

DAY 6 - Substitution Method

Solve the systems and check the solutions.

A.

$$\begin{aligned} 2x + y &= 2 & \textcircled{1} \\ 3x + 2y &= 5 & \textcircled{2} \end{aligned}$$

• isolate y in $\textcircled{1}$

$$y = 2 - 2x$$

sub in $\textcircled{2}$

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

$$3x + 4 - 4x = 5$$

$$-1x + 4 = 5 \quad -4$$

$$-1x = 1$$

$$x = -1$$

sub in $\textcircled{1}$

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

$$-2 + y = 2 + 2$$

$$y = 4$$

$$\therefore \text{POI } \textcircled{B} (-1, 4)$$

• check in $\textcircled{2}$

$$\begin{array}{r} 3x + 2y = 5 \\ 3(-1) + 2(4) \\ -3 + 8 \end{array}$$

$$-3 + 8$$

27 ✓

B.

$$\begin{aligned} 2x - 3y &= 6 & \textcircled{1} \\ 2x - y &= 7 & \textcircled{2} \end{aligned}$$

isolate y in $\textcircled{2}$

$$2x - 7 = y$$

sub in $\textcircled{1}$

$$2x - 3(2x - 7) = 6$$

$$2x - 6x + 21 = 6$$

$$-4x + 21 = 6 \quad -21$$

$$-4x = -15$$

$$x = 3.75$$

sub in $\textcircled{2}$

$$2(3.75) - y = 7$$

$$7.5 - 7 = y$$

$$0.5 = y$$

$$\therefore \text{POI } \textcircled{A} (3.75, 0.5)$$

check in $\textcircled{1}$

$$2x - 3y = 6$$

$$2(3.75) - 3(0.5)$$

$$7.5 - 1.5$$

$$6$$

C.

$$\begin{aligned} x + 2y &= 2 & \textcircled{1} \\ 3x + 5y &= 4 & \textcircled{2} \end{aligned}$$

isolate x in $\textcircled{1}$

$$x = 2 - 2y$$

sub in $\textcircled{2}$

$$3(2 - 2y) + 5y = 4$$

$$6 - 6y + 5y = 4$$

$$6 - y = 4$$

$$-y = -2$$

$$y = 2$$

sub in $\textcircled{1}$

$$x + 2(2) = 2$$

$$x + 4 = 2$$

$$x = -2$$

$$\therefore \text{POI } \textcircled{B} (-2, 2)$$

check in $\textcircled{2}$

$$2x + 5y = 4$$

$$3(-2) + 5(2)$$

$$-6 + 10$$

$$4$$

Solve the systems and check the solutions.

$3x + y = 7$ (1)

$-x + 2y = 7$ (2)

D. isolate x in (2) or isolate y in (1)

$2y - 7 = x$

sub in (1)

$3(2y - 7) + y = 7$

$6y - 21 + y = 7$

$7y = 28$

$y = 4$

sub in (2)

$-x + 2(4) = 7$

$-x + 8 = 7$

$1 = x$

••• POI (1, 4)

• check in (1)

$$\begin{array}{r} 3x + y = 7 \\ 3(1) + 4 \\ 3 + 4 \\ 7 \end{array}$$

9x3

27

$2x + y = 4$ (1)

$3x - 2y = 13$ (2)

isolate y in (1)

$y = 4 - 2x$

sub in (2)

$3x - 2(4 - 2x) = 13$

$3x - 8 + 4x = 13$

$7x - 8 = 13$

$7x = 21$

$x = 3$

sub in (1)

$2(3) + y = 4$

$6 + y = 4$

$y = -2$

••• POI (3, -2)

check in (2)

$$\begin{array}{r} 3x - 2y = 13 \\ 3(3) - 2(-2) \\ 9 + 4 \end{array}$$

$y - 2x = 10$ (1)

$2y + 4x = 100$ (2)

isolate y in (1)

$y = 10 + 2x$

sub in (2)

$2(10 + 2x) + 4x = 100$

$20 + 4x + 4x = 100$

$20 + 8x = 100$

$8x = 80$

$x = 10$

sub in (1)

$y - 2(10) = 10$

$y - 20 = 10$

$y = 30$

••• POI (10, 30)

check in (2)

$$\begin{array}{r} 2y + 4x = 100 \\ 2(30) + 4(10) \\ 60 + 40 \end{array}$$