3. $n=10$ $\bar{x}=13.63$ $S=6.05$ $n-1=9$ $1-\alpha=0.98$ $\frac{\alpha}{2}=0.01$

$$\bar{x} \pm t_{\frac{\alpha}{2}}(n-1)\frac{S}{\sqrt{n}} = 13.63 \pm t_{0.01}(n)\frac{6.05}{\sqrt{10}}$$

$$= 13.63 \pm 2.827 \times 1.91$$

$$= 13.63 \pm 5.39 \qquad (8.24, 19.02)$$

4. (1) $n=1200$, $\hat{p}=0.33$ $1-\alpha=0.98$

$$0.33 \pm Z_{\frac{\alpha}{2}}\sqrt{\frac{p(1-p)}{n}}$$

$$= 0.33 \pm 2.329 \times \sqrt{\frac{0.33 \times 0.67}{1206}} = 0.33 \pm 0.3 = (0.30, 0.36)$$

(2) $n=820$ $x_1=650$ $\hat{p}=\frac{650}{820}=0.79$

$1-\alpha=0.95$ $\frac{\alpha}{2}=0.025$

$$0.79 \pm 1.96\sqrt{\frac{0.78 \times 0.21}{820}} = 0.79 \pm 1.96 \times 0.014$$

$$= 0.79 \pm 0.03 = (0.76, 0.82)$$

14. (1) $n=15$ $\bar{x}=1.73$ $S=0.8$ $1-\alpha=0.95$ $t_{\frac{\alpha}{2}}(n-1)=t_{0.025}(14)=2.145$

$$1.73 \pm t_{0.025}(14)\frac{0.8}{\sqrt{15}} = 1.73 \pm 0.44 = (1.29, 2.17)$$

(2) $1.73 \pm t_{0.10}(14)\frac{0.8}{\sqrt{15}}$

$$= 1.73 \pm 1.345\frac{0.8}{\sqrt{15}}$$

$$= 1.73 \pm 0.28$$

$$= (1.45, 2.01)$$