

SHOW YOUR WORK!

ID # _____

(Do not put your name on this exam.)

1. While reviewing an article submitted for publication in the *Journal of Experimental Psychology*, Professor Anita Lyphe likes to make sure the statistics reported in the results sections are correct. In the paper she is reading currently, the authors report:

“The overall effect of goal type on performance was not significant, $F(2,21) = 3.22, p > .05$ ($M_{\text{intrinsic}} = 6.50, SD = 0.53; M_{\text{extrinsic}} = 2.50, SD = 0.53; M_{\text{both}} = 6.00, SD = 5.90$). However, post-hoc tests using the Fisher-Hayter method revealed that participants in the intrinsic goal group performed significantly better than those in the extrinsic group, $p < .05$. None of the other groups significantly differed from each other.”

A. (30 points) Help Prof. Lyphe by filling out as much as you can of the summary source table below given the information above (assume equal n in each group, and show your work):

Source	df	SS	MS	F
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Mean

A

S/A

“Real Total”

- C. (10 points) I'm concerned that your study did not have enough statistical power. Please discuss in the limitations section what you could do differently to increase the power of this experiment.
3. Professor Lynn E. Yer is interested in the relationship between amount of payment for doing charity work and personal satisfaction. Prof. Yer hypothesizes that doing charity work for free will lead to a feeling of great satisfaction, being underpaid for the work will lead to lower satisfaction, while being paid a fair amount will lead to more satisfaction, but being overpaid will lead to lower satisfaction. She runs an experiment with 6 groups given different payments or no payment for helping at a fundraiser and then measures personal satisfaction on a scale from 1-19, high numbers indicating greater satisfaction. The data are given here:

Pay	\$0	\$5	\$10	\$15	\$20	\$25
Mean	18	13.5	14.5	15.5	15.0	14.0

$MS_{S/A} = 2.944; n = 4$

$MS_A = 10.167$

- A. (15 points) Please test Prof. Yer's hypothesis.

- B. (10 points) Another researcher, Prof. Q. Byck, believes that there may be another unspecified trend that explains some of the variance in the above data. Conduct a test to show whether there is a significant amount of variance remaining after Prof. Yer's hypothesis is tested.
- C. (5 points) There are two different ways to compute the test in B. Explain the difference between the two methods.

D. (15 points) Prof. Lyphe is also reviewing this paper for JEP. In her response she asks whether the pattern of data might not be better explained by the hypothesis that volunteer work, where one is paid no money, is more satisfying than work in which one gets paid any money at all. Test her hypothesis.

E. (10 points) Whose hypothesis accounts for the most variance, Prof. Yer's (part A) or Prof. Lyphe's (part D)?

4. (10 points) Describe what the sampling distribution of the mean is, and why it is an important concept of ANOVA.

5. Here is a 95 % confidence interval:

$$2.04 \leq \mu_1 - \mu_2 \leq 4.84$$

- A. (5 points) Write an interpretation of the confidence interval.

- B. (5 points) Given this confidence interval, what must $\bar{Y}_1 - \bar{Y}_2$ have been in this experiment?
- C. (5 points) If the H_0 for this experiment was $\mu_1 - \mu_2 = 0$, then what was probability that the researcher committed a type II error?