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

(2) $t_{0.75}(8) = -t_{0.25} = -0.86$

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

(4) $\alpha = 0.75$

(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) $F_\alpha(6,6) = 4.28$
$\alpha = 0.05$

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

(2) $z_{\frac{\alpha}{2}}\sqrt{\frac{\hat{p}(1-\hat{p})}{n}} = z_{0.025}\sqrt{\frac{0.56\times0.44}{80}}$
$= 1.96 \times 0.06$
$= 0.12$

(3) $\hat{p} \pm z_{\frac{\alpha}{2}}\sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$
$= 0.56 \pm z_{0.05}\sqrt{\frac{0.56\times0.44}{50}}$
$= 0.56 \pm 1.645 \times 0.06$
$= 0.56 \pm 0.1$
$= (0.46, 0.66)$

8. $\hat{p}_1 = 0.55$ $\hat{p}_2 = 0.6$
$(\hat{p}_1 - \hat{p}_2) \pm z_{\frac{\alpha}{2}}\sqrt{\frac{\hat{p}_1(1-\hat{p}_1)}{n_1} + \frac{\hat{p}_2(1-\hat{p}_2)}{n_2}}$
$= (0.55 - 0.6) \pm z_{0.025}\sqrt{\frac{0.55\times0.45}{100} + \frac{0.6\times0.4}{100}}$
$= -0.05 \pm 1.96 \times 0.07$
$= -0.05 \pm 0.14$

(1) $\hat{p} = \frac{105}{250} = 0.42$
$0.42 \pm z_{0.05}\sqrt{\frac{0.42\times0.58}{250}}$
$= 0.42 \pm 1.645 \times 0.03$
$= 0.42 \pm 0.05$
$\Rightarrow (0.37, 0.47)$

(1) $\hat{p} = 0.3$ $e = 0.03$ $1-\alpha = 0.95$
$e = \frac{\sigma}{\sqrt{n}} \times z$
$n = (\frac{z}{e})^2 \times \hat{p} \times (1-\hat{p})$
$n = (\frac{1.96}{0.03})^2 \times 0.3 \times 0.7$
$\doteq 896.37 \doteq 897$

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

(3) $\hat{p} = 0.5$
$n = (\frac{1.96}{0.03})^2 \times 0.5 \times 0.5 = 1067.11 \doteq 1068$

2. $e = \frac{\sigma}{\sqrt{n}} \times z_{\frac{\alpha}{2}}$

(1) $\sigma = 3$ $e = 0.5$ $\alpha = 1-0.95$
$n = (\frac{3}{0.5})^2 \times 1.96^2$
$= 138.3 \doteq 139$

(2) $\sigma = 0.2$ $e = 0.03$ $1-\alpha = 0.9$
$n = [\frac{0.2}{0.03}]^2 \times 1.645^2 = 120.21 \doteq 121$

(3) $\sigma = 0.05$ $e = 0.02$ $1-\alpha = 0.98$
$n = (\frac{0.05}{0.02})^2 \times 2.326^2 = 33.8 \doteq 34$

$1250 \pm z_{0.025}\sqrt{\frac{14^2}{150}}$
$= 1250 \pm 25.05$
$= (1224.95, 1275.05)$

10. (1) $\mu_1 - \mu_2 = \bar{x} - \bar{y} = 85 - 75 = 7$

(2) $7 \pm 1.645 \cdot \sqrt{\frac{15^2}{50} + \frac{14^2}{40}}$
$= 7 \pm 1.645 \times 2.59$
$= 7 \pm 4.26$