

Mathematics 10D

1.4 – Solving POI by Substitution

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$$\begin{aligned}y &= 6x - 12 \\y &= -5x + 21\end{aligned}$$

- Assume that the x and y are the same

① solve one equation
to $y = \underline{\hspace{2cm}}$

or $x = \underline{\hspace{2cm}}$

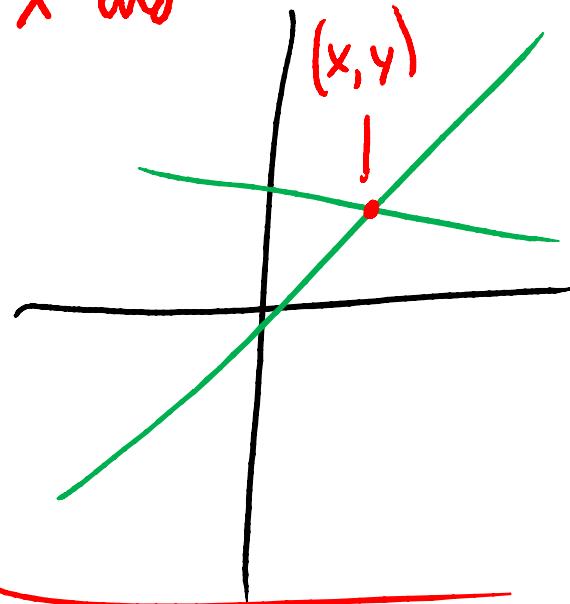
② Substitute that into
the x or y of the other equation.

③ solve

$$\begin{array}{rcl}6x - 12 & = & -5x + 21 \\+12 & & +12\end{array}$$

$$\begin{aligned}11x &= 33 \\x &= 3\end{aligned}$$

$$\begin{cases} y = 6(3) - 12 \\ y = 18 - 12 \\ y = 6 \end{cases}$$



\therefore P.I., s

$$(3, 6)$$

$$5x + 4y = -9$$

$$y = 7x + 6$$

$$5x + 4(7x + 6) = -9$$

$$5x + 28x + 24 = -9 \quad \begin{matrix} -24 \\ -24 \end{matrix}$$

$$\frac{33x}{33} = -\frac{33}{33}$$

$$x = -1$$

$$y = 7(-1) + 6$$

$$y = -7 + 6$$

$$y = -1$$

$$\therefore P_0 D \ni (-1, -1)$$

$$1 \quad x - 3y = -14 \Rightarrow x = 3y - 14$$

$$2 \quad \cancel{x} - 1y = -18$$

(Note: A green curved arrow points from the \cancel{x} in equation 2 to the x in equation 1.)

$$2(3y - 14) - y = -18$$

$$6y - 28 - y = -18 + 28$$

$$5y = 10$$

$$y = 2$$

(Note: A curly brace groups the equations above with the ones below.)

$$\left. \begin{array}{l} x = 3(2) - 14 \\ x = 6 - 14 \\ x = -8 \end{array} \right\}$$

\therefore Point is $(-8, 2)$

$$\begin{array}{l} \cancel{(3x - 2y = 2)}^{\cancel{-3x}} \Rightarrow \frac{-2y}{-2} \doteq \frac{-3x + 2}{-2} \\ 7x + 8y = -8 \end{array}$$

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

$$7x + 8\left(\frac{3}{2}x - 1\right) = -8 \quad \left. \begin{array}{l} y = \frac{3}{2}(0) - 1 \\ y = -1 \end{array} \right\}$$

$$7x + 12x - 8 = -8$$

$$\frac{19x}{19} = \frac{0}{19}$$

$$x = 0$$

$\therefore \text{P}_0 \text{ is } (0, -1)$