

Spring 2016, MATH 408, Exam 2

Monday, April 18, 2016; 12–12:50pm

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Name: _____

Circle the time of your discussion section: 8am 9am

Instructions:

- No books or notes of any kind.
- Turn off cell phones.
- Necessary tables are included. **If your calculator supports statistical functions, you are welcome to use those instead of tables.**
- Answer all questions and clearly indicate your answers.
- **Each problem is worth 10 points.**
- **Show your work!** Points might be taken off for a correct answer with no explanations. Wrong answer with no explanations is worth zero points.

Problem	Possible	Actual
1	10	
2	10	
3	10	
4	10	
5	10	
Total	50	

Problem 1.

Below is part of a two-way ANOVA table (aka randomized block design) with 5 blocks (columns) and 5 treatments (rows). Fill out the rest of the table.

Source	SS	df	MS	F	Prob $> F$
Columns	210				
Rows					
Error	190				
Total	483				

Problem 2.

To test whether a die is fair, 60 rolls were made, and the corresponding outcomes were as follows:

Face value	Observed frequency
1	6
2	9
3	15
4	14
5	9
6	7

Estimate the P -value if the χ^2 test is used.

Problem 3. In a certain city, there are about one million eligible voters. To study the relationship between sex and participation in the last election, a simple random sample of size 10,000 was chosen. The results:

	Men	Women
Voted	2,850	3,550
Didn't vote	1,450	2,150

Compute the P-values for the χ^2 -test of the null hypothesis that sex and voting are independent.

Problem 4. Assume the following is independent sample from a population with a continuous cdf $F_X = F(x)$:

14 4 13 11 12,

and assume that the following is an independent sample from a population with cdf $F_Y = F(x - \theta)$

10 8 7 4 0.

Compute the p-value of the sign test for the null hypothesis $\theta = 0$ against the alternative $\theta < 0$.

Problems 5. A coin-making machine produces pennies in such a way that, for each coin, the probability U to turn up heads is uniform on $[0, 1]$. A coin pops out of the machine. Compute the conditional distribution of U given that the coin is flipped 2000 times and lands heads 400 times.