

Score: _____ / 18

PSTAT 5A / FINAL EXAM / Spring 2023

Instructor: Ethan Marzban

Name: _____
First, then Last

UCSB NetID: _____
NOT your Perm Number!

Circle the section you attend:

Yuan 10 - 10:50am Jason 11 - 11:50am Nickolas 12 - 12:50pm Nickolas 1 - 1:50pm

Your Seat Number: _____

SAMPLE MULTIPLE CHOICE QUESTIONS

Instructions:

- You will have **180 minutes** to complete the entire exam
 - Do not begin working on the exam until instructed to do so.
 - During the final 10 minutes of the exam, we will ask everyone to remain seated until the exam concludes.
 - This exam comes in **TWO PARTS**: this is the **MULTIPLE CHOICE** part of the exam.
 - There is a separate booklet containing Free-Response questions that should have been distributed to you at the same time as this booklet.
 - Fill in the bubble corresponding to your answer **on the provided scantron**; **Absolutely NOTHING** written directly on this exam booklet will be graded. Partial credit will **not** be awarded.
 - Unless explicitly instructed otherwise, mark only one answer per question. If you mark multiple answers for the same question, you will receive 0 points for the question even if one of your choices is correct.
 - You are allowed the use of two **8.5 × 11-inch** sheets, front and back, of notes. You are also permitted the use of **calculators**; the use of any and all other electronic devices (laptops, cell phones, etc.) is prohibited.
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|---|
| PLEASE DO NOT DETACH ANY PAGES FROM THIS EXAM. |
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 - Good Luck!!!
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Problem 1. What is the correct syntax to import the `scipy.stats` module with the nickname `sps`? [1pts.]

- A. `import scipy.stats with nickname sps`
- B. `import scipy.stats as sps`
- C. `import nickname(scipy.stats, sps)`
- D. `import module scipy.stats as nickname sps`
- E. None of the above

Problem 2. A hypothesis test has been conducted at a 5% level of significance. For which of the following p -values would we reject the null hypothesis in favor of the alternative? **Select ALL that apply**; incorrect choices incur a deduction of 0.5pts (capped out at zero; i.e. you will never receive negative points for this question.) [2pts.]

- A. 0.0100
- B. 0.0200
- C. 0.0600
- D. 0.0700
- E. 0.1000

Problem 3. If $X \sim \text{Bin}(10, 0.2)$, which of the following is the correct value of $P(X = 3)$? [1pts.]

- A. 0.0000
- B. 0.2013
- C. 1.2649
- D. 2.0000
- E. None of the above.

Problem 4. A password is to be created using 3 letters, and 4 digits. Suppose the password must be of the form DLDLDL (where “D” represents “digit” and “L” represents “letter”), and that the same letter/digit can be used more than once. How many passwords can be created using this scheme? [1pts.]

- A. 260
- B. 546,000
- C. 78,624,000
- D. 175,760,000
- E. None of the above.

Problems 5 - 8 refer to the following situation: An ANOVA (Analysis of Variance) has been performed on k groups. The resulting ANOVA table is shown below, but has certain entries redacted.

	DF	Sum Sq.	Mean Sq.	F-value	P(> F)
Btwn. Grps.	7	35	5	<blank2>	0.435
Residuals	122	<blank1>	5		

Problem 5. What is k , the number of groups?

[1pts.]

- A. 5
- B. 6
- C. 7
- D. 8**
- E. None of the above.

Problem 6. What is n , the total number of observations (aggregated across all groups)?

[1pts.]

- A. 122
- B. 123
- C. 129
- D. 130**
- E. None of the above

Problem 7. What is the value of <blank1>?

[1pts.]

- A. 1.4000
- B. 24.4000
- C. 100.0000
- D. 610.0000**
- E. None of the above

Problem 8. What is the value of <blank2>?

[1pts.]

- A. 1.0000**
- B. 7.0000
- C. 9.0000
- D. 122.0000
- E. None of the above

Problems 9 - 11 refer to the following situation: A linear regression has been performed on two variables $x = \{x_i\}_{i=1}^{30}$ and $y = \{y_i\}_{i=1}^{30}$. (Assume y is the response variable and x is the explanatory variable.) The output is displayed in the following table, like the ones seen in Lecture 19:

	Estimate	Std. Error	t-value	$\mathbb{P}(> t)$
Intercept	0.3440	0.3068	1.121	0.272
Slope	2.7319	0.3177	8.598	2.42e-09

Problem 9. Which of the following correctly gives the equation of the OLS regression line? [1pts.]

- A. $\hat{y} = 2.7319 + 0.3440 \cdot x$
- B. $\hat{y} = 0.3440 + 2.7319 \cdot x$
- C. $\hat{y} = 1.121 + 8.598 \cdot x$
- D. $\hat{y} = 8.598 + 1.121 \cdot x$
- E. None of the above.

Problem 10. Suppose it is known that the x -values were all between -2 and 2, respectively. If we tried to use the OLS regression line to predict the y -value associated with an x -value of 1 million, would this be an example of extrapolation? [1pts.]

- A. Yes
- B. No

Problem 11. Which of the following correctly gives a 95% confidence interval for the slope of the true linear relationship between x and y , rounded to 4 decimal places? [1pts.]

- A. [7.9467, 9.2493]
- B. [7.9499, 9.2461]
- C. [8.1818, 9.0142]
- D. [8.0579, 9.1381]
- E. None of the above

Problems 12 - 17 refer to the following situation: A student wishes to write a function called `is_mult_of_three()` which is designed to take in a single input `x` and output:

- True if `x` is a multiple of 10
- False if `x` is not a multiple of 10
- Error: Input cannot be a string if `x` is a string.

To that end, they have written the following skeleton code, but it is missing some crucial parts. (Assume this is the **only** code in the student's Jupyter Notebook, and that there are **no** other code cells before or after.

```
def is_mult_of_ten(Blank 1):  
    if (Blank 2(x) == str):  
        return print("Error: input cannot be a string")  
    Blank 3 :  
        return (x Blank 4 10 Blank 5 0)
```

Problem 12. What should go in Blank 1?

[1pts.]

- A. x**
- B. y
- C. z
- D. w
- E. None of the above.

Problem 13. What should go in Blank 2?

[1pts.]

- A. data_type**
- B. `typeof`
- C. `type_of`
- D. type**
- E. None of the above.

Problem 14. What should go in Blank 3?

[1pts.]

- A. else**
- B. `else if`
- C. `elif`
- D. `e_if`
- E. None of the above.

Problem 15. What should go in Blank 4?

[1pts.]

- A. %%
- B. %**
- C. mod
- D. ||
- E. None of the above.

Problem 16. What should go in Blank 5?

[1pts.]

- A. ==**
- B. =
- C. !=
- D. =!
- E. None of the above.

Problem 17. What is missing from the body of the student's function (specifically, this is something we mentioned in Lab that should *always* be included with a function)

[1pts.]

- A. An output statement
- B. A return statement
- C. An exception statement
- D. A docstring**
- E. None of the above.