Math 255 - Spring 2018
Exam 2 Information

Exam 2 will be in class on Wednesday April 11. It will not be explicitly cumulative; the focus will be squarely on material that has been covered since Exam 1 (Homework 8, 9, 10; Quizzes 14 through 19; the suggested problems assigned between March 19 and April 6, inclusively; and Sections 5, 6, 7, and part of 9). However, the material in this course is highly cumulative by its nature, so you should expect to be using facts and techniques from the first part of the semester on this exam.

Please read these instructions carefully, as not heeding them will constitute a breach of the UVM Code of Academic Integrity:

- You may not use a calculator or any notes or book during the exam.
- You may not access your cell phone during the exam for any reason; if you think that you will want to check the time please wear a watch.
- The work you present must be your own.
- Finally, you will more generally be bound by the UVM Code of Academic Integrity, with which you should familiarize yourself if you haven't already.

You will be asked to acknowledge that you have read these instructions on the first page of the exam.

For each problem, you **must** write down all of your work carefully and legibly to receive full credit **and** use theorems and/or mathematical reasoning to support your answer, as appropriate.

Things that could be on Exam 2:

- Any proof or problem that is identical or substantially similar (same but with different numbers say) to a problem that was assigned on the Homework, Quizzes or suggested problems covered by this exam (see full list at the top of the document). All homework and quiz solutions are/will be posted on our course website. **Solutions to other problems will not be posted,** although I will answer any question you have on Piazza or during my office hours.
- Any problem that is identical or substantially similar to any problem from the past exams that are posted online (specific problems that are relevant to this version of the course were pulled from the past exams). The solutions will be posted on Sunday afternoon. If I forget to do it at that time, please do not hesitate to email me to remind me.
- Any problem from the Practice Exam 2, which is posted online. The solutions will be posted on Sunday afternoon. Note that the Practice Exam is longer than our actual exam, but you should aim to still do it in 50 minutes to be comfortable during the real exam.
- Several questions will begin by asking you to state a theorem or give a definition. This is meant to be a hint; you should expect to use that theorem or definition in a subsequent part of the same problem.
- State and use any one of these important theorems/formulae we have seen: Theorem 1 of Section 5, the Chinese Remainder Theorem (Theorem 2 of Section 5) and its generalization to solve simultaneous congruences when the moduli are not pairwise relatively prime, Fermat's Little Theorem (Theorem 1 of Section 6), Wilson's Theorem (Theorem 2 of Section 6), the formula for $d(n)$ (the stronger version of Theorem 1 of Section 7 which we proved in class), the formula for $\sigma(n)$ (the stronger version of Theorem 2 of Section 7 which we proved in class), Theorem 5 of Section 7 (including its converse which we proved in class), and the formula for $\phi(n)$ (which follows from Theorem 2 and Lemma 2 of Section 9).
- Give the definition of: multiplicative function, the functions d, σ and the Euler-ϕ function (also sometimes denoted φ; those are the same).

- Some past theorems that are likely to come up again are the Division Algorithm, the Euclidean Algorithm, and the Fundamental Theorem of Arithmetic. Some past definitions that are likely to come up again are divisibility, the greatest common divisor (either the book definition or the alternative definition given in class), relatively prime, prime number (either the book definition or the alternative definition given in class), unit, zero divisor, and congruence modulo n. You should also be able to compute the inverse of a number modulo n, if it exists.

You will not be given any formulae for the exam.

Note about graduate credit: There will be an extra question for graduate credit. This will count as a required part of the exam for any student taking the course for graduate credit. For anyone not taking the course for graduate credit, the assigned grade will be the maximum of the grade including the question for graduate credit and the grade not including the question for graduate credit.