

## Sección 1

### Bloque 1

1.

$x = \text{PRECIO GAMA BAJA}$ ;  $y = \text{PRECIO GAMA MEDIA}$

$z = \text{PRECIO GAMA ALTA}$

$$\begin{array}{l} a) z = x + y \\ 50y = 30z \\ 5x + 5y + 10z = 7500 \end{array} \quad \left\{ \begin{array}{l} z = x + y \\ 5y = 3z \\ x + y + 2z = 1500 \end{array} \right. \quad \left\{ \begin{array}{l} 5y = 3(x + y) \\ x + y + 2(x + y) = 1500 \end{array} \right.$$

$$\begin{array}{l} b) 2y = 3x \\ 3x + 3y = 1500 \end{array} \quad \left\{ \begin{array}{l} 2y = 3x \\ x + y = 500 \end{array} \right. \quad \left\{ \begin{array}{l} 2y = 3x \\ x = 500 - y \end{array} \right. \quad \left\{ \begin{array}{l} 2y = 3(500 - y) \end{array} \right.$$

$$\boxed{y = \$300; x = 200; z = 500}$$

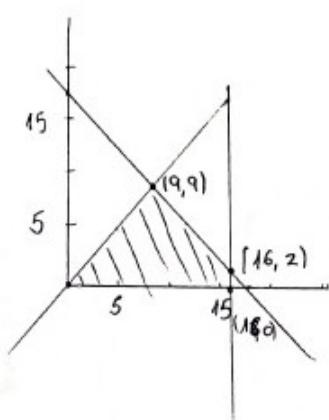
2.

$x = \text{ha AGUACATES}$

$y = \text{ha MANGOS}$

$$a) Z = 10.000x + 12.000y$$

$$\left. \begin{array}{l} b) x + y = 18 \\ x \leq 16 \\ y \leq x \end{array} \right\}$$



$$\begin{aligned} c) Z(0,0) &= 0 \\ Z(9,9) &= 198.000 \\ Z(16,2) &= 184.000 \\ Z(16,0) &= 160.000 \end{aligned}$$

**Bloque 2**

1.

$$\begin{aligned} \text{a) } \lim_{x \rightarrow 1^+} f(x) &= 4 + t \quad \left\{ \begin{array}{l} 4 + t = 3 \\ t = -1 \end{array} \right. \\ \lim_{x \rightarrow 1^-} f(x) &= 4 + t \end{aligned}$$

$$\text{b) } f'(x) = 0 ; \quad 2(x-3) = 0 ; \quad x = 3$$

$$f(3) = 0 \Rightarrow (3, 0) \text{ MÍNIMO}$$

$$\text{c) } \begin{array}{c} f'(x) > 0 \\ \diagup \quad \diagdown \\ 3 \end{array}, \quad \begin{array}{l} f'(x) > 0 \\ \diagup \quad \diagdown \end{array} \quad \begin{array}{l} \text{CRECIMIENTO } (3, +\infty) \\ \text{DECRECIMIENTO } (1, 3) \end{array}$$

2.

$$f(x) = ax^2 + bx + c \quad \text{MÁXIMO } (0, -3) \quad x = -1 \Rightarrow m = 6$$

$$f(0) = -3 \Rightarrow f(0) = a \cdot 0^2 + b \cdot 0 + c = -3 ; \quad \boxed{c = -3}$$

$$f'(x) = 2ax + b ; \quad f'(0) = 0 ; \quad f'(0) = 2 \cdot a \cdot 0 + b = 0 ; \quad \boxed{b = 0}$$

$$f'(-1) = 6 ; \quad f'(-1) = 2 \cdot a \cdot (-1) + 0 = 6 ; \quad \boxed{a = -3}$$

## Sección 2

### Bloque 1

3.

$X$  = CONSUMO DE AZÚCAR POR PERSONA EN UNA SEMANA

$\bar{x} = 60$  GRAMOS  $n = 50$   $\bar{X} = 200$  GRAMOS

a) INTERVALO DE CONFIANZA 95%

$$1 - \alpha = 0.95 \Rightarrow \alpha = 0.05 \Rightarrow \alpha/2 = 0.025 \Rightarrow 1 - \alpha/2 = 0.975; Z_{\alpha/2} = 1.96$$

$$I.C = \left( 200 - 1.96 \cdot \frac{60}{\sqrt{50}}, 200 + 1.96 \cdot \frac{60}{\sqrt{50}} \right) = (183.37, 216.63)$$

c) Si DISMINUIMOS EL NIVEL DE CONFIANZA, DISMINUYE LA AMPLITUD DEL INTERVALO. POR LO QUE, 220 GRAMOS SIGUE SIN PERTENECER AL INTERVALO ANTERIOR. NO SERÍA ADMISIBLE.

