Chapters 5 and 6    Set 2   Answers

(1) 
\[ t = \frac{2.11 - 2.31}{\sqrt{\frac{0.71^2}{23} + \frac{0.41^2}{20}}} = 1.15 \]
\( df \approx 36 \)
0.25 < p-value < 0.10. Don’t reject with \( \alpha = 0.05 \)

(2) 
\[ t = \frac{7.8 - 5.6}{\sqrt{\frac{0.4^2}{28} + \frac{0.9^2}{22}}} = 10.67 \quad df \approx 27.5 \]
P < 2*0.0005 \quad p < 0.001. Reject \( H_0 \) at the 0.05 level.
Rejecting the null hypothesis indicates evidence that juvenile and adult voles do not have
the same DDT concentration.

(3) \( \alpha = 0.05 \)
\( \beta = 0.01 \)
\( \sigma = 2 \)
\[ (1.645 + 2.326)^2 \times 2 \times 2^2 \]
\[ \frac{0.5^2}{504.6} = 504.6 \]
n = 505

(4) a) \( \bar{y} = 99.6 \quad s = 0.59 \)
b) \( SE = \frac{0.59}{\sqrt{5}} = 0.26 \)
c) Means of \( n = 5 \) values from this population will vary about the population mean with a
standard deviation of about 0.26. An error of 0.26 for \( \bar{y} \) would be a very usual, standard
sized error in this situation.
d) \( 99.6 \pm 2.776(0.26) \)

(5) 
\[ t = \frac{(99.6 - 98.6)}{0.26} = 3.8 \quad 4 \text{ df} \]
\( H_0 : \mu \leq 98.6 \)
\( H_a : \mu > 98.6 \)
0.005 < p-value < 0.01. Reject \( H_0 \) at \( \alpha = 0.05 \)
If \( H_a : \mu < 98.6 \) \quad 0.99 < p-value < 0.995
If \( H_a : \mu \neq 98.6 \quad 0.01 < \text{p-value} < 0.02 \)

(6)
a) 11.5%
b) 64.8 inches
c) 0.25
d) 97.7%

(7) Paired t-test
\[ H_0 : \mu_d = 0 \quad H_a : \mu_d \neq 0 \]
\[ t = \frac{\bar{d}}{s_d / \sqrt{n}} = \frac{0.372}{0.389 / \sqrt{5}} = 2.14 \quad df = 4 \]
0.025 < p-value < 0.05 Reject \( H_0 : \mu_d = 0 \) at the \( \alpha=0.05 \) level.

(8) \( \mu = 120 \quad \sigma = 12 \)
\[ \frac{12}{\sqrt{100}} = 1.2 \]

(9) \[ \sqrt{\text{Var}(\bar{y}_{40\text{yr}} - \bar{y}_{20\text{yr}})} = \sqrt{\frac{8^2}{100} + \frac{10^2}{100}} = 1.28 \]