

EJERCICIOS RESUELTOS 1/5

Periodo 6. (A Distancia)

1) Determine el valor de las variables en la igualdad de matrices

$$a) \begin{pmatrix} 5x+2 \\ \frac{2x+4}{6} \\ \frac{3-(2x+1)}{2} + 3x \end{pmatrix} = \begin{pmatrix} 3x+8 \\ 3x-10 \\ \frac{x+8}{2} \end{pmatrix} \quad (5pts)$$

Solución:

$$\begin{aligned} \text{Ecu. 1} \\ * 5x+2 &= 3x+8 \Rightarrow 5x-3x = -2+8 \\ &\Rightarrow 2x=6 \rightarrow x = \frac{6}{2} \rightarrow \boxed{x=3} \end{aligned}$$

$$* \frac{2x+4}{6} = 3x-10 \rightarrow 2x+4 = 18x-60$$

$$\Rightarrow 4+60 = -2x+18x \rightarrow 64 = 16x \Rightarrow x = \frac{64}{16} \rightarrow \boxed{x=4}$$

$$* \frac{3-(2x+1)}{2} + 3x = \frac{x+8}{2}$$

$$\Rightarrow 3-2x-1+6x = x+8 \rightarrow -2x+6x-x = 8-3+1$$

$$\rightarrow 6x-3x = 9-3 \rightarrow 3x=6 \rightarrow x = \frac{6}{3} \rightarrow \boxed{x=2}$$

$$b) \begin{pmatrix} \sqrt[3]{4+\sqrt{x+5}} + 3 \\ \frac{2x+4}{6} \end{pmatrix} = \begin{pmatrix} 5 \\ 3x-10 \end{pmatrix} \quad (5pts)$$

$$* \sqrt[3]{4+\sqrt{x+5}} + 3 = 5 \rightarrow \sqrt[3]{4+\sqrt{x+5}} = 5-3$$

$$\Rightarrow (\sqrt[3]{4+\sqrt{x+5}})^3 = (2)^3 \Rightarrow 4+\sqrt{x+5} = 8$$

$$\Rightarrow \sqrt{x+5} = 8-4 \Rightarrow (\sqrt{x+5})^2 = (4)^2 \Rightarrow x+5 = 16$$

$$x = 16-5 \Rightarrow \boxed{x=11}$$

$$\frac{2x+4}{6} = 3x-10 \Rightarrow 2x+4 = 18x-60$$

$$\Rightarrow 4+60 = -2x+18x \Rightarrow 64 = 16x \rightarrow x = \frac{64}{16} \rightarrow x = 4$$

2) Dada las matrices

$$A = \begin{pmatrix} -1 & 3 & 2 \\ 0 & 5 & -3 \\ 1 & 2 & 4 \end{pmatrix} \quad B = \begin{pmatrix} 1 & 3 & 5 \\ 1 & 2 & -3 \\ -1 & 0 & 2 \end{pmatrix} \quad C = \begin{pmatrix} 7 & 5 & 3 \\ 0 & 2 & 4 \\ 2 & -3 & 2 \end{pmatrix} \quad D = \begin{pmatrix} 2 & 12 & 3 \\ 3 & -2 & 4 \\ 7 & -3 & -2 \end{pmatrix}$$

Determine:
 Valor:
 5pts C/U

a) $A + B^T - C = \begin{pmatrix} -1 & 3 & 2 \\ 0 & 5 & -3 \\ 1 & 2 & 4 \end{pmatrix} + \begin{pmatrix} 1 & 1 & -1 \\ 3 & 2 & 0 \\ 5 & -3 & 2 \end{pmatrix}^T - \begin{pmatrix} 7 & 5 & 3 \\ 0 & 2 & 4 \\ 2 & -3 & 2 \end{pmatrix}$

$$= \begin{pmatrix} -1+1-7 & 3+1-5 & 2-1-3 \\ 0+3-0 & 5+2-2 & -3+0-4 \\ 1+5-2 & 2-3+3 & 4+2-2 \end{pmatrix} = \begin{pmatrix} -7 & -1 & -2 \\ 3 & 5 & -7 \\ 4 & 2 & 4 \end{pmatrix}$$

