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B 2.

$$e = \frac{\sigma}{2n} \times Z \frac{\alpha}{2}$$

(1)

$$\sigma = 3 \quad e = 0.15 \quad 1 - \alpha = 0.95$$

$$n = \left(\frac{3}{0.15} \right)^2 \times 1.96^2 = 138.13 \approx 139$$

(2)

$$\sigma = 0.12 \quad e = 0.103 \quad 1 - \alpha = 0.9$$

$$n = \left(\frac{0.12}{0.103} \right)^2 \times 1.645^2 = 120.27 \approx 121$$

(3)

$$\sigma = 0.105 \quad e = 0.02 \quad 1 - \alpha = 0.98$$

$$n = \left(\frac{0.105}{0.02} \right)^2 \times 2.31^2 = 33.8 \approx 34$$

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B 6.

$$1250 \pm z_{0.025} \sqrt{\frac{140^2}{120}}$$

$$= 1250 \pm 25.105 = (1224.95, 1275.05)$$

10.

$$(1) 85 - 78 = 7$$

$$(2) 7 \pm 1.645 \sqrt{\frac{154}{80} + \frac{146}{40}}$$

$$= 7 \pm 1.645 \times 2.59$$

$$= 7 \pm 4.26$$

(2.74, 11.26)

11.

$$n = 250, 105$$

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

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

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

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

$$(2) (a) \hat{p} = 0.3, e = 0.03, 1 - \alpha = 0.95$$

$$e = \frac{z}{\sqrt{n}} \times z$$

$$n = \left(\frac{z}{e}\right)^2 \times \hat{p} \times (1 - \hat{p})$$

$$= \left(\frac{1.96}{0.03}\right)^2 \times 0.3 \times 0.7 = \frac{896.37}{0.21} = 4268.43$$

(b)

$$\hat{p} = 0.42$$

$$n = \left(\frac{1.96}{0.03} \right)^2 \times 0.42 \times 0.58 = 1039.29$$

$$\approx 1040$$

(c) $\hat{p} = 0.5$

$$n = \left(\frac{1.96}{0.03} \right)^2 \times 0.5 \times 0.5 = 1067.11 \approx 1068$$

P. 229. 習 7.

(1) $n = 80$, 45 有兼差.

$$\frac{45}{80} = 0.56$$

(2) $z_{\frac{\alpha}{2}} \sqrt{\frac{(1-\hat{p})\hat{p}}{n}}$

$$= z_{0.025} \sqrt{\frac{0.44 \times 0.56}{80}} = 1.96 \times 0.06 = 0.12$$

(3) $\hat{p} \pm z_{\frac{\alpha}{2}} \sqrt{\frac{\hat{p}(1-\hat{p})}{n}} = 0.56 \pm z_{0.05} \sqrt{\frac{0.56 \times 0.44}{80}}$

$$= 0.56 \pm 1.645 \times 0.06 = 0.56 \pm 0.1$$

$$= (0.46, 0.66)$$

7.8.

$$\hat{p}_1 = 0.155$$

$$\hat{p}_2 = 0.16$$

$$\begin{aligned} & (\hat{p}_1 - \hat{p}_2) \pm z_{\frac{\alpha}{2}} \sqrt{\frac{\hat{p}_1(1-\hat{p}_1)}{n} + \frac{\hat{p}_2(1-\hat{p}_2)}{n}} \\ & = (0.155 - 0.16) \pm z_{0.025} \sqrt{\frac{0.155 \times 0.145}{100} + \frac{0.16 \times 0.14}{100}} \\ & = -0.005 \pm 1.96 \times 0.007 \\ & = -0.005 \pm 0.014 = (-0.019, 0.009) \end{aligned}$$

$p > 28$, $\frac{2}{1}$

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

$$(2) t_{0.95}(8) = -t_{0.05}(8) = -1.86$$

$$(3) \chi^2_{0.05}(12) = 21.03$$

$$(4) \chi^2_{\frac{\alpha}{2}}(15) = 7.26 \quad \alpha = 0.15$$

$$(5) \chi^2_{0.95}(10) = 3.94$$

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

$$(7) F_{0.95}(6, 7) = \frac{1}{F_{0.05}(7, 6)} = \frac{1}{4.21} = 0.238$$

$$(8) F_{\alpha}(6, 6) = 4.28, \quad \alpha = 0.05.$$