Review Test Submission: Practice M2

User	Akhila Juturu
Course	-CSE 544.01 Probability and Statistics for Data Scientists - Spring 2022
Test	Practice M2
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Question 1

0 out of 10 points

Refer to the 2-party, 2-gender example from Lec 19. Of the 100 females that voted, assume 30 voted for A and 70 for B. Of the 150 males that voted, assume 90 voted for A and 60 for B. Consider an alternative definition for Q defined as (refer to notation on slide 13 of Lec 19): $\sum_r \sum_c \left(\frac{O_{rc}}{E_{rc}} \right)$, where O_{rc} is the observed value for row r and column c, and E_{rc} is the expected value for row r and column c. Report the value for this alternative definition of Q for the above problem. Report the value rounded to the closest integer without any decimals. For example, 2.91 is reported as 3 and 5.421 is reported as 5.

Question 2

0 out of 10 points

Let ε_i and ε_j be errors for simple LR, using the notation and concepts from class. Which of the following is NOT true about simple linear regression, as discussed in class.

Question 3

10 out of 10 points

Consider the one-sided hypothesis test for true mean, m, using T-test. H_0: m ≥ 9, H_1: m < 9. Let sample data be D={9, 1, 6, 4} and let α = 0.05. You are given $t_{3,0.025}$ = 3.18 and $t_{3,0.05}$ = 2.35. Will the one-sided t-test accept or reject for the given α value? Enter a for accept or r for reject in your answer. Assume the test is applicable. For the sample standard deviation, please use the uncorrected version (with n in the denominator).

Question 4

0 out of 10 point

Consider data D = {e^{-1}, e^{-3}, e^{-2}} drawn from a distribution with p.d.f. of f(x) = m x^{m-1}. Find the MLE of m numerically for the given data points in D. Report the result as a decimal rounded to two digits after the decimal point and one before the decimal (ex: 1.466 is rounded and reported as 1.47, 0.103 is rounded and reported as 0.10).

Question 5

10 out of 10 points

Consider the Wald's test for checking whether a given coin is unbiased or not given an i.i.d. sample of data {X_1, X_2, ..., X_n}. Use MME as the estimator for the p parameter. Given sample data {1, 0, 1, 0, 1, 0}, report the absolute value of the Wald's statistic using the given estimator.

Question 6

0 out of 10 points

Let D={X_1, X_2, ..., X_n} be i.i.d. distributed with a distribution having p.m.f. p(x) such that p(x) is proportional to x c^x, where c is the unknown parameter. Let S = X_1 + X_2 + ... + X_n. Let the prior of c be the H(a, b) distribution which has p.d.f. f(x) proportional to x^a $e^{-b\,x}$. Use Bayesian inference to compute the posterior of c given data D. You will find that the posterior looks like the H distribution (after ignoring any constants). What are the parameters of this posterior H distribution?

Question 7

10 out of 10 points

Given the set of (Y_i, X_i) samples: {(3, 4), (2, 1), (4, 5), (2, 3)} and the equation Y = -1 + X as the line of best fit (regression fit), report the SSE over these data points. Report the result as a decimal rounded to two digits after the decimal point (ex: 14.466 is rounded and reported as 14.47, 1.103 is rounded and reported as 1.10).

Question 8

10 out of 10 points

Let X = {9, 1, 3} and Y = {4}. Let the statistic for Permutation test be absolute difference in medians of the two sets. Report the p-value for Permutation test as 1 digit before decimal and rounded to 2 digits after the decimal.

Question 9

10 out of 10 points

Use K-S test to compare X={0.2, 1.6, 1.5} with Unif(0, 2) and report the statistic. However, for the statistic, report the minimum distance between the two distributions from among all values in your table. Compute the differences to the left and right of data points as usual, as in class, but then find the min value from among these and report that. Report the result as a decimal rounded to two digits after the decimal point and with exactly one digit before the decimal (ex: 1.466 is rounded and reported as 1.47 and 0.103 is rounded and reported as 0.10).

Question 10

10 out of 10 points

172.30.32.12

Consider a Z-test to check whether H_0: $\mu = 2$ vs H_1: $\mu \neq 2$, and for this question assume that the test is applicable. Let D={1, 2, 0, 1} be the i.i.d. data samples that are Normally distributed with true variance 4. Let the critical threshold or the right-hand-size of the Z-test (the $z_{\alpha/2}$ value) be denoted as c. For what values of c will Z-test result in a rejection for the stated hypothesis?

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