4.

100 ALUMNOS, 6 NO HAN ENCONTRADO TRABAJO

a)  $\frac{94}{100} = 94\%$  ALUMNOS QUE HAN ENCONTRADO TRABAJO

b)  $N_1$  = PRIMER ALUMNO SIN TRABAJO,  $N_2$  = SEGUNDO ALUMNO SIN TRABAJO

$N_3$  = TERCER ALUMNO SIN TRABAJO

$$P(N_1 \cap N_2 \cap N_3) = P(N_1) P(N_2 | N_1) P(N_3 | (N_1 \cap N_2)) =$$

$$\frac{6}{100} \cdot \frac{5}{99} \cdot \frac{4}{98} = \frac{1}{8085}$$

$$c) P(N_2 \cap N_3 | N_1) = \frac{P(N_2 \cap N_3 \cap N_1)}{P(N_1)} = \frac{1/8085}{6/100} = \frac{10}{4851}$$

## Bloque 2

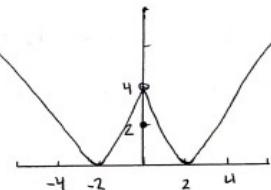
3.

$$f(x) = \begin{cases} (x+2)^2 & \text{si } x < 0 \\ t & \text{si } x = 0 \\ (x-2)^2 & \text{si } x > 0 \end{cases}$$

a)  $f(0) = \lim_{x \rightarrow 0^-} f(x) = \lim_{x \rightarrow 0^+} f(x)$

$$f(0) = t ; \lim_{x \rightarrow 0^-} f(x) = 4 ; \lim_{x \rightarrow 0^+} f(x) = 4 \Rightarrow \boxed{t=4}$$

b) REPRESENTACIÓN  $t=2$



VÉRTICES : Si  $x < 0$ ;  $f(x) = 2(x+2)$   
 $\boxed{x=-2}$

Si  $x > 0$ ;  $f(x) = 2(x-2)$   
 $x=2$

4.

$$P(t) = -40t^2 + 240t + 540 \quad t = \text{SEMANAS} \quad (1 \leq t \leq 4)$$

a)  $P(1) + P(2) ; P(1) + P(2) = (-40 + 240 + 540) + (-160 + 480 + 540)$

$P(1) + P(2) = 1600$  PORCIONES

b)  $P'(t) = 0 ; P'(t) = -80t + 240 = 0 \Rightarrow t = 3$

$\frac{P'(t) > 0}{3} \quad \frac{P'(t) < 0}{}$  MÁXIMO EN  $t = 3$

c)  $P(3) = -40 \cdot 3^2 + 240 \cdot 3 + 540 = 900$  PORCIONES

d)  $\boxed{P(1) = 740} ; P(2) = 860 ; P(3) = 900 ; P(4) = 860$

### Sección 3

#### Bloque 1

5.

$$A = \begin{pmatrix} 3 & -6 \\ -1/2 & 3 \end{pmatrix}, \quad B = \begin{pmatrix} 1 & -4 \\ -1 & 4 \end{pmatrix}; \quad C = \begin{pmatrix} 2/3 \\ 1/3 \end{pmatrix}; \quad D = \begin{pmatrix} -6 & 3 \end{pmatrix}$$

$$a) A \cdot C + D^t = \begin{pmatrix} 3 & -6 \\ -1/2 & 3 \end{pmatrix} \begin{pmatrix} 2/3 \\ 1/3 \end{pmatrix} + \begin{pmatrix} -6 \\ 3 \end{pmatrix} = \begin{pmatrix} 0 \\ 2/3 \end{pmatrix} + \begin{pmatrix} -6 \\ 3 \end{pmatrix} = \begin{pmatrix} -6 \\ 11/3 \end{pmatrix}$$

