

Instructions

1. Introduce yourselves!
2. Find some blackboard space, a piece of chalk, and decide who will be your first scribe.
3. Do the problems below, having a different person be the scribe for each one.

Trig Integrals I

1. Find $\int \sin x \cos x dx$
 - (a) By making a u-substitution
 - (b) By integrating by parts
 - (c) By using an identity
 - (d) Are your answers the same?
2. $\int \sin^3 x \cos^\pi x dx$
3. $\int_{-\pi/4}^{\pi/4} \tan^5(x) \sec^3(x) dx$
4. $\int \frac{1 - \tan^2(x)}{\sec^2(x)} dx$
5.
 - (a) Find the average value of $\sin^2 x$ between 0 and 2π .
 - (b) Now sketch a graph of $\sin^2 x$. Does your answer seem reasonable?
6. For this problem, m, n are non-negative integers
 - (a) Determine whether each of the following are even or odd: $2m + 1, 4n - 3, 6m, 2n^2 + 1$
 - (b) Find a general formula for $\int \sin^{2n+1} x \cos^m x dx$
 - (c) Find a general formula for $\int \sec^{2n} x \tan^m x dx$

Trig Integrals II

1. $\int \sin(4x) \sin(3x) dx$
2. $\int \cos(4x) \sin^2(3x) dx$
3. $\int x \cos(2x^2 + 3) \sin(3x^2 - 1) dx$

Extra Problems If you finish early, take a stab at these.

1. $\int \frac{\cos x - 1}{\cos x + 1} dx$
2. Find the volume of the solid obtained by rotating $y = \sin x$ between $x = 0$ and $x = \pi$
 - (a) about the y-axis
 - (b) about the x-axis
3. Find $\int \frac{\sin x + \cos x}{\sin 2x} dx$
4. Find the average value of $\sin^2 x \cos^2 x$ over one period. Now do the same for $\sin^4 x$