

Homework 5 SOLUTIONS

5.19(d)

We have

$$\bar{d} = 1.1^\circ$$

$$s_d = 4.9^\circ$$

$$n = 51$$

The test statistic is:

$$\begin{aligned}\text{test statistic} &= \frac{\bar{d}}{s_d/\sqrt{n}} \\ &= \frac{1.1^\circ}{4.9^\circ/\sqrt{51}} \\ &\approx 1.60\end{aligned}$$

Since n is large ($51 > 30$), we can use a z -test & Table II:

$$\begin{aligned}p\text{-value} &= P(Z > 1.60) \\ &\approx 0.0548\end{aligned}$$

or using a t -test and table IV ($df = 50$):

$$0.05 < P < 0.10$$

So we fail to reject the null at $\alpha = 5\%$.

[NOTE: The true p -value is 0.0579]

5.21(a) Standard error = s_d / \sqrt{n}
 $= 4.9^\circ / \sqrt{51}$
 $\approx 0.686^\circ$

Margin of error ($df = 50$) = $t_{5\%} \cdot \text{Standard error}$
 $\approx 1.676 \cdot 0.686^\circ$
 $\approx 1.15^\circ$

[Note: $\alpha = 100\% - 90\% = 10\%$, so $\alpha/2 = 5\%$]

90° Confidence Interval = $1.1^\circ \pm 1.15^\circ$
 $= (-0.1^\circ, 2.3^\circ)$