Section 7.2

Exercise 1. Evaluate $\int \cos^5 x \, dx$.

Here are some guidelines for evaluating $\int \sin^m x \cdot \cos^n x \, dx$.

1. If m is an odd integer: Write the integral as

$$\int \sin^m x \cos^n x \, dx = \int \sin^{m-1} x \cos^n x \sin x \, dx$$

and express $\sin^{m-1} x$ in terms of cos x by using the trigonometric identity $\sin^2 x = 1$ - $\cos^2 x$. Make the substitution

$$u = \cos x, \qquad du = - \sin x \, dx$$

and evaluate the resulting integral.

2. If m is an even integer and n is an odd integer: Write the integral as

$$\int \sin^m x \cos^n x \, dx = \int \sin^m x \cos^{n-1} x \cos x \, dx$$

and express $\cos^{n-1} x$ in terms of sin x by using the trigonometric identity $\cos^2 x = 1$ - $\sin^2 x$. Make the substitution

$$u = \sin x, \, du = \cos x \, dx$$

and evaluate the resulting integral.

3. If m and n are even: Use half-angle formulas for $\sin^2 x$ and $\cos^2 x$ to reduce the exponents by one-half.

Exercise 2. Evaluate $\int \sin^4 x \, dx$.

Class Exercise 1. Evaluate $\int \cos^2 x \, dx$.

Class Exercise 2. Evaluate $\int \cos^3 x \sin^4 x \, dx$.

Class Exercise 3. Evaluate $\int \sin^3 x \quad \cos^2 x \, dx$.

Here are some guidelines for evaluating $\int \tan^m x \cdot \sec^n x \, dx$.

1. If m is an odd integer: Write the integral as

$$\int \tan^m x \sec^n x \, dx = \int \tan^{m-1} x \sec^{n-1} x \sec x \tan x \, dx$$

and express $\tan^{m-1} x$ in terms of sec x by using the trigonometric identity $\tan^2 x = \sec^2 x$ - 1. Make the substitution

$$u = \sec x, \qquad du = \sec x \tan x \, dx.$$

and evaluate the resulting integral.

2. If n is an even integer: Write the integral as

$$\int \tan^m x \sec^n x \, dx = \int \tan^m x \sec^{n-2} x \sec^2 x \, dx$$

and express $\sec^{n-2} x$ in terms of tan x by using the trigonometric identity $\sec^2 x = 1 + \tan^2 x$. Make the substitution

$$u = \tan x, \, du = \sec^2 x \, dx$$

and evaluate the resulting integral.

3. If m is even and n are odd: There is no standard method of evaluation. Possibly use integration by parts.

Exercise 3. Evaluate $\int \tan^2 x \sec^4 x \, dx$.

Exercise 4. Evaluate $\int \tan^3 x \sec^5 x \, dx$.

Class Exercise 4. Evaluate $\int \tan^4 x \sec^4 x \, dx$.

Class Exercise 5. Evaluate $\int \sec^3 x \, dx$.

Class Exercise 6. Evaluate $\int \cot^3 x \, dx$.

Class Exercise 7. Evaluate $\int \csc^4 x \cot^6 x \, dx$.

Homework: 1-13 (every 4th), 19, 23, 29, 39, 43, 49, 53