

# Practice Quiz 7

Statistics 200

Fall 2007

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1. (5 pts.) In an Allegheny County Health Department survey, the proportion of respondents aged 18 to 29 who were sexually abstinent in 2002 was .06. Approximately 600 people in this age group were surveyed.
  - (a) Identify .06: (i)  $X$  (ii)  $n$  (iii)  $p$  (iv)  $\hat{p}$
  - (b) Identify 600: (i)  $X$  (ii)  $n$  (iii)  $p$  (iv)  $\hat{p}$
  - (c) Identify  $.06(600) = 36$ : (i)  $X$  (ii)  $n$  (iii)  $p$  (iv)  $\hat{p}$
  - (d) If a sample of size 600 yields a sample proportion of .06, the approximate standard deviation of the distribution of sample proportion is  $\sqrt{.06(1 - .06)/600} = .01$ . Give an approximate 95% confidence interval for the proportion of all people in this age group in Allegheny County who were abstinent.
    - (e) Based on your interval, is it plausible that more than .10 of residents in this age group were abstinent?
    - (f) To interpret your interval in (d), circle **one** of the following:
      - i. The population proportion has a 95% probability of falling in this interval.
      - ii. The sample proportion has a 95% probability of falling in this interval.
      - iii. We are 95% confident that sample proportion falls in this interval.
      - iv. We are 95% confident that population proportion falls in this interval.
    - (g) A narrower interval would be produced with a  
(i) lower (ii) higher level of confidence; or (iii) doesn't it matter?
    - (h) A narrower interval would be produced with a  
(i) smaller (ii) larger sample size; or (iii) doesn't it matter?
    - (i) A narrower interval would be produced with a  
(i) smaller (ii) larger population size; or (iii) doesn't it matter?

2. (5 pts.) A survey asked 1000 adult Americans in the year 2004, “Should elected officials set their convictions aside to get results in government?”; the proportion who answered yes was .74. Suppose we want to determine if the proportion is significantly less than .84, which is how many answered yes to the question in the year 2000.
- (a) Which one of these is the correct formulation of the alternative hypothesis in this case? (i)  $H_a : p = .74$  (ii)  $H_a : p < .74$  (iii)  $H_a : \hat{p} = .74$  (iv)  $H_a : \hat{p} < .74$   
 (v)  $H_a : p = .84$  (vi)  $H_a : p < .84$  (vii)  $H_a : \hat{p} = .84$  (viii)  $H_a : \hat{p} < .84$
- (b) For  $n = 1000$  and  $p_0 = .84$ , the standard deviation of sample proportion is .012. Find the  $z$ -statistic. \_\_\_\_\_
- (c) The  $z$ -statistic is (i) not large (ii) large (iii) borderline.
- (d) The  $p$ -value is (i) not small (ii) small (iii) borderline.
- (e) Based on the data provided, can we conclude that less than .84 of all Americans believed in 2004 that elected officials should set their convictions aside to get results in government?
- (f) Which of these is a potential source of bias?
- i. The proportion of Republicans in the sample was much more than the proportion in the population.
  - ii. The survey was anonymous.
  - iii. Both (i) and (ii).
  - iv. Neither (i) nor (ii).
- (g) Suppose the sample proportion had been found to be .90. Explain why a formal test would not be necessary in order to conclude that there isn't enough evidence to convince someone that less than .84 of all Americans agreed with the statement in 2004.