

Pledge:

3/29/2007
Dr. Lunsford

MATH 171
Quiz 5

Name: Solution
20 Points Possible

I. Let μ be the mean systolic blood pressure for healthy white males from a particular population. Suppose we want to test the hypothesis $H_0: \mu = 116$ against $H_a: \mu \neq 116$. We select a random sample of 27 healthy white males from the population and find they have a mean systolic blood pressure of 114.9 with a standard deviation of 9.3. Please answer the following questions. (11 points total)

(a) What statistical test below will you use to test the hypotheses (circle one)? (1 point)

z-test for a population mean

t-test for a population mean

paired t-test

(b) What assumptions (if any) will you need to make to use this test? (2 points)

The distribution of the data has no outliers and does not have a strong skewness. OR The distribution of systolic blood pressure for healthy white males is approximately normal. See page 463 of your text. (from this population)

(c) Find the test statistic and p-value of the test. Clearly indicate your answers as well as show all calculator input. (3 points)

Calc input: T-Test

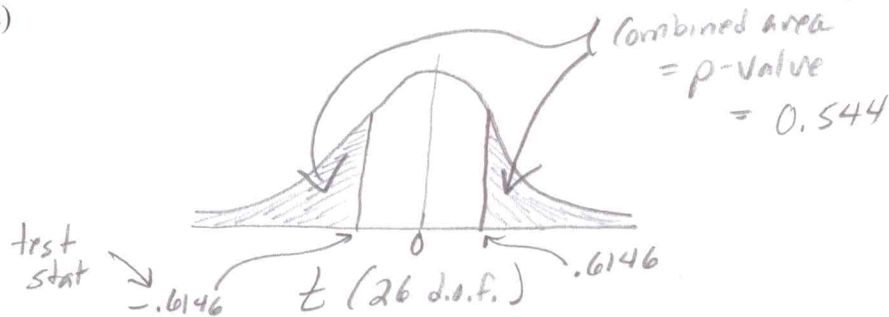
$$\begin{aligned} \mu_0 &= 116 & s &= 9.3 \\ \bar{x} &= 114.9 & n &= 27 \end{aligned}$$

$\neq \mu_0$

$$\text{test stat} = t = -0.6146$$

$$p\text{-value} = 0.544$$

(d) Draw a picture that illustrates the test statistic and p-value found in part (c). (2 points)



(e) What is your conclusion of the test in the context of this problem? (3 points)

Since p is large we fail to reject the null hypothesis. Thus the mean systolic blood pressure for healthy white males from this particular population is not significantly different from 116.

II. Biologists studying the healing of skin wounds measured the rate at which new cells closed a razor cut made in the skin of an anesthetized newt. Here are data from 18 newts, measured in micrometers (millionths of a meter) per hour:

29 27 34 40 22 28 14 35 26
35 12 30 23 18 11 22 23 33

Please answer the following questions. (9 points total)

(a) Draw a stem and leaf plot of the data and determine if there are any outliers and/or if there is a strong deviation of the data from normality. (3 points)

Stem (10's)	Leaf (1's)
1	4 2 8 1
2	9 7 2 8 6 3 2 3
3	4 5 5 0 3
4	0

There do not appear to be any outliers nor is the data strongly deviant from normal.

(b) Find a 95% confidence interval for the mean healing rate, μ , for all newts of this species. Please indicate what type of interval (z or t) you are finding and why. (3 points)

Will find a t-interval; T-Interval: Data in L_1 , C-level = 0.95.
Will use a t-interval since σ is unknown and data is not strongly skewed and does not have outliers.

Answer: (21.527, 29.806)

(c) Write a complete English sentence giving the meaning of the confidence interval above in the context of this problem. (3 points)

We are 95% confident that the average healing rate for all newts of this species is between 21.5 micrometers/hr and 29.8 micrometers/hr.