

Examen Segunda Unidad Mano Polo Solonoff
Sustitución

1. a) $5x + 2y + 4z = 12$ b) $-3x + 3y + 3z = 56$

c) $2x - y - z = 69$

Despejar X

$$5x + 2y + 4z = 12$$

$$5x + 2y + 4z - (2y + 4z) = 12 - (2y + 4z)$$

$$5x = 12 - 2y - 4z$$

$$\frac{5x}{5} = \frac{12}{5} - \frac{2y}{5} - \frac{4z}{5}$$

$$x = \frac{12 - 2y - 4z}{5}$$

Sustituir $x = \frac{12 - 2y - 4z}{5}$

$$\left[\begin{array}{l} -3 \cdot \frac{12 - 2y - 4z}{5} + 3y + 3z = 56 \\ 2 \cdot \frac{12 - 2y - 4z}{5} - y - z = 69 \end{array} \right]$$

a) $\frac{-3 \cdot 12 - 2y - 4z}{5} + 3y + 3z = 56$ $\circ \frac{21y + 27z - 36}{5} = 56$

b) $\frac{2 \cdot 12 - 2y - 4z}{5} - y - z = 69$ $\circ \frac{-9y - 13z + 24}{5} = 69$

$$\text{Despeja } Y \text{ para } \frac{21y + 27z - 36}{5} = 56 \quad \circ \quad Y = \frac{-27z + 316}{21}$$

$$\frac{5(21y + 27z - 36)}{5} = 56 \cdot 5$$

$$21y + 27z - 36 = 280$$

$$21y + 27z - 36 - 27z = 280 - 27z$$

$$21y - 36 = 280 - 27z$$

$$21y - 36 + 36 = 280 - 27z + 36$$

$$21y = -27z + 316$$

$$\frac{21y}{21} = \frac{27z}{21} + \frac{316}{21}$$

$$Y = \frac{-27z + 316}{21}$$

$$\text{Sustituir } Y = \frac{-27z + 316}{21}$$

$$\left[\frac{-9 \cdot \frac{-27z + 316}{21} - 13z + 24}{5} = 69 \right]$$

$$\left[\frac{-2(z + 78)}{7} = 69 \right]$$

$$\text{Despeja } z \text{ para } = \frac{-2(z + 78)}{7} = 69 \quad z = -\frac{639}{2}$$

$$\text{Para } Y = \frac{-27z + 316}{21}$$

Sustituir z

$$Y = \frac{-27\left(-\frac{639}{2}\right) + 316}{21}$$

$$-27 \left(\frac{-639}{2} \right) + 316 = \frac{2555}{6}$$

$$Y = \frac{2555}{6}$$

$$\text{Para } X = \frac{12 - 2y - 4z}{5}$$

$$X = \frac{12 - 2 \cdot \frac{2555}{6} - 4 \left(-\frac{639}{2} \right)}{5}$$

$$\frac{12 - 2 \cdot \frac{2555}{6} - 4 \left(-\frac{639}{2} \right)}{5} = \frac{263}{3}$$

$$X = \frac{263}{3}$$

$$X = \frac{263}{3}, \quad z = \frac{639}{2}, \quad \frac{2555}{6}$$

Elimination

$$2. \quad 5x - 2y - 3z = 22 \quad x + 2y + 9z = 22 \quad -4x + 3y + 8z = 45$$

$$\begin{bmatrix} 5x - 2y - 3z = 22 \\ x + 2y + 9z = 22 \\ -4x + 3y + 8z = 45 \end{bmatrix}$$

Multiplicar $x + 2y + 9z = 22$ por 5

$$\begin{bmatrix} 5x - 2y - 3z = 22 \\ 5x + 10y + 45z = 110 \\ -4x + 3y + 8z = 45 \end{bmatrix}$$

$$\begin{array}{r} 5x + 10y + 45z = 110 \\ -5x - 2y - 3z = 22 \\ \hline 12y + 48z = 88 \end{array}$$

$$\begin{bmatrix} 5x - 2y - 3z = 22 \\ 12y + 48z = 88 \\ -4x + 3y + 8z = 45 \end{bmatrix}$$

Multiplicar $5x - 2y - 3z = 22$ por 4
 Multiplicar $-4x + 3y + 8z = 45$ por 5

$$\begin{bmatrix} 20x - 8y - 12z = 88 \\ 12y + 48z = 88 \\ -20x + 15y + 40z = 225 \end{bmatrix}$$

$$\begin{array}{r}
 -20x + 15y + 40z = 225 \\
 + \quad 20x - 8y - 12z = 88 \\
 \hline
 7y + 28z = 313
 \end{array}$$

$$\left[\begin{array}{r}
 20x - 8y - 12z = 88 \\
 12y + 48z = 88 \\
 7y + 28z = 313
 \end{array} \right]$$

