Group Work - Chapter 7

1 Suppose it is known that 45% of the general population believes that correlation implies causation.

(a) A survey taken of 60 students after completing a statistics course finds that 32% of them believe that correlation implies causation. Find a 95% confidence interval of the population proportion of students who have completed a statistics course who believe that correlation implies causation. Write it in both interval notation, (L, U) or $L < p < U$, and in $\hat{p} \pm ME$ notation.

(b) Is the proportion of students who have completed a statistics course who believe that correlation implies causation different than the general population at a $\alpha = 0.05$ significance level? Did the statistics courses cause the difference, if it exists?

(c) If we wanted to known the population proportion of students who have completed a statistics course who believe that correlation implies causation within plus/minus 3% with 90% confidence, what sample size would be needed for a survey? Calculate with both unknown sample proportion and with proportion found in the earlier survey in part (a).

2 Suppose winter daily maximum temperatures in Minnesota are known to be normally distributed with a standard deviation 12.5 ˚F.

(a) A random sample of 16 winter day maximum temperatures has a sample mean of 14.3 ˚F. What is 90% confidence interval for the population mean maximum temperature? Write it in both interval notation, (L, U) or $L < \mu < U$, and in $\bar{x} \pm ME$ notation.

(b) Suppose the file "max_temps_dec17.csv" represents a random sample of max temperatures in December. What is a 99% confidence interval based on this sample? (Don't have to write both forms.) Is the mean maximum December temperature different than the mean max winter temperature 14.3 ˚F as found in part (a) at a significance level of $\alpha = 0.01$?

(c) If we wanted to find the mean winter maximum temperature within plus/minus 1.5 ˚F with 95% confidence, how many days would need to be sampled?