Name(1)_____

STA 3032
Section 7370
Quiz #3
Spring, 2009

1. Specifications call for the mean tensile strength μ of packaging paper to be greater than 50 psi. Tensile strength was measured on 100 samples of a new type of paper, yielding $\bar{y} = 51.2$ and $s = 4.0$ psi. Perform a statistical test of $H_0 : \mu \leq 50$ versus $H_a : \mu > 50$. Show work for each of the following steps:

a. (4) Test statistic= ***t = (51.2 – 50)/(4.0/10) = 1.2/.4 = 3***

b. (4) P-value= ***.0014***

c. (4) Do you believe it is plausible that the mean tensile strength meets the specification, or are you convinced that it does not? Why?

It is plausible that the tensile strength meets the specification (that μ>50) because the p-value is very small, indicating the null hypothesis is false.

2. An engineer studied the uniformity of a process used to etch silicon dioxide off of silicon wafers. Nine wafers are sampled after etching. Etch rates are measured at two sites on each wafer, one near the center and one the edge. Results are summarized in the table below (Note: The standard deviation for the difference is the standard deviation of the differences for the 9 wafers, NOT the difference between the standard deviations).

	Center	Edge	Diff=Center-Edge
Mean	565.4	562.9	2.5
Std Dev	15.1	15.8	3.0

Perform a test of hypothesis to help you conclude whether the mean etch rates differ between center and edge. Complete each part below.

a. (4) H_0: $\mu_d = 0$ H_a: $\mu_d \neq 0$

b. (4) Test statistic (show how you computed it):

t = 2.5/(3.0/3) = 2.5

c. (4) P-value in terms of an inequality:

$t_{.025} = 2.306 < 2.5 < 2.896 = t_{.01}$ *so* $2(.01) = .02 < P < .05 = 2(.025)$