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Examen final

### Problema I

a)  $n = 50$

$$p = 0.2$$

$E =$  Artículo defectuoso

$$q = 1 - p = 0.8$$

$$\mu = n \cdot p = 50 \cdot 0.2 = \underline{10}$$

b)

$$P(0) = \binom{50}{0} (0.2)^0 (0.8)^{50} = 0.000014$$

### Problema II

$$p = 0.1$$

$$a) \mu = \frac{1}{p} = \frac{1}{0.1} = \underline{10}$$

$$b) \mu = n \cdot p = (10)(0.1) = \underline{1}$$

### Problema III

$K, Y$  = Numero de Reparaciones

$$E(X) = 0.96$$

$$E(Y) = 1.12$$

$$C_A(X) = 160 + 40X = 160 + 40(0.96) = 198.4$$

$$C_B(Y) = 128 + 40Y = 128 + 40(1.12) = 172.8$$

R/ El equipo que minimiza el costo esperado es el B.

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### Problema IV

$$M = 100$$

$$G = 25$$

$$a) \quad 1 - \frac{1}{K^2} = 0.75$$

$$\frac{1}{K^2} = 0.25$$

$$\frac{1}{0.25} = K^2$$

$$4 = K^2$$

$$\sqrt{4} = K$$

$$2 = K$$

$$K = 2$$

$$M + K G = 100 + (2 \times 25) = 150$$

$$M - K G = 100 - (2 \times 25) = 50$$

R/

$$(50, 150)$$

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b) Demostrar  $\text{var}(cX) = c^2 \text{var}(X)$

$$\begin{aligned}\text{Var}(cX) &= E[(cX)^2] - [E(cX)]^2 \\ &= c^2 [E(X^2) - c^2 E(X)^2] \\ &= c^2 \text{Var}(X)\end{aligned}$$

### Problema V

$$f(x) = \begin{cases} \frac{3}{2}x^2 + x & ; 0 \leq x \leq 1 \\ 0 & \text{e.o.p} \end{cases}$$

a)  $P(X < 0.5)$

$$\int_0^{0.5} \left( \frac{3}{2}x^2 + x \right) dx = 0.1875$$

b)  $P(X \geq 0.5)$

$$\int_{0.5}^1 \left( \frac{3}{2}x^2 + x \right) dx = 0.8125$$