

NOMBRE:.....

$$1.-- Pt = \frac{1}{4} X_1^3 X_2 + \frac{27}{16} X_1^2 X_2^2 + \frac{9}{64} X_1 X_2^3$$

$$X_2 = 4$$

Para 5 productores

$$2.- 1200 = (X_1 + 5) * 3 X_2$$

$$P_1 = 17$$

$$P_2 = 28$$

$$C = ?$$

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$$(1) \quad PT = -\frac{1}{4} x_1^3 x_2 + \frac{27}{16} x_1^2 x_2^2 + \frac{9}{64} x_1 x_2^3$$

$x_2 = 4$; Para 5 productores

$$PT = -\frac{1}{4} x_1^3 (4) + \frac{27}{16} x_1^2 (4)^2 + \frac{9}{64} x_1 (4)^3$$

$$PT = -1x_1^3 + 27x_1^2 + 9x_1 //$$

x_2	x_1	PT	PMe	PMq
4	1	35	35	—
4	2	118	59	83
4	3	243	81	125
4	4	404	101	161
4	5	595	119	191

$$PT = -1(x_1)^3 + 27(x_1)^2 + 9(x_1)$$

$$= -1(1)^3 + 27(1)^2 + 9(1) = 35$$

$$PT = -1(2)^3 + 27(2)^2 + 9(2) = 118$$

$$PT = -1(3)^3 + 27(3)^2 + 9(3) = 243$$

$$PT = -1(4)^3 + 27(4)^2 + 9(4) = 404$$

$$PT = -1(5)^3 + 27(5)^2 + 9(5) = 595$$

$$PMe = \frac{PT}{x_1}$$

$$35/1 = 35$$

$$118/2 = 59$$

$$243/3 = 81$$

$$404/4 = 101$$

$$595/5 = 119$$

$$PMq = \frac{118 - 35}{2 - 1} = 83$$

$$\frac{243 - 118}{3 - 2} = 125$$

$$\frac{404 - 243}{4 - 3} = 161$$

$$\frac{595 - 404}{5 - 4} = 191$$

$$PMe = \frac{PT}{x_1} = \frac{-1x_1^3 + 27x_1^2 + 9x_1}{x_1}$$

$$PMe = -1x_1^2 + 27x_1 + 9 //$$

$$\frac{dPMe}{dx_1} = 2x_1 + 27 = 0$$

$$x = 13,5 //$$

$$PMq = \frac{dPT}{dx_1} = -3x_1^2 + 54x_1 + 9$$

$$PMq = -3(13,5)^2 + 54(13,5) + 9 = 191,25 //$$

$$PMe = -1(13,5)^2 + 27(13,5) + 9 = 191,25 //$$

Producto Total Máximo

$$PT = -x^3 + 27x^2 + 9x_1$$

$$\frac{dPT}{dx_1} = -3x^2 + 54x + 9 = 0 \quad (-1)$$

$$3x^2 - 54x - 9 = 0$$

$$a \quad b \quad c$$

$$x_1 = \frac{-(-54) \pm \sqrt{(54)^2 - 4(3)(-9)}}{2 \cdot 3}$$

$$x_1 = \frac{54 \pm \sqrt{2916 + 108}}{6}$$

$$x_1 = \frac{54 \pm \sqrt{3024}}{6}$$

$$x_1 = \frac{54 \pm 54,99}{6}$$

$$x_1 = \frac{54 \pm 54,99}{6}$$

$\left(18,17 \right) \checkmark$
 $-0,17$

- Reemplazando en el original

$$PT = -1(18,17)^3 + 27(18,17)^2 + 9(18,17)$$

$$PT = 3078,74 //$$

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$$(2) \quad 1200 = (x_1 + 5) \cdot 3x_2$$

$$P_1 = 17$$

$$P_2 = 28$$

$$C = P$$

$$1200 - (x_1 + 5) \cdot 3x_2 = 0$$

$$C = P_1 x_1 + P_2 x_2$$

$$C = 17x_1 + 28x_2$$

$$Z = 17x_1 + 28x_2 + \lambda (1200 - (x_1 + 5) \cdot 3x_2)$$

$$\frac{dZ}{dx_1} = 17 - \lambda \cdot 3x_2 \Rightarrow \lambda = \frac{17}{3x_2}$$

$$\frac{dZ}{dx_2} = 28 - \lambda (x_1 + 5) \cdot 3 \Rightarrow \lambda = \frac{28}{(x_1 + 5) \cdot 3}$$

$$\frac{dZ}{d\lambda} = 1200 - (x_1 + 5) \cdot 3x_2 = 0$$

$$\frac{17}{3x_2} = \frac{28}{(x_1 + 5) \cdot 3}$$

$$17 \cdot 3 (x_1 + 5) = 28(3x_2)$$

$$51x_1 + 255 = 84x_2$$

$$\frac{51x_1 + 255}{84x_2}$$

$$\boxed{\frac{51x_1 + 255}{84} = x_2}$$

$$1200 - (x_1 + 5) \cdot 3 \left(\frac{51x_1 + 255}{84} \right) = 0$$

$$1200 - (x_1 + 5) \cdot \frac{(153x_1 + 765)}{84} = 0$$

$$1200 - \frac{(183x_1^2 + 765x_1 + 765x_1 + 3825)}{84} = 0$$

$$1200 - \frac{(153x_1^2 + 1530x_1 + 3825)}{84} = 0$$

$$100800 - 153x_1^2 - 1530x_1 - 3825 = 0$$

$$-153x_1^2 - 1530x_1 + 96975 = 0 \quad (-1)$$

$$\underbrace{153x_1^2}_a + \underbrace{1530x_1}_b - \underbrace{96975}_c = 0$$

$$x_1 = \frac{-b \pm \sqrt{b^2 - 4ac}}{2 \cdot a}$$

$$x_1 = \frac{-1530 \pm \sqrt{(1530)^2 - 4(153) \cdot (-96975)}}{2 \cdot 153}$$

$$x_1 = \frac{-1530 \pm \sqrt{2340900 + 59348700}}{306}$$

$$x_1 = \frac{-1530 \pm \sqrt{61689600}}{306}$$

$$x_1 = \frac{-1530 \pm 7854,27}{306}$$

$$x_1 \begin{cases} 20,67 \\ -30,67 \end{cases}$$

$$x_2 = \frac{51(20,67) + 255}{84}$$

$$x_2 = 15,58 //$$

$$C^0 = 17x_1 + 28x_2$$

$$C^0 = 17(20,67) + 28(15,58)$$

$$C^0 = 787,63 //$$

