HW9 MATH 1550 Fall 2018

Section 6.2

#10 $c = 0.95$, $\bar{x} = 13.4$, $s = 0.85$, $n = 8$

$c = 0.95 \rightarrow t_c = 2.365$

$n = 8 \rightarrow d.f. = 7$

$$E = t_c \frac{s}{\sqrt{n}} = 0.7107$$

$$\bar{x} - E = 12.689$$

$$\bar{x} + E = 14.110$$

confidence interval: $12.689 < \mu < 14.110$

#15 $\bar{x} - E = 64.6$ (i)

$\bar{x} + E = 83.6$ (ii)

From (i), $\boxed{\bar{x} = 64.6 + E}$. Plug that into (ii) to get

$$(64.6 + E) + E = 83.6$$

$$2E = 83.6 - 64.6$$

$$2E = 19$$

$$E = 9.5$$

So, $\bar{x} = 64.6 + 9.5 = 74.1$

#20 $n = 7$, $\bar{x} = 110$, $s = 44.5$, $c = 0.95$

$n = 7 \rightarrow d.f. = 6$

$c = 0.95 \rightarrow t_c = 2.447$

$$E = t_c \frac{s}{\sqrt{n}} = 41.157$$

$$\bar{x} - E = 68.843$$

$$\bar{x} + E = 151.157$$

confidence interval: $68.843 < \mu < 151.157$

#26 Spreadsheet posted to website

Section 6-3

#12 $n = 420$, $x = 279 \longrightarrow \hat{p} = \frac{x}{n} = 0.664 \longrightarrow \hat{q} = 1 - \hat{p} = 0.336$

$c = 0.9$

$z_c = 1.645$

$E = z_c\sqrt{\frac{\hat{p}\hat{q}}{n}}$

$= 0.0379$

$\bar{p} - E = 0.6261$

$\bar{p} + E = 0.7019$

Confidence interval

$0.6261 < p < 0.7019$

$c = 0.95$

$z_c = 1.96$

$E = z_c\sqrt{\frac{\hat{p}\hat{q}}{n}}$

$= 0.0451$

$\bar{p} - E = 0.6189$

$\bar{p} + E = 0.7091$

Confidence interval

$0.6189 < p < 0.7091$

#13 $c = 0.99$, $\underbrace{n = 3110, x = 1435}$

$\downarrow$

$z_c = 2.575$

$\rightarrow \hat{p} = \frac{x}{n} = 0.4614$

$\rightarrow \hat{q} = 1 - \hat{p} = 0.5386$

$E = z_c\sqrt{\frac{\hat{p}\hat{q}}{n}}$

$= 0.023$

$\hat{p} - E = 0.4384$

$\hat{p} + E = 0.4844$

Confidence interval

$0.4384 < p < 0.4844$

#18 $c = 0.99$, $E = 0.2$

$\downarrow$

$z_c = 2.575$

a) $\hat{p} = \hat{q} = 0.5$

$$\Rightarrow n = \hat{p}\hat{q}\left(\frac{z_c}{E}\right)^2 = 41.44 \xrightarrow{\text{round up}} 42$$

b) $\hat{p} = 0.87$, $\hat{q} = 1 - \hat{p} = 0.13$

$$\Rightarrow n = \hat{p}\hat{q}\left(\frac{z_c}{E}\right)^2 = 18.748$$

Section 6.4

#15 uploaded to website

#17 $n = 14$, $s = 3.9$, $c = 0.99$

d.f. = 13

$$\frac{1-c}{2} = 0.005 \xrightarrow{\text{table}} \chi_R^2 = 29.819$$

$$\frac{1+c}{2} = 0.995 \xrightarrow{\text{table}} \chi_L^2 = 3.565$$

$$\frac{(n-1)s^2}{\chi_R^2} = 6.631 \longrightarrow \sqrt{\frac{(n-1)s^2}{\chi_R^2}} = 2.575$$

$$\frac{(n-1)s^2}{\chi_L^2} = 55.464 \longrightarrow \sqrt{\frac{(n-1)s^2}{\chi_L^2}} = 7.447$$

Confidence interval for standard deviation

$$2.575 < \sigma < 7.447$$