Statistics: Chapter 9 Solutions

Lesson 9.1.1

9-1. The "pooled" proportion is $\frac{506}{600}$, approximately 0.843. Using this value for the null hypothesis in three separate tests: Jermaine: z = –1.297, *p*-value = 0.1947; Aliah: z = 0.259, *p*-value = 0.7953; Tobiah: z = 1.038, *p*-value = 0.2995.

9-2. One possible conclusion might be that all *p*-values were relatively high. There does not seem to be evidence that any group member differs significantly in proportion of paper field goal proportion.

9-3.
a. 2.8257
b. df = 2
c. *p*-value ≈ χ^2cdf(2.8257, 10^99, 2) ≈ 0.2435

9-4.
a. z = 1.065, *p*-value = 0.2869
b. "pooled" proportion = $\frac{332}{400}$ = 0.83
c. $z_j = -0.7529766$, $z_a = 0.7529766$, $\chi^2 = 1.133948$
d. *p*-value = 0.2869 using df = 1
e. The two procedures produced identical *p*-values. It can also be observed that squaring the z-score in part (a) exactly produces the chi-squared statistic in part (c).

9-5. Negative z-scores (in the left tail) and positive z-scores (in the right tail) would have both have positive squares. The process of squaring would make the procedure inherently two-tailed.

9-6. Results of the one proportion significance test: z = 1.291, *p*-value = 0.1967. Chi-squared test: χ^2 = 1.667, *p*-value = 0.1967. The two *p*-values are identical.

9-7.
a. $\frac{7+9+17}{54+58+56} = \frac{33}{168} = 0.1964$
b. –1.236, –0.791, 2.018
c. 6.224, df = 2
d. 0.0445

9-8. a. H_0: $p = 0.8$, H_A: $p < 0.8$

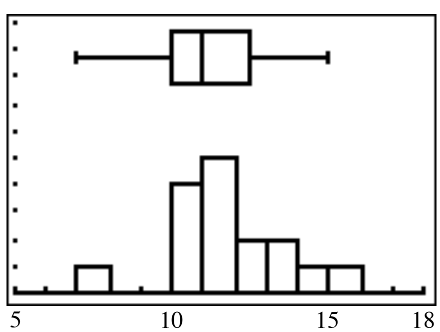
b. one-tail, one proportion z-test

c. The calculated z-value is -2.37, the p-value is 0.0089. Reject the null hypothesis. The manager has a valid claim that no more than 80% of U.S. adults rate their photography skills as good to excellent.

d. Since the null hypothesis was rejected, a Type I error could occur which means you should not have rejected the null hypothesis and the manager's claim (the alternative hypothesis) is not valid.

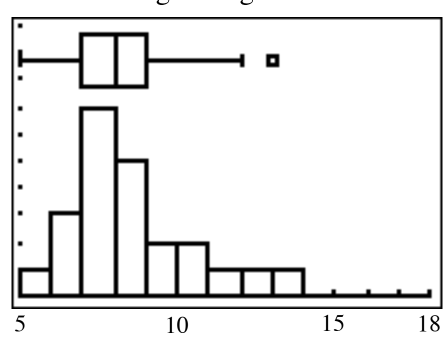
9-9. The median and IQR will be used to compare statistics since mean and standard deviation are not appropriate—both distributions are skewed and one has an outlier. The median age at which low-weight babies start crawling is 11 months, while the median age for average-weight babies is 8 months. See diagrams below. Both distributions are single-peaked and skewed. The low-weight babies appear to have an outlier at 7 months, although the calculator does not identify it as a true outlier. The average-weight babies have an outlier at 13 months. The variability in the crawling age is roughly the same for low-weight babies (IQR is 2.5 months) as for average-weight babies (IQR is 2 months). Low-weight babies have their development delayed by about 3 months. About 75% of low-weight babies have not started crawling at an age when 75% of average-weight babies are already crawling.

Low Weight Babies



Crawling Age (months)

Average Weight Babies



Crawling Age (months)

