Chapter 8 Solutions

Quiz 8.1A

1. (a) The point estimate is the sample mean, which is the midpoint of the confidence interval: 0.995 ounces. (b) The margin of error is half the width of the interval: 0.003 ounces. (c) We are 90% confident that the interval from 0.992 to 0.998 ounces captures the true mean weight of Fun-Size candy bars. (d) If this method of constructing an interval were repeated many times, about 90% of the intervals constructed would contain the population mean weight of Fun-Size candy bars. **2.** (a) If our interval has to capture the true mean 98% of the time in repeated samples instead of only 95% of the time, it will have to be wider. (b) If the sample size is larger, the standard deviation of the sampling distribution will be smaller, so the confidence interval will be narrower. (c) It's not possible to adjust the confidence interval to compensate for bias inherent in the data collection methods. The margin of error for a confidence intervals only includes chance variation, not other sources of error like nonresponse.

Quiz 8.1B

1. (a) The point estimate is the sample mean, which is the midpoint of the confidence interval: 124 bushels per acre. (b) The margin of error is half the width of the interval: 6 bushels per acre. (c) We are 99% confident that the interval from 118 to 130 bushels per acre captures the true the mean yield of this variety of corn in all possible plots. (d) If this method of constructing an interval were repeated many times, about 99% of the intervals constructed would contain the population mean yield of this variety of corn in all possible plots.
2. (a) If our interval has to capture the true mean only 90% of the time in repeated samples instead of 95% of the time, an narrower interval can be constructed. (b) If the sample size is larger, the standard deviation of the sampling distribution will be smaller, so the confidence interval will be narrower. (c) It's not possible to adjust the confidence interval to compensate for bias inherent in the data collection methods. The margin of error for a confidence intervals only includes chance variation, not other sources of error like undercoverage.

Quiz 8.1C

1. (a) $\mu_{\bar{x}} = 25; \sigma_{\bar{x}} = \frac{8}{\sqrt{45}} \approx 1.193$. Since $n = 45$, the central limit theorem applies, so the shape of the sampling distribution is approximately Normal. (b) From Table A, 95% of the scores in a Normal distribution are within ±1.96 standard deviations of the mean, so $k = 1.96 \cdot \frac{8}{\sqrt{45}} \approx 2.34$ minutes.

(c) Since $\bar{x}$ will be within ±k minutes of 25 minutes in 95% of samples, $\bar{x} \pm k$ will contain 25 minutes in 95% of samples. **2.** The confidence level can be interpret as the percentage of repeated samples that "capture" the true mean within the interval. **3.** Point estimate = midpoint of interval = 7.7 mm. Margin of error = half of the width of the interval = 0.8 mm. (b) The 99% confidence interval would have to be wider in order to contain the true mean length in 99% of repeated samples, instead of only 95% of samples. (c) Take a larger sample, which will reduce the standard deviation of the sampling distribution and make the interval narrower.

Assignment #8.1c

(10) a) We are 95% confident that the true proportion of U.S. adults who would like to lose weight is between .56 and .62.

b) $\hat{p} = .59$ moe = .03

c) Because all values in the interval are above 50%, there is good evidence that more than 50% of US adults want to lose weight.

(14) Various sampling bias...

(22) e

(24) c