STA 771S: Mock grading

6.12   (7 points)

(a) **(1)** 48% is a sample statistic, it's the observed sample proportion.

(b) **(3 - 1 for SE, 1 for CI, 1 for interpretation)** A 95% confidence interval can be calculated as follows:

$$\hat{p} \pm z^{\star}\sqrt{\frac{\hat{p}(1-\hat{p})}{n}} = 0.48 \pm 1.96\sqrt{\frac{0.48 \times (1 - 0.48)}{1,259}}$$

$$= 0.48 \pm 1.96 \times 0.014$$

$$= 0.48 \pm 0.0274$$

$$(0.4526, 0.5074)$$

We are 95% confident that approximately 45% to 51% of Americans think marijuana should be legalized.

(c) **(2 - 1 for indep, 1 for S/F, 1 for therefore sampling dist normal)**

1. Independence: The sample is random, and comprises less than 10% of the American population, therefore we can assume that the individuals in this sample are independent of each other

2. Success-failure: The number of successes (people who said marijuana should be legalized: $1259 \times 0.48 = 604.32$) and failures (people who said it shouldn't be: $1259 \times 0.52 = 654.68$) are both greater than 10, therefore the success-failure condition is met as well.

Therefore the distribution of the sample proportion is expected to be approximately normal.

(d) **(1 - explanation required)** No, the interval contains 50%, suggesting that the true population proportion could be 50%, or even lower. Using this interval we wouldn't reject a null hypothesis where $p = 0.50$.