Cálculo B - Prova 1

1. Encontre uma expressão para $\int \sin^n x \, dx$
2. $\displaystyle\int \frac{\tan^3(\ln x)\sec^6(\ln x)}{x}\, dx$
3. $\displaystyle\int \frac{x+3}{4x^4+4x^3+x^2}\, dx$
4. $\displaystyle\int \frac{dx}{2+\cos x}$
5. Calcule, caso exista, $\displaystyle\int_0^1 \frac{dx}{x\sqrt{x^2-1}}$

Tabela de Integrais

$\int \sin x \, dx = -\cos x$
$\int \cos x \, dx = \sin x$
$\int \tan x \, dx = \ln|\sec x|$
$\int \cot x \, dx = -\ln|\csc x|$
$\int \sec x \, dx = \ln|\sec x + \tan x|$
$\int \csc x \, dx = \ln|\csc x - \cot x|$
$\int \sec^2 x \, dx = \tan x$
$\int \csc^2 x \, dx = -\cot x$
$\int \sec x \, \tan x \, dx = \sec x$
$\int \csc x \, \cot x \, dx = -\csc x$

Relações Trigonométricas

$\sin^2 = 1 - \cos^2 x$
$\cos^2 x = 1 - \sin^2 x$
$\sin^2 x = \frac{1-\cos 2x}{2}$
$\cos^2 x = \frac{1+\cos 2x}{2}$
$\sin 2x = 2\sin x \, \cos x$
$\cos 2x = \cos^2 x - \sin^2 x$
$1 + \tan^2 x = \sec^2 x$
$1 + \cot^2 x = \csc^2 x$
$\sin mx \sin nx = \frac{1}{2}\cos(m-n)x - \frac{1}{2}\cos(m+n)x$
$\cos mx \cos nx = \frac{1}{2}\cos(m+n)x + \frac{1}{2}\cos(m-n)x$
$\sin mx \cos nx = \frac{1}{2}\sin(m-n)x + \frac{1}{2}\sin(m+n)x$

Substituição útil: $z = \tan\frac{x}{2}, \quad \sin x = \frac{2z}{1+z^2}, \quad \cos x = \frac{1-z^2}{1+z^2}$