this equation will be considered the first equation.  
(easiest one to get  $x=$  or  $y=$  from either eqn 1 or eqn 2)
- ii) Substitute the solution from step 1 into the second equation and solve for the variable in the equation.
- iii) Using the value found in step 2, substitute it into the first equation and solve for the second variable.  
(either)
- iv) Substitute the values for both variables into both equations to show they are correct.

\* your answer will be an ordered pair  $(x,y)$ . This is the point where the two lines intersect.

Solve this system of equation by substitution.

$$\begin{aligned} y &= 15+6x \\ -3x -2y &= 0 \end{aligned}$$

$$\begin{aligned} -3x -2y &= 0 \\ -3x -2(15+6x) &= 0 \\ -3x -\underline{30} -\underline{12x} &= 0 \\ -3x \quad -12x &= 0 + \underline{30} \\ \underline{-15x} &= \underline{30} \\ \underline{-15} & \quad \underline{-15} \\ x &= \underline{-2} \end{aligned}$$

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$$\begin{aligned} y &= 15+6x \\ y &= 15 + \underline{6(-2)} \\ y &= 15 - 12 \\ y &= 3 \\ &(-2, 3) \end{aligned}$$

Solve the system by Substitution Method

$$x + 2y = 3$$

$$\underline{3x} + 5y = 8$$

.....solve for x →

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

$$3x + 5y = 8$$

$$3(\underline{3-2y}) + 5y = 8$$

$$\underline{9 - 6y} + 5y = 8$$

$$-6y + 5y = 8 - 9$$

$$-y = -1$$

$$y = 1$$



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$$x + 2y = 3$$

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

$$x + 2 = 3$$

$$x = 3 - 2$$

$$x = 1$$

$$(1, 1)$$

Use Substitution to Find the Point of Intersection

$$1) \begin{cases} x - 4y = 6 \\ 7x + 6y = 8 \end{cases} \longrightarrow (i) \begin{cases} x - 4y = 6 + 4y \\ x = \underline{6 + 4y} \end{cases}$$

$$(ii) \begin{cases} x = 6 + 4y \\ x = 6 + 4(-1) \\ x = 6 - 4 \\ x = 2 \end{cases}$$

$$(iv) \boxed{(2, -1)}$$

$$(iii) \begin{cases} 7x + 6y = 8 \\ 7(6 + 4y) + 6y = 8 \\ 42 + 28y + 6y = 8 \\ \underline{34y} = \underline{-34} \\ \underline{34} \quad \underline{34} \\ y = \underline{-1} \end{cases}$$

Use Substitution to Find the Point of Intersection

$$2) \begin{aligned} 2x + y &= 9 \\ 3x - 5y &= -19 \end{aligned}$$

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$$(i) \begin{aligned} 2x + y &= 9 \\ y &= \underline{9 - 2x} \end{aligned}$$

$$(iii) \begin{aligned} y &= 9 - 2x \\ y &= 9 - 2(2) \\ y &= 9 - 4 \\ y &= 5 \end{aligned}$$

$$(iv) \boxed{(2, 5)}$$

$$(ii) \begin{aligned} 3x - 5y &= -19 \\ 3x - 5(9 - 2x) &= -19 \\ \underline{3x} - 45 + \underline{10x} &= -19 \\ \underline{13x} &= \underline{26} \\ \underline{13} & \quad \underline{13} \\ \underline{x} &= \underline{2} \end{aligned}$$

## Questions from homework

Substitution Method:

$$\textcircled{i} \quad \begin{array}{l} 7x + y = 6 \\ 5x - 5y = 10 \end{array} \longrightarrow \textcircled{ii} \quad \begin{array}{l} 7x + y = 6 \\ \underline{y = -7x + 6} \end{array}$$

$$\textcircled{iii} \quad \begin{array}{l} y = -7x + 6 \\ y = -7(1) + 6 \\ y = -7 + 6 \\ y = -1 \end{array}$$

$$\textcircled{iv} \quad \boxed{(1, -1)}$$

$$\textcircled{ii} \quad \begin{array}{l} 5x - 5y = 10 \\ 5x - 5(-7x + 6) = 10 \\ \underline{5x} + \underline{35x} - 30 = 10 \\ \underline{40x} = \underline{40} \\ \underline{40} \quad \underline{40} \\ x = 1 \end{array}$$

### Answers to Homework

① C

② D

③ C

④ A

⑤ (3,5)

⑥ (-5,0)

⑦ (1,-2)

⑧ No Solution (Parallel lines)

⑨ (2,-5)

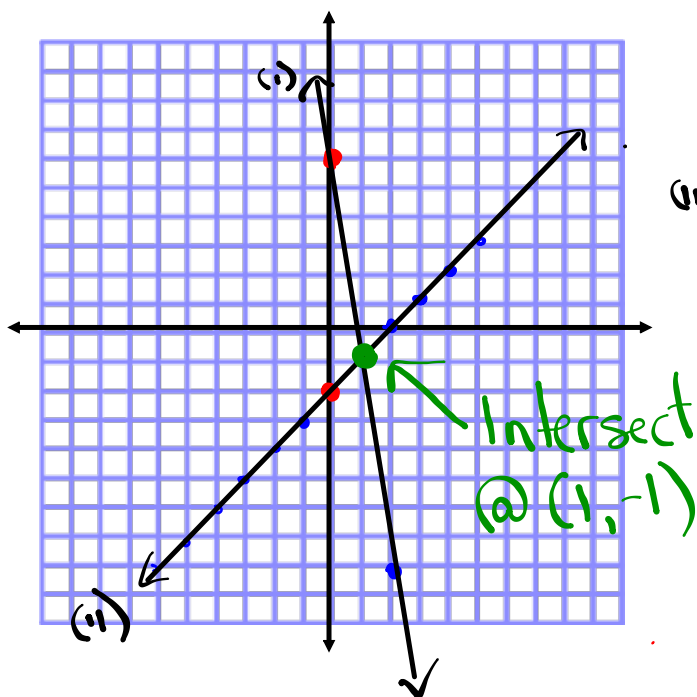
⑩ (3,4)



Solve by graphing

$$7x + y = 6$$

$$5x - 5y = 10$$



$$(i). 7x + y = 6$$

$$y = -\underline{7}x + \underline{6}$$

$$m = -\frac{7}{1}$$

$$b = 6 \quad (0, 6)$$

$$(ii) 5x - 5y = 10$$

$$-5y = -5x + 10$$

$$y = \underline{x} - 2$$

$$m = \frac{1}{1}$$

$$b = -2 \quad (0, -2)$$