



Substitution Method

Steps:

- get x or y by itself*
- 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.
 - iv) Substitute the values for both variables into both equations to show they are correct.

Solve this system of equation by substitution.

$$y = 15 + 6x$$

$$-3x - 2y = 0$$

$$-3x - 2y = 0$$

$$-3x - 2(15 + 6x) = 0$$

$$-3x - 30 - 12x = 0$$

$$-3x - 12x = 0 + 30$$

$$\underline{-15x} = \underline{30}$$

$$\underline{-15} \quad \underline{-15}$$

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

$$y = 15 + 6x$$

$$y = 15 + 6(\underline{\underline{-2}})$$

$$y = 15 - 12$$

$$y = 3$$

$$\boxed{(-2, 3)}$$

Solve the system by Substitution Method

$$x + 2y = 3$$

$$3x + 5y = 8$$

.....solve for x → $x = 3 - 2y$

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

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

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

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

$$-y = -1$$

$$\underline{y = 1}$$

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

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

$$x + 2 = 3$$

$$x = 3 - 2$$

$$x = 1$$

$$(1,1)$$



Use Substitution to Find the Point of Intersection

$$1) \quad x - 4y = 6 \rightarrow x = \underline{6 + 4y}$$

$$7x + 6y = 8$$

$$\underline{7x} + 6y = 8$$

$$7(6 + 4y) + 6y = 8$$

$$\underline{42} + 28y + 6y = 8$$

$$26y + 6y = 8 - 42$$

$$\frac{34y}{34} = \frac{-34}{34}$$

$$y = -1$$

$$x = 6 + 4y$$

$$x = 6 + 4(-1)$$

$$x = 6 - 4$$

$$x = 2$$

$$(2, -1)$$

Use Substitution to Find the Point of Intersection

$$\begin{aligned} 2) \quad 2x + y &= 9 \longrightarrow y = \underline{9 - 2x} \\ 3x - 5y &= -19 \\ 3x - 5(9 - 2x) &= -19 \\ 3x - 45 + 10x &= -19 \\ 3x + 10x &= -19 + 45 \\ \frac{13x}{13} &= \frac{26}{13} \\ x &= 2 \end{aligned}$$
$$\begin{aligned} y &= 9 - 2x \\ y &= 9 - 2(2) \\ y &= 9 - 4 \\ y &= 5 \\ (2, 5) \end{aligned}$$

Answers to worksheet:

① $(1, -1)$

② $(3, 2)$

③ $(0, -1)$

④ $(6, 6)$

⑤ $(3, -7)$

⑥ $(-6, 1)$

⑦ $(6, -4)$

⑧ $(-6, 2)$

⑨ $(-2, 6)$

⑩ $(3, 1)$