

Last update: Thu Sep 15 14:05:19 MDT 2005 /m175.fa05/handouts175 t1_175_916/review_suggestions_1.tex

1 This list is now in final form.

2 Test #1 is

Friday
9/16/05.

3 There will be no with-calculator part of this exam.

4 The test will cover the material of Assignments #1 – #9 roughly, that is, sections 5.5, 6.1-6.5, and 7.1-7.3. It will emphasize

(a) Slice-ology: Finding the Elementary Riemann-Sum Term for an Integral to Compute

(i) Area between two curves:

- approximating rectangles
- crossings for integration limits

(ii) Volume of a Solid

- given a regular cross-section
- solids of revolution

(iii) Work by Integrating “force \times distance”

(iv) Be on the lookout for problems that ask you only to setup the integral for the situation, as in “set up the appropriate integral but do not evaluate it”. For such problems, make sure the grader can see your steps. Present the integral with integrand and limits of integration set out clearly.

(b) Integration by Substitution (MATH 170 – 5.5)

(i) Spotting situations where this method might work.

(ii) Spotting situations where this method is not working.

(iii) Spotting the u .

(iv) Computing du

(v) For “definite integrals”, cooking up the *New Limits*.

(vi) For “indefinite integrals”, one finds the du antiderivative, then “un-substitutes” back to the original variable in the original integral.

(c) Use of Symmetry to Simplify Integral Computations.

- (d) Integration "by Parts"
- (i) Know how this method relies on more elementary material. That is, be able to **derive** the "parts" formula.
 - (ii) Spotting situations where this method might work.
 - (iii) Spotting situations where this method is not working.
- (e) Integration of Powers of Sine and Cosine
- (f) Integration of Powers of Tangent and Secant
- (g) Trigonometric Substitutions
- (i) Spotting situations where this method might work. This method revolves around changing the sum or difference of squares to a square by means of the MATH-147 Pythagorean identities (or by hyperbolic-function identities).
 - (ii) Spotting situations where this method is not working.
 - (iii) We need to be able to evaluate things like

$$\cos(2 \arctan(3x)) \quad \text{or} \quad \csc\left(\arccos\left(\frac{5x}{13}\right)\right)$$

when we are doing the "unsubstitution" steps of an antiderivative problem. We have to get these into trig-function-free forms such as

$$\frac{1 - 9x^2}{1 + 9x^2} \quad \text{or} \quad \frac{13}{\sqrt{169 - 25x^2}}.$$

5 How to fill in this table rapidly. This may come up in section-7.3-type problems. See also the September-6 quiz

6 Some relevant end-of-chapter problems:

- (a) Page 431: 3, 31
- (b) Page-468 EXERCISES: 5, 15, 23, 25, 29a
- (c) Page 541: odds 1-39 (except for 25) and 73, 75
- (d) Page 541: 55 and 57: we don't need no tables!