



FACULDADE DE TECNOLOGIA E CIÊNCIAS DA BAHIA

FATEC-BA – FACULDADE DE TECNOLOGIA E CIÊNCIAS DA BAHIA

Componente Curricular: Cálculo Diferencial e Integral I

Docente: Luiz Henrique Menezes de Lima **Semestre:** 2022.2

Cursos: Engenharia – 2º Semestre **Data:** 08 de Dezembro de 2022

Discente: _____ **Nota:** _____

AVALIAÇÃO – 3º BIMESTRE

“A persistência é o melhor caminho do êxito” – Charles Chaplin

Questão 01: (8,0)

Resolver as integrais abaixo passo a passo

a) $\int \frac{\sec^2 x}{\operatorname{cosec} x} dx$

b) $\int \frac{x^5 - 2x^4 + \frac{3}{5}x^3 - x^2 + 3}{\sqrt{x}} dx$

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

d) $\int (4\operatorname{cosec} x \cot gx + 2\sec^2 x) dx$

e) $\int (2yx^3 - xy^2)^2 dxy$

Gabarito da Prova 03

Cálculo I 2022.2

Questão 01:

$$a) \int \frac{\sec^2 x}{\cos x \sec x} dx \Rightarrow \sec x = \frac{1}{\cos x}$$

$$\cos x = \frac{1}{\sec x}$$

$$\int \frac{\frac{1}{\cos^2 x}}{\frac{1}{\sec x}} dx$$

$$\int \left(\frac{1}{\cos^2 x} \cdot \sec x \right) dx$$

$$\int \frac{\sec x}{\cos^2 x} dx$$

$$\int \left(\frac{\sec x}{\cos x} \cdot \frac{1}{\cos x} \right) dx$$

$$\int (\sec x \cdot \sec x) dx$$

$$\sec x + C$$

$$b) \int \frac{x^5 - 2x^4 - \frac{3}{5}x^3 - x^2 + 3}{\sqrt{x}} dx \quad \begin{matrix} 5 \\ 2 \end{matrix} \quad \begin{matrix} 4 \\ 2 \end{matrix} \quad \begin{matrix} 3 \\ 5 \end{matrix} \quad \begin{matrix} 2 \\ 2 \end{matrix} \quad \begin{matrix} 3 \\ 2 \end{matrix}$$

$$\int \frac{x^5}{\sqrt{x}} dx - \int \frac{2x^4}{\sqrt{x}} dx - \int \frac{\frac{3}{5}x^3}{\sqrt{x}} dx - \int \frac{x^2}{\sqrt{x}} dx + \int \frac{3}{\sqrt{x}} dx$$

$$\int x^5 \cdot x^{-\frac{1}{2}} dx - \int 2x^4 \cdot x^{-\frac{1}{2}} dx - \int \frac{3}{5} x^3 \cdot x^{-\frac{1}{2}} dx - \int x^2 \cdot x^{-\frac{1}{2}} dx + \int 3 \cdot x^{-\frac{1}{2}} dx$$

$$\int x^{\frac{9}{2}} dx - 2 \int x^{\frac{7}{2}} dx - \frac{3}{5} \int x^{\frac{5}{2}} dx - \int x^{\frac{3}{2}} dx + 3 \int x^{-\frac{1}{2}} dx$$

$$\frac{x^{\frac{9}{2}+1}}{\frac{9}{2}+1} - 2 \int x^{\frac{7}{2}} dx - \frac{3}{5} \int x^{\frac{5}{2}} dx - \int x^{\frac{3}{2}} dx + 3 \int x^{-\frac{1}{2}} dx$$

$$\frac{\frac{13}{2}}{\frac{13}{2}} - 2 \cdot \left(\frac{x^{\frac{7}{2}+1}}{\frac{7}{2}+1} \right) - \frac{3}{5} \left(\frac{x^{\frac{5}{2}+1}}{\frac{5}{2}+1} \right) - \frac{x^{\frac{3}{2}+1}}{\frac{3}{2}+1} + 3 \cdot \left(\frac{x^{-\frac{1}{2}+1}}{-\frac{1}{2}+1} \right)$$

$$\frac{2}{13} x^{\frac{13}{2}} - 2 \cdot \frac{x^{\frac{9}{2}}}{\frac{9}{2}} - \frac{3}{5} \cdot \frac{x^{\frac{7}{2}}}{\frac{7}{2}} - \frac{x^{\frac{5}{2}}}{\frac{5}{2}} + 3 \cdot \frac{x^{\frac{1}{2}}}{\frac{1}{2}}$$

$$\frac{2}{13} x^{\frac{13}{2}} - 2 \cdot \frac{2}{9} x^{\frac{9}{2}} - \frac{3}{5} \cdot \frac{2}{7} x^{\frac{7}{2}} - \frac{2}{5} x^{\frac{5}{2}} + 3 \cdot \frac{2}{1} x^{\frac{1}{2}}$$

$$\frac{2}{13} \sqrt{13} - \frac{4}{9} \sqrt{9} - \frac{6}{35} \sqrt{7} - \frac{2}{5} \sqrt{5} + 6 \sqrt{x} + C$$

~~$$\frac{2}{13} \sqrt{13} - \frac{4}{9} \sqrt{9} - \frac{6}{35} \sqrt{7} - \frac{2}{5} \sqrt{5} + 6 \sqrt{x} + C$$~~

$$9 \int y^3 (2y^2 - 3) dy$$

$$\int 2y^5 - 3y^3 dy$$

$$\int 2y^5 dy - \int 3y^3 dy$$

$$2 \int y^5 dy - 3 \int y^3 dy$$

$$2 \cdot \left(\frac{y^{5+1}}{5+1} \right) - 3 \left(\frac{y^{3+1}}{3+1} \right)$$

$$2 \cdot \frac{y^6}{6} - 3 \cdot \frac{y^4}{4}$$

$$\frac{y^6}{3} - \frac{3y^4}{4} + C$$

$$d) \int (4 \operatorname{cosec} x \cot x + 2 \sec^2 x) dx$$

$$\int 4 \operatorname{cosec} x \cot x + \int 2 \sec^2 x dx$$

$$4 \int \operatorname{cosec} x \cot x + 2 \int \sec^2 x dx$$

$$-4 \operatorname{cosec} x + 2 \operatorname{tg} x + C$$

$$e) \int (2yx^3 - xy^2)^2 dx y$$

$$\int [(2yx^3 - xy^2)(2yx^3 - xy^2)] dx y$$

$$\int (4y^2x^6 - 2x^4y^3 - 2x^4y^3 + x^2y^4) dx y$$

$$\int (4y^2x^6 - 4x^4y^3 + x^2y^4) dx y$$

$$\int 4y^2x^6 dx y - \int 4x^4y^3 dx y + \int x^2y^4 dx y$$

$$4 \int y^2x^6 dx y - 4 \int x^4y^3 dx y + \int x^2y^4 dx y$$

$$4 \left(\frac{y^{2+1} \cdot x^{6+1}}{2+1 \cdot 6+1} \right) - 4 \left(\frac{x^{4+1} \cdot y^{3+1}}{4+1 \cdot 3+1} \right) + \frac{x^{2+1} \cdot y^{4+1}}{2+1 \cdot 4+1}$$

$$4 \frac{y^3}{3} \cdot \frac{x^7}{7} - 4 \frac{x^5}{5} \frac{y^4}{4} + \frac{x^3 y^5}{3 \cdot 5}$$

$$\left(\frac{4x^7y^5}{21} - \frac{x^5y^4}{5} + \frac{x^3y^5}{15} + C \right)$$









