

STAT 341 - Elizabeth Thompson
Homework 8 Solutions

LM 5.3.1, 5.3.10, 5.3.23

(5.3.1) The confidence interval is

$$\left(\bar{y} - z_{\alpha/2} \frac{\sigma}{\sqrt{n}}, \bar{y} + z_{\alpha/2} \frac{\sigma}{\sqrt{n}} \right)$$
$$\left(0.766 - 1.96 \frac{0.09}{\sqrt{19}}, 0.766 + 1.96 \frac{0.09}{\sqrt{19}} \right) = (0.726, 0.806)$$

The CI contains the value of 0.80, so it is believable.

(5.3.10) Let p be the probability that a viewer would watch less than a quarter of the advertisements during Super Bowl XXIX. The confidence interval for p is

$$\left(\frac{281}{1015} - 1.64 \sqrt{\frac{(281/1015)(1 - 281/1015)}{1015}}, \frac{281}{1015} + 1.64 \sqrt{\frac{(281/1015)(1 - 281/1015)}{1015}} \right)$$
$$= (0.254, 0.300)$$

(5.3.23) Using Theorem 5.3.2:

Case 1: n is the smallest integer greater than

$$\frac{z_{.04/2}^2}{4(0.05)^2} = \frac{2.05^2}{4(0.05)^2} = 420.25$$

so take $n = 421$.

Case 2:

$$\frac{z_{.08/2}^2}{4(0.04)^2} = \frac{1.75^2}{4(0.04)^2} = 478.5$$

so take $n = 479$. Case 2 requires the larger sample size.