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9.

(1) $\bar{x} = \frac{56}{6} = 14.33 \quad n-1=5$

σ之点估計值 $= \sqrt{\frac{(15^2+18^2+9^2+13^2+17^2+14^2)-6\times14.33^2}{5}}$

$= \sqrt{\frac{1284-1232.1}{5}} = \sqrt{10.38} = 3.22$ ✱

(2) $1-\alpha = 0.90 \quad \frac{\alpha}{2} = 0.05$

$\chi^2_{0.05}(5) = 11.07$

$\chi^2_{1-0.05}(5) = \chi^2_{0.95}(5) = 1.15$

$\left[\sqrt{\frac{5\times10.38}{\chi^2_{0.05}(5)}}, \sqrt{\frac{5\times10.38}{\chi^2_{0.95}(5)}}\right] = \left[\sqrt{\frac{51.9}{11.07}}, \sqrt{\frac{51.9}{1.15}}\right]$

$= (2.17, 6.72)$ ✱

20.

$n_1 = 9 \quad \bar{x} = 7.67 \quad S_1 = 9.27$

$n_2 = 9 \quad \bar{x} = 6.78 \quad S_2 = 21.15$

(1) $\sigma_1^2 \neq \sigma_2^2$

$$V = \frac{\left(\frac{9.27^2}{9} + \frac{21.15^2}{9}\right)}{\frac{\left(\frac{9.27^2}{9}\right)}{8} + \frac{\left(\frac{21.15^2}{9}\right)}{8}} = 10.96$$

∴ $\mu_1 - \mu_2$ 之95%信賴區間

$(7.67-6.78) \pm t_{0.025}(11)\sqrt{\frac{9.27^2}{9} + \frac{21.15^2}{9}}$

$= 0.89 \pm 2.201 \times 7.70$

$= 0.89 \pm 16.95$

$= (-16.06, 17.84)$ ✱

20.

(2) $1-\alpha = 0.90 \quad \chi^2_{\frac{\alpha}{2}}(n_1-1) = \chi^2_{0.05}(8) = 15.51$

$\chi^2_{1-\frac{\alpha}{2}}(n_1-1) = \chi^2_{0.95}(8) = 2.73$

σ_1 之90%信賴區間

$\left(\sqrt{\frac{8\times9.27^2}{\chi^2_{0.05}(8)}}, \sqrt{\frac{8\times9.27^2}{\chi^2_{0.95}(8)}}\right) = (6.66, 15.87)$

(3) $1-\alpha = 0.90 \quad F_{0.05}(8,8) = 3.44$

$F_{0.95}(8,8) = 0.29$

$\left[\frac{9.27^2}{21.15^2} \times \frac{1}{3.44}, \frac{9.27^2}{21.15^2} \times \frac{1}{0.29}\right]$

$= (0.06, 0.66)$ ✱