

Math 189 – Formula Sheet for Quiz #1

Trig integrals:

$$\begin{aligned}\int \tan x \, dx &= -\ln |\cos x| + C \\ &= \ln |\sec x| + C\end{aligned}$$

$$\begin{aligned}\int \cot x \, dx &= \ln |\sin x| + C \quad (\text{textbook}) \\ &= -\ln |\csc x| + C \quad (\text{Gilles' materials})\end{aligned}$$

$$\int \sec x \, dx = \ln |\sec x + \tan x| + C$$

$$\begin{aligned}\int \csc x \, dx &= \ln |\csc x - \cot x| + C \quad (\text{textbook}) \\ &= -\ln |\csc x + \cot x| + C \quad (\text{Gilles' materials})\end{aligned}$$

$$\int \sec^2 x \, dx = \tan x + C$$

$$\int \csc^2 x \, dx = -\cot x + C$$

$$\int \sec x \tan x \, dx = \sec x + C$$

$$\int \csc x \cot x \, dx = -\csc x + C$$

$$\int \frac{dx}{\sqrt{a^2 - x^2}} = \sin^{-1} \left(\frac{x}{a} \right) + C$$

$$\int \frac{dx}{a^2 + x^2} = \frac{1}{a} \tan^{-1} \left(\frac{x}{a} \right) + C$$

Integration by parts:

$$\int u \, dv = uv - \int v \, du$$

Differential Equations:

$$\frac{dy}{dx} + P(x)y = Q(x) \quad \text{has integrating factor } e^{\int P(x)dx}$$

$$y = e^{\alpha x} (C_1 \sin \beta x + C_2 \cos \beta x)$$

Euler's Method:

$$y_{new} = y_{old} + f(x, y) \cdot \Delta x$$