



Universidade Anhanguera

Curso: Engenharias

Disciplina: Cálculo III

Campus: Campo Limpo

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Lista 1- Integral Indefinida

1) Calcule as integrais:

a) $\int \frac{1}{x^{20}} dx$

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

c) $\int (3x + 5) dx$

d) $\int (5x^4 - 8x^3 + 9x^2 - 2x + 7) dx$

e) $\int \frac{5t^2 + 7}{t^{4/3}} dt$

f) $\int \sqrt{x} dx$

g) $\int 5u^{3/2} du$

h) $\int 10\sqrt[3]{x^2} dx$

i) $\int 6t^2\sqrt[3]{t} dt$

j) $\int y^3(2y^2 - 3) dy$

k) $\int x^4(5 - x^2) dx$

l) $\int \left(\sqrt{x} - \frac{1}{\sqrt{x}} \right) dx$

m) $\int \left(\frac{2}{x^3} + \frac{3}{x^5} + 5 \right) dx$

n) $\int \left(3 - \frac{1}{x^4} + \frac{1}{x^2} \right) dx$

o) $\int \left(\frac{x^2 + 4x - 4}{\sqrt{x}} \right) dx$

p) $\int (3 \sin t - 2 \cos t) dt$

q) $\int (5 \cos x - 4 \sin x) dx$

2) Calcule as integrais:

a) $\int (10^x + 2e^x - 5x^4 - 3) dx$

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

c) $\int \left(\frac{x^3 - x^2 + 8}{x} \right) dx$

d) $\int \left(4x + \frac{1}{x} \right) dx$

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

f) $\int (3 \sin x + 5 \cos x) dx$

g) $\int (7 \sin x + 3 \sec^2 x + 3e^x) dx$

h) $\int (x^{-1} + x + 13) dx$

j) $\int 5 \operatorname{cosec}^2 x dx$

i) $\int 6^x dx$

k) $\int (2 \sec x \cdot \operatorname{tg} x dx - 5 \operatorname{sen} x) dx$

l) $\int (e^x + 3^x) dx$

m) $\int \left(\frac{4}{x^2} - \frac{3}{x^3} \right) dx$

n) $\int (2x - 5e^x + \sec^2 x) dx$

3) Determine a derivada das funções abaixo.

a) $f(x) = (2x + 1)^3$

b) $f(x) = (x^2 - 4x + 5)^4$

c) $f(x) = 4 \cos(3x) - 3 \operatorname{sen}(4x)$

d) $y = \operatorname{sen}^2 x$

e) $y = \operatorname{sen} x^2$

f) $y = e^{10x^2 - 4x + 5}$

g) $y = \operatorname{sen}^2 x + \operatorname{tg}^2 x$

h) $y = e^{\cos x}$

i) $f(x) = \sqrt{4 + 3x}$

j) $y = \operatorname{sen}(2x) + \cos(3x)$

k) $y = \left(\frac{x^2 + 3}{3} \right)^2$

l) $y = \ln(2x^2 + 4x)$

m) $f(x) = 2^{3x^2} + 3x - 5$

n) $f(x) = \ln(\operatorname{sen} x)$

Respostas - lista 1- Integral Indefinida

$$1a) a) \int \frac{1}{x^{20}} dx = -\frac{1}{19} x^{19} + C$$

$$b) \int \sqrt[3]{x} dx = \frac{3}{4} \sqrt[3]{x^4} + C$$

$$c) \int (3x + 5) dx = \frac{3}{2} x^2 - 5x + C$$

$$d) \int (5x^4 - 8x^3 + 9x^2 - 2x + 7) dx = x^5 - 2x^4 + 3x^3 - x^2 + 7x + C$$

$$e) \int \frac{5t^2 + 7}{t^{4/3}} dt = 3\sqrt[3]{t^5} + \frac{21}{\sqrt[3]{t^4}} + C$$

$$f) \int \sqrt{x} dx = \frac{2}{3} \sqrt{x^3} + C$$

$$g) \int 5u^{3/2} du = 2\sqrt{u^5} + C$$

$$h) \int 10\sqrt[3]{x^2} dx = 6\sqrt[3]{x^5} + C$$

$$i) \int 6t^2 \sqrt[3]{t} dt = \frac{9}{5} \sqrt[3]{t^{10}} + C$$

$$j) \int y^3(2y^2 - 3) dy = \frac{y^6}{3} - \frac{3}{4} y^4 + C$$

$$k) \int x^4(5 - x^2) dx = x^5 - \frac{x^7}{7} + C$$

$$l) \int \left(\sqrt{x} - \frac{1}{\sqrt{x}} \right) dx = \sqrt{x^3} - \sqrt{x} + C$$

