

Queen's University  
Department of Mathematics and Statistics  
**STAT 464/864**  
Instructions for Final Exam April 19, 2020

**PLEASE READ ALL OF THE FOLLOWING INSTRUCTIONS CAREFULLY.**

**A. LOGISTICS:**

1. The exam is “take-home” 24 hour exam. The exam will be posted to the course web page on Sunday, April 19, at 2pm (this is the date and time that the university had previously scheduled the final exam).
2. The exam is to be submitted through crowdmark. You will receive an invitation from crowdmark shortly before the exam is posted on the course web page (so around 1:45pm on April 19).
3. The deadline for submission of your solutions is 3pm on April 20. So you will have 24 hours from 2pm on April 19 to 2pm on April 20, and you will have one hour to prepare your solutions for upload to crowdmark.

**B. EXAM RULES AND ACADEMIC HONESTY:**

1. The exam will have 4 questions for STAT 464 and STAT 864, plus one extra question for STAT 864. Each question will be worth 15 marks for a total of 60 marks for STAT 464 and 75 marks for STAT 864. Students in STAT 464 can choose any 4 of the 5 questions but must indicate which of the 4 solutions to mark if there is any ambiguity. The default will be to mark questions 1-4.
2. The exam is open book. This means that you can use your notes, the textbook, and your computer.
3. **ABSOLUTELY ZERO COLLABORATION IS ALLOWED ON THE EXAM.**  
There is to be no collaboration in any form on any question on any part of the exam, either in person or remotely. All work on both parts of the exam must be completed *on your own*. Any suspicion of collaboration on a solution will result in a mark of 0 for that solution for all parties involved. Suspicious solutions include identical wording, identical incorrect solution, identical incorrect logic, and of course identical correct solution. The judgement of collaboration will err on the side of “yes, there was collaboration”. You can appeal judgements of collaboration that you feel were wrong later, and the judgement will be revisited. Keep in mind that if upon further investigation you have been found to have practiced academic dishonesty, the consequences can be quite severe.

4. Begin each solution at the top of a new sheet of paper and write your student number at the start of each solution.

### C. EXAM COVERAGE:

1. Questions 1-4 (intended for everyone) will cover the following topics:
  - Linear filters and the backshift/differencing operators to eliminate/pass trends and seasonality.
  - Stationary and linear process, autocovariance and autocorrelation functions, covariance and correlation matrices.
  - AR(1), MA( $q$ ), ARMA(1,1), and MA( $\infty$ ) processes.
  - Linear prediction, the Durbin-Levinson algorithm, the Innovations algorithm.
2. In any given question, there may be overlap in the topics covered above.
3. Question 5, which is intended for the STAT 864 students, is open and may cover any aspect of the material from the course.
4. The exam will not require the use of R. You may use R to do calculations if you wish for any question that may require some simple calculations, but any such calculations should also be able to be done on a calculator.