20. $1-\alpha = 0.9$, $\chi^2_{\frac{\alpha}{2}}(n_1-1) = \chi^2_{0.05}(8) = 15.51$

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

$$\left(\sqrt{\frac{8\times 9.27^2}{\chi^2_{0.05}(8)}}, \sqrt{\frac{8\times 9.27^2}{\chi^2_{0.95}(8)}}\right) = \left(\sqrt{\frac{687.46}{15.51}}, \sqrt{\frac{687.46}{2.73}}\right)$$

$= (6.66, 15.87)$

$1-\alpha = 0.9$

13) $F_{\frac{\alpha}{2}}(n_1-1, n_2-1) = F_{0.05}(8,8) = 3.44$

$F_{1-\frac{\alpha}{2}}(n_1-1, n_2-1) = F_{0.95}(8,8)$

$$= \frac{1}{F_{0.05}(8,8)} = 0.29$$

$$\therefore \left(\frac{S_1^2}{S_2^2} \times \frac{1}{F_{\frac{\alpha}{2}}(n_1-1, n_2-1)}, \frac{S_1^2}{S_2^2} \times \frac{1}{F_{1-\frac{\alpha}{2}}(n_1-1, n_2-1)}\right)$$

$$= \left(\frac{9.27^2}{21.15^2} \times \frac{1}{3.44}, \frac{9.27^2}{21.15^2} \times \frac{1}{0.29}\right)$$

$= (0.06, 0.66)$