# 8.9 Chapter Summary & Reminders for Review

8.1 LIATE for $u$; or $dv$ is most complicated part which can be integrated

8.2 A—power of cosine is odd: e.g. $\int \sin^4 x \cos^3 x \, dx$

We want even powers of both functions so that we can use $\cos^2 x = 1 - \sin^2 x$ identity, with $u = \sin x, \, du = \cos x \, dx$

8.2 B—power of sine is odd: e.g. $\int \sin^5 x \cos^4 x \, dx$

We want even powers of both functions so that we can use $\sin^2 x = 1 - \cos^2 x$ identity, with $u = \cos x, \, du = -\sin x \, dx$

8.2 C—powers of both sine and cosine are even: e.g. $\int \sin^2 x \cos^4 x \, dx$

Use reduction of powers formula $\cos^2 x = \dfrac{1 + \cos 2x}{2}$ or $\sin^2 x = \dfrac{1 - \cos 2x}{2}$ to convert the integral into a form like 8.2 A or 8.2 B above.

8.2 D—power of secant is even: $\int \tan^2 x \sec^4 x \, dx$

Factor out $\sec^2 x$, so that you can use $\tan^2 x = \sec^2 x - 1$ identity, with $u = \tan x, \, du = \sec^2 x \, dx$

8.2 E—power of tangent is odd: $\int \tan^3 x \sec^4 x \, dx$

Factor out $\sec x \tan x$, so that you can use $\sec^2 x = \tan^2 x + 1$ identity, with $u = \sec x, \, du = \sec x \tan x$

8.2 F—power of secant is odd and power of tangent is even: $\int \tan^2 x \sec x \, dx$

Convert everything to powers of secant using $\sec^2 x = \tan^2 x + 1$ identity, then rely on integration by parts and on knowing that $\int \sec x \, dx = \ln|\sec x + \tan x| + C$

8.3 Know how to do trigonometric substitution. I suggest knowing and using the three triangles illustrated at the beginning of Lecture 8.3 outline.

8.4 Know how to use partial fractions. Include all necessary denominators, and know that the degree of the numerator of each partial fraction must be one less than the degree of the denominator.

8.5 no questions on your Exam

8.6 Know how to use Midpoint Rule, Trapezoidal Rule, and Simpson's Rule. All Exam questions will either have very simple calculations or state "Set up only." Know how to work with Trapezoidal and Simpson's error formulas.

8.7 Know how to recognize, set up, and evaluate improper integrals. Know how to use the Comparison Property.


**Review exercises from the text:**

Chapter 8 Review Exercises, numbers 1 – 4, 6 – 53, 58 and 60

Chapter 8-Cumulative Review for Chapters 1-7, numbers 15 – 20