

Group: _____

Name: _____

Math 231 A. Worksheet 3.

The goal is to learn how to evaluate the trig integrals of the form $\int \sin^n x \cos^m x \, dx$

1. Use substitution to evaluate $\int \sin^2 x \cos x \, dx$.

2. The goal is to evaluate $\int \sin^2 x \cos^3 x \, dx$.

Technique: Rewrite as $\int \sin^2 x \cos^3 x \, dx = \int \sin^2 x \cos^2 x (\cos x \, dx)$. Use the identity $\sin^2 x + \cos^2 x = 1$ to write $\cos^2 x$ in terms of $\sin x$. Then make the substitution $u = \sin x$.

3. Use the idea in problem 2 to evaluate $\int \sin^3 x \cos^2 x \, dx$.

These ideas work on any integral $\int \sin^n x \cos^m x \, dx$ where one of n or m is odd.

4. The goal is to evaluate $\int \cos^2 x \, dx$.

Technique: Use the identity $\cos^2 x = \frac{1}{2}(1 + \cos 2x)$ to rewrite the integral as the sum of two simpler ones.

The identity $\sin^2 x = \frac{1}{2}(1 - \cos 2x)$ can be used to evaluate integrals like $\int \sin^2 x \, dx$.

5. Evaluate $\int \cos^4 x \, dx$.

6. For which values of A are the integrals $\int_0^A \cos^2 x \, dx$ and $\int_0^A \sin^2 x \, dx$ equal?

7. How might you solve $\int \sec^2 x \tan x \, dx$? How about $\int \sec^3 x \tan x \, dx$?