CÁLCULO II

S T Q Q S S D
M T W T F S S

1º Exercício Avaliativo (2ª Nota)

Davi Ventura Cardoso Perdigão

a) $\int (x+1)\cos 2x \, dx$

$\int x \cdot \cos(2x) + \cos(2x) \, dx$

$\int x \cdot \cos(2x) \, dx + \int \cos(2x) \, dx$

$\frac{x \cdot \operatorname{sen}(2x)}{2} + \frac{\cos(2x)}{4} + \frac{\operatorname{sen}(2x)}{2}$

$\frac{x \cdot \operatorname{sen}(2x) + \operatorname{sen}(2x)}{2} + \frac{\cos(2x)}{4}$

$\frac{x \cdot \operatorname{sen}(2x) + \operatorname{sen}(2x) + \cos(2x)}{2} + C$

b) $\int x \, e^x \, dx$

$u = x \quad , \quad dv = e^x \, dx$

$du = dx$

$v = e^x$

$x e^x - \int e^x \, dx$

$x e^x - e^x + C$

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

$u = x \quad ; \quad dv = \cos(x) \, dx$

$du = dx$

$v = \operatorname{sen}(x)$

$x \cdot \operatorname{sen}(x) - \int \operatorname{sen}(x) \, dx$

$x \cdot \operatorname{sen}(x) - (-\cos(x))$

$x \cdot \operatorname{sen}(x) + \cos(x) + C$

d) $\int x \operatorname{sen} 5x \, dx$

$u = x, \quad dv = \operatorname{sen}(5x)\,dx$

$du = dx$

$v = -\frac{\cos(5x)}{5}$

$x\left(-\frac{\cos(5x)}{5}\right) - \int -\frac{\cos(5x)}{5}\,dx \rightarrow -1 \cdot \left(\frac{-1}{5}\right)$

$x\left(-\frac{\cos(5x)}{5}\right) + \frac{1}{5}\cdot\int \frac{\cos(t)}{5}\,dt$

$x\left(-\frac{\cos(5x)}{5}\right) + \frac{1}{5}\cdot\frac{1}{5}\int \cos(t)\,dt$

$x\left(-\frac{\cos(5x)}{5}\right) + \frac{1}{25}\cdot \operatorname{sen}(5x)$

$-\frac{x\cdot\cos(5x)}{5} + \frac{\operatorname{sen}(5x)}{25} + C$

e) $\int x \ln x \, dx$ $\qquad u = \ln(x)$

$\int \ln(x)\cdot x\,dx$ $\qquad dv = x\,dx$

$du = \frac{1}{x}\,dx \; ; \quad v = \frac{x^2}{2}$

$\ln(x)\cdot\frac{x^2}{2} - \int \frac{x^2}{2}\cdot\frac{1}{x}\,dx$

$\ln(x)\cdot\frac{x^2}{2} - \frac{1}{2}\cdot\int x\,dx$

$\ln(x)\cdot\frac{x^2}{2} - \frac{1}{2}\cdot\frac{x^2}{2}$

$\frac{\ln(x)\cdot x^2}{2} - \frac{x^2}{4} + C$

f) $\int x\, e^{-2x}\, dx$

$u = x$; $dv = e^{-2x}\, dx$

$du = dx$; $v = -\frac{e^{-2x}}{2}$

$$x\left(-\frac{e^{-2x}}{2}\right) - \int -\frac{e^{-2x}}{2}\, dx$$

$$x\left(-\frac{e^{-2x}}{2}\right) - 1\left(-\frac{1}{2}\right) \cdot \int e^{-2x}\, dx$$

$$x\left(-\frac{e^{-2x}}{2}\right) + \frac{1}{2} \cdot \frac{1}{-2} e^{-2x}$$

$$-\frac{x}{2e^{2x}} - \frac{1}{4e^{2x}} + C$$

g) $\int x^2 \operatorname{sen} x\, dx$

$u = x^2$; $dv = \operatorname{sen}(x)\, dx$

$du = 2x\, dx$; $v = -\cos(x)$

$$x^2(-\cos(x)) - \int -\cos(x) \cdot 2x\, dx$$

$$x^2(-\cos(x)) - 1 \cdot (-2) \cdot \int \cos(x)\, x\, dx$$

$$x^2(-\cos(x)) + 2(x \cdot \operatorname{sen}(x) - \int \operatorname{sen}(x)\, dx)$$

