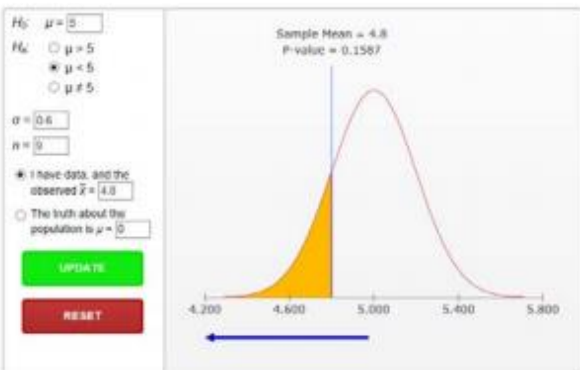
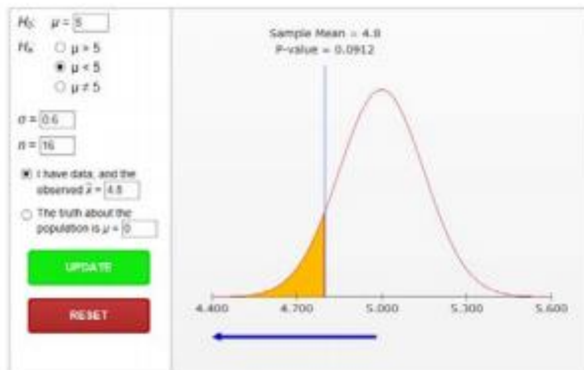
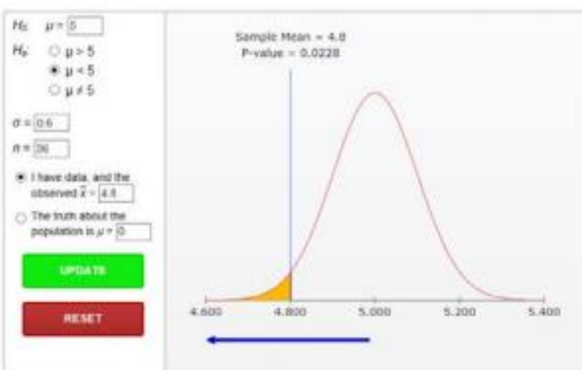
Chapter 18 – Inference in Practice

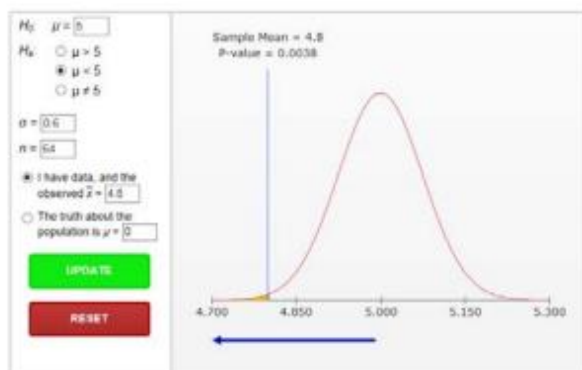
18.2 (a) The 95% confidence interval is $\bar{x} \pm z^* \frac{s}{\sqrt{n}} = 1.92 \pm 1.96 \frac{1.83}{\sqrt{880}} = 1.92 \pm 0.1209 =$ 1.799 to 2.041 motorists. **(b)** The large sample size means that, because of the central limit theorem, the sampling distribution of $\bar{x}$ is roughly Normal even if the distribution of responses is not. **(c)** Only people with listed telephone numbers were represented in the sample, and the low response rate (10.9% = 5,029/45,956) means that even that group may not be well represented by this sample.

18.9 (a) and (b) The results and the curves are shown below. We see that as the sample size increases, the same difference between μ_0 and $\bar{x}$ goes from being not at all significant to highly significant.









18.10 The intervals are given below. Notice that, as the sample size increases, the margin of error becomes smaller. Note we would reject $H_0: \mu = 5$ with a sample size of 36 (or larger) and a two-tailed alternate hypothesis.

n	C.I. Computation	Result
9	$4.8 \pm (1.96)(0.6)/\sqrt{9}$	4.408 to 5.192
16	$4.8 \pm (1.96)(0.6)/\sqrt{16}$	4.506 to 5.094
36	$4.8 \pm (1.96)(0.6)/\sqrt{36}$	4.604 to 4.996
64	$4.8 \pm (1.96)(0.6)/\sqrt{64}$	4.653 to 4.947

18.12 For a margin of error ±1, we need at least $n = \left(\frac{(1.96)(7.5)}{1}\right)^2 = 216.09$, so a sample of size 217 will be needed.

18.13 For a margin of error ±10, we need at least $n = \left(\frac{(1.645)(125)}{10}\right)^2 = 422.82$, so a sample of size 423 will be needed.