

9. **Cars.** What fraction of cars are made in Japan? The computer output below summarizes the results of a random sample of 50 autos. Explain carefully what it tells you.

```
z-Interval for proportion
With 90.00% confidence,
0.29938661 < p(japan) < 0.46984416
```

17. **Death penalty, again.** In the survey on the death penalty you read about in the chapter, the Gallup Poll actually split the sample at random, asking 538 respondents the question quoted earlier, "Generally speaking, do you believe the death penalty is applied fairly or unfairly in this country today?" The other half were asked "Generally speaking, do you believe the death penalty is applied unfairly or fairly in this country today?" Seems like the same question, but sometimes the order of the choices matters. Suppose that for the second way of phrasing it, only 44% said they thought the death penalty was fairly applied.

- Construct a 95% confidence interval for the true proportion of adults who approve of the way the death penalty is currently applied, according to the responses for this second question.
- Recall that 53% of the respondents in the other random half of the study said that the death penalty is applied fairly. Does a proportion of 0.53 fall inside the confidence interval you just found?

20. **Gambling.** A city ballot includes a local initiative that would legalize gambling. The issue is hotly contested, and two groups decide to conduct polls to predict the outcome. The local newspaper finds that 53% of 1200 randomly selected voters plan to vote "yes," while a college Statistics class finds 54% of 450 randomly selected voters in support. Both groups will create 95% confidence intervals.

- Without finding the confidence intervals, explain which one will have the larger margin of error.
- Find both confidence intervals.
- Which group concludes that the outcome is too close to call? Why?

21. **Rickets.** Vitamin D, whether ingested as a dietary supplement or produced naturally when sunlight falls upon the skin, is essential for strong, healthy bones. The bone disease rickets was largely eliminated in England during the 1950s, but now there is concern that a generation of children more likely to watch TV or play computer games than spend time outdoors is at increased risk. A recent study of 2700 children randomly selected from all parts of England found 20% of them deficient in vitamin D.

- Find a 98% confidence interval.
- Explain carefully what your interval means.
- Explain what "98% confidence" means.

29. **Deer ticks.** Wildlife biologists inspect 153 deer taken by hunters and find 32 of them carrying ticks that test positive for Lyme disease.

- Create a 90% confidence interval for the percentage of deer that may carry such ticks.
- If the scientists want to cut the margin of error in half, how many deer must they inspect?
- What concerns do you have about this sample?

32. **Hiring.** In preparing a report on the economy, we need to estimate the percentage of businesses that plan to hire additional employees in the next 60 days.

- How many randomly selected employers must we contact in order to create an estimate in which we are 98% confident with a margin of error of 5%?
- Suppose we want to reduce the margin of error to 3%. What sample size will suffice?
- Why might it not be worth the effort to try to get an interval with a margin of error of only 1%?

34. **Better hiring info.** Editors of the business report in Exercise 32 are willing to accept a margin of error of 4% but want 99% confidence. How many randomly selected employers will they need to contact?