Last update: Fri Oct 14 05:48:46 MDT 2005 /m175.fa05/handouts175/t2_175_A14/review_suggestions_2_tex

1 This list is now in final form.

2 Test #2 is

Friday
10/14/05.

3 An email exchange. My answer to questions from one of your classmates:

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> Just was wondering about a few things not listed on the rev sheet.  Will we
> need to use the squeeze theorem on any sequence problems?

YES, the squeeze-theorem idea comes up.

> Will we need to
> write down any formal proofs that we did in the past week or so?

NO, there are going to be theoretical home-work problems on
this.

> Will there
> be any problems asking for the ammount of slices we need to obtain a certain
> error tolerance using simpsons, trap, midpt?

YES, but the error-bound formula is given.
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4 How's about having a with-calculator portion based on section 7.7. So bring the thing along with new batteries.

The with-calculator part will be handed out first. It should not take more than 10-12 minutes.

When you have finished the with-calculator part, put your calculator away and trade in your with-calculator part on the no-calculator part.

5 The test will cover the material of Assignments #9 – #14, roughly, that is, sections 7.4, 7.5, 7.7, 7.8, and 11.1.

6 Be sure you know how to

(a) $\int \boldsymbol{\sin(\theta)^2\,d\theta}$ or $\int \boldsymbol{\cos(u)^2\,du}$.

(b) Combine sums of rational fractions into a single fraction with the **Least Common Denominator**.

(c) Partial Fractions:

(i) Kinds functions appropriate to the method.

(ii) Degrees of numerator and denominator may require **long division**.

(iii) By trial and error: $\dfrac{\mathbf{1}}{(\boldsymbol{x-P})(\boldsymbol{x-Q})}$

(iv) Partial-fractions guesses for $\boldsymbol{(x-R)^2}$ and for $\boldsymbol{(x-R)^3}$ as factors of the denominators.

(v) Partial-fractions guesses for $\boldsymbol{x^2+R^2}$ and for $\boldsymbol{\left(x^2+Q^2\right)^3}$ as factors of the denominators.

(d) Evaluate definite integrals approximately via

(i) Trapezoidal Rule

(ii) Midpoint Rule

(iii) Simpson's Rule

(e) Improper Integrals

(i) Definitions

(ii) How to handle $\boldsymbol{\int_A^\infty}$ and $\boldsymbol{\int_{-\infty}^\infty}$.

(iii) How to handle $\boldsymbol{\int_A^B}$ when the integrand "blows up"

(A) at $\boldsymbol{A}$

(B) at $\boldsymbol{B}$

(C) somewhere in $\boldsymbol{(A,B)}$

(iv) Some famous improper integrals:

(A) $\boldsymbol{\int_0^\infty e^{kx}\,dx}$

(B) $\boldsymbol{\int_0^1 \frac{1}{x^p}\,dx}$

(C) $\boldsymbol{\int_0^\infty \frac{1}{x^p}\,dx}$.

The last of these is important in section 11.3. See also problem 2.

(v) Showing convergence or divergence of an improper integral by comparison with a relevant simpler improper integral, This comes up again in chapter 11.

(f) Find the limit of a sequence using tools such as

(A) L'Hôpital's Rule

(B) Long division

(C) Partial Fractions

(g) Know examples of sequences which

(A) converge

(B) are bounded

(C) are unbounded

(D) diverge

(E) are bounded, but divergent

(F) are unbounded, but convergent

(h)

(i)

7 You need to appear conversant with the $\boldsymbol{\varepsilon - N}$ formal definition of sequence convergence to a finite limit. And how this needs to be modified in the case where we say the limit is $+\boldsymbol{\infty}$.

It might be helpful to be able to write proofs of the limit of a sum and the squeeze theorem.

8 The 10/4/05 group-work facts and methods need to be part of your on-board toolbox. These sequences are famous.

9 Section-7.5 antiderivative problems may end you up with something like

$$\boldsymbol{\sin\bigl(2\arctan(t/3)\bigr).}$$

Be able to transform this to a non-trig, non-transcendental, form:

$$\boldsymbol{\frac{6t}{t^2+9}.}$$

10 Some relevant end-of-chapter problems:

(a) Page-540 True-False Quiz

(b) Page 541: 19, 25

(c) Page 541: 41-49 odds

(d) Page 787: 1-7 odds

(e)

(f)

(g)

11 Filling in this table rapidly is still live business.