

Pledge:

10/26/2006
Dr. Lunsford

MATH171 – Statistical Decision Making
Quiz 7

Name: _____
20 Points Total

Please show all work and calculator input for full credit.

I. SAT scores for the year 2005 were roughly normally distributed with mean 1026 and standard deviation 209. Please answer the following questions: (12 points total)

(a) If a student is randomly chosen from the population of students who took the SAT in 2005, about how likely is it that the student scored 950 or below on the SAT? (3 points)

(b) Suppose a random sample of 64 students was obtained from the population of students who took the SAT in 2005 and their average score was 965. Please fill in the table below by indicating if each symbol is a parameter or statistic and give its value: (3 points)

(c) How likely is it for the mean score of 64 randomly chosen students who took the SAT in 2005 to be less than or equal to 965? (5 points)

Symbol	Param. or Stat.?	Value
μ		
σ		
n	XXXXXXXXXX	
\bar{x}		

(d) If you are a principle at a high school and the 64 seniors in your senior class who took the SAT in 2005 had an average score of 965 what would you conclude? Circle one. (1 point)

1. Even though the average score for your seniors was lower than the national average, average scores as low as theirs could have easily occurred because of random variation in sample mean scores. Thus your seniors, on average, score about the same as students nationally on the SAT.
2. Your seniors, on average, score significantly below the national average in terms of performance on the SAT since averages as low as theirs are very unlikely to occur by chance.

II. The Harvard College Alcohol Study found that 67% of college students support efforts to “crack down on underage drinking.” Assume this is the true proportion of college students who support these efforts. The administration of Longwood University surveys a simple random sample of 50 Longwood students and finds that 31 support a crackdown on underage drinking. Please answer the following: (8 points total)

(a) Find the values of the indicated parameters and statistics: (2 points)

$$p = \underline{\hspace{2cm}} \quad n = \underline{\hspace{2cm}} \quad x = \underline{\hspace{2cm}} \quad \hat{p} = \underline{\hspace{2cm}}$$

(b) IF the proportion of students at Longwood who support a crackdown is the same as the national 67%, then how likely is it that the proportion in a simple random sample of 50 Longwood students would be as small as or smaller than the administration’s sample? (5 points)

(c) Which of the following best describes what the administration can conclude from their statistics: (1 point)

1. The administration can definitely claim that the proportion of Longwood students who support a crackdown is less than the national average since the sample proportion is less than the population proportion.
2. The administration cannot claim that the proportion of Longwood students who support a crackdown is actually less than the national average since sample proportions as small the administration’s sample are not that unusual and could occur due to random variation.
3. Longwood students like to party and thus would be more sympathetic to underage drinkers than students nationally.

Formulas and results you may or may not need:

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

$$x \approx \text{normal}(\mu_x = np, \sigma_x = \sqrt{np(1-p)}) \quad \hat{p} \approx \text{normal}(\mu_{\hat{p}} = p, \sigma_{\hat{p}} = \sqrt{\frac{p(1-p)}{n}})$$

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