unesc

Lucas Orestes Fabris

Resolução prova Cálculo 2

1a) Concavidade -16

b) [-4,4]

c) $\int_{-4}^{4} x^2 - 16 dx = \frac{x^{2+1}}{2+1} - 16x = \frac{x^3}{3} - 16x$

$f(4) - f(-4)$

$\left[\frac{(4)^3}{3} - 16 \cdot 4\right] - \left[\frac{(-4)^3}{3} - 16 \cdot (-4)\right]$

$\left[\frac{64}{3} - 64\right] - \left[-\frac{64}{3} + 64\right]$

$\left[\frac{64 - 192}{3}\right] - \left[\frac{-64 + 192}{3}\right]$

$\left[-\frac{128}{3}\right] - \left[\frac{128}{3}\right]$

$-\frac{256}{3}$ u.a //

2- $\int_{-2}^{1} (5x^3 + 2x)^2 dx = \int_{-2}^{1} (5x^3 + 2x) \cdot (5x^3 + 2x) dx =$

$\int_{-2}^{1} (25x^6 + 20x^4 + 4x^2$

2 - continuação

$$\int_{-2}^{1} 25x^6 - 20x^4 + 4x^2$$

$$\int 25x^6\,dx \int +20x^4\,dx \int 4x^2\,dx$$

$$25 \cdot \int x^6\,dx + 20 \int x^4\,dx + 4 \cdot \int x^2\,dx$$

$$25 \cdot \frac{1}{6+1} \cdot x^{6+1} + 20 \cdot \frac{1}{4+1} \cdot x^{4+1} + 4 \cdot \frac{1}{2+1} x^{2+1}$$

$$\frac{25}{7}x^7 + 4x^5 + \frac{4}{3}x^3$$

a) $f(b) = f(1)$

$$\frac{25}{7} \cdot (1)^7 + 4 \cdot 1^5 + \frac{4}{3} \cdot (1)^3$$

$$\frac{25}{7} + \frac{4}{1} + \frac{4}{3} = \frac{187}{21}$$

b) $f(a) = f(-2)$

$$\frac{25}{7} \cdot (-2)^7 + 4 \cdot (-2)^5 + \frac{4}{3} \cdot (-2)^3$$

$$\frac{25}{7} \cdot (-128) + \frac{4}{1} \cdot (-32) + \frac{4}{3} \cdot (-8)$$

$$-\frac{3200}{7} - \frac{128}{1} - \frac{32}{3} = -\frac{12512}{21}$$

c) $f(1) - f(-2)$

$$\frac{187}{21} + \frac{12512}{21}$$

$$\frac{4233}{7}$$

3. $\int \frac{-40x^5 + 24^3 + 16x}{4x}\, dx$

$\frac{1}{4} \cdot \int \frac{-40x^5 + 24x^3 + 16x}{x}\, dx$

$\frac{1}{4}\left(-\int \frac{40x^5}{x}\, dx \int \frac{24x^3}{x}\, dx + \int \frac{16x}{x}\, dx\right.$

$\frac{1}{4}(-8x^5 + 8x^3 + 16x)$

$2x(-x^4 + x^2 + 2) + C$

4- 2) $\int 6x^2 + 4x\, dx = 6\int x^2\, dx + 4\int x\, dx$

$6 \cdot \frac{1}{3} x^3 + 4 \cdot \frac{1}{2} x^2 + C$

$f(x) = 2x^3 + 2x^2 + C$ $\boxed{2x^3 + 2x^2 + C}$

$f(-2) = -1$

$2 \cdot (-2)^3 + 2(-2)^2 + C = -1$

$-16 + 8 + C = -1$

$C = 7$

5. $\int (9x^2 - x^{2/3})\, dx \rightarrow \frac{9x^3}{3} - \frac{x^{2/3+1}}{2/3+1} \rightarrow 3x^3 - \frac{x^{\frac{2+3}{3}}}{\frac{2+3}{3}}$

$3x^3 - \frac{x^{5/3}}{5/3} \rightarrow 3x^3 - \frac{3x^{5/3}}{5}$

$f(1) = (3(1)^3 - \frac{3(1)^{5/3}}{5} \rightarrow 3 - \frac{3}{5} \rightarrow \frac{15-3}{5} \rightarrow \frac{12}{5}$

