1. You would like to start an Internet Service Provider and need to estimate the average internet usage of households during one week for your business plan. **How many households must you select** to be 95% sure that the sample mean is within 1 minute (E=1) of the population mean? Assume a previous survey of household usage has shown that sigma=6.95 minutes.

**Solution:**

Solve for n.

Sigma hat (estimated standard deviation) = 6.95 min

E (margin of error) = 1

Confidence = 95%

Z\* = 1.96

n = [1.96 (6.95)/1 ]^2 = 185.56 = rounded to 186

(note: “ ^2 ” denotes the expression is squared)

1. You are interested in how long it takes to get your food at a take-out restaurant (the time it takes from placing your order to when the food arrives). Over the next month you decide to sample 20 times to determine the actual average. You find that x-bar=15.8 minutes and s=2.5 minutes. **Find the 95% Confidence interval** for the true mean.

**Solution:**

Xbar = 15.8

s = 2.5

n = 20

small sample size = use t-test

t\* at 95% = 2.093 with df= n-1= 19

Upper limit = xbar + t\* (s/ squareroot of n) = 15.8 + 2.093 (2.5/ sqrt 20) = 16.97

Lower limit = xbar - t\* (s/ squareroot of n) = 15.8 - 2.093 (2.5/ sqrt 20) = 14.63

Confidence interval = (14.63, 16.97)