10.14 $\frac{1}{\sqrt{n}} = \frac{1}{\sqrt{550}} = .043$, or 4.3%.

10.18 **a.** 90% (See Table 10.1)
b. 95% (or 95.44%)
c. 98%
d. 99%

10.33 At least n =1,112. Solve for n in the equation $\frac{1}{\sqrt{n}} = .03$.

10.42 The professor's class is the entire population of interest and is not a sample from a larger group. A confidence interval is unnecessary because the population value is observed and does not have to be estimated.

10.52 The first step is to tally the number and percent who oppose legalization.

```
>gss=read.table("http://www.stat.psu.edu/~dhunter/220/files
/datasets/ascii/GSS-93.txt", header=T, na.strings="*")
> table(gss[,"marijaun"])  # Note the misspelling

   Legal NotLegal
     234      770
> 770/1004
[1] 0.7669323
```

Thus, p-hat equals .767 (rounded to 3 decimal places).
The "by hand" calculations, done to 3 decimal places, are:

$\hat{p} = .767$

$s.e.(\hat{p}) = \sqrt{\frac{\hat{p}(1-\hat{p})}{n}} = \sqrt{\frac{.767(1-.767)}{1004}} = .013$

$\hat{p} \pm 2 \times s.e.(\hat{p})$ is .767 ± (2×.013), which is .741 to .793.

11.22 **a.** The conditions are met. The sample is a random sample, and the sample size is large enough because np_0 = (20)(.50) = 10, and $n(1-p_0)$ =(20)(1 − .50) = 10.
b. The conditions are not met. The sample size is not large enough because np_0 = (20)(.10) = 2 is smaller than 10.
c. The conditions are not met. A test of hypothesis is not necessary because the all members of the population have been observed. In other words, this is not a random sample from a larger population.
d. The conditions are not met. This is not a random sample of all mall visitors, but instead is a somewhat haphazard convenience sample.

11.43 **a.** The difference is statistically significant. The reported p-value (0.005) is less than .05, the usual standard for significance.

b. This is not a contradiction. There is not much (if any) practical importance to the observed difference in incidence of drowsiness (6% versus 8%), but the large sample sizes led to a *statistically* significant difference.
c. A statistically significant difference indicates that the difference in the population is not zero but does not indicate that it has any practical significance. The meaning should be clarified when the word is used.

11.71 **a.** A frequency tally of the variable ***Seat*** gives the information that $\hat{p}$=139/238 is the proportion of the sample that prefers sitting in the middle. (There are 239 students in the data set, but one student gave no response for this survey question.) These numbers are obtained as follows:

```
>ucd=read.table(http://www.stat.psu.edu/~dhunter/220/files/
datasets/ascii/UCDavis2.na.txt, header=TRUE)
> attach(ucd)
> table(Seat)

  B   F   M
 46  53 139
```

Step 1: H_0: $p \le .5$ (one-half or fewer prefers the middle)
H_a; $p > .5$ (a majority prefers the middle)
p = proportion of population of students who prefer to sit in the middle of the classroom.
Step 2: We assume that the sample is representative of a larger population of students. Concerning sample size, it is large enough so that both np_0 and $n(1-p_0)$ are greater than 10. Here, n =238 and p_0= .5.
Step 2 continued and Step 3: The value of p-hat is 139/238 = .584. Thus, the z-statistic is (.584-.500) / sqrt(.5*.5/238), which equals .084 / .032 = 2.59. The alternative hypothesis tells us that the p-value equals the probability of a Z statistic GREATER than 2.59, which equals 0.005.
Steps 4 and 5: We can reject the null hypothesis at the 0.05 level. The evidence is that a majority of students in the population prefer to sit in the middle of the classroom.
b. There is not really a wrong answer here. But I'd say that the population of interest is all college students, and I have doubts about whether students in a statistics class at a state school in California are truly representative of that population on the question of where they'd like to sit.