$f(-1) = (3(-1)^3 - \frac{3(-1)^{5/3}}{5} \rightarrow -3 + \frac{3}{5} \rightarrow \frac{-15+3}{5} \rightarrow -\frac{12}{5}$

$5 - \lim \text{d} \; f(1) - f(-1) = \frac{12}{5} - \left(-\frac{12}{5}\right) \rightarrow \frac{12}{5} + \frac{12}{5} = \frac{24}{5}$

$\frac{24}{5}$ u.a. //

$6, \frac{dy}{dx} = -12x^5 - 5x^4 + 16x^3 + 9x^2 + 8x + 4$

$\int -12x^5 dx - \int 5x^4 dx + \int 16x^3 dx + \int 9x^2 dx + \rightarrow$

$\rightarrow \int 8x \, dx + \int 4 \, dx =$

$-12 \cdot \frac{1}{5+1} x^{5+1} = -12 \cdot \frac{1}{6} \cdot x^6 = -\frac{12x^6}{6} = -2x^6$ //

$-5 \cdot \frac{1}{4+1} x^{4+1} = \frac{-5}{5} x^5 = -1x^5$ //

$16 \cdot \frac{1}{3+1} \cdot x^{3+1} = 16 \cdot \frac{1}{4} \cdot x^4 = \frac{16}{4} x^4 = 4x^4$ //

$9 \cdot \frac{1}{2+1} \cdot x^{2+1} = \frac{9x^3}{3} = 3x^3$ //

$8 \cdot \frac{1}{1+1} x^{1+1} = \frac{8x^2}{2} = 4x^2$

$4 \cdot \frac{1}{0+1} x^{0+1} = 4x$ //

$-2x^6 - 1x^5 + 4x^4 + 3x^3 + 4x^2 + 4x + C$

7- $y = -x^2 + 6x - 5$

$\int_1^3 -x^2 + 6x - 5 \, dx =$

$\int -x^2 \, dx + \int 6x \, dx - \int 5x^0 \, dx =$

$-1 \int x^2 \, dx + 6 \int x \, dx - 5 \int x^0 \, dx$

$-1 \cdot \frac{1}{2+1} x^{2+1} + 6 \cdot \frac{1}{1+1} x^{1+1} - 5 \cdot \frac{1}{0+1} x^{0+1} =$

$-\frac{1}{3} x^3 + \frac{6x^2}{2} - \frac{5}{1} x =$

$$\boxed{F = -\frac{1}{3}x^3 + 3x^2 - 5x}$$

$F(b) = F(3) = -\frac{1}{3} \cdot (3)^3 + 3 \cdot (3)^2 - 5(3) = -\frac{27}{3} + 27 - 15 = 3$

$F(a) = F(1) = -\frac{1}{3}(1)^3 + 3(1^2) - 5 \cdot (1) = -\frac{1}{3} + 3 - 5 = -\frac{7}{3}$

$F(b) - F(a) = 3 + \frac{7}{3} = \frac{9+7}{3} = \frac{16}{3}$

$8 - \int_{-5}^{5} x^2\,dx - \int_{-5}^{5} 25\,dx$

$\frac{250}{3} - 250$

$\frac{-500}{3} = -166{,}666$

$9x^2 + 3x - 8 + 2x^2 + 3x - 17 \quad [-5, 5]$

$9 - x^2 - 12x + 27$

$\frac{+12}{2} = 6$

$36 - 72 + 27 = -9$

$[-1, -9]$

$\int x^2 = \frac{x^3}{3}$

$\int -12x = -\frac{12x^2}{2} = -6x^2$

$\frac{x^3}{3} - 6x^2 + 27x$

$\left(\frac{(-1)^3}{3} - 6(-1)^2 + 27(-1) \right)$

$\frac{(-1)^3}{3} - 6 - 27$

$-\frac{1}{3} - 33 = -\frac{100}{3}$

$\frac{-9}{3}^3 - 6(-9)^2 + 27(-9)$

$-243 - 486 - 243 = -972$

$\int -\frac{100}{3} - (-972) = 972 - \frac{100}{3} = 938{,}660$