$$m) \int \left(\frac{2}{x^3} + \frac{3}{x^5} + 5 \right) dx = \frac{-1}{x^2} - \frac{3}{4x^4} + 5x + C$$

$$n) \int \left(3 - \frac{1}{x^4} + \frac{1}{x^2} \right) dx = 3x - \frac{1}{3x^3} - \frac{1}{x} + C$$

$$o) \int \left(\frac{x^2 + 4x - 4}{\sqrt{x}} \right) dx = \frac{2}{5} \sqrt{x^5} + \frac{8}{3} \sqrt{x^3} - 8\sqrt{x} + C$$

$$p) \int (3 \sin t - 2 \cos t) dt = -3 \cos t - 2 \sin t + C$$

$$q) \int (5 \cos x - 4 \sin x) dx = 5 \sin x + 4 \cos x + C$$

$$2a) \int (10^x + 2e^x - 5x^4 - 3) dx = \frac{10^x}{\ln 10} + 2e^x - x^5 - 3x + C$$

$$b) \int (x + 3)^2 dx = \frac{x^3}{3} + 3x^2 + 9 + C$$

$$c) \int \left(\frac{x^3 - x^2 + 8}{x} \right) dx = \frac{x^3}{3} - \frac{x^2}{2} + 8 \ln|x| + C$$

$$d) \int \left(4x + \frac{1}{x} \right) dx = 2x^2 + \ln|x| + C$$

$$e) \int \left(\frac{1}{x} + \sqrt{x} \right) dx = \ln|x| + \frac{2}{3} \sqrt{x^3} + C$$

$$f) \int (3 \sin x + 5 \cos x) dx = -3 \cos x + 5 \sin x + C$$

$$g) \int (7 \sin x + 3 \sec^2 x + 3e^x) dx = -7 \cos x + 3 \tan x + 3e^x + C$$

$$h) \int (x^{-1} + x + 13) dx = \ln|x| + \frac{x^2}{2} + 13x + C$$

$$i) \int 6^x dx = \frac{6^x}{\ln 6} + C$$

$$j) \int 5 \operatorname{cosec}^2 x dx = -5 \cot x + C$$

$$k) \int (2 \sec x - \tan x - 5 \sin x) dx = 2 \sec x + 5 \cos x + C$$

$$l) \int (e^x + 3^x) dx = e^x + \frac{3^x}{\ln 3} + C$$

$$m) \int \left(\frac{4}{x^2} - \frac{3}{x^3} \right) dx = \frac{-4}{3x^3} + \frac{3}{2x^2} + C$$

$$n) \int (2x - 5e^x + \sec^2 x) dx = x^2 - 5e^x + \operatorname{tg} x + C$$

$$3a) f'(x) = 3(2x + 1)^2 \cdot 2 = 6(2x + 1)^2$$

$$b) f'(x) = 4(x^2 - 4x + 5)^3 \cdot (2x - 4)$$

$$c) f'(x) = 4 \cdot (-\operatorname{sen} 3x) \cdot 3 - 3 \cdot \cos 4x \cdot 4$$

$$f'(x) = -12 \operatorname{sen} 3x - 12 \cos 4x$$

$$d) y' = 2 \cdot \operatorname{sen} x \cdot \cos x$$

$$e) y' = \cos x^2 \cdot 2x = 2x \cdot \cos x^2$$

$$f) y' = e^{10x^2 - 4x + 5} \cdot (20x - 4)$$

$$g) y' = 2 \cdot \operatorname{sen} x \cdot \cos x + 2 \cdot \operatorname{tg} x \cdot \sec^2 x$$

$$h) y' = e^{\cos x} \cdot (-\operatorname{sen} x) = -\operatorname{sen} x \cdot e^{\cos x}$$

$$i) f'(x) = \frac{3}{2\sqrt{4 + 3x}}$$

$$j) y' = \cos(2x) \cdot 2 - \operatorname{sen}(3x) \cdot 3$$

$$y' = 2 \cos(2x) - 3 \operatorname{sen}(3x)$$

$$k) y' = 2 \left(\frac{x^2 + 3}{3} \right) \cdot 2x$$

$$y' = 4x \left(\frac{x^2 + 3}{3} \right)$$

$$l) y' = \frac{1}{2x^2 + 4x} \cdot (4x + 4)$$

$$y' = \frac{4x + 4}{2x^2 + 4x}$$

$$m) f'(x) = 2^{3x^2} \cdot \ln 2 \cdot (6x + 3)$$

$$n) f'(x) = \frac{1}{\operatorname{sen} x} \cdot \cos x$$

$$f'(x) = \operatorname{cotg} x$$