PROBLEMA 1

Para $\alpha = 5\%$ ($\gamma = 95\%$) se obtiene $\lambda = 1'96$

Para $\alpha = 1\%$ ($\gamma = 99\%$) se obtiene $\lambda = 2'57$

Por tanto el intervalo más pequeño (más preciso) es el primero.

PROBLEMA 2

(A) $P(s^2 < 1'1\sigma^2) = P\left(\frac{n s^2}{\sigma^2} < \frac{1'1 \cancel{\sigma^2} n}{\cancel{\sigma^2}}\right) = P(\chi^2_{14} < 16'5) =$

$1 - P(\chi^2_{14} > 16'5) \simeq 1 - 0'30 = 0'70$

De manera exacta $1 - 0'2838 = 0'7162$

(B) $\bar{x} = 4'6 \quad S_x = 2'154 \quad n = 5$

$P(-k < t_4 < k) = 1 - \alpha = \gamma = 0'90 \Rightarrow P(t_4 > k) = \frac{\alpha}{2} = 0'05 \Rightarrow k = 2'132$

$$P\left[4'6 - 2'132 \cdot \frac{\sqrt{\frac{5 \cdot 2'154^2}{4}}}{\sqrt{5}} \leq \mu \leq 4'6 + 2'132 \frac{\sqrt{\frac{5 \cdot 2'154^2}{4}}}{\sqrt{5}}\right] = 0'90$$

$[2'3; 6'9]$

PROBLEMA 3

(A) $\bar{x} = 10 \quad S_x^2 = 16 \quad n = 17$

$P(-k < t_{16} < k) = 0'95 = 1 - \alpha = \gamma \Rightarrow P(t_{16} > k) = \frac{\alpha}{2} = 0'025 \Rightarrow k = 2'12$

$$P\left[10 - 2'12 \frac{\sqrt{\frac{17 \cdot 16}{16}}}{\sqrt{17}} \leq \mu \leq 10 + 2'12 \frac{\sqrt{\frac{17 \cdot 16}{16}}}{\sqrt{17}}\right] = 0'95$$

$[7'88; 12'12]$

(B) $P(K_1 \le \chi^2_{16} \le K_2) = 1-\alpha = \gamma = 0'95 \Rightarrow P(\chi^2_{16} \le K_1) = \frac{\alpha}{2} = 0'025 \Rightarrow K_1 = 6'908$

$P(\chi^2_{16} \geq K_2) = \frac{\alpha}{2} = 0'025 \Rightarrow K_2 = 28'845$

$$P\left[\frac{17 \cdot 16}{28'845} \le \sigma^2 \le \frac{17 \cdot 16}{6'908}\right] = 0'95$$

$$[9'43 ; 39'37]$$

PROBLEMA 4

$\bar{x} = 14'35 \qquad \sigma = 6 \qquad n = 100$

$P(-K \le N(0,1) \le K) = 1-\alpha = \gamma = 0'99 \Rightarrow P(N(0,1) > K) = \frac{\alpha}{2} = 0'005 \Rightarrow K = 2'575$

$$P\left[14'35 - 2'57 \cdot \frac{6}{\sqrt{100}} \le \mu \le 14'35 + 2'57 \frac{6}{\sqrt{100}}\right] = 0'99$$

$$[12'81 ; 15'89]$$

PROBLEMA 5

$\sigma = 2 \qquad \gamma = 0'95 \qquad e = 0'2$

$P(-K \le N(0,1) \le K) = 1-\alpha = \gamma = 0'95$

$P(N(0,1) \geq K) = \frac{\alpha}{2} = 0'025 \Rightarrow K = 1'96$

$$P\left[\bar{x} - K\frac{\sigma}{\sqrt{n}} \le \mu \le \bar{x} + K\frac{\sigma}{\sqrt{n}}\right] = \gamma$$

$\text{error}(e) = K\frac{\sigma}{\sqrt{n}} \Rightarrow n = \frac{K^2\sigma^2}{e^2} = \frac{1'96^2 \cdot 2^2}{0'2^2} = 384'16 \simeq 384$