Math 483 Quiz 11 Fall 2007 Name_____

test	df	test statistic	p-value
pooled t	38	-2.47	0.0091
2 sample t	37	-2.47	0.0092

1) An experimental brand of corn was fed to a random sample of 20 male chicks (baby chickens). The usual brand of corn was fed to **another** random sample of 20 male chicks. The weight gains after 20 days were recorded. The investigators desired to show that the experimental brand decreased the weight gain. One of the lines in the table above is appropriate. Test whether the population mean weight gain from the experimental corn (sample 1) is less than the population weight gain from the usual brand (sample 2). State which procedure is used. 2 sample t, (not told $\sigma_1 = \sigma_2$)

i) $H_0: \mu_1 - \mu_2 = 0$ $H_A: \mu_1 - \mu_2 < 0$

ii) $t_0 = -2.47$

iii) pval = .0092

iv) reject H_0 mean weight gain from the experimental brand is less than that of the usual brand

2) In a random sample of 25468 firstborn children, 13173 were boys. Investigators want to know if the proportion of baby boys in the population is greater than 0.5. Do a 4 step test.

$H_0: p = .5$ $H_A: p > .5$ $\hat{p} = \frac{13173}{25468} = .5172373$

$$z_0 = \frac{\hat{p} - p_0}{\sqrt{\frac{p_0(1-p_0)}{n}}} = \frac{.5172373 - .5}{\sqrt{\frac{.5(1-.5)}{25468}}} = \frac{.0172373}{.0031331} = 5.50$$

pval = 0

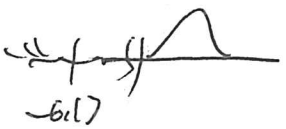
reject H_0 boy proportion > .5

Q10d12
Q10d17

3) The recommended daily allowance (RDA) for zinc for males over 50 is 15 mg/day. A researcher believes that older males may be taking less than the RDA of zinc. Suppose $n = 115$, $\bar{x} = 11.3$, $s = 6.43$ and the CLT applies. Do a 4 step test of hypotheses.

$H_0\ \mu = 15 \quad H_A\ \mu < 15$

$t_0 = \frac{\bar{x} - \mu_0}{s/\sqrt{n}} = \frac{11.3 - 15}{6.43/\sqrt{115}} = \frac{-3.7}{0.60} = -6.17$



$df = n - 1 = 114$ $pval = 0$ Or $pval < .05$

.005 left tail
$z = -2.576$

reject H_0 the mean amount of zinc is less than the RDA of 15

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4) 23 mice were exposed to cigarette smoke over a period of one year while 32 mice in a control group were not. 21/23 of the exposed mice developed a lung tumor while 19/32 if the control group developed a lung tumor. Test whether the proportion of mice (p_1) exposed to cigarette smoke that developed a tumor is higher than the proportion of mice that were not exposed. Assume that $\hat{p}_1 = 0.913$, $\hat{p}_2 = 0.594$, $\hat{p} = 0.727$. Perform the appropriate 4 step test.

$H_0\ p_1 - p_2 = 0 \quad H_A\ p_1 - p_2 > 0$

$z_0 = \frac{\hat{p}_1 - \hat{p}_2}{\sqrt{\hat{p}(1-\hat{p})\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}} = \frac{.913 - .594}{\sqrt{.727(1-.727)\left(\frac{1}{23} + \frac{1}{32}\right)}} = 2.623$

$pval = 0 < 0.005$

reject H_0 the proportion of mice exposed to smoke that developed a tumor is higher than that of the unexposed mice

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