Name (1)________________________

STA 3032
Section 7347
Quiz #3
Spring, 2009

1. A chemical plant has a mean μ daily production of at least 740 tons of a product when it is operating properly. The output was measured on a random sample of 36 days, yielding $\bar{y} = 712$ and $s = 24$ tons/day. Perform a test of $H_0 : \mu \geq 740$ versus $H_a : \mu < 740$. Show work for each of the following steps:

a. (4) Test statistic= ***t = (712 – 740)/(24/6) = -28/4 = -7***

b. (4) P-value= ***extremely small, less than .0001***.

c. (4) Do you believe it is plausible that the plant is operating properly, or are you convinced that it is not? Why?

No, it is not plausible because the p-value is extremely small. The probably of getting a value of t as extreme as -7 is less than .0001 if, indeed, the null hypothesis were true.

2. Five carbon content measurements were made on a silicon wafer on each of two consecutive days to determine if the calibration of the spectrometer would change from one day to the next. The means and standard deviations were $\bar{y}_1 = 2.106$, $\bar{y}_2 = 2.099$, $s_1 = 0.029$, and $s_2 = 0.033$. Perform a test of $H_0 : \mu_1 = \mu_2$ versus $H_1 : \mu_1 \neq \mu_2$. Show work.

a. (4) Test statistic: ***t = (2.106 – 2.099)/((.029^2 + .033^2)/5)$^{1/2}$ = .007/ =.356***

b. (4) P-value in terms of an inequality: ***P>.5 (Even if df=120, the p-value would be >.5)***

c. (4) Can you conclude that the calibration of the spectrometer changed from day 1 to day 2? Why or why not?

No, because a value of |t|=.365 would occur more 50% of the time by chance alone.