Section 7-4

7. df = 39. $\chi_L^2 = 24.433$ (Tech: 23.654) and $\chi_R^2 = 59.342$ (Tech: 58.120).

$$\sqrt{\frac{(n-1)s^2}{\chi_R^2}} < \sigma < \sqrt{\frac{(n-1)s^2}{\chi_L^2}}$$

$$\sqrt{\frac{(40-1)65.2^2}{59.342}} < \sigma < \sqrt{\frac{(40-1)65.2^2}{24.433}}; \text{df} = 40$$

$52.9 < \sigma < 82.4$ (Tech: $53.4 < \sigma < 83.7$)

14. Because traffic conditions vary considerably at different times during the day, the confidence interval is an estimate of the standard deviation of the population of speeds at 3:30 on a weekday, not other times.

$$\sqrt{\frac{(n-1)s^2}{\chi_R^2}} < \sigma < \sqrt{\frac{(n-1)s^2}{\chi_L^2}}$$

$$\sqrt{\frac{(12-1)4.075^2}{19.675}} < \sigma < \sqrt{\frac{(12-1)4.075^2}{4.575}}$$

$2.9 \text{ mi/h} < \sigma < 6.9 \text{ mi/h}$

Section 8-2

3. a. H_0: $\mu = 98.6°\text{F}$

   b. H_1: $\mu \neq 98.6°\text{F}$

   c. Reject the null hypothesis or fail to reject the null hypothesis.

   d. No. In this case, the original claim becomes the null hypothesis. For the claim that the mean body temperature is equal to 98.6°F, we can either reject that claim or fail to reject it, but we cannot state that there is sufficient evidence to support that claim.

5. a. $p = 0.20$

   b. H_0: $p = 0.20$ and H_1: $p \neq 0.20$

6. a. $p > 0.5$

   b. H_0: $p = 0.5$ and H_1: $p > 0.5$

7. a. $\mu \leq 76$

   b. H_0: $\mu = 76$ and H_1: $\mu < 76$

13. $z = \dfrac{\hat{p} - p}{\sqrt{\frac{pq}{n}}} = \dfrac{0.89 - 0.75}{\sqrt{\frac{(0.75)(0.25)}{1021}}} = 10.33$ (or $z = 10.35$ if using $x = 909$)

14. $z = \dfrac{\hat{p} - p}{\sqrt{\frac{pq}{n}}} = \dfrac{0.48 - 0.50}{\sqrt{\frac{(0.48)(0.52)}{1002}}} = -1.27$ (or $z = -1.26$ if using $x = 481$)

15. $\chi^2 = \dfrac{(n-1)s^2}{\sigma^2} = \dfrac{(40-1)2.28^2}{5^2} = 8.110$

16. $t = \dfrac{\overline{x} - \mu}{s/\sqrt{n}} = \dfrac{7.15 - 8}{2.28/\sqrt{40}} = -2.358$

25. a. Reject H_0.

   b. There is sufficient evidence to support the claim that the percentage of blue M&Ms is greater than 5%.

26. a. Fail to reject H_0.

   b. There is not sufficient evidence to support the claim that fewer than 20% of M&M candies are green.

27. a. Fail to reject H_0.

   b. There is not sufficient evidence to warrant rejection of the claim that women have heights with a mean equal to 160.00 cm.

Section 8-3

10. H_0: $p = 0.13$. H_1: $p \neq 0.13$. Test statistic: $z = \dfrac{0.08 - 0.13}{\sqrt{\frac{(0.13)(0.87)}{100}}} = -1.49$. Critical values: $z = \pm 1.96$.

P-value $= 2 \cdot P(z > 1.49) = 0.1362$ (Tech: 0.1371). Fail to reject H_0. There is not sufficient evidence to warrant rejection of the claim that 13% of M&Ms are brown.

MINITAB

Test of p = 0.13 vs p not = 0.13

Sample	X	N	Sample p	95% CI	Z-Value	P-Value
1	8	100	0.080000	(0.026828, 0.133172)	-1.49	0.137

12. H_0: $p = 0.5$. H_1: $p > 0.5$. Test statistic: $z = \dfrac{\frac{492}{806} - 0.5}{\sqrt{\frac{(0.5)(0.5)}{806}}} = 6.27$. Critical value: $z = 2.33$. P-value

$= P(z > 6.27) = 0.0001$ (Tech: 0.000000000182). Reject H_0. There is sufficient evidence to support the claim that the majority of adults prefer window seats when they fly.

MINITAB

Test of p = 0.5 vs p > 0.5

Sample	X	N	Sample p	Z-Value	P-Value
1	492	806	0.610422	6.27	0.000