HW 8 key answer

1 $\hat{p} = \frac{250}{1000} = 0.25$

90% upper C.I $= p \leq \hat{p} + z_{1-\alpha}\sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$ " a simple C.I "

$$\Rightarrow p \leq 0.25 + 1.29\sqrt{\frac{0.25(.75)}{1000}} \Rightarrow p \leq 0.268$$

2

a. $\mu \in \bar{X} \mp z_{\alpha/2} \cdot \frac{s}{\sqrt{n}} \Rightarrow \mu \in \left[135.39 \mp 1.96 \frac{4.89}{\sqrt{153}}\right] \Rightarrow \mu \in [\quad]$

b. what, we have here is a large sample C.I. we have for large $\frac{\bar{X}-\mu}{s/\sqrt{n}}$ approximately normal $(0,1)$

3 $n = 14$ $\bar{x} = 8.48$ $s = 0.79$

a. 95% C.I $\Rightarrow \mu \in \left[\bar{x} \mp t_{\alpha/2, n-1} \frac{s}{\sqrt{n}}\right] \Rightarrow \mu \in \left[8.48 \mp 2.145 \frac{0.79}{\sqrt{14}}\right] = [8.03, 8.93]$

we need To assume That The sample came from a population with normal Dis

b. $\mu \in \left[\bar{x} \pm t_{\alpha/2, n-1}\, s\sqrt{1+\frac{1}{n}}\right] \Rightarrow \mu \in \left[8.48 \mp 2.145(0.79)\sqrt{1+\frac{1}{14}}\right] = [6.76, 10.234]$

4 $n = 9$ $s = 2.81$ $\Rightarrow \sigma^2 \in \left[\frac{(n-1)s^2}{\chi^2_{0.025, 8}}, \frac{(n-1)s^2}{\chi^2_{0.975, 8}}\right] = \left[\frac{8 \times (2.81)^2}{17.534}, \frac{8 \times (2.81)^2}{2.18}\right]$

$= (3.601, 28.977) \Rightarrow \sigma \in (\sqrt{3.601}, \sqrt{28.977}) = (1.898, 5.38)$