Math 132 - October 4, 2017

Sections Covered: 7.3

Trig Idenities:

- $\sin^2\theta + \cos^2\theta = 1$
- $1 + \tan^2\theta = \sec^2\theta$
- $1 + \cot^2\theta = \csc^2\theta$
- $\sin(A \pm B) = \sin A\cos B \pm \sin B\cos A$
- $\cos(A \pm B) = \cos A\cos B \mp \sin A\sin B$
- $\tan(A \pm B) = \frac{\tan A \pm \tan B}{1 \mp \tan A\tan B}$
- $\sin A\sin B = \frac{1}{2}[\cos(A-B) - \cos(A+B)]$
- $\cos A\cos B = \frac{1}{2}[\cos(A-B) + \cos(A+B)]$
- $\sin A\cos B = \frac{1}{2}[\sin(A+B) + \sin(A-B)]$
- $\sin^2 x = \frac{1}{2}(1 - \cos 2x)$
- $\cos^2 x = \frac{1}{2}(1 + \cos 2x)$
- $\sin(2\theta) = 2\sin\theta\cos\theta$
- $\cos(2\theta) = \cos^2\theta - \sin^2\theta$

Trig Integral Stategies

- $\int \sin^m x\ \cos^n x\ dx$
- $\int \tan^m x\ \sec^n x\ dx$
- $\int \tan x\ dx$
- $\int \sin(nx)\ \cos(mx)\ dx$
- $\int \sec x\ dx$
- $\int \sec^3 x\ dx$
- Others

Warm-up Problems

1. **Clicker** $\int \sin x\cos x\ dx$ =??
   (a) $\frac{1}{2}\sin^2 x + C$
   (b) $-\frac{1}{2}\cos^2 x + C$
   (c) Both A and B
   (d) Neither A nor B
   (e) Anything you want it to be
2. Find the derivatives:
   (a) $\dfrac{d}{dx}(\sec x + \tan x)$
   (b) $\dfrac{d}{dx}(\csc x + \cot x)$
3. Use integration by parts.
   $\int \sec^3 x\ dx$

Class Problems

4. Compute $\int \sec x\ dx$

5. Compute $\int \csc x\ dx$

6. **Clicker** Identify the strategy to integrate
$$\int \sin^4 x \, \cos^5 x \, dx$$

   (a) Use $\cos^2 x = 1 - \sin^2 x$ and then let $u = \sin x$.
   (b) Use $\sin^2 x = 1 - \cos^2 x$ and then let $u = \cos x$.
   (c) Use half angle identities to reduce the even powers of $\sin x$ and $\cos x$.
   (d) Give up, nothing will work

7. **Clicker** Identify the strategy to integrate
$$\int \sin^5 x \, \cos^4 x \, dx$$

   (a) Use $\cos^2 x = 1 - \sin^2 x$ and then let $u = \sin x$.
   (b) Use $\sin^2 x = 1 - \cos^2 x$ and then let $u = \cos x$.
   (c) Use half angle identities to reduce the even powers of $\sin x$ and $\cos x$.
   (d) Give up, nothing will work

8. **Clicker** Identify the strategy to integrate
$$\int \sin^4 x \, \cos^6 x \, dx$$

   (a) Use $\cos^2 x = 1 - \sin^2 x$ and then let $u = \sin x$.
   (b) Use $\sin^2 x = 1 - \cos^2 x$ and then let $u = \cos x$.
   (c) Use half angle identities to reduce the even powers of $\sin x$ and $\cos x$.
   (d) Give up, nothing will work

9. Actually compute the integrals above.