FINAL EXAM INFORMATION

Math 262, Fall 2019

The final exam will occur on **Friday, December 13**, from 9am to 11am. The exam will also include a small take-home portion, distributed on the last day of class and due at the final exam session. The exam will be cumulative, with emphasis on the material from Chapter 4.

Concepts and Theorems

You should be able to define, illustrate, use, and briefly summarize the following:

- sample space
- event
- probability (definition, 3 axioms)
- inclusion-exclusion principle
- fundamental principle of counting
- combination
- permutation
- selection with or without replacement
- counting when order does or does not matter
- conditional probability
- independent events
- law of total probability
- Bayes' rule
- discrete/continuous random variable
- probability mass/density function
- cumulative distribution function
- expected value, mean
- variance, standard deviation
- Chebyshev's inequality
- Bernoulli random variable
- binomial distribution
- geometric distribution
- negative binomial distribution
- Poisson distribution
- hypergeometric distribution
- uniform distribution
- normal distribution
- exponential distribution
- gamma distribution
- moment generating function
- joint distribution
- marginal distribution
- conditional distribution
- conditional expectation
- covariance, correlation
- independent random variables
- distribution function method (for finding the density of a function of rvs)
- transformation theorem (univariate and bivariate)
- Central Limit Theorem
- Law of Large Numbers
- order statistics

Take-Home

For the take-home portion of the exam, you may use your textbook, your notes, the course web site, and computing technology (such as *R*, *Mathematica*, or *Wolfram Alpha*). Do not

consult other sources, people, web sites, etc. Remember the honor code! The take-home exam will be due at the in-class exam on Friday, December 13.

In-Class

Books and notes will not be permitted during the in-class exam. Calculators will be allowed, but not necessary. You should know (from memory) the mean, variance, and probability mass/density functions for the same distributions as on Exam 2 (binomial, geometric, Poisson, uniform, exponential, and normal distributions).

Study Suggestions

- For each of the named distributions that we studied, what is something that can be modeled by a random variable of that distribution? What parameters are required to specify the distribution? What is the moment generating function?
- Make a list of key properties of moment generating functions. Why are they called "moment generating functions"?
- Work the *Transformations of Random Variables* problems found on the course web site.
- Work some of the *Supplementary Exercises* at the end of the chapters in the book, such as the following problems from Section 4.11: #154, **155**, 156, **157**, 158, 160, **161**, 164, **165**, 166, **167**, 168, **171**, 173, **175**, 177, **179**, 180, 181
- Review homework problems that you found to be difficult (solutions are on the course web site).