Q4 (Ex 23, pg 400)

a) $\hat{p} \pm z_{\alpha/2} \sqrt{\hat{p}(1-\hat{p})/n}$

$\hat{p} = \dfrac{x}{n} = \dfrac{24}{37} = 0.65$ $\alpha = 0.1 \Rightarrow z_{\alpha/2} = -1.65$

$0.65 + \sqrt{\dfrac{0.65(1-0.65)}{37}} = 0.73$

$0.65 - \sqrt{\dfrac{0.65(1-0.65)}{37}} = .57$

The 90% CI for p is $(0.57, 0.73)$

b) width $w = 2z_{\alpha/2}\sqrt{\dfrac{\hat{p}(1-\hat{p})}{n}} \Rightarrow n = \dfrac{4\hat{p}(1-\hat{p})z_{\alpha/2}^2}{w^2}$

$n = \dfrac{4\left(\frac{24}{37}\right)\left(1-\frac{24}{37}\right)(-1.65)^2}{0.1^2} = 248.19$

The sample size would need to be
at least 249.