

UESB-Engenharia de Alimentos

Cálculo II - Lista 1 de Integrais.

1. Calcule as seguintes integrais indefinidas(G):

(a) $\int x dx$

(b) $\int 3 dx$

(c) $\int (3x + 1) dx$

(d) $\int (x^2 + x + 1) dx$

(e) $\int x^3 dx$

(f) $\int (x^3 + 2x + 3) dx$

(g) $\int \frac{1}{x^2} dx$

(h) $\int \sqrt{x} dx$

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

(j) $\int \sqrt[3]{x} dx$

(k) $\int \left(x + \frac{1}{x} \right) dx$

(l) $\int (2 + \sqrt[4]{x}) dx$

(m) $\int (ax + b) dx$ com a, b constantes.

(n) $\int \left(3x^2 + x + \frac{1}{x^3} \right) dx$

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

(p) $\int \left(\frac{2}{x} + \frac{3}{x^2} \right) dx$

(q) $\int (3\sqrt[5]{2} + 3) dx$

(r) $\int \frac{dx}{(ax)^2 + a^2}$

2. Encontre uma primitiva F da função $f(x) = x^{\frac{2}{3}} + x$ que satisfaz $F(1) = 1$.

3. Determine a função $f(x)$ tal que $\int f(x)dx = x^2 + \frac{1}{2} \cos 2x + c$.

4. Calcule as integrais abaixo pelo método da substituição:

(a) $\int (2x^2 + 2x - 3)^{10}(2x + 1)dx$

(b) $\int (x^3 - 2)^{1/7} x^2 dx$

(c) $\int \frac{x}{\sqrt[5]{x^2 - 1}} dx$

(d) $\int 5x\sqrt{4 - 3x^2} dx$

(e) $\int \sqrt{x^2 + 2x^4} dx$

(f) $\int (e^{2t} + 2)^{1/3} e^{2t} dt$

(g) $\int \frac{e^x}{e^x + 4} dx$

(h) $\int \frac{e^{1/x} + 2}{x^2} dx$

(i) $\int \frac{dx}{16 + x^2}$

(j) $\int \frac{dx}{x^2 - 4x + 4}$

(k) $\int \frac{\ln^2 x}{x} dx$

(l) $\int (e^{ax} + e^{-ax})^2 dx$

(m) $\int \frac{e^x}{e^{2x} + 16} dx$

(n) $\int \frac{3}{x \ln^2 3x} dx$

(o) $\int (2^{x^2+1}) x dx$

(p) $\int x e^{3x^2} dx$

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

(r) $\int \frac{dx}{x \ln x}$

(s) $\int 8x\sqrt{1 - 2x^2} dx$

(t) $\int (e^{2x} + 2)^5 e^{2x} dx$

- (u) $\int \frac{4x}{\sqrt{4t^2+5}} dx$
- (v) $\int x^4 e^{-5x} dx$
- (w) $\int 8x^2 \sqrt{6x^3+5} dx$
- (x) $\int (1+e^{-at})^{3/2} e^{-at} dx$ com $a > 0$.

5. Calcule as seguintes integrais pelo método da substituição:

- (a) $\int \tan x \sec^2 x dx$
- (b) $\int \sin^4 x \cos x dx$
- (c) $\int \frac{\sin x}{\cos^5 x} dx$
- (d) $\int \frac{2 \sin x - 5 \cos x}{\cos x} dx$
- (e) $\int e^x \cos(2e^x) dx$
- (f) $\int \frac{x}{2} \cos x^2 dx$
- (g) $\int \sin(5x - \pi) dx$
- (h) $\int \frac{\arcsin x}{2\sqrt{1-x^2}} dx$
- (i) $\int \frac{2 \sec^2 x}{a + b \tan x} dx$
- (j) $\int \sqrt[3]{\sin x \cos x} dx$
- (k) $\int \sin ax dx$
- (l) $\int \cos bx dx$
- (m) $\int x \cos x^2 dx$
- (n) $\int \sqrt{\sin 2x} \cos 2x dx$
- (o) $\int \sec^2(5x+3) dx$
- (p) $\int \frac{\sin x}{(5 - \cos x)^3} dx$
- (q) $\int \cot x dx$

$$(r) \int \frac{\cos \sqrt{x}}{\sqrt{x}} dx$$

6. Resolva as integrais abaixo por partes:

$$(a) \int x \sin 5x dx$$

$$(b) \int \ln(1-x) dx$$

$$(c) \int x e^{4x} dx$$

$$(d) \int (x+1) \cos 2x dx$$

$$(e) \int x \ln 3x dx$$

$$(f) \int e^x \cos \frac{x}{2} dx$$

$$(g) \int \sqrt{x} \ln x dx$$

$$(h) \int x^2 \cos ax dx$$

$$(i) \int e^{ax} \sin(bx) dx$$

$$(j) \int \frac{\ln(ax+b)}{\sqrt{ax+b}} dx$$

$$(k) \int x^3 \sqrt{1-x^2} dx$$

$$(l) \int \ln^3 2x dx$$

$$(m) \int (x-1)e^{-x} dx$$

$$(n) \int x^2 \ln x dx$$

$$(o) \int x^2 e^x dx$$

$$(p) \int \ln(x^2+1) dx$$

$$(q) \int x^5 e^{x^2} dx$$