b) $4D - 2A^T - C^T + 5B$

$$= 4 \begin{pmatrix} 2 & 12 & 3 \\ 3 & -2 & 4 \\ 7 & -3 & -2 \end{pmatrix} - 2 \begin{pmatrix} -1 & 0 & 1 \\ 3 & 5 & 2 \\ 2 & -3 & 4 \end{pmatrix}^T - \begin{pmatrix} 7 & 0 & 2 \\ 5 & 2 & -3 \\ 3 & 4 & 2 \end{pmatrix}^T + 5 \begin{pmatrix} 1 & 3 & 5 \\ 1 & 2 & -3 \\ -1 & 0 & 2 \end{pmatrix}$$

$$= \begin{pmatrix} 8 & 48 & 12 \\ 12 & -8 & 16 \\ 28 & -12 & -8 \end{pmatrix} - \begin{pmatrix} -2 & 0 & 2 \\ 6 & 10 & 4 \\ 4 & -6 & 8 \end{pmatrix} - \begin{pmatrix} 7 & 0 & 2 \\ 5 & 2 & -3 \\ 3 & 4 & 2 \end{pmatrix} + \begin{pmatrix} 5 & 15 & 25 \\ 5 & 10 & -15 \\ -5 & 0 & 10 \end{pmatrix}$$

$$= \begin{pmatrix} 8+2-7+5 & 48-0-0+15 & 12-2-2+25 \\ 12-6-5+5 & -8-10-2+10 & 16-4+3-15 \\ 28-4-3-5 & -12+6-4+0 & -8-8-2+10 \end{pmatrix}$$

$$= \begin{pmatrix} 8 & 63 & 33 \\ 6 & -10 & 0 \\ 16 & -10 & -8 \end{pmatrix}$$

Ejercicios Resueltos
 3/5 Periodo 6 (a distancia)

1) Dada las matrices

$$A = \begin{pmatrix} 1 & -1 & 2 \\ 0 & 3 & 4 \end{pmatrix} \quad B = \begin{pmatrix} 4 & 0 & -3 \\ -1 & -2 & 3 \end{pmatrix} \quad C = \begin{pmatrix} 2 & -3 & 0 \\ 5 & -1 & -4 \\ -1 & 0 & 0 \end{pmatrix}$$

$$D = \begin{pmatrix} 2 \\ -1 \\ 3 \end{pmatrix} \quad E = \begin{pmatrix} 3 & 5 \\ -7 & 4 \\ 2 & -6 \end{pmatrix} \quad F = \begin{pmatrix} -5 & 8 \\ 7 & -1 \end{pmatrix} \quad C_7 = \begin{pmatrix} 1 & -2 \\ 0 & 5 \end{pmatrix}$$

determine valor $A \cdot B = 4 \text{ pts}$ y $C \cdot D = 6 \text{ pts}$ y

$$a) A \cdot D = \begin{pmatrix} 1 & -1 & 2 \\ 0 & 3 & 4 \end{pmatrix} \cdot \begin{pmatrix} 2 \\ -1 \\ 3 \end{pmatrix} = \begin{pmatrix} 2 + 1 + 6 \\ 0 - 3 + 12 \end{pmatrix} = \begin{pmatrix} 9 \\ 9 \end{pmatrix}$$

$$b) A \cdot A^T = \begin{pmatrix} 1 & -1 & 2 \\ 0 & 3 & 4 \end{pmatrix} \begin{pmatrix} 1 & 0 \\ -1 & 3 \\ 2 & 4 \end{pmatrix}^T = \begin{pmatrix} 1 + 1 + 4 & 0 - 3 + 8 \\ 0 - 3 + 8 & 0 + 9 + 16 \end{pmatrix} = \begin{pmatrix} 6 & 5 \\ 5 & 25 \end{pmatrix}$$

$$c) A \cdot E - F^T = \begin{pmatrix} 1 & -1 & 2 \\ 0 & 3 & 4 \end{pmatrix} \begin{pmatrix} 3 & 5 \\ -7 & 4 \\ 2 & -6 \end{pmatrix} - \begin{pmatrix} -5 & 7 \\ 8 & -1 \end{pmatrix}^T$$

$$= \begin{pmatrix} 3 + 7 + 4 & 5 - 4 - 12 \\ 0 - 21 + 8 & 0 + 12 - 24 \end{pmatrix} - \begin{pmatrix} -5 & 7 \\ 8 & -1 \end{pmatrix} = \begin{pmatrix} 14 & -11 \\ -13 & -12 \end{pmatrix} - \begin{pmatrix} -5 & 7 \\ 8 & -1 \end{pmatrix}$$

