HOMEWORK 9

Chapter 7

13.

a. $\bar{x} \pm z_{.025}\frac{s}{\sqrt{n}} = 654.16 \pm 1.96\frac{164.43}{\sqrt{50}}$ = (608.58, 699.74). We are 95% confident that the true average CO_2 level in this population of homes with gas cooking appliances is between 608.58ppm and 699.74ppm

b. $w = 50 = \frac{2(1.96)(175)}{\sqrt{n}} \Rightarrow \sqrt{n} = \frac{2(1.96)(175)}{50} = 13.72 \Rightarrow$ $n = (13.72)^2 = 188.24$, which rounds up to 189.

18. 90% lower bound: $\bar{x} - z_{.10}\frac{s}{\sqrt{n}} = 4.25 - 1.28\frac{1.30}{\sqrt{78}} = 4.06$.

21. For a one-sided bound, we need $z_\alpha = z_{.05} = 1.645$; $\hat{p} = \frac{250}{1000} = .25$; and $\tilde{p} = \frac{.25 + 1.645^2/2000}{1 + 1.645^2/1000}$ = .2507. The resulting 95% upper confidence bound for p, the true proportion of such consumers who never apply for a rebate, is

$$.2507 + \frac{1.645\sqrt{(.25)(.75)/1000 + (1.645)^2/(4 \cdot 1000^2)}}{1 + (1.645)^2/1000} = .2507 + .0225 = .2732.$$

Yes, there is compelling evidence the true proportion is less than 1/3 (.3333), since we are 95% confident this true proportion is less than .2732.

23.

a. With such a large sample size, we can use the "simplified" CI formula (7.11). With $\hat{p}$ = .25, n = 2003, and $z_{\alpha/2} = z_{.005} = 2.576$, the 99% confidence interval for p is

$$\hat{p} \pm z_{\alpha/2}\sqrt{\frac{\hat{p}\hat{q}}{n}} = .25 \pm 2.576\sqrt{\frac{(.25)(.75)}{2003}} = .25 \pm .025 = (.225, .275).$$

30.

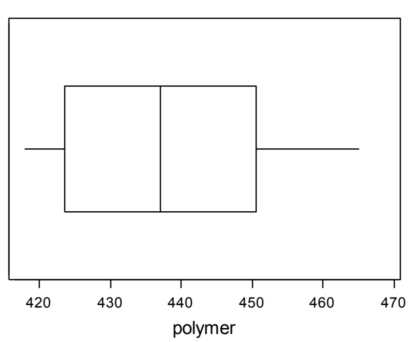
a. $t_{.025,10} = 2.228$

b. $t_{.025,15} = 2.131$

c. $t_{.005,15} = 2.947$

33.

a. The boxplot indicates a very slight positive skew, with no outliers. The data appears to



center near 438.

b. Based on a normal probability plot, it is reasonable to assume the sample observations came from a normal distribution.

c. With df = n – 1 = 16, the critical value for a 95% CI is $t_{.025,16} = 2.120$, and the interval is $438.29 \pm (2.120)\left(\frac{15.14}{\sqrt{17}}\right) = 438.29 \pm 7.785 = (430.51, 446.08)$. Since 440 is within the interval, 440 is a plausible value for the true mean. 450, however, is not, since it lies outside the interval.

37.

a. A 95% CI : $.9255 \pm 2.093(.0181) = .9255 \pm .0379 \Rightarrow (.8876, .9634)$

Chapter 8

2.

a. These hypotheses comply with our rules.

b. H_a cannot include equality (i.e. σ = 20), so these hypotheses are not in compliance.

c. H_0 should contain the equality claim, whereas H_a does here, so these are not legitimate.

d. The asserted value of $\mu_1 - \mu_2$ in H_0 should also appear in H_a. It does not here, so our conditions are not met.