Calculus 2, Chapter 8 Study Guide
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The following is a *brief* list of topics covered in Chapter 8 of *Thomas' Calculus*. Test questions will be chosen directly from the text. This list is not meant to be comprehensive, but only gives a list of several important topics. I reserve the right to ask you definitions and theorems on the tests. If I do so, then I will choose from the **bold-faced** items below.

8.1. <u>Integration by Parts.</u> Integration by Parts, $\int e^x \sin x \, dx$ and related methods, reduction formulas.

8.2. <u>Trigonometric Integrals.</u> $\int \sin^m x \cos^n x \, dx$, integration powers of $\tan x$ or $\sec x$; using trig identities for $\int \sin mx \sin nx \, dx$, $\int \sin mx \cos nx \, dx$, and $\int \cos mx \cos nx \, dx$.

8.3. <u>Trigonometric Substitution.</u> Integrals involving $a^2 + x^2$, $a^2 - x^2$, and $x^2 - a^2$; trig substitution, reference triangles.

8.4. <u>Integration of Rational Functions by Partial Fractions.</u> Linear factors, irreducible quadratic factors, factors of higher order (or "multiplicity"), Heaviside Cover-Up Method.

8.5. <u>Integral Tables and Computer Algebra Systems.</u> Use of the Table of Integrals on pages T1–T5, using the TI-89, substitution and completing the square to get into standard form.

8.6. <u>Numerical Integration.</u> Trapezoid Rule and its error bound, Simpson's Rule and its error bound.

8.7. <u>Improper Integrals.</u> Improper integrals of Type I ($\int_{-\infty}^{\infty} f(x) \, dx$), improper integrals of Type II (integrals over vertical asymptotes, for example), convergence and divergence of improper integrals, **Direct Comparison Test**, **Limit Comparison Test**.