STAT 1450, Quiz #9, Fall 2013   Name _____ KEY _____

Instructions: Show all work. If you use your calculator to conduct the hypothesis tests or find confidence intervals rather than doing them by hand, show what your Test screen looks like, and the results after pressing calculate, along with your interpretation.

1. A simple random sample of pages from *Merriam-Webster's Dictionary, 11th edition* is obtained. Listed below are the numbers of words defined on those pages. Given that the dictionary has 1459 pages with defined words, the claim that there are more than 70,000 defined words is the same as that the mean number of defined words on each page is greater than 48.0. Use a 0.05 significance level to test the claim. Explain why you used the test that you did.

    51, 63, 36, 43, 34, 62, 73, 39, 53, 79

T-TEST (Data)
$\mu_0 = 48.0$
List: L_1 $\Rightarrow$
$\mu > \mu_0$

$\mu > 48$
$t = 1.07...$
$p = .156$
$\bar{x} = 53.3$
$S_x = 15.656...$
$n = 10$

T-test. even if normal, $n < 30$
$H_0: \mu \leq 48.0$
$H_1: \mu > 48.0$

fail to reject null

this is not enough evidence to show total > 70,000

2. A Pew Research Center poll asked randomly selected individuals if they agreed with the statement "It is morally wrong for married people to have an affair." Among the 386 women surveyed, 347 agreed with the statement. Among the 359 men surveyed, 305 agreed with the statement. Use a 0.05 significance level to test the claim that the percentage of women who agree is different from the percentage of men who agree. Does there appear to be a difference between the way men and women think about this issue?

2-Prop Z-Test
$x_1 = 347$
$n_1 = 386$
$x_2 = 305$
$n_2 = 359$
$p_1 \neq p_2$

$\Rightarrow$

$p_1 \neq p_2$
$z = 2.037...$
$p = .04159...$
$\hat{p}_1 = .8989...$
$\hat{p}_2 = .849...$
$\hat{p} = .875...$
$n_1 = 386 \quad n_2 = 359$

$H_0: p_1 = p_2$
$H_1: p_1 \neq p_2$

reject H_0
there does appear to be a difference between men & women on this issue

3. The Revenue Commissioners in Ireland conducted a contest for promotion. Statistics from the ages of the unsuccessful and successful applicants are given below. Some of the applicants who were unsuccessful in getting a promotion charged that the competition involved discrimination based on age. Treat the data as samples from larger populations and use a 0.05 significance level to test the claim that the unsuccessful applicants are from a population with greater mean age than the mean age of the successful candidates. Based on the results, does there appear to be discrimination based on age?

    Ages of unsuccessful applicants: $n = 23, \bar{x} = 47.0, s = 7.2 \text{ years}$
    Ages of successful applicants: $n = 30, \bar{x} = 43.9, s = 5.9 \text{ years}$

3.

2-Samp T-Test   (S from Sample only, Samples small)
(Stats)

$H_0: \mu_1 \leq \mu_2$

$H_1: \mu_1 > \mu_2$

$\bar{X}_1 = 47$

$S_{X1} = 7.2$

$n_1 = 23$

$\bar{X}_2 = 43.9$

$S_{X2} = 5.9$

$n_2 = 30$

pooled: no

⟹

$\mu_1 > \mu_2$

$t = 1.6776...$

$P = .0504...$

$df = 42.03...$

$X_1 = 47$

$X_2 = 43.9$

$S_{X1} = 7.2$

$S_{X2} = 5.9$

$n_1 = 23$

$n_2 = 30$

the p-value is just above the significance level so we should fail to reject the null at the 0.05 significance level, but it is so close that the original data w/ more decimal places may change that conclusion.