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NPTEL

Courses » Introduction to Data Analytics

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Unit 3 - Week 2 - Probability Distributions & Inferential Statistics

Course outline

How to access the portal

Week 1 - Course Overview and Descriptive Statistics

Week 2 - Probability Distributions & Inferential Statistics

○ Random Variables and Probability Distributions

○ Probability Distributions(cont'd)

○ Probability Distributions(cont'd)

○ Inferential Statistics - Motivation

○ Inferential Statistics - Single sample tests

○ Quiz : Assignment 2

○ Feedback for week 2

○ Assignment 2 Solution

Week 3 - Inferential Statistics

Week 4 - Machine Learning

Assignment 2

The due date for submitting this assignment has passed. **Due on 2017-08-12, 23:55 IST.**
As per our records you have not submitted this assignment.

1) Suppose that you are part of a data analytic company and your task is to analyze the salary   **1 point**
data of another company. You have access to the employee's name, date of birth, marital status, number
of days since joining, and salary of every month. The results which you have to report back also include
the mean of all the salaries in a month. What kind of random variable is the mean of the salaries?

○ discrete

○ continuous

○ it cannot be a random variable

○ none of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
continuous

2) Which of the following is a Binomial random variable?   **1 point**

○ time it takes a bus to reach its destination

○ the amount of rain happened on a particular day

○ number of students taller than 65 inches in a random sample of 5 students

○ all of the above

○ none of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
number of students taller than 65 inches in a random sample of 5 students

3) For a continuous distribution we can find its probability density function (PDF), whereas, in   **1 point**
the case of a discrete distribution, we can find its probability mass function (PMF). Poisson distribution is
a discrete probability distribution which is defined over a continuous space. Which of the following is true
in the context of Poisson distribution?

○ we can find its PMF as it is a discrete probability distribution

○ we can find its PDF as it is PDF as it is defined over a continuous space

○ we can find both PMF and PDF, depending upon the application

○ none of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
we can find its PMF as it is a discrete probability distribution

4) We are told that for a particular coin, the probability of observing k heads in n tosses is x (0 ≤ **1 point** k ≤ n, 0 < x < 1) and the probability of observing k heads in n+1 tosses is y (0 < y < 1). What is the probability, p, of the coin showing up heads in a single toss?

○ $\dfrac{y\binom{n}{k}}{x\binom{n+1}{k}}$

○ $\dfrac{x\binom{n+1}{k}}{y\binom{n}{k}}$

○ $\dfrac{y\binom{n}{k}}{x\binom{n+1}{k}} - 1$

○ $\dfrac{x\binom{n+1}{k} - y\binom{n}{k}}{x\binom{n+1}{k}}$

No, the answer is incorrect.
Score: 0

Accepted Answers:

$\dfrac{x\binom{n+1}{k} - y\binom{n}{k}}{x\binom{n+1}{k}}$

5) You are given a biased coin with probability of seeing a head is p = 0.6 and probability of   **1 point** seeing a tail is q = 0.4. Suppose you toss the coin 10 times, what is the probability of you getting the head at most 4 times? Also, what is the probability of you getting the head for the first time on your fourth attempt?

○ 0.166, 0.038

○ 0.054, 0.038

○ 0.166, 0.064

○ 0.054, 0.064

No, the answer is incorrect.
Score: 0

Accepted Answers:
0.166, 0.038

6) Suppose we are trying to model a *p* dimensional Gaussian distribution. What is the actual   **1 point** number of independent parameters that need to be estimated?

○ *2*

○ *2p*

○ *p(p + 1)*

○ *p(p + 3)/2*

No, the answer is incorrect.
Score: 0

Accepted Answers:
p(p + 3)/2

7) The Central Limit Theorem (CLT) states that the sampling distribution of the sample mean is **1 point** approximately normal under certain conditions. Given an arbitrary distribution, you are about to take samples and use CLT. Which of the following is a necessary condition for the CLT to be used?

○ The sample size must be large

○ The population size must be large (e.g., at least 30)

○ The population from which we are sampling must be normally distributed

○ The population from which we are sampling must not be normally distributed.

No, the answer is incorrect.
Score: 0

Accepted Answers:
The sample size must be large

8) A randomly selected sample of 400 employees working for a large company was asked   **1 point**
whether or not they think the company should change its business model. 32% of the surveyed
employees answered "yes". Which of the following statement is correct about the number 32%

   ○ it is a population parameter
   ○ it is a sample static
   ○ it is a margin error
   ○ it is a standard error

No, the answer is incorrect.
Score: 0

Accepted Answers:
it is a sample static

9) Suppose that a bus speeds at National Highway-1 (NH1) has a normal distribution of the   **1 point**
speed with a mean of 70 mph and a standard deviation of 8 mph. Find out the z-score for a speed of
64mph

   ○ -6
   ○ +6
   ○ +0.75
   ○ -0.75

No, the answer is incorrect.
Score: 0

Accepted Answers:
-0.75

10)A bank branch advertises that the mean waiting time for customers (considering all possible   **1 point**
transaction types) is less than or equal to seven minutes with a standard deviation of one and a half
minutes. We observe the following waiting times (in minutes): 3.5, 7.5, 15, 12, 11.5, 6, 5, 9.5, 2, 8. Based
on the observations and assuming the stated standard deviation is correct, apply the single sample z-
test. What is the value of the test statistic? Assuming a significance level of 0.05, can we reject the
company's claim?

   ○ 2.10, yes
   ○ 2.10, no
   ○ 0.67, yes
   ○ 0.67, no

No, the answer is incorrect.
Score: 0

Accepted Answers:
2.10, yes

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A project of

National Programme on
Technology Enhanced Learning

In association with

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Funded by

Government of India
Ministry of Human Resource Development

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