10.3. Find the approximating interval for the \( p \)-value of each \( t \) and given number \( df \) of degrees of freedom.

(a) Two-tailed test, \( t = 2.43 \), \( df = 12 \).

(b) Right-tailed test, \( t = 3.21 \), \( df = 16 \).

(c) Two-tailed test, \( t = -1.19 \), \( df = 25 \).

(d) Left-tailed test, \( t = -8.77 \), \( df = 7 \).

10.5’. A 12-element sample from a normal population has a mean of \( \bar{x} = 47.1 \) and sample variance \( s^2 = 4.7 \).

(a) Test the hypothesis \( H_0: \mu = 48 \). Use \( \alpha = .10 \). Find \( t \). Should \( H_0 \) be accepted or rejected. Why?

(b) Find the \( p \)-value interval.

(c) Find the 90% confidence interval for the population mean.

Answers

10.3.

(a) [.02, .05]

(b) [0, .005]

(c) [.2, 1]

(d) [0, .005]

10.5’. \( df = n-1 = 11 \), \( t_{a/2} = 1.796 \), \( SE = \frac{s}{\sqrt{12}} = .6258 \).

(a) \( t = \frac{47.1 - 48}{.6258} = -1.438 \),

Null region for \( t \): \( t \in [0] \)

Acceptance region for \( t \): \( t \in [0] = [-1.796, 1.796] \)

Accept \( H_0 \).

Why? \( t = -1.438 \in [-1.796, 1.796] \) = accept. region.

(b) \( t = 1.438 \) is between \( t_{10} = 1.363 \) and \( t_{05} = 1.796 \)

\( p \)-value \( = 2 \times .05 = [.10, .20] \)

(c) \( \mu \in \bar{x} \pm t_{a/2} SE = 47.1 \pm 1.796 \times .6258 = [45.976, 48.224] \)

Page 382.

10.17(2). (a) 1.94   (b) 4.61