**UNIVERSIDADE FEDERAL DA GRANDE DOURADOS**
**Cálculo 2 — Avaliação P1**
**Prof. Adriano Barbosa**

Química 24/04/2026

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| 1 | |
| 2 | |
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| Nota | |

**Aluno(a):** .....

**Todas as respostas devem ser justificadas.**

1. (2 pts) Encontre todas as $f$ tais que $f'(x) = \frac{5}{2}x^3 - \frac{2}{x^2}$.

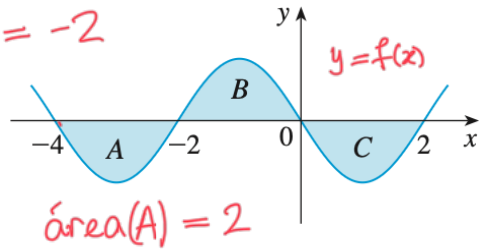
$f(x) = \frac{5}{2}\cdot\frac{x^4}{4} - 2\frac{x^{-1}}{-1} + C = \frac{5}{8}x^4 + \frac{2}{x} + C$

$= \frac{5}{2}x^3 - 2x^{-2}$

2. (2 pts) Determine o valor da intergal $\int_{-4}^{2} f(x) + 3x^2 - 1\ dx$ sabendo que a área de cada região é 2.

$\int_{-4}^{2} f(x)\,dx + \int_{-4}^{2} 3x^2 - 1\,dx$

$\int_{-4}^{2} f(x)\,dx = -2 + 2 - 2 = -2$




$-2 + x^3 - x \Big|_{-4}^{2}$

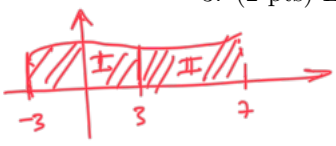
$-2 + 8 - 2 - (-64 + 4)$

$-2 + 6 + 60$

$-2 + 66 = 64$

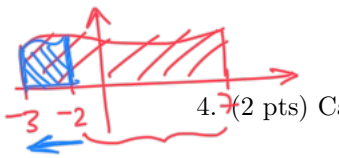
área(A) = 2
área(B) = 2
área(C) = 2

3. (2 pts) Escreva como uma única integral na forma $\int_a^b f(x)\ dx$:




$\int_{-3}^{3} f(x)\,dx + \int_{3}^{7} f(x)\,dx - \int_{-3}^{-2} f(x)\,dx$

$\int_{-3}^{7} f(x)\,dx + \int_{-2}^{-3} f(x)\,dx = \int_{-2}^{7} f(x)\,dx$




4. (2 pts) Calcule a integral $\int_9^1 \frac{t-1}{\sqrt{t}}\ dt$.

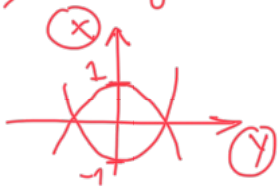
$\int_9^1 \frac{t-1}{\sqrt{t}}\,dt = \int_9^1 (t-1)\,t^{-1/2}\,dt = \int_9^1 t^{1/2} - t^{-1/2}\,dt$

$= \frac{t^{3/2}}{3/2} - \frac{t^{1/2}}{1/2}\Big|_9^1 = \frac{2}{3}t^{3/2} - 2t^{1/2}\Big|_9^1 = \frac{2}{3}1^{3/2} - 2\cdot 1^{1/2} - \frac{2}{3}9^{3/2} + 2\cdot 9^{1/2}$

$= \frac{2}{3} - 2 - \frac{2}{3}\cdot 27 + 2\cdot 3 = \frac{2}{3} - \frac{6}{3} - \frac{54}{3} + \frac{18}{3} = -\frac{40}{3}$.

5. (2 pts) Calcule a área da região delimitada pelas curvas $x = 1 - y^2$ e $x = y^2 - 1$.

$x = 1 - y^2$
$x = y^2 - 1$




*Boa Prova!*

$9^{3/2} = (9^{1/2})^3 = (\sqrt{9})^3$

Solução

① Calculando a primitiva:

$$f'(x) = \frac{5}{2}x^3 - 2x^{-2} \Rightarrow f(x) = \frac{5}{2}\cdot\frac{x^4}{4} - 2\cdot\frac{x^{-1}}{-1} + C$$

$$\Rightarrow f(x) = \frac{5}{8}x^4 + \frac{2}{x} + C.$$

②
$$\int_{-4}^{2} f(x) + 3x^2 - 1\,dx = \int_{-4}^{2} f(x) + \int_{-4}^{2} 3x^2 - 1\,dx$$

$$= -2 + \left(x^3 - x\Big|_{-4}^{2}\right) = -2 + (8-2) - (-64+4) = 64.$$

③
$$\int_{-3}^{3} f(x)\,dx + \int_{3}^{7} f(x)\,dx - \int_{-3}^{-2} f(x)\,dx$$

$$= \int_{-3}^{7} f(x)\,dx - \int_{-3}^{-2} f(x)\,dx = \int_{-3}^{7} f(x) + \int_{-2}^{-3} f(x)\,dx$$

