

Trabalho 2 - Cálculo II

Ex 1 - $\int \tan^3 x \, dx = \int \tan^2 x \cdot \tan x \, dx = \int (\sec^2 x - 1) \tan x \, dx$
 $= \int \sec^2 x \tan x \, dx - \int \tan x \, dx$

1- $\int \sec^2 x \tan x \, dx = \int u \, du$ $= \frac{\tan^2 x}{2} - (-\ln |\cos x|) + C$
 $u = \tan x$ $= \frac{u^2}{2} + C$
 $du = \sec^2 x \, dx$ $= \frac{\tan^2 x}{2} + C$
 $= \frac{1}{2} \tan^2 x + \ln |\cos x| + C //$

2- $\int \tan x \, dx = - \int \frac{\sin x}{\cos x} \, dx = - \int \frac{1}{u} \, du = -\ln |u| + C$
 $u = \cos x$ $= -\ln |\cos x| + C$
 $du = -\sin x \, dx$

Ex 2 - $\int \csc^6 x \, dx = \int (\csc^2 x)^2 \cdot \csc^2 x \, dx = \int (\cot^2 x + 1)^2 \cdot \csc^2 x \, dx$
 $= \int (\cot^2 x + 1)(\cot^2 x + 1) \csc^2 x \, dx = \int (\cot^4 x + 2\cot^2 x + 1) \csc^2 x \, dx$
 $= \int \cot^4 x \csc^2 x \, dx + 2 \int \cot^2 x \csc^2 x \, dx + \int \csc^2 x \, dx$

① $\int \cot^4 x \csc^2 x \, dx = - \int u^4 \, du = -\frac{u^5}{5} + C$ $= -\frac{\cot^5 x}{5} + \frac{2}{3} \cot^3 x - \cot x + C$
 $u = \cot x$
 $du = -\csc^2 x \, dx$ $= -\frac{\cot^5 x}{5} + C$ $= -\frac{1}{5} \cot^5 x - \frac{2}{3} \cot^3 x - \cot x + C //$

② $\int 2 \cot^2 x \csc^2 x \, dx = -2 \int \cot^2 x \csc^2 x \, dx$
 $u = \cot x$
 $du = -\csc^2 x \, dx$ $= -2 \int u^2 \, du$
 $= -2 \frac{u^3}{3} + C = -\frac{2}{3} \cot^3 x + C$