Section D: Extending Your Comprehension
(Answers below)

33. Suppose that the 95% confidence interval (not assuming that we know $\sigma$) for a certain $\mu$ is $10.5 \leq \mu \leq 13.5$ and that $n = 16$. Now suppose that $n$ is 32 instead of 16, with all else remaining the same. What is the 95% confidence interval? [Hint: You have enough information; start by finding $\bar{X}$.]

34. Use the $n = 16$ confidence interval in Exercise 33. (a) By eyeball, approximately what is the 99% confidence interval? (b) Compute the 99% confidence interval.

35. The width of the 95% confidence interval in Exercise 33 is 3. What must $n$ be (all else remaining the same) if we wish the width to be 1?

36. (a) Usually a confidence interval when $\sigma$ is known is narrower than the same confidence interval when $\sigma$ is unknown. Why? (b) Is it possible that the $\sigma$-unknown confidence interval is narrower? How?

37. (Exercise 13 continued) Suppose that when you give the report to candidate Harris, she says that the range of possible percentages is too wide to be acceptable. She wants you to give her a result that has the form “best point-estimate plus or minus 1%.” Assuming that you retain the 95% level of confidence and assuming that the percentage favoring Harris remains about .55, how large a sample must you query to satisfy the candidate?

Section E: From the Journals
(Answers below)

38. Folnegovic-Smalc, Folnegovic, and Kulcar (1990) sampled 360 patients from the population of 8069 schizophrenics hospitalized in Croatia, Yugoslavia, between 1962 and 1971. The mean age of onset was found to have the 95% confidence interval 22.9 to 26.7 years: the range was 9 to 48 years. (a) What was the mean age of onset for the 360 patients in this sample? (It can be computed from the confidence interval.) (b) What was the standard error of the mean? (c) Eyeball-estimate the standard deviation of age of onset for this sample using the range method. (d) What was the actual standard deviation of age of onset in this sample (computed from the confidence interval)? (e) Do Folnegovic-Smalc’s results seem reasonable? Why or why not?

Section F: Computer Explorations

39. (a) Use the computer to simulate taking a random sample of size $n = 5$ from the population of IQ scores, where $\mu = 100$ and $\sigma = 15$. Determine the 95% confidence interval. Does the confidence interval contain the point $\mu = 100$? (b) Repeat part (a) 20 times. How often is $\mu$ outside the confidence interval? How often would you expect it to be outside the confidence interval?
40. (a) Enter the values 1, 2, 3, 4, and 5 into a variable. Have the computer determine the mean, the standard deviation, and the 95% confidence interval limits.

(b) Now duplicate those values so that you have ten values: 1, 2, 3, 4, 5, 1, 2, 3, 4, 5. How do the mean, the standard deviation, and the 95% confidence interval limits compare with those in part (a)?

(c) Now duplicate all ten values so that you have 20 values (four replications of 1 through 5). How do the mean, the standard deviation, and the 95% confidence interval limits compare with those you found in parts (a) and (b)?

(d) Now duplicate all 20 values so that you have 40 values (eight replications of 1 through 5). How do the mean, the standard deviation, and the 95% confidence interval limits compare with those you found in parts (a), (b), and (c)?

(e) State a general rule about how the mean, the standard deviation, and the confidence interval limits change as the sample size gets larger but the data stay the same.
Answers to Selected Additional Exercises for Chapter 8

Section D: Extending Comprehension

33. $\bar{X} = 12$, $t_{cv_{df=15}} = 2.131$, $s_{\bar{X}_{df=15}} = .704$, $s = 2.82$, $t_{cv_{df=31}} = 2.040$, $s_{\bar{X}_{n=32}} = .498$, so with 95% confidence $10.98 \leq \mu \leq 13.02$.

34. (b) $9.93 \leq \mu \leq 14.07$

35. $n = 123$

36. (a) Because $z_{cv}$ is smaller than $t_{cv}$
   (b) Yes; if $s$ happens to be smaller than $\sigma$

37. $n = 9513$

Section E: From the Journals

38. (a) 24.8 years
   (b) .97 year
   (c) 6.5 years
   (d) 18.4 years
   (e) No; it seems likely that the reported confidence interval is too wide because the standard deviation as computed from it is too large.