

## WORKSHEET FOR 2/18/2009

**Reading assignment for Monday.** Review section 8.4, 8.5.

**Be sure to study for the exam on Friday!**

**Homework due Monday.** 8.3: 11, 12, 13, 15

**Notes:** Useful identities:

$$(1) \sin^2 x + \cos^2 x = 1$$

$$(2) \tan^2 x + 1 = \sec^2 x$$

$$(3) \sin^2 x = \frac{1}{2} - \frac{\cos(2x)}{2}$$

$$(4) \cos^2 x = \frac{1}{2} + \frac{\cos(2x)}{2}$$

$$(5) \frac{d}{dx} \tan x = \sec^2 x$$

The idea in the first half of this section is to use trigonometric identities to simplify integrals involving powers of trigonometric function. These sorts of problems may require some playing around before you get the hang of them.

**Example:**  $\int \sin^3 x \cos^3 x dx$

The goal to keep in mind is that we eventually want to do a substitution like  $u =$  (trig function), and get a nice easy polynomial to work with. Using the identity  $\cos^2 x = 1 - \sin^2 x$ , we see that:

$$\begin{aligned} \int \sin^3 x \cos^3 x dx &= \int \sin^3 x (1 - \sin^2 x) \cos x dx \\ &= \int u^3 (1 - u^2) du \quad (\text{where } u = \sin x, du = \cos x dx) \end{aligned}$$

If your group finishes early, tell me, and I'll give you a copy of the review sheet for the exam.

$$(1) \int \cos^3(2x) \sin^2(2x) dx$$

$$(2) \int \sec^2 x \tan^4 x dx$$

$$(3) \int \sec^3 x \tan^2 x dx$$