$$= \begin{pmatrix} 14 + 5 & -11 - 7 \\ -13 - 8 & -12 + 1 \end{pmatrix} = \begin{pmatrix} 19 & -18 \\ -21 & -11 \end{pmatrix}$$

$$d) -3 \cdot (A + B) \cdot D = -3 \left(\begin{pmatrix} 1 & -1 & 2 \\ 0 & 3 & 4 \end{pmatrix} + \begin{pmatrix} 4 & 0 & -3 \\ -1 & -2 & 3 \end{pmatrix} \right) \cdot \begin{pmatrix} 2 \\ -1 \\ 3 \end{pmatrix}$$

$$= -3 \cdot \begin{pmatrix} 5 & -1 & -1 \\ -1 & 1 & 7 \end{pmatrix} \cdot \begin{pmatrix} 2 \\ -1 \\ 3 \end{pmatrix} = \begin{pmatrix} -15 & 3 & 3 \\ 3 & -3 & -21 \end{pmatrix} \cdot \begin{pmatrix} 2 \\ -1 \\ 3 \end{pmatrix}$$

$$= \begin{pmatrix} -30 - 3 + 9 \\ 6 + 3 - 63 \end{pmatrix} = \begin{pmatrix} -24 \\ -54 \end{pmatrix}$$

4/5

A Distancia, Ejercicios Resueltos

Periodo 6 "Cardenal Quintero"

1) Aplicando Determinantes, Resuelva las ecuaciones.

$$A y B = 4pts \quad c y d = 6pts$$

$$a) \begin{vmatrix} 2 & 3x \\ -1 & x \end{vmatrix} = 15$$

Solución

$$2x - (-3x) = 15$$

$$2x + 3x = 15$$

$$5x = 15$$

$$x = \frac{15}{5}$$

$$x = 3$$

$$b) \begin{vmatrix} x & 5 \\ x & 2x \end{vmatrix} = 42 \Rightarrow 2x^2 - 5x = 42$$

$$\Rightarrow 2x^2 - 5x - 42 = 0 \text{ factorizando}$$

$$(2x)^2 - 5(2x) - 84 = 0$$

$$(2x - 12)(2x + 7) = 0$$

$$x) x_1 = +\frac{12}{2} \Rightarrow x_1 = 6$$

$$x_2 = -\frac{7}{2}$$

$$\begin{array}{r|l} 84 & 2 \\ 42 & 2 \\ \hline 21 & 3 \\ 7 & 3 \\ \hline 1 & \end{array}$$

$$c) \begin{vmatrix} x+1 & x-2 \\ 2x+1 & x-3 \end{vmatrix} = 1 \Rightarrow (x+1) \cdot (x-3) - [(2x+1)(x-2)] = 1$$

$$\Rightarrow x^2 - 3x + x - 3 - (2x^2 - 3x + x - 2) = 1$$

$$\Rightarrow x^2 - 2x - 3 - 2x^2 + x + 2 - 1 = 0$$

$$\Rightarrow -x^2 - x - 2 = 0 \Rightarrow x^2 + x + 2 = 0$$

$$a=1, b=1, c=2$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \Rightarrow x = \frac{-1 \pm \sqrt{1^2 - 4 \cdot 1 \cdot 2}}{2 \cdot 1}$$

$$\Rightarrow x = \frac{-1 \pm \sqrt{1-8}}{2} \Rightarrow x = \frac{-1 \pm \sqrt{-7}}{2}$$

Periodo 6
5/3

$$d) \begin{vmatrix} x & 2x & -3 \\ 2 & 5 & 1 \\ x & 4 & 1 \end{vmatrix} = 4x$$

$$\Rightarrow \begin{vmatrix} x & 2x & -3 & x & 2x \\ 2 & 5 & 1 & 2 & 5 \\ x & 4 & 1 & x & 4 \end{vmatrix} = 4x$$

$$\Rightarrow 5x + 2x^2 - 24 - (-15x + 4x + 4x) = 4x$$

$$\rightarrow 5x + 2x^2 - 24 + 15x - 4x - 4x = 4x$$

$$\rightarrow 2x^2 + 12x - 4x - 24 = 0$$

$$\rightarrow \frac{2x^2 + 8x - 24}{2} = 0 \rightarrow x^2 + 4x - 12 = 0$$

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

$$x_1 = -6 \checkmark$$

$$x_2 = 2 \checkmark$$