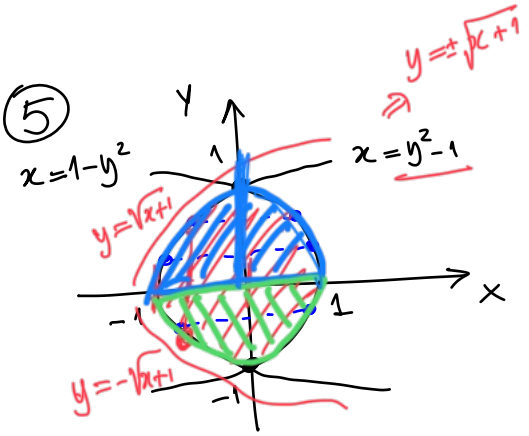
$$= \int_{-2}^{-3} f(x)\,dx + \int_{-3}^{7} f(x)\,dx = \int_{-2}^{7} f(x)\,dx.$$

④
$$\int_{9}^{1} \frac{t-1}{\sqrt{t}}\,dt = \int_{9}^{1} \frac{t}{\sqrt{t}} - \frac{1}{\sqrt{t}}\,dt = \int_{9}^{1} t^{1/2} - t^{-1/2}\,dt$$

$$= \frac{2}{3}t^{3/2} - 2t^{1/2}\Big|_{9}^{1} = \frac{2}{3}\cdot 1^{3/2} - 2\cdot 1^{1/2} - \left(\frac{2}{3}\cdot 9^{3/2} - 2\cdot 9^{1/2}\right)$$

$$= \frac{2}{3} - 2 - \left(\frac{2}{3}\cdot 27 - 2\cdot 3\right) = \frac{2}{3} - 2 - 18 + 6 = \frac{2-6-54+18}{3} = -\frac{40}{3}.$$

⑤



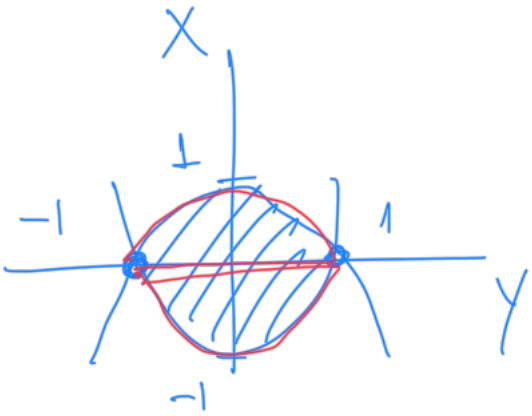

Interseção:

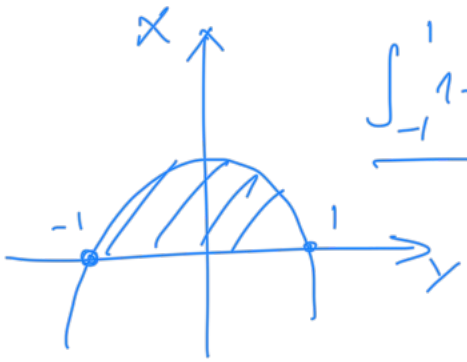
$$1-y^2 = y^2-1 \Rightarrow 2y^2 = 2 \Rightarrow y^2 = 1 \Rightarrow y = \pm 1$$

$$\therefore A = \int_{-1}^{1} 1-y^2-(y^2-1)\,dy = \int_{-1}^{1} -2y^2+2\,dy$$

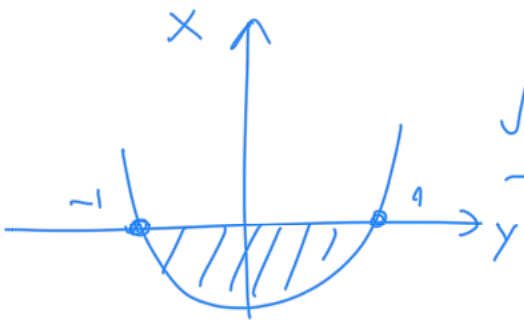
$$= 2\int_{-1}^{1} -y^2+1\,dy = 2\left(-\frac{y^3}{3}+y\Big|_{-1}^{1}\right)$$

$$= 2\left[-\frac{1}{3}+1+\frac{(-1)}{3}-(-1)\right] = 2\cdot\left[-\frac{2}{3}+2\right] = 2\cdot\frac{4}{3} = \frac{8}{3}.$$




$$\int_{-1}^{1} 1-y^2\,dy$$




$$\int_{-1}^{1} 1+y^2\,dy$$