

$$1. (1) t_{0.025}(10) = 2.228$$

$$(2) t_{0.95}(8) = -1.86$$

$$(3) \chi^2_{0.05}(12) = 21.026$$

$$(4) \chi^2_{\alpha}(15) = 7.26$$

$$\Rightarrow \alpha = 0.95$$

$$(5) \chi^2_{0.95}(10) = 3.940$$

$$(6) F_{0.05}(5,8) = 3.69$$

$$(7) F_{0.95}(6,7)$$

$$= \frac{1}{F_{0.05}(7,6)} = \frac{1}{4.21} = 0.238$$

$$(8) F_{\alpha}(6,6) = 4.28$$

$$\alpha = 0.05$$

$$21. (1) \hat{p} = \frac{105}{250} = 0.42$$

$$0.42 \pm Z_{0.05} \sqrt{\frac{0.42 \times 0.58}{250}}$$

$$= 0.42 \pm 1.645 \times 0.03$$

$$= 0.42 \pm 0.05 \Rightarrow (0.37, 0.47)$$

(2-a)

$$\hat{p} = 0.3, e = 0.03, 1 - \alpha = 0.95$$

$$e = \frac{\hat{p}}{n} \times Z$$

$$n = \left(\frac{\hat{p}}{e}\right)^2 \times Z^2$$

$$n = \left(\frac{0.3}{0.03}\right)^2 \times 0.3 \times 0.7 = 896.37 \approx 897$$

$$7. (1) \hat{p} = \frac{45}{80} = 0.56$$

$$(2) Z_{\frac{\alpha}{2}} \sqrt{\frac{\hat{p}(1-\hat{p})}{n}} = Z_{0.025} \sqrt{\frac{0.56 \times 0.44}{80}} \\ = 1.96 \times 0.06 = 0.12$$

$$(3) \hat{p} \pm Z_{\frac{\alpha}{2}} \sqrt{\frac{\hat{p}(1-\hat{p})}{n}} \\ = 0.56 \pm 1.645 \times 0.06 \\ \Rightarrow (0.46, 0.66)$$

$$8. \hat{p}_1 = 0.55, \hat{p}_2 = 0.6$$

$$(\hat{p}_1 - \hat{p}_2) \pm Z_{\frac{\alpha}{2}} \sqrt{\frac{\hat{p}_1(1-\hat{p}_1)}{n_1} + \frac{\hat{p}_2(1-\hat{p}_2)}{n_2}}$$

$$\Rightarrow (0.55 - 0.6) \pm Z_{0.025} \sqrt{\frac{0.55 \times 0.45}{100} + \frac{0.6 \times 0.4}{100}} \\ = -0.05 \pm 1.96 \times 0.07$$

$$= -0.05 \pm 0.14 \Rightarrow (-0.19, 0.29)$$

(2-b)

$$\hat{p} = 0.42, n = \left(\frac{1.96}{0.03}\right)^2 \times 0.42 \times 0.58 = 1039.79 \\ \approx 1040$$

(2-c)

$$\hat{p} = 0.5$$

$$n = \left(\frac{1.96}{0.03}\right)^2 \times 0.5 \times 0.5$$

$$= 1067.11 \approx 1068$$