Gabarito - AV1 - Cálculo II

① $f(x) = 15x^{2/3} + 2x \quad , \quad F(1) = 3$

$F(x) = ?$

$F(x) = \int 15x^{2/3} + 2x \, dx = ?$

$F(x) = \int 15x^{2/3} \, dx + \int 2x \, dx$

$F(x) = 15 . \int x^{2/3} \, dx + 2 . \int x \, dx$

$F(x) = 15 . \frac{1}{\frac{2}{3}+1} . x^{\frac{2}{3}+1} + 2 . \frac{1}{1+1} . x^{1+1} + C$

$F(x) = \frac{15}{\frac{5}{3}} x^{5/3} + \frac{2}{2} x^2 + C$

$F(x) = \cancel{15}^{3} . \frac{3}{\cancel{5}} \sqrt[3]{x^5} + x^2 + C$

$F(x) = 9 . \sqrt[3]{x^5} + x^2 + C$

$F(1) = 3 = ?$

$\Rightarrow \quad 9 . \sqrt[3]{1^5} + 1^2 + C = 3$

$9 . 1 + 1 + C = 3$

$9 + 1 + C = 3$

$10 + C = 3$

$\boxed{C = -7}$ "Alternativa B"

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② $f(x) = x^2 - 8$ e $g(x) = 8 - 3x^2$

a) $x^2 - 8 = 8 - 3x^2$

$x^2 + 3x^2 - 8 - 8 = 0$

$4x^2 - 16 = 0$

$4x^2 = 16$

$x^2 = \frac{16}{4}$

$x^2 = 4$

$x = \pm\sqrt{4}$

$x = \pm 2$

Limite inferior $= a = -2$
Limite superior $= b = +2$

b) Área $= \int 4x^2 - 16 \, dx$

$= \int 4x^2 \, dx - \int 16 \, dx$

$= 4 . \int x^2 \, dx - 16 . \int x^0 \, dx$

$= 4 . \frac{1}{2+1} x^{2+1} - 16 . \frac{1}{0+1} . x^{0+1}$

$= \boxed{\frac{4}{3} x^3 - 16x} \rightarrow$ Área

$F(2) = \frac{4}{3} . (2)^3 - 16 . (2) = \frac{32}{3} - \frac{32}{1} = \frac{32 - 96}{3} = -\frac{64}{3}$

$F(-2) = \frac{4}{3} . (-2)^3 - 16 . (-2) = -\frac{32}{3} + \frac{32}{1} = \frac{-32 + 96}{3} = \frac{64}{3}$

$F(2) - F(-2) = -\frac{64}{3} - \frac{64}{3} = \left| -\frac{128}{3} \right|$ u.a

(3) $f(x) = x^2 + 6x - 7 \rightarrow \begin{cases} a = -7 \\ b = +1 \end{cases}$

$$\text{Área} = \int x^2 + 6x - 7 \, dx$$

$$= \int x^2 \, dx + \int 6x \, dx - \int 7 \, dx$$

$$= \frac{1}{3}x^3 + \frac{6}{2}x^2 - 7x$$

$$= \boxed{\frac{1}{3}x^3 + 3x^2 - 7x} \rightarrow \text{Área}$$

$$F(1) = \frac{1}{3} \cdot 1^3 + 3 \cdot 1^2 - 7 \cdot 1 = \frac{1}{3} + 3 - 7 = \frac{1 + 9 - 21}{3} = -\frac{11}{3}$$

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

$$= -\frac{343}{3} + 147 + 49 = \frac{-343 + 441 + 147}{3} = \frac{245}{3}$$

$$F(1) - F(-7) = -\frac{11}{3} - \frac{245}{3} = \left| -\frac{256}{3} \right| \text{ u.a.}$$

④ (V)

(V)

(F) ... sendo deslocada "VERTICALMENTE" ...

⑤ (F) ... e o eixo das abscissas ou ordenadas.

⑥ $\int \frac{12x^5 - 9x^4 + 6x^3}{3x^2} dx = ?$

$$\int \frac{12x^5}{3x^2} - \frac{9x^4}{3x^2} + \frac{6x^3}{3x^2} dx =$$

$$\int 4x^3 - 3x^2 + 2x \, dx =$$

$$\cancel{4} \cdot \frac{1}{\cancel{4}} x^4 - \cancel{3} \cdot \frac{1}{\cancel{3}} x^3 + \cancel{2} \cdot \frac{1}{\cancel{2}} x^2 + C =$$

$$= \underbrace{x^4 - x^3 + x^2 + C}_{} \; \rightarrow \; \underbrace{\text{Alternativa A}}_{}$$

7 $f(x) = 3x^3 - 2x \quad , \quad F(1) = 3$

$F(x) = \int 3x^3 - 2x \, dx = ?$

$F(x) = \int 3x^3 dx - \int 2x \, dx$

$F(x) = 3 \cdot \frac{1}{4} x^4 - \cancel{2} \cdot \frac{1}{\cancel{2}} x^2 + C$

$F(x) = \frac{3}{4} x^4 - x^2 + C$

$F(1) = 3 = ?$

$\Rightarrow \frac{3}{4} \cdot 1^4 - 1^2 + C = 3$

$\frac{3}{4} - 1 + C = 3$

$C = 3 - \frac{3}{4} + 1$

$C = \frac{12 - 3 + 4}{4}$

$C = \frac{13}{4}$

$$\boxed{F(x) = \frac{3}{4} x^4 - x^2 + \frac{13}{4}}$$

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