Math 1B
Disc #3

Trigonometric integrals

Jan 31
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Review

$\cos^2\theta + \sin^2\theta = 1$ $\qquad \tan\theta = \frac{\sin\theta}{\cos\theta}$ $\qquad \sec\theta = \frac{1}{\cos\theta}$

$1 + \tan^2\theta = \sec^2\theta$

$\sin(2\theta) = 2\sin(\theta)\cos(\theta)$ $\qquad \cos(2\theta) = \cos^2\theta - \sin^2\theta = 2\cos^2\theta - 1$

$\int \tan(\theta)\,d\theta = \ln|\sec\theta| + C$ $\qquad \int \sec(\theta) = \ln|\sec\theta + \tan\theta| + C$ } check this

Solving $\int \sin^a(x)\cos^b(x)\,dx$:

A. If a or b odd, use $\cos^2+\sin^2=1$ identity, u-subst.

A. If a+b even, (i) convert to $\int \tan^c(x)\sec^d(x)\,dx$ form, $u = \tan(x)$
or (ii) use half angle formulae and write in terms of $\cos(2x)$

Problems

1. $\int \sin^2(x)\cos^4(x)\,dx$

2. $\int \sqrt{\cos(x)}\,\sin^3(x)\,dx$

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

4. $\int \tan^3(x)\sec^4(x)\,dx$

5. $\int \tan^2(x)\sec(x)\,dx$