

$2x + 3y + z = 6 \rightarrow$ is a plane

Possible solutions for (x, y, z)

$$(x, y, z) = (1, 1, 1)$$

$$2(1) + 3(1) + (1) = 6$$

$$2 + 3 + 1 = 6$$

$$6 = 6 \checkmark$$

$$(x, y, z) = (0, 2, 0)$$

$$\cancel{2(0)} + 3(2) + \cancel{(0)} = 6$$

$$6 = 6 \checkmark$$

$$(x, y, z) = (3, 0, 0)$$

Others: $(0, 1, 3)$, $(3, 0, 0)$, etc.

$$\begin{aligned}
 2x + y - 3z &= -7 & \textcircled{A} \\
 3x - 2y + z &= 11 & \textcircled{B} \\
 -2x - 3y - 2z &= 3 & \textcircled{C}
 \end{aligned}$$

$$* (x, y, z) = (1, -3, 2)$$

* Graphing
Substitution

Elimination *

* Choose to eliminate x.

$$\textcircled{A} \quad 2x + y - 3z = -7$$

$$\textcircled{B} \quad 3x - 2y + z = 11$$

$$-3 \textcircled{A} \quad -6x - 3y + 9z = 21$$

$$2 \textcircled{B} \quad 6x - 4y + 2z = 22$$

$$\textcircled{D} \quad -7y + 11z = 43$$

$$\textcircled{D} \quad -7y + 11z = 43$$

$$\textcircled{E} \quad -2y - 5z = -4$$

$$-2 \textcircled{D} \quad 14y - 22z = -86$$

$$7 \textcircled{E} \quad -14y - 35z = -28$$

$$-57z = -114$$

$$\frac{-57z}{-57} = \frac{-114}{-57}$$

$$z = 2$$

$$\textcircled{C} \quad -2x - 3y - 2z = 3$$

$$\textcircled{A} \quad 2x + y - 3z = -7$$

$$\textcircled{E} \quad -2y - 5z = -4$$

* Solve 2x2 system

$$\begin{aligned} \textcircled{E} \quad & -2y - 5z = -4 \\ & -2y - 5(2) = -4 \\ & -2y - 10 = -4 \\ & \quad \quad +10 \quad +10 \\ \hline & \cancel{-2y} \quad = \frac{6}{-2} \\ & \quad \quad \quad y = -3 \end{aligned}$$

$$\begin{aligned} \textcircled{B} \quad & 3x - 2y + z = 11 \\ & 3x - 2(-3) + (2) = 11 \\ & 3x + 6 + 2 = 11 \\ & 3x + 8 = 11 \\ & \quad \quad -8 \quad -8 \\ \hline & \cancel{3x} \quad = \frac{3}{3} \\ & \quad \quad \quad x = 1 \end{aligned}$$

* Solve for x

$$(x, y, z) = (1, -3, 2)$$

$$\textcircled{A} \quad 2x + y - 3z = -7$$

$$\textcircled{B} \quad 3x - 2y + z = 11$$

$$\textcircled{C} \quad -2x - 3y - 2z = 3$$

$$3 \textcircled{A} \quad 6x + 3y - 9z = -21$$

$$2 \textcircled{B} \quad 6x - 4y + 2z = 22$$

$$3 \textcircled{C} \quad -6x - 9y - 6z = 9$$

$$3 \textcircled{A} \quad 6x + 3y - 9z = -21$$

$$3 \textcircled{C} \quad -6x - 9y - 6z = 9$$

$$\textcircled{D} \quad -6y - 15z = -12$$

divide all coefficients
by -3

$$-\frac{1}{3} \textcircled{D} \quad 2y + 5z = 4$$

$$2 \textcircled{B} \quad 6x - 4y + 2z = 22$$

$$3 \textcircled{C} \quad -6x - 9y - 6z = 9$$

$$\textcircled{E} \quad -13y - 4z = 31$$