

Pledge:

11/21/2006
Dr. Lunsford

MATH171 – Statistical Decision Making
Quiz 9

Name: _____
20 Points Total

Please show all work and calculator input for full credit.

I. In a FOX News/Opinion Dynamics Poll conducted on Nov. 4-5, 2006, 891 likely voters nationwide were asked "Do you believe gays and lesbians should be allowed to get legally married, allowed a legal partnership similar to but not called marriage, or should there be no legal recognition given to gay and lesbian relationships?" The results of the poll are given in the table below. Please answer the following questions. (12 points total)

Response	Number
Legally Married	270
Legal Partnership	270
No Legal Recognition	288
Unsure	63

(a) Find a 95% confidence interval for the true proportion of likely voters nationwide who think that gays and lesbians should not be given any legal recognition for their relationships. (4 points)

(b) What is the margin of error for the confidence interval you found in part (a)? (2 point)

(c) Please write a complete English sentence giving the results of the confidence interval computed in part (a). Please use percent instead of proportion to report the results. (3 points)

(d) Susie believes that less than $1/3$ of all college students think that gays and lesbians should not be given any legal recognition for their relationships. She would like to test her belief. What are the hypotheses she should use to do so? Please be sure to indicate the meaning of any parameters you use in the hypotheses and which hypothesis is Susie's belief. (3 points)

BONUS! What is your favorite dish served at Thanksgiving dinner? (1 point)

II. You are conducting a z-test for a population mean, μ . The hypotheses are $H_0 : \mu = 280$ versus $H_1 : \mu < 280$. The z-test statistic for your data is -2.39 . Please answer the following: (8 points total)

(a) Find the p-value for the test. Graphically represent the p-value. (3 points)

(b) Is the result of the test significant, and if so, what is the smallest standard alpha level for which you have significance? (2 points)

(c) “true” or “false” according to which is most correct: (1 point each, 2 points total)

- _____ The sample mean of the data is greater than 280.
 _____ The data is in the direction of the alternative hypothesis.

Formulas and results you may or may not need:

$$x \text{ - count, } \hat{p} = \frac{x}{n}, \quad x \sim \text{binomial}(\mu = np, \sigma = \sqrt{np(1-p)})$$

$$x \approx \text{normal}(\mu_x = np, \sigma_x = \sqrt{np(1-p)})$$

$\bar{x} \approx \text{normal}(\mu_{\bar{x}} = \mu, \sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}})$ for n large enough and is normal if the population variable is normal.

$$\hat{p} \approx \text{normal}(\mu_{\hat{p}} = p, \sigma_{\hat{p}} = \sqrt{\frac{p(1-p)}{n}}) \text{ for } n \text{ large enough.}$$

$$z \text{ confidence interval for } \mu \text{ is } \bar{x} \pm m \text{ where } m = z^* \frac{\sigma}{\sqrt{n}}, \quad n = \left(\frac{z^* \sigma}{m} \right)^2$$

$$z \text{ confidence interval for } p \text{ is } \hat{p} \pm m \text{ where } m = z^* \sqrt{\frac{\hat{p}(1-\hat{p})}{n}}, \quad n = \left(\frac{z^*}{2m} \right)^2 \text{ or}$$

$$n = \left(\frac{z^*}{m} \right)^2 p^*(1-p^*)$$

$$z\text{-test statistic for } \bar{x}: z_{\bar{x}} = \frac{\bar{x} - \mu_0}{\sigma_{\bar{x}}} = \frac{\bar{x} - \mu_0}{\frac{\sigma}{\sqrt{n}}}$$

$$z\text{-test statistic for } \hat{p}: z_{\hat{p}} = \frac{\hat{p} - p_0}{\sigma_{\hat{p}}} = \frac{\hat{p} - p_0}{\sqrt{\frac{p_0(1-p_0)}{n}}}$$