MATH 10B with Prof. Stankova
Section #209 ; time: 3:30-5pm
GSI: Ninh DO

Quiz 13 Solution

Student:
SID:
Tue 4/30/19

True/False - No explanation needed. (1pt for correct, 0pt - no answer, -1pt - incorrect)

1. If two samples that were treated identically show a difference that is statistically significant, it is a Type II error. True/False
   False. It's Type I error.

2. The independent-samples t-test cannot be used when samples differ in size. True/False
   False. Just truncate the bigger sample.

Problems - Need justification. No justification means **zero**!

1. (10pts) We toss two coins 100 times and record the outcomes: 30 times of two H's, 40 times of one H one T, 30 times of two T's.
   (a) Calculate the expected frequencies, given the null hypothesis H_0 that both coins are fair.

   The expected frequencies for HH's, one H one T 's, TT's are, respectively: 25, 50, 25

   (b) Take the significance level $\alpha = 0.1$, perform the χ^2 test and draw a conclusion.
   H_0: both coins are fair vs H_1: not fair
   $\chi^2 = \frac{(30-25)^2}{25} + \frac{(40-50)^2}{50} + \frac{(30-25)^2}{25} = 4$

   DOF = 3 - 1 = 2

   Critical χ^2 corresponding to $\alpha = 0.1$ and DOF = 2 is 4.61.
   $4 < 4.61$. Thus, fails to reject H_0