Mathematics 162: Final Exam Information

**Time and Location:** 9:00 am-noon pm on Thursday, December 16, NH 251

**Exam Syllabus:** The final exam will cover the following sections:

Chapter 7: Sections 1-4, 6, 7

Chapter 8: Material from ‘substitute chapter’, except you do not need to know the Alternating Series Test (you should still know for which \( p \) values the series

\[
\sum_{n=1}^{\infty} (-1)^{n-1} n^p = 1 - 2^p + 3^p - 4^p + 5^p - 6^p + \cdots
\]

converges—namely, all \( p < 0 \); compare that to the list of \( p \)-values for which

\[
\sum_{n=1}^{\infty} n^p = 1 + 2^p + 3^p + 4^p + 5^p + 6^p + \cdots
\]

converges), nor the material in Section 6.3 (but do know the series table on the last page and what the \( n \)-th order Taylor polynomials generated by \( f \) at \( a \) are—see Theorem 6.2 and Exercises 8.7:1–6)

Chapter 9: 1-3, 5, 6

Chapter 10: 1-4

Chapter 11: 1-5, 7

Chapter 12: 1-4, 6

The exam will have two parts. The first part of the exam is to be worked without the aid of a calculator. Calculators may be used on the second part of the exam. Both parts of the exam will be handed out at the beginning of the exam period. However, you will not be allowed to use your calculator until you turn in the first part of the exam. Having a look at part two before you turn in part one should make budgeting your time easier.

In order to give you a sense for the flavor and/or difficulty of the types of problems we might give on the final, we recommend that you look at the problems listed below. You are hereby **strongly warned** against studying only the problems from this list to the exclusion of other material.


9.1–2: see section 10.1 where these matters are covered (in 3D) – 9.3: 3, 13, 15 – 9.6: 3, 21


You are responsible for knowing the concepts, techniques and topics from all sections listed in the Exam Syllabus above. We would like to emphasize the following particular expectations:

- You are expected to be able to evaluate integrals, find partial derivatives, and find exact values for series (when possible), without the assistance of a calculator.

- You are expected to show calculations that support your answers. For example, answers to integral problems that do not show the supporting steps, or numeric results simply copied from a calculator will receive no credit, whether or not the answer is correct.

You are expected to know the formulas used in this course. However, to assist you in preparing a list of things to have memorized for the exam, we offer the following guidelines. Among the things you will want to know are:

- these basic trigonometric facts:
  1. values of $\sin \theta$, $\cos \theta$, etc. when $\theta$ is a common angle (multiples of $\pi/6$ and $\pi/4$)
  2. $\sin^2 \theta + \cos^2 \theta = 1$ and $\tan^2 \theta + 1 = \sec^2 \theta$
  3. $\sin^2 \theta = \frac{1}{2}[1 - \cos(2\theta)]$ and $\cos^2 \theta = \frac{1}{2}[1 + \cos(2\theta)]$
  4. $\sin(2\theta) = 2 \sin \theta \cos \theta$ and $\cos(2\theta) = \cos^2 \theta - \sin^2 \theta$

- the antiderivative formulas (1)–(15), in Table 7.1 on page 540 of the text, as well as the antiderivative formula for $\frac{1}{1 + x^2}$

- the Maclaurin series for $\sin x$, $\cos x$, $e^x$, $\frac{1}{1 - x}$, and $\arctan x$, and the radius of convergence for each.

- the volume elements $dV$ for triple integrals when written in cylindrical and spherical coordinates