Homework 7 Solutions
Chapter 9: #60, 66, 79
Chapter 10: #17, 27, 30a, 42abc

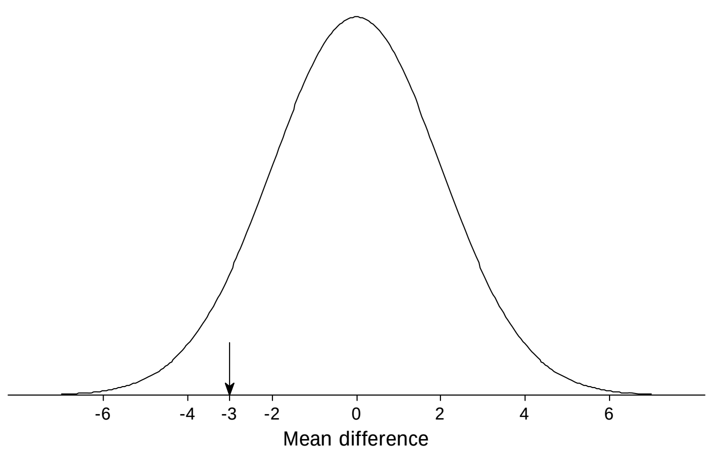
Assigned Monday, November 9

9.60 **a.** Mean = μ = 60 mph; s.d. $(\bar{x}) = \frac{\sigma}{\sqrt{n}} = \frac{6}{\sqrt{36}} = 1$ mph.
b. 58 and 62, calculated as 60 ±(2×1)
c. A sample mean of 66 mph (when n = 36) would not be consistent with the belief that the population mean is 60 mph. It is well outside the range of possible means for 95% of all random samples of n = 36. Another way to answer the question is to find the standardized score for a sample mean of 66. It is z = (66 – 60)/1 = 6; from the "In the extreme" portion of Table A.1 (at bottom of page) the area above a z-score of 6 is .000000001. Clearly this is too unusual for us to believe.

9.66 **a.** The parameter is the difference in population means for independent samples, $\mu_1 - \mu_2$.
b. The parameter is the mean of paired differences, μ_d.
c. The parameter is one population mean, μ.
d. The parameter is the difference in population means for independent samples, $\mu_1 - \mu_2$.
e. The parameter is the mean of paired differences, μ_d.

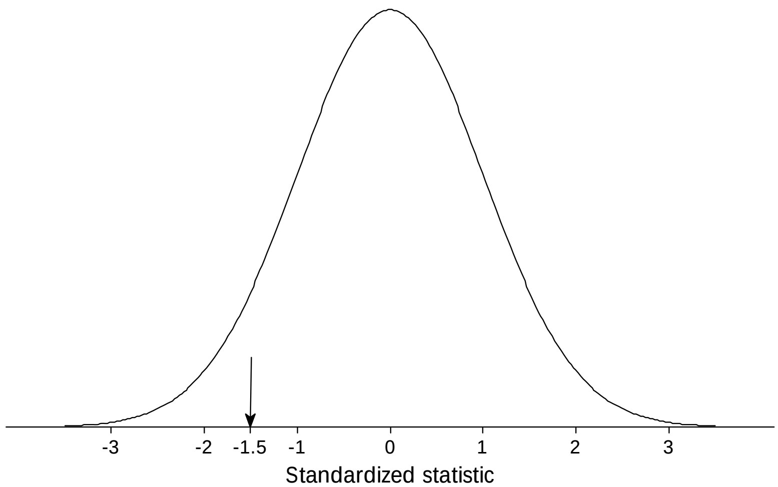
9.79 **a.** The picture is centered on 0 and has standard deviation of 10/5 = 2.

Figure for Exercise 9.79a



b. (−3 − 0)/2 = −1.5.
c. The new picture is centered on 0 and has standard deviation of 1. The location of −1.5 on this picture should be the same as the location of −3 in the picture in part (a). (See next page for picture.)

Figure for Exercise 9.79c



Assigned Friday, November 13

10.17 **a.** $\hat{p}$ = .3 (which is 30% expressed as a proportion)

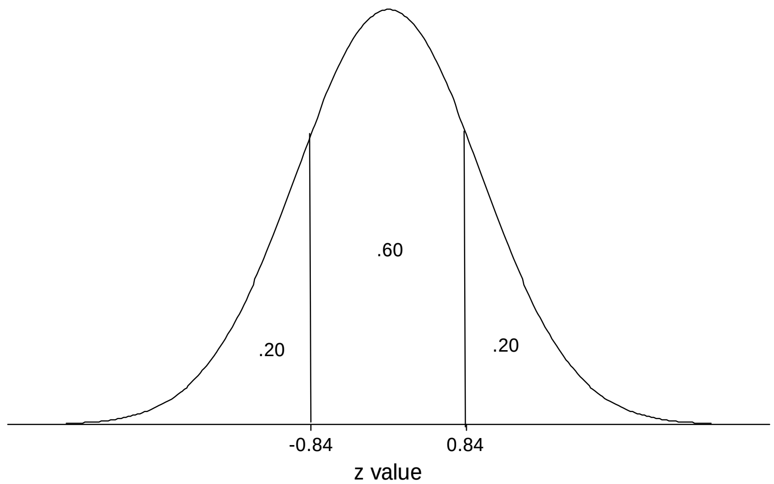
b. $s.e.(\hat{p}) = \sqrt{\frac{\hat{p}(1-\hat{p})}{n}} = \sqrt{\frac{.3(1-.3)}{439}} = ..022$

c. The 95% confidence interval is $\hat{p} \pm 2\, s.e.(\hat{p})$, which is .3 ± 2 × .022 or .256 to .344. With 95% confidence, we can say that between .256 (25.6%) and .344 (34.4%) of American teenagers think their parents are less strict than their friends' parents.

10.27 A necessary condition for using the methods in this chapter is that the number in each category is at least 10 (although some authors say at least 5), and there is only one left-handed person in the sample.
Note: Theoretically, the sample size condition has to do with the expected numbers in the categories. Only slightly more than 10% of humans are left-handed so any sample this small will almost certainly have fewer than 10 left-handed people. The expected number of left-handed people in a sample of n = 15 is only about 1.5, many fewer than the 10 (or 5) required to use the procedures in this Chapter.

10.30 **a.** z^* = 0.84. To find this, use the standard normal curve to find the value z^* such that the probability between $-z^*$ and $+z^*$ is .60. If .60 is the probability between $-z^*$ and $+z^*$, then .20 is the probability to the left of $-z^*$. And, .80 is the probability to the left of $+z^*$ (because .20 is to the right of this value). In Table A.1, look either for .20 or for .80 where the probabilities are given, and determine the corresponding z-value. The figure is shown on the next page.

Figure for Exercise 10.30a



10.42 **a.** In 2000, the proportion opposed was .312 and in 1993 the proportion opposed was .226.

b. $\hat{p}_1 - \hat{p}_2 = .312 - .226 = .086$.

c. The interval is 0.058 to 0.114. With 95% confidence, we can say that the difference between the population proportions opposed in the years 2000 and 1993 was between 0.058 and 0.114. Or, to be more specific, we are 95% confident that the proportion of the population opposed to the death penalty decreased by between .058 and .114 from 1993 to 2000. Equivalently, we are 95% confident that between 5.8% and 11.4% less of the population was opposed to the death penalty in 2000 than in 1993.