

Section 7-4

6. $df = 19$. $\chi_L^2 = 6.844$ and $\chi_R^2 = 38.582$.

$$\sqrt{\frac{(n-1)s^2}{\chi_R^2}} < \sigma < \sqrt{\frac{(n-1)s^2}{\chi_L^2}}$$
$$\sqrt{\frac{(20-1)0.04111^2}{38.582}} < \sigma < \sqrt{\frac{(20-1)0.04111^2}{6.844}}$$
$$0.02885 \text{ g} < \sigma < 0.06850 \text{ g}$$

13. $\sqrt{\frac{(n-1)s^2}{\chi_R^2}} < \sigma < \sqrt{\frac{(n-1)s^2}{\chi_L^2}}$
$$\sqrt{\frac{(7-1)0.36576^2}{12.592}} < \sigma < \sqrt{\frac{(7-1)0.36576^2}{1.635}}$$
$$0.252 \text{ ppm} < \sigma < 0.701 \text{ ppm}$$

Section 8-2

3. a. $H_0: \mu = 98.6^\circ\text{F}$
b. $H_1: \mu \neq 98.6^\circ\text{F}$
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 $H_1: p \neq 0.20$
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: $z = \frac{0.08 - 0.13}{\sqrt{\frac{(0.13)(0.87)}{100}}} = -1.49$. 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

13. $H_0: p = 0.5$. $H_1: p > 0.5$. Test statistic: $z = \frac{\frac{879}{945} - 0.5}{\sqrt{\frac{(0.5)(0.5)}{945}}} = 26.45$. Critical value: $z = 2.33$. P -value

= $P(z > 26.45) = 0.0001$ (Tech: 0.0000). Reject H_0 . There is sufficient evidence to support the claim that the XSORT method is effective in increasing the likelihood that a baby will be a girl.

MINITAB

Test of p = 0.5 vs p > 0.5

Sample	X	N	Sample p	Z-Value	P-Value
1	879	945	0.930159	26.45	0.000

Section 8-4

13. $H_0: \mu = 0.8535$ g. $H_1: \mu \neq 0.8535$ g. Test statistic: $t = \frac{0.8635 - 0.8535}{0.0570/\sqrt{19}} = 0.765$. Critical values:

$t = \pm 2.101$. P -value > 0.20 (Tech: 0.4543). Fail to reject H_0 . There is not sufficient evidence to warrant rejection of the claim that the mean weight of all green M&Ms is equal to 0.8535 g. The green M&Ms do appear to have weights consistent with the package label.

MINITAB

Test of mu = 0.8535 vs not = 0.8535

N	Mean	StDev	SE Mean	95% CI	T	P
19	0.8635	0.0570	0.0131	(0.8360, 0.8910)	0.76	0.454

15. $H_0: \mu = 0$ lb. $H_1: \mu > 0$ lb. Test statistic: $t = \frac{3 - 0}{4.9/\sqrt{40}} = 3.872$. Critical value: $t = 2.426$.

P -value < 0.005 (Tech: 0.0002). Reject H_0 . There is sufficient evidence to support the claim that the mean weight loss is greater than 0. Although the diet appears to have statistical significance, it does not appear to have practical significance, because the mean weight loss of only 3.0 lb does not seem to be worth the effort and cost.

MINITAB

Test of mu = 0 vs > 0

N	Mean	StDev	SE Mean	T	P
40	3.000	4.900	0.775	3.87	0.000

18. $H_0: \mu = 102.8$ min. $H_1: \mu < 102.8$ min. Test statistic: $t = \frac{98.9 - 102.8}{42.3/\sqrt{16}} = -0.369$. Critical value:

$t = -1.753$ (assuming a 0.05 significance level). P -value > 0.10 (Tech: 0.3587). Fail to reject H_0 . There is not sufficient evidence to support the claim that after treatment with Zopiclone, subjects have a mean wake time less than 102.8 min. This result suggests that the Zopiclone treatment is not effective.

MINITAB

Test of mu = 102.8 vs < 102.8

N	Mean	StDev	SE Mean	T	P
16	98.9	42.3	10.6	-0.37	0.359