1. Se tiene

$\sigma^2 = 1.4 \quad n = 20$

$P(a < \sigma^2 < b) = 0.95$

Usamos el teorema de Limite central

$50\% = 0.5$

$P(a < 1.4 < b) = 0.95$

$P\left(-\frac{0.5\sqrt{20}}{1.4} < z < \frac{0.5\sqrt{20}}{1.4} \right) = 0.95$

$P(-1.59 < \cancel{a} < 1.59)$

$\boxed{a = -1.59 \quad b = 1.59}$

L

2 - Sabemos que

$$S^2 = \frac{1}{n(n-1)}\left[n\sum_{i=1}^{n} x_i^2 - \left(\sum_{i=1}^{n} x_i\right)^2 \right]$$

Tenemos que $1.9^2 + 2.4^2 + 3.0^2 + 3.5^2 + 4.2^2 = 48.26$

y $(1.9 + 2.4 + 3 + 3.5 + 4.2)^2 = 15^2 = 225$

con $n = 5$

$$\rightarrow \quad S^2 = \left(\frac{1}{5(4)}\right) 5(48.26) - 225$$

$$= \frac{163}{20(10)} = \frac{163}{200} = \boxed{0.815}$$

entonces $\chi^2 = \frac{4 \cdot 0.815}{1} = \boxed{3.26}$

desviación de 1

$\sigma^2 = 1$ cae dentro del marco, por lo que desviación estandar de 1 año es correcto

ellllllllll

3

3 - Con la tabla t notamos

que $t_{0.05} = 1.711$ con 24 grados libertad

Tomando $\mu = 500$

$$T = \frac{\bar{x} - \mu}{S / \sqrt{n}}$$

Tenemos $\bar{x} = 518$ $\mu = 500$ $s = 40$ $n = 25$

$$T = \frac{518 - 500}{40 / \sqrt{25}} = \frac{18}{8} = \boxed{2.25}$$

Como $2.25 > 1.711 \Rightarrow$ el proceso es eficaz

4-

$$s^2 = \sum_{i=1}^{n} \frac{(x_i-\bar{x})^2}{n-1} \qquad s = \sqrt{s^2}$$

$$\bar{x}_1 = (19.8 + 12.7 + 13.2 + 16.9 + 10.6 + 19.8 + 11.1 + 14.3 + 17 + 12.5)/10 = \boxed{14.69}$$

$$\bar{x}_2 = (24.9 + 22.8 + 23.6 + 22.1 + 20.4 + 21.6 + 21.8 + 22.5)/8 = \boxed{22.4625}$$

$$t = \frac{\bar{x}_1 - \bar{x}_2}{s\sqrt{\frac{1}{n_1}+\frac{1}{n_2}}} = \frac{14.69 - 22.4625}{s\sqrt{\frac{1}{10}+\frac{1}{8}}}$$

$$= \frac{-16.385}{s_p}$$

$$s_p^2 = \frac{9 \cdot s_1^2 + 7 \cdot s_1^2}{10+8-2} = \frac{9(10.9) + 7(1.73)}{16} = 6.89$$

$$s = \sqrt{6.89} = \boxed{2.62}$$

$$s_1^2 = \sum_{i=1}^{10} \frac{(x^i - \bar{x})^2}{n-1} = 10.9$$

Por lo que

$$t = \frac{-16.385}{2.62} = -6.24$$

$$s_2^2 = \sum_{i=1}^{8} \frac{(x_i-\bar{x})^2}{n-1} = 1.73$$

Con 90% existe diferencia significativa

5- Notamos que es distribución F

donde $P(F \leq 4.89) = ?$ con tabla

$$\frac{10}{12} \leq 4.89 = \boxed{0.9928}$$

6 = Distribución F donde

$$F = \left[\frac{s_1}{s_2}\right]^2 \left(\frac{\sigma_2}{\sigma_1}\right)^2 = 1.89$$

con $F = 1.89$

Con la tabla notamos que $\frac{s_1}{s_2} < 1.26 = 0.95$

por lo que $P\left(\frac{s_1}{s_2} > 1.26\right) = 1 - 0.95 = \boxed{0.05}$

7. TLC

$$0.95 = \frac{x - \mu}{\frac{9}{\sqrt{n}}} = \frac{19.9 - 20.1}{\frac{9}{\sqrt{n}}} = \frac{-\frac{1}{5}}{\frac{9}{\sqrt{n}}}$$

$$= \frac{-\sqrt{n}}{45} = 0.95$$

$$\sqrt{n} = -(.95 \cdot 45) = -\frac{171}{4} \quad n = 6.5$$