$$b) |A| = \begin{vmatrix} 3 & -6 \\ -1/2 & 3 \end{vmatrix} = 9 + 3 = 6 \neq 0 \text{ TIENE INVERSA}$$

$$|B| = \begin{vmatrix} 1 & -4 \\ -1 & 4 \end{vmatrix} = 4 - 4 = 0 \text{ NO TIENE INVERSA}$$

$$c) D \cdot C \text{ MATRIZ } 1 \times 2 \cdot 2 \times 1 \rightarrow \text{MATRIZ } 1 \times 1$$

$$D^t \cdot C^t \text{ MATRIZ } 2 \times 1 \cdot 1 \times 2 \rightarrow \text{MATRIZ } 2 \times 2$$

6.

$x$  = MOTOS GASOLINA;  $y$  = MOTOS GASOLINA Y ACEITE

$z$  = MOTOS ELÉCTRICAS

$$\left. \begin{array}{l} x+y+z=100 \\ y-x=\frac{z}{2} \\ x-z=\frac{y}{3} \end{array} \right\}$$

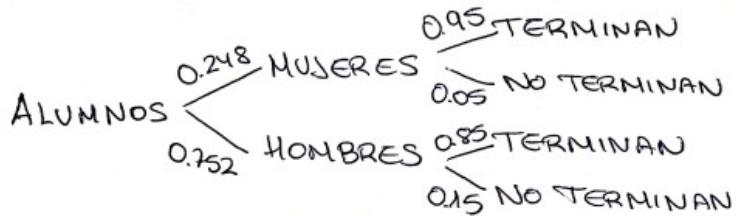
$$\left. \begin{array}{l} x+y+z=100 \\ 2y-2x=z \\ 3x-3z=y \end{array} \right\} \quad \begin{array}{l} x+y+z=100 \\ 2x+2y-z=0 \\ 3x-y-3z=0 \end{array} \quad \text{RESOLVENDO POR GAUSS}$$

$$\left( \begin{array}{ccc|c} 1 & 1 & 1 & 100 \\ -2 & 2 & -1 & 0 \\ 3 & -1 & -3 & 0 \end{array} \right) \xrightarrow{\begin{array}{l} F_2=F_2+2F_1 \\ F_3=F_3-3F_1 \end{array}} \left( \begin{array}{ccc|c} 1 & 1 & 1 & 100 \\ 0 & 4 & 1 & 200 \\ 0 & -4 & -6 & -300 \end{array} \right) \xrightarrow{\begin{array}{l} F_3=F_3+F_2 \\ F_2=F_2/4 \end{array}}$$

$$\left( \begin{array}{ccc|c} 1 & 1 & 1 & 100 \\ 0 & 1 & 1/4 & 50 \\ 0 & 0 & -5 & -100 \end{array} \right) \Rightarrow \left. \begin{array}{l} x+y+z=100 \\ y+z=200 \\ 5z=-100 \end{array} \right\} \quad \begin{array}{l} x=35 \\ y=45 \\ z=20 \end{array}$$

## Bloque 2

5.



a)  $P(T) = 0.248 \cdot 0.95 + 0.752 \cdot 0.85 = 0.8748 = 87.48\%$

b)  $P(M|T) = \frac{P(M \cap T)}{P(T)} = \frac{0.248 \cdot 0.95}{0.8748} = 0.2693 = 26.93\%$

6.

$X$  = ALTURA EN cm     $\bar{x} = 15$  cm     $n = 400$  PLANTAS  
 $\bar{x} = 110$  cm

a) INTERVALO DE CONFIANZA 95%.

$$1 - \alpha = 0.95; \alpha = 0.05; \alpha/2 = 0.025; 1 - \alpha/2 = 0.975; Z_{\alpha/2} = 1.96$$

$$\text{INTERVALO DE CONFIANZA} = \left( \bar{x} - 1.96 \cdot \frac{s}{\sqrt{n}}, \bar{x} + 1.96 \cdot \frac{s}{\sqrt{n}} \right) = \left( 108.53, 111.46 \right)$$

b) Si aumentamos el nivel de confianza, aumenta  $Z_{\alpha/2}$  por lo que aumentaría la amplitud del intervalo.

c) Como 109 cm sí pertenece a mi intervalo, es un valor ADMISIBLE.