

Assignment 10:

Chapter 7

Questions 2,4, 6, 12, 14, 20, 24, 30, 32

Chapter 7

2.

$$\bar{x} = \frac{114.4 + 115.6}{2} = 115$$

- a. The sample mean is the center of the interval, so
- b. The interval (114.4, 115.6) has the 90% confidence level. The higher confidence level will produce a wider interval.

4.

a. $58.3 \pm \frac{1.96(3)}{\sqrt{25}} = 58.3 \pm 1.18 = (57.1, 59.5)$

b. $58.3 \pm \frac{1.96(3)}{\sqrt{100}} = 58.3 \pm .59 = (57.7, 58.9)$

c. $58.3 \pm \frac{2.58(3)}{\sqrt{100}} = 58.3 \pm .77 = (57.5, 59.1)$

- d. 82% confidence $\Rightarrow 1 - \alpha = .82 \Rightarrow \alpha = .18 \Rightarrow \alpha/2 = .09$, so $z_{\alpha/2} = z_{.09} = 1.34$ and the interval is $58.3 \pm \frac{1.34(3)}{\sqrt{100}} = (57.9, 58.7)$

e. $n = \left[\frac{2(2.58)3}{1} \right]^2 = 239.62$ so $n = 240$.

6.

a. $8439 \pm \frac{(1.645)(100)}{\sqrt{25}} = 8439 \pm 32.9 = (8406.1, 8471.9)$.

b. $1 - \alpha = .92 \Rightarrow \alpha = .08 \Rightarrow \alpha/2 = .04$ so $z_{\alpha/2} = z_{.04} = 1.75$

12.

$$\bar{x} \pm 2.58 \frac{s}{\sqrt{n}} = .81 \pm 2.58 \frac{.34}{\sqrt{110}} = .81 \pm .08 = (.73, .89)$$

14.

- a. $89.10 \pm 1.96 \frac{3.73}{\sqrt{169}} = 89.10 \pm .56 = (88.54, 89.66)$
 . Yes, this is a very narrow interval.
 It appears quite precise.

b. $n = \left[\frac{(1.96)(.16)}{.5} \right]^2 = 245.86 \Rightarrow n = 246$

20. Because the sample size is so large, the simpler formula (7.11) for the confidence interval for p is sufficient.

$$.15 \pm 2.58 \sqrt{\frac{(.15)(.85)}{4722}} = .15 \pm .013 = (.137, .163)$$

24. $n = 56, \bar{x} = 8.17, s = 1.42$; For a 95% C.I., $z_{\alpha/2} = 1.96$

$$8.17 \pm 1.96 \left(\frac{1.42}{\sqrt{56}} \right) = (7.798, 8.542)$$

The interval is

We make no assumptions about the distribution if percentage elongation.

- 30.

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

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

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

d. $t_{.005,4} = 4.604$

e. $t_{.01,24} = 2.492$

f. $t_{.005,37} \approx 2.712$

32. d.f. = $n - 1 = 7$, so the critical value for a 95% C.I. is $t_{.025,7} = 2.365$. The interval is

$$30.2 \pm (2.365) \left(\frac{3.1}{\sqrt{8}} \right) = 30.2 \pm 2.6 = (27.6, 32.8)$$