$$x^2(-\cos(x)) + 2(x \cdot \operatorname{sen}(x) - (-\cos(x)))$$

$$-x^2 \cdot \cos(x) + 2x \cdot \operatorname{sen}(x) + 2\cos(x) + C$$

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h) $\int x^2 e^x \, dx$

$u = x^2$; $dv = e^x \, dx$

$du = 2x \, dx$; $v = e^x$

$x^2 e^x - \int e^x \cdot 2x \, dx$

$x^2 e^x - 2 \int e^x x \, dx$

$x^2 e^x - 2 \int x e^x \, dx$

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

$x^2 e^x - 2(x e^x - e^x)$

$x^2 e^x - 2x e^x + 2e^x + C$

i) $\int 5x(3 + 7x^2)^9 \, dx$

$5 \int x(3 + 7x^2)^9 \, dx$

$5 \int \frac{t^9}{14} \, dt$

$5 \cdot \frac{1}{14} \int t^9 \, dt$

$\frac{5}{14} \cdot \frac{t^{10}}{10}$

$\frac{5}{14} \cdot \frac{(3 + 7x^2)^{10}}{10}$

$\frac{(3 + 7x^2)^{10}}{28} + C$

j) $\int \frac{3+2x-5x^3}{\sqrt{x}}\,dx$

$\int \frac{3+2x-5x^3}{x^{\frac{1}{2}}}\,dx$

$\int \frac{3}{x^{\frac{1}{2}}} + \frac{2x}{x^{\frac{1}{2}}} - \frac{5x^3}{x^{\frac{1}{2}}}\,dx$

$\int \frac{3}{x^{\frac{1}{2}}} + 2x^{\frac{1}{2}} - 5x^{\frac{5}{2}}\,dx$

$\int \frac{3}{x^{\frac{1}{2}}}\,dx + \int 2x^{\frac{1}{2}}\,dx - \int 5x^{\frac{5}{2}}\,dx$

$6\sqrt{x} + \frac{4x\sqrt{x}}{3} - \frac{10x^3\sqrt{x}}{7} + C$

K) $\int x^2 \ln x\,dx$

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

$u = \ln(x)$; $dv = x^2\,dx$

$du = \frac{1}{x}\,dx$; $v = \frac{x^3}{3}$

$\ln(x)\frac{x^3}{3} - \int \frac{x^3}{3}\cdot\frac{1}{x}\,dx$

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

$\ln(x)\frac{x^3}{3} - \frac{1}{3}\int x^2\,dx$

$\ln(x)\frac{x^3}{3} - \frac{1}{3}\cdot\frac{x^3}{3}$

$\frac{\ln(x)\cdot x^3}{3} - \frac{x^3}{9} + C$

L) $\int 1(x^4 - x^2 + 1)^2 (4x^3 - 2x)\,dx$

$\int (x^8 + x^4 + 1 - 2x^6 + 2x^4 - 2x^2)(4x^3 - 2x)\,dx$

$\int (x^8 + 3x^4 + 1 - 2x^6 - 2x^2)(4x^3 - 2x)\,dx$

$\int 4x^{11} - 2x^9 + 12x^7 - 6x^5 + 4x^3 - 2x - 8x^9 + 4x^7 - 8x^5 + 4x^3\,dx$

$\int 4x^{11} - 10x^9 + 16x^7 - 14x^5 + 8x^3 - 2x\,dx$

$\int 4x^{11}\,dx - \int 10x^9\,dx + \int 16x^7\,dx - \int 14x^5\,dx + \int 8x^3\,dx - \int 2x\,dx$

$\frac{x^{12}}{3} - x^{10} + 2x^8 - \frac{7x^6}{3} + 2x^4 - x^2$

$\frac{x^{12} - 7x^6}{3} - x^{10} + 2x^8 + 2x^4 - x^2 + C$

M) $\int \frac{x^3 + 3x - 1}{1 + x^2} + \frac{10}{9 - 25x^2}\,dx$

$10\int \frac{dx}{9 - 25x^2}$ $\quad a = 3$ $\quad x = 5x$

$\int \frac{dx}{a^2 - x^2} = \frac{1}{2a} \ln\left|\frac{a + x}{a - x}\right|$

$\frac{1}{6} \ln\left|\frac{3 + 5x}{3 - 5x}\right| + C$

m) $\int \frac{5\,dx}{\sqrt{1-x^2}} + e^{-4x} + dx$

$5\arcsin(x) - \frac{7}{4}e^{-4x} + C$

o) $\int x^2 - \sec^2 x\,dx$

$\int x^2\,dx - \int \sec(x)^2\,dx$

$\frac{x^3}{3} - \tan(x) + C$