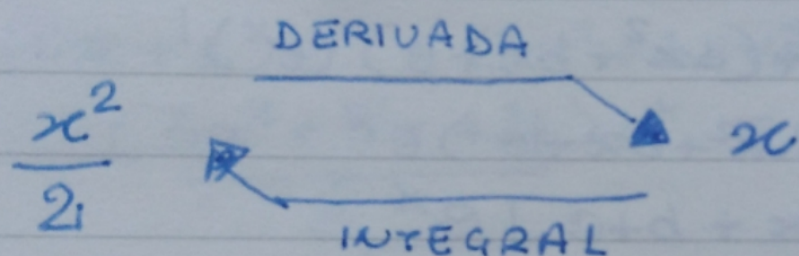
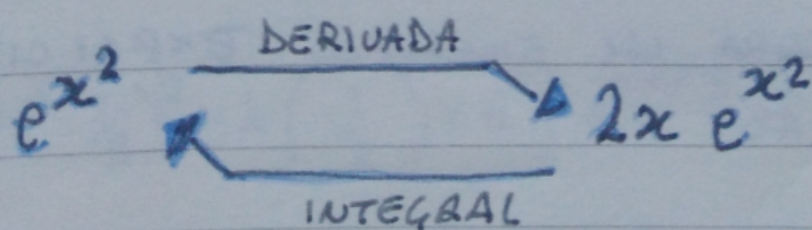
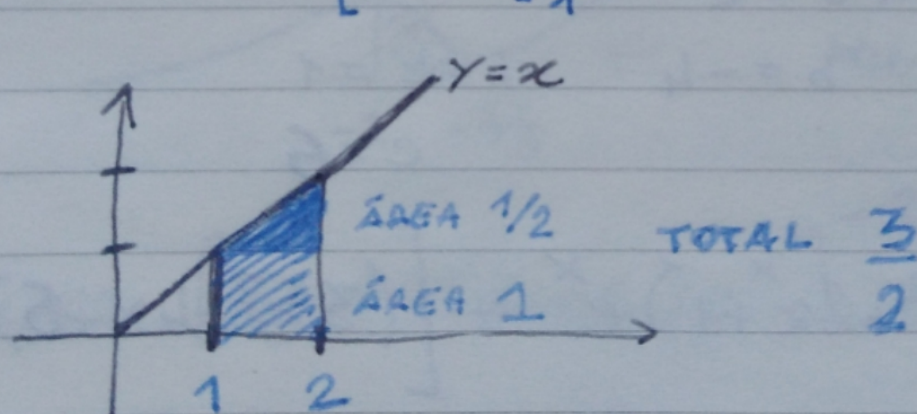


NÚMEROS PODEM SER LEVADO DE UM LADO PARA OUTRO



$$\int_1^2 dx \quad x = \left[\frac{x^2}{2} \right]_1^2 = \frac{2^2}{2} - \frac{1^2}{2} = \frac{3}{2}$$



$\begin{array}{c} \text{DERIVADA} \\ \hline ? \quad \quad \quad \rightarrow (3x^2 + 2x + 2)e^x \\ \hline \text{INTEGRAL} \end{array}$

COMO RESOLVER ESTE PROBLEMA?

$$[(ax^2 + bx + c)e^x]' = (3x^2 + 2x + 2)e^x$$

$$\begin{aligned}
 & (ax^2 + bx + c)'e^x + (ax^2 + bx + c)(e^x)' \\
 & (2ax + b)e^x + (ax^2 + bx + c)e^x \\
 & [ax^2 + (2a + b)x + b + c]e^x \\
 & (3x^2 + 2x + 2)e^x
 \end{aligned}$$

$$a = 3 \quad 2a + b = 2 \quad b + c = 2$$

$$6 + b = 2$$

$$b = -4 \quad -4 + c = 2$$

$$c = 6$$

$$\int_{\alpha}^{\beta} dx (3x^2 + 2x + 1)e^x = \left[(3x^2 - 4x + 6)e^x \right]_{\alpha}^{\beta}$$

VEREMOS AGORA UM EXEMPLO EXPLICITO DE APLICAÇÃO

ESTUDAMOS A FUNÇÃO
 $(3x^2 + 2x + 2)e^x$

E CALCULAMOS A ÁREA
ENTRE O MAX E MIN

ENCONTRAMOS MAX E MIN

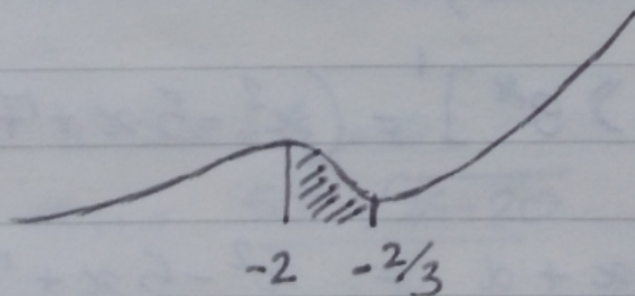
$$[(3x^2 + 2x + 2)e^x]' = 0$$

$$(3x^2 + 2x + 2)'e^x + (3x^2 + 2x + 2)(e^x)' = 0$$

$$(6x + 2)e^x + (3x^2 + 2x + 2)e^x = 0$$

$$(3x^2 + 8x + 4)e^x = 0$$

$$x = \frac{-4 \pm \sqrt{16 - 12}}{3} = \frac{-4 \pm 2}{3} \quad \begin{matrix} -2 \\ -2/3 \end{matrix}$$



$$\text{MAX } (-2, 10e^{-2})$$

$$\text{MIN } (-\frac{2}{3}, 2e^{-2/3})$$

$$\text{ÁREA } [(3x^2 - 4x + 6)e^x]_{-2/3}^{-2}$$

$$[3(-2)^2 - 4(-2) + 6]e^{-2}$$

$$[3(-\frac{2}{3})^2 - 4(-\frac{2}{3}) + 6]e^{-2/3}$$

$$(12 + 8 + 6)e^{-2} - (\frac{4}{3} + \frac{8}{3} + 6)e^{-2/3}$$

$$\boxed{26e^{-2} - 10e^{-2/3}} \quad \text{ÁREA}$$

$$\text{MAX} \in \text{MIN} \quad \frac{1}{2} \in \frac{2}{1}$$

$$(x-1)(x-2) = x^2 - 3x + 2$$

$$x^2 + ax + b + 2x + a = x^2 - 3x + 2$$

$$a + 2 = -3$$

$$a = -5$$

$$a + b = 2$$

$$b = 7$$

função ~~$(x^2 - 5x + 7)e^x$~~

$$\text{MAX: } (1 - 5 + 7)e = 3e$$

$$\text{MIN: } (4 - 10 + 7)e^2 = e^2$$

derivada $(2x - 5 + x^2 - 5x + 7)e^x$

$$(x^2 - 3x + 2)e^x$$

$$(x-1)(x-2)e^x$$

integração

$$[(x^2 + \alpha x + \beta)e^x]' = (x^2 - 5x + 7)e^x$$

$$x^2 + \alpha x + \beta + 2x + \alpha = x^2 - 5x + 7$$

$$\alpha + 2 = -5$$

$$\alpha = -7$$

$$\alpha + \beta = 7$$

$$\beta = 14$$

$$\int_1^2 dx (x^2 - 5x + 7)e^x = \left[(x^2 - 7x + 14)e^x \right]_1^2$$

$$(4 - 14 + 14)e^2 - (1 - 7 + 14)e$$

$$(4e - 8)e \quad \text{ÁREA}$$

$$\text{MAX: } (1, 3e)$$

$$\text{MIN: } (2, e^2)$$