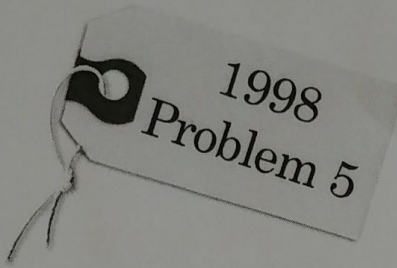9.2

"FRAPPY"
{Free Response AP Problem...Yay!}

1998
Problem 5

The following problem is taken from an actual Advanced Placement Statistics Examination. Your task is to generate a complete, concise statistical response in 15 minutes. You will be graded based on the AP rubric and will earn a score of 0-4. After grading, keep this problem in your binder for your AP Exam preparation.

A large university provides housing for 10 percent of its graduate students to live on campus. The university's housing office thinks that the percentage of graduate students looking for housing on campus may be more than 10 percent. The housing office decides to survey a random sample of graduate students, and 62 of the 481 respondents say that they are looking for housing on campus.

(a) On the basis of the survey data, would you recommend that the housing office consider increasing the amount of housing on campus available to graduate students? Give appropriate evidence to support your recommendation.

(b) In addition to the 481 graduate students who responded to the survey, there were 19 who did not respond. If these 19 had responded, is it possible that your recommendation would have changed? Explain.

Total:___/4

<u>1998 # 5</u>

(a) ① Let p= proportion of grad students that require
on campus housing

1 sample proportion Z-test

H_0: p = 0.10

H_A: p > 0.10

② Conditions:

· Random ✓

· Normal ✓

· Independent ✓

Problem states

$np_0 \geq 10$ $481(.10) \geq 10$

$n(1-p_0) \geq 10$ $481(.90) \geq 10$

Assume there are at least
4810 grad students and all
are independent.

③ Calculations

Z = 2.11

p-val = 0.02

α = 0.05

④ Since p-val < α,
reject H_0

⑤ There is convincing evidence that the proportion
of grad student that require on campus housing is more
than 0.10. ∴ The housing office should consider
increasing the amount of housing.