Spring 2018, MATH 408, Exam 2

Monday, April 16, 2018; 10–10:50am

Instructor — S. Lototsky (KAP 248D; x0–2389; lototsky@usc.edu)

Name: _____

Circle the time of your discussion section: **2pm** **3pm**

Instructions:

- No books or notes of any kind.
- Turn off cell phones.
- You should have the necessary tables. **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.

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	83				
Error					
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 $F_X = F(x)$:

$$14 \quad 4 \quad 13 \quad 11 \quad 12,$$

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

$$10 \quad 8 \quad 7 \quad 4 \quad 0.$$

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 with unknown probability p to turn up heads; this probability is equally likely to be any number between 0 and 1.

A coin pops out of the machine, flipped 20 times and lands heads 6 times. Compute the Bayesian estimate $\hat{p}$ of p.