Answer Key

Math 132: Discussion Session: Week 5

Directions: In groups of 3-4 students, work the problems on the following page. Below, list the members of your group and write down your answer to #1 and include your work. Turn **this paper** in at the end of class. You do not need to turn in the question page or answers to there other questions.

Additional Instructions: It is okay if you do not completely finish all of the problems, but you should solve most of the problems. Also, each group member should work through each problem, as similar problems may appear on the exam.

Group Members

Group Answer and Work

7.2: Trig Integrals

1. $\int \tan^6 x \sec^4 x \, dx$

$= \int \tan^6 x \, [1 + \tan^2 x] \sec^2 x \, dx$

$u = \tan x$

$du = \sec^2 x \, dx$

$= \int u^6 [1 + u^2] \, du$

$= \int u^6 + u^8 \, du$

$= \frac{u^7}{7} + \frac{u^9}{9} + C$

$= \frac{\tan^7 x}{7} + \frac{\tan^9 x}{9} + C$

Math 132 Discussion Session: Week 6

7.2: Trigonometric Integrals

1. Compute the integral $\int \tan^6 x \sec^4 x \, dx$. $\frac{\tan^7 x}{7} + \frac{\tan^9 x}{9} + C$

2. Compute the following integrals

a.* $\int \csc^3(x) \, dx$ $-\frac{1}{2}\cot x \csc x + \frac{1}{2}\ln|\csc x - \cot x|$

b. $\int_0^{\pi/2} \sin^5(x) \, dx$ $\frac{8}{15}$

c. $\int_0^{\pi/6} \sin(2x)\cos(4x) \, dx$ $\frac{1}{24}$

d. $\int \cos^2(\sin t)\cos t \, dt$ $\frac{1}{2}\cos(\sin t)\sin(\sin t) + \frac{1}{2}\sin t + C$

e. $\int \cot^5 x \csc^5 x \, dx$ $-\frac{1}{9}\csc^9 x + \frac{2}{7}\csc^7 x - \frac{1}{5}\csc^5 x + C$

7.3: Trigonometric Substitution

1. Compute the following integrals using Trigonometric Subsitution:

a. $\int \frac{dx}{x\sqrt{x^2+16}} \, dx$ $\frac{1}{4}\ln\left|\frac{\sqrt{x^2+16}-4}{x}\right| + C$

b.* $\int \frac{dx}{\sqrt{x^2+4x+13}}$ $\ln\left|\sqrt{x^2+4x+13} + x + 2\right| + C$

c. $\int \frac{x^2}{\sqrt{6x^2-49}} \, dx$ $\frac{1}{12}x\sqrt{6x^2-49} + \frac{49\ln(x\sqrt{6} + \sqrt{6x^2-49})}{12\sqrt{6}} + C$

d. $\int \frac{dx}{(4-x^2)^{3/2}}$ $\frac{x}{4\sqrt{4-x^2}} + C$

e.* $\int \frac{dx}{(x^2+a^2)^2}$ for $a > 0$ $\frac{1}{2a^2}\left[\frac{x}{x^2+a^2} + \frac{1}{a}\tan^{-1}\left(\frac{x}{a}\right)\right] + C$