# LISTA EXTRA

Atenção: Essa lista consiste em alguns exercícios resolvidos referentes ao conteúdo da 1° prova (1° bimestre). Além desse conteúdo, na prova final terá matéria da 2° prova (2° bimestre). Oriento resolver a lista avaliativa e exercícios dos slides. **Bons estudos e qualquer dúvida estou à disposição!**

1. Calcule a integral abaixo:

$$\int_0^2 \int_0^1 (1 + 2x + 2y)dydx$$

$$\int_0^1 (1 + 2x + 2y)dy = 2 + 2x$$

$$\int_0^2 (2 + 2x)dx = 4 + 4 = 8$$

2. Calcular a integral dupla:

$$\iint_R x\ y\ dxdy$$

Tendo o seguinte:

$$R = \{(x, y) \in \mathbb{R}^2 / \ 4 - 2x \leq y \leq 4 - x^2\}$$

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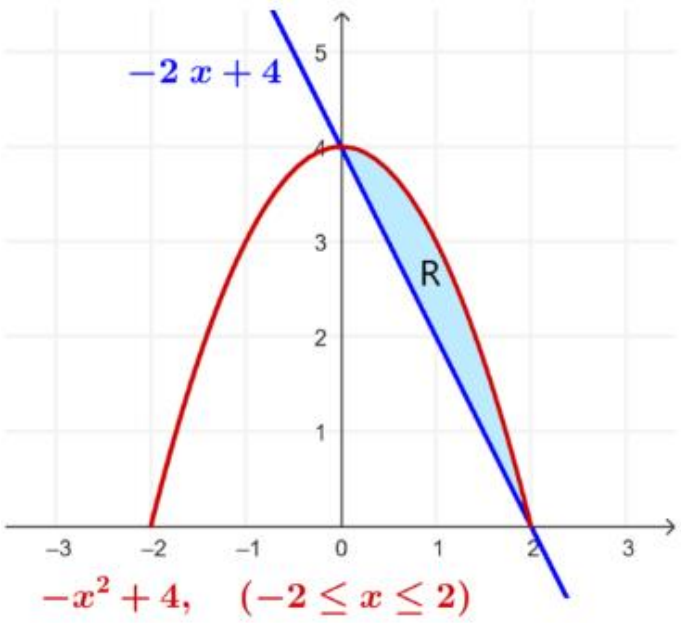


$$\int_0^2 \left[ \int_{4-2x}^{4-x^2} x\, y\, dy \right] dx$$

$$\left[ x \int_{4-2x}^{4-x^2} y dy \right] = \frac{1}{2}x^2(x-2)^2(x+4)$$

$$\int_0^2 \left[ \frac{1}{2}x^2(x-2)^2(x+4) \right] dx = \int_0^2 \left( \frac{1}{2}x^5 - 6x^3 + 8x^2 \right) dx$$

$$= \left[ \frac{x^6}{12} - \frac{6x^4}{4} + \frac{8x^3}{3} \right]_0^2 = \frac{8}{3}$$

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3. Calcular a integral abaixo:

$$\int_{y=0}^{2}\int_{y=0}^{x^2} y\,dy\,dx$$

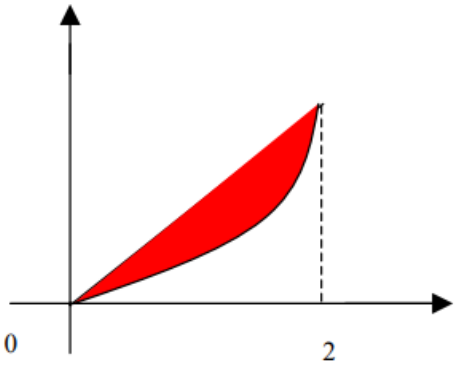
$$\frac{1}{2}\int_{0}^{2} y^2 \Big|_{0}^{x^2} dx$$

$$\frac{1}{2}\int_{0}^{2} x^4\,dx$$

$$\frac{1}{2}\cdot\frac{1}{5}x^5\Big|_{0}^{2}$$

$$\frac{1}{10}(2)^5 = \frac{32}{10} = \frac{16}{5}$$

4. Determinar a área da região limitada:




$$\begin{cases} y = x^3 \\ y = 4x \end{cases}$$

$$x^3 - 4x = 0 \begin{cases} 0 \\ +2 \\ -2 \end{cases}$$

$$R = \begin{cases} 0 \le x \le 2 \\ x^3 \le y \le 4x \end{cases}$$

$$A = \int_{x=0}^{2}\int_{y=x^3}^{4x} dy\,dx$$

$$A = \int_{0}^{2} y \Big|_{x^3}^{4x} dx$$

$$A = \int_{0}^{2} \left(4x - x^3\right)dx = 4\frac{x^2}{2} - \frac{x^4}{4}\Big|_{0}^{2} = 4$$

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5. Calcular a integral tripla:

$$\int_0^1 \int_0^{1-x} \int_0^{1-x-z} x^2 \, dz \, dy \, dx$$

$$= \int_0^1 \int_0^{1-x} x^2(1-x-y) \, dy \, dx = \int_0^1 \int_0^{1-x} (x^2 - x^3 - x^2 y) \, dy \, dx$$

$$= \int_0^1 \left( x^2 y - x^3 y - x^2 \frac{y^2}{2} \right) \Big|_0^{1-x} dx = \int_0^1 \left( x^2(1-x) - x^3(1-x) - \frac{x^2}{2}(1-x)^2 \right) dx$$

$$= \int_0^1 \left( \frac{x^2}{2} - x^3 + \frac{x^4}{2} \right) dx = \left[ \frac{1}{2} \cdot \frac{x^3}{3} - \frac{x^4}{4} + \frac{1}{2} \cdot \frac{x^5}{5} \right] \Big|_0^1 = \frac{1}{60}.$$

6. Calcular a integral tripla: