

Lista de exercícios 9

Cálculo I

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1. Calcule e verifique sua resposta por derivação.

(a) $\int 3 \, dx$

(f) $\int \sin 4t \, dt$

(b) $\int \sqrt[5]{x} \, dx$

(g) $\int \left(\frac{1}{2} - \frac{1}{2} \cos 2x \right) dx$

(c) $\int \frac{x + x^2}{x^2} \, dx$

(h) $\int \left(\frac{1}{x} + 4 \sin 3x \right) dx$

(d) $\int \left(\frac{1}{x} + \frac{1}{x^2} \right) dx$

(i) $\int \frac{\sin 2x}{\cos x} \, dx$

(e) $\int \left(e^{4x} + \frac{1}{x^2} \right) dx$

(j) $\int \left(\frac{1}{3} e^{3x} + \sin 3x \right) dx$

2. (a) Verifique que $\sin^2 x = \frac{1}{2} - \frac{1}{2} \cos 2x$.

(b) Calcule $\int \sin^2 x \, dx$.

3. (a) Verifique que $\int \sec x \, dx = \ln(\sec x + \tan x) + k$, com $x \in]-\frac{\pi}{2}, \frac{\pi}{2}[$

(b) Verifique que $\int \sec x \, dx = \ln(-\sec x - \tan x) + k$, com $x \in]\frac{\pi}{2}, \frac{3\pi}{2}[$

(c) Mostre que $\int \sec x \, dx = \ln |\sec x + \tan x| + k$

4. Calcule e verifique por derivação

(a) $\int \cos^2 2x \, dx$

(f) $\int \sec x \, dx$

(b) $\int \cos^2 \frac{x}{2} \, dx$

(g) $\int \sec 3x \, dx$

(c) $\int \cos^4 x \, dx$

(h) $\int 3^x \, dx$

(d) $\int \tan x \, dx$

(i) $\int \frac{5}{\sqrt{1-x^2}} \, dx$

(e) $\int \tan^2 x \, dx$

(j) $\int \frac{\cos x + \sec x}{\cos x} \, dx$