Stat 2470, Quiz #12, Spring 2014 Name KEY

Instructions: Show all work. You may use your calculator rather than compute formulas by hand, but if you do, 'show work' by saying which program you used to obtain the result and what information you entered. Round measures of center to one decimal place more than the data, and variance/standard deviation to two decimal places more than the original data. Round probabilities to three decimal places (or percent plus one decimal place).

1. The true average diameter of ball bearings of a certain type is supposed to be 1.0 cm. A one-sample t test is carried out to see whether this is the case. What conclusion is appropriate in each of the following situations?

   a. n=13,t=1.6, α=0.05

   $H_0: \mu = 1.0$ cm $H_a: \mu \neq 1.0$ cm

   $P = .06779 > .05$ for one tailed fail to reject H_0

   $P = .1355 > .05$ for two-tailed They are correct size

   b. n=25, t= −2.6, α=0.01

   (one-tailed)

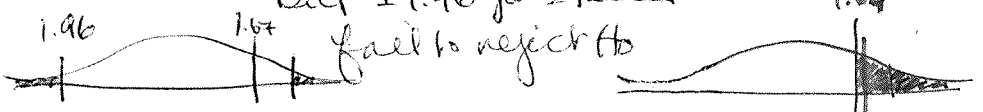
   $P = .007 < .01$ reject H_0 → they are too small

   $P = .0137 > .01$ fail to reject for 2-tailed

   c. Now suppose that n=50, and we know from previous data what the standard deviation is, and use that to obtain a value for the z test of 1.67. What you conclude about the test if the test was conducted with α=0.05?

   $\alpha = .05$

   corresponds to critical values of 1.644 but ±1.96 for 2 tailed

   in critical region for one-tailed reject H_0

   d. What is the p-value associated with each of the tests in a-c?

   $P = .06779$

   $P = .007$

   $P = .047459659$ } one-tailed

   $P = .1355$

   $P = .0137$

   $P = .094919318$ } two-tailed

2. What is the difference between a Type I and Type II error?

Type I is chance of H_0 being right but we reject it; Type II is chance of H_0 being false but we fail to reject it.