Multiplicar $12y + 48z = 88$ por 7
 Multiplicar $7y + 28z = 313$ por 12

$$\left[\begin{array}{r}
 20x - 8y - 12z = 88 \\
 84y + 336z = 616 \\
 84y + 336z = 3756
 \end{array} \right]$$

$$\begin{array}{r}
 84y + 336z = 3756 \\
 - 84y + 336z = 616 \\
 \hline
 = 3140
 \end{array}$$

$$\left[\begin{array}{r}
 20x - 8y - 12z = 88 \\
 84y + 336z = 616 \\
 0 = 3140
 \end{array} \right]$$

$0 = 3140$ es falso

sin solución

Sustitucion

$$\begin{cases} 12x - 14y - 45z = 120 & 654x + 120y - 3z = -600 \\ -5x - 2y + z = 60 \end{cases}$$

$$-5x - 2y + z = 60$$

$$12x - 14y - 45z = 120$$

$$654x + 120y - 3z = -600$$

$$-5x - 2y + z = 60$$

Despeja X para $12x - 14y - 45z = 120$

$$12x - 14y - 45z = 120$$

Restar $-14y - 45z$ de ambas lados

$$12x - 14y - 45z - (-14y - 45z) = 120 - (-14y - 45z)$$

$$12x = 120 + 14y + 45z$$

Dividir ambas entre 12

$$\frac{12x}{12} = \frac{120}{12} + \frac{14y}{12} + \frac{45z}{12}$$

$$x = \frac{120 + 14y + 45z}{12} \quad \text{sustituir.}$$

Sustitucion

$$654 \cdot \frac{120 + 14y + 45z}{12} + 120y - 3z = -600$$

$$-5 \cdot \frac{120 + 14y + 45z}{12} - 2y + z = 60$$

Simplificar

$$\left[\begin{array}{l} \frac{1766y + 4899z + 13080}{2} = -600 \\ -5 \cdot \frac{120 + 14y + 45z}{12} - 2y + z = 60 \end{array} \right]$$

Despejar Y para $\frac{1766 + 4899z + 13080}{2} = -600$

$$\left[-94 \cdot \frac{-4899z - 14280}{1766} - 213z - 600 = 60 \right]$$

$$\left[\frac{7029z + 23560}{1766} = 60 \right]$$

Despejar z para $\frac{7029z + 23560}{1766} = 60$

Para $Y = \frac{-4899z - 14280}{1766}$

Substituir $z = \frac{82400}{7029}$

$$Y = \frac{-4899 \cdot \frac{82400}{7029} - 14280}{1766}$$

$$\frac{-4899 \cdot \frac{82400}{7029} - 14280}{1766} = -\frac{1346}{33}$$

$$Y = -\frac{1340}{33}$$

$$\text{Para } X = \frac{120 + 14y + 45z}{12}$$

$$z = \frac{82400}{7029} \quad Y = -\frac{1340}{33}$$

$$X = \frac{120 + 14\left(-\frac{1340}{33}\right) + 45 \cdot \frac{82400}{7029}}{12}$$

$$\frac{120 + 14\left(-\frac{1340}{33}\right) + 45 \cdot \frac{82400}{7029}}{12} = \frac{46300}{7029}$$

$$X = \frac{46300}{7029}$$

$$X = \frac{46300}{7029}, \quad z = \frac{82400}{7029}, \quad Y = -\frac{1340}{33}$$

$$4. \quad -x + 3y - z = 40 \quad x + 2y = 50 \quad 2x - 6y + 2z = 30$$

$$\left[\begin{array}{l} -x + 3y - z = 40 \\ x + 2y = 50 \\ 2x - 6y + 2z = 30 \end{array} \right]$$

$$\left[\begin{array}{l} -x + 3y - z = 40 \\ 2x - 6y + 2z = 30 \\ x + 2y = 50 \end{array} \right]$$

$$\left[\begin{array}{l} -2x + 6y - 2z = 80 \\ 2x - 6y + 2z = 30 \\ x - 2y = 50 \end{array} \right]$$

$$\begin{array}{r} 2x - 6y + 2z = 30 \\ + \quad -2x + 6y - 2z = 80 \\ \hline \end{array}$$

$$0 = 110$$

$$\left[\begin{array}{l} -2x + 6y - 2z = 80 \\ 0 = 110 \\ x + 2y = 50 \end{array} \right]$$

$0 = 110$ es falso