

MATH 141 Calculus 2
Fall 2015
Review lecture planning (updated December 3)

This collaborative document will be updated frequently ([December 1 updates](#), [November 30 updates](#)). **Please check MyCourses for the latest version** (the course webpage may be a little late).

We finished the syllabus on Monday November 30. This leaves us with three lectures for review. Schedule so far:

Wednesday 2 December:

- Summary of convergence tests and when to use each one* (now posted on MyCourses and the course webpage.)
- Example: Compute the sum of the series

$$\sum_{n=1}^{\infty} \left(\cos \frac{1}{n^2} - \cos \frac{1}{(n+1)^2} \right),$$

or explain why it diverges.

- Example: Determine whether the following series converges or diverges.

$$\sum_{n=1}^{\infty} \frac{n^2 + 1}{5^n}.$$

Friday 4 December:

- Summary of when to use each integration technique*
- Example: Compute the following indefinite integral:

$$\int \frac{x^3 + x^2 + 6}{x(x^2 + 3)} dx.$$

- Example: Compute the following indefinite integral:

$$\int \sqrt{18x - x^2} dx.$$

- Example: Compute the following indefinite integral:

$$\int 20(x \sec(x^5))^4 dx.$$

- Example: Let C be the parametric curve

$$x = t^3, \quad y = t^2, \quad 0 \leq t \leq 1.$$

Find the area of the surface obtained by rotating the curve about the x -axis.

Monday 7 December: Common errors on exams, more problems.

Please keep sending in your requests. The cutoff time is **24 hours in advance** of the lecture. This document will be updated at least 12 hours before each review lecture with the problems we will cover.

*You are strongly encouraged to make your own of these “cheat sheets” before seeing mine, since it is the process of making them that helps you do well in the exam, far more than just reading someone else’s summary. (You will NOT be allowed any notes in the exam.)

The review lectures are optional. If you prefer to study at home, by all means do so. You are also welcome to open your laptops and study quietly on your own at the review lectures, if what we’re doing is not useful to you.

I would like to make the review lectures useful for you. So please email me (cy.amy.pang@mcgill.ca) with what you’d like me to do (e.g. go through theory, do problems, something else) and any particular topics you’d like the review lectures to emphasise. Also please email me any particular problems you would like me to do at the review lectures. The problems can be from anywhere - the textbook, past exams, a study guide, a website - I’ll pick ones that are appropriate in terms of content and difficulty. Please email a screenshot / photo of your problem in .pdf, .gif, .jpg or .png format (no text or web links please). I will keep track of the suggestions on this document.

As voted in the lecture of Monday November 30, 60% of the problems in the review lecture will be hard, and 40% of medium difficulty.

Suggested topics, not yet covered:

- Derivative of an integral (fundamental theorem of calculus).
- Distance travelled vs displacement.
- Improper integrals.
- Volumes of revolution, arc length.
- Finding limits of integration for area in polar coordinates.
- More series problems.