Math 1840 Midterm Exam #2 Review Sheet

The midterm will focus on the following sections, although keep in mind Stephen Pinker's quote:

"Mathematics is ruthlessly cumulative, all the way back to counting to ten!"

Section 5.8	Indeterminate forms and L'Hospital's Rule.
Section 6.1	Integration by parts.
Section 6.2	Trigonometric Integrals and Substitutions.
Section 6.3	Partial fractions.
Section 6.4	Integration with tables and computer algebra systems.
Section 6.6	Improper Integrals
Section 7.4	Arc length
Section 9.1	Parametric curves
Section 9.2	Calculus with parametric curves

Review checklist:

- Use L'Hospital's rule to evaluate limits. Know when it does and does not apply. Also evaluate limits of other "indeterminate forms" such as those of type $(\infty - \infty)$, etc.. by manipulating the expression first to use L'Hospital's rule or by taking natural logarithms first.
- Apply integration by parts, including for integrals that "repeat," e.g. example 4 in Section 6.1.
- Use the appropriate trigonometric identities and substations to integrate various products of trig functions.
- Do trigonometric substitutions (x=asin(u) etc..) to evaluate integrals.
- Integrate rational functions using partial fractions.
- Use integral tables to evaluate integrals, including first making a u-substitution before applying the formula.
- Understand the definition of improper integrals of Type I and Type II as limits of definite integrals, including the definition of convergent or divergent integrals. Omit the comparison test.
- Set up and, in some cases evaluate, the integral for arc length of curves of the form y=f(x), x=g(y), or more generally of parameterized curves (x(t), y(t)).
- Understand the definition of a parameterized curve.
- Sketch parameterized curves, eliminating the parameter of possible.
- Find tangent lines to parameterized curves, using the velocity vector. Find areas enclosed by parameterized curves where possible.

Warning: You will NOT be allowed to use any reference pages. You will be proved the following formulas on the test:

"Double-Angle Formulas" and "Half-Angle Formulas" from the reference pages. Also the formulas sin^2x + cos^2x=1, 1+tan^2x=sec^2x and 1+cos^2x=csc^x.