

EXERCÍCIOS PROPOSTOS



I - Resolva as seguintes integrais:

$$1. \int x^2 e^x dx = x^2 e^x - 2xe^x - 2e^x + C$$

$$2. \int x \sin 3x \, dx = -\frac{1}{3}x \cos 3x + \frac{1}{9} \sin 3x + C$$

$$3. \int \ln(3x - 2) \, dx = x \ln(3x - 2) - x - \frac{2}{3} \ln(3x - 2) + C$$

$$4. \int \operatorname{arctg}(3x) \, dx = x \operatorname{arctg}(3x) - \frac{1}{6} \ln(1 + 9x^2) + C$$

$$5. \int x \sqrt{x+1} \, dx = \frac{2x\sqrt{(x+1)^3}}{3} - \frac{4\sqrt{(x+1)^5}}{15} + C$$

II - Determine a substituição u , completando o quadrado:

$$a) \int \frac{1}{x^2 - 2x + 10} dx = \int \frac{1}{u^2 + 3^2} du \quad u =? \quad R: u = x - 1$$

$$b) \int \sqrt{x^2 - 6x + 8} dx = \int \sqrt{u^2 - 1} du \quad u =? \quad R: u = x - 3$$

$$c) \int \frac{3}{x^2 - 4x + 1} dx = 3 \int \frac{1}{u^2 - 3} du \quad u =? \quad R: u = x - 2$$

$$d) \int \frac{1}{x^2 + 6x + 13} dx = \int \frac{1}{u^2 + 4} du \quad u =? \quad R: u = x + 3$$

III - Resolva as seguintes integrais:

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$$1. \int \frac{dx}{x^2 - 4x + 5} = \arctg(x - 2) + C$$

$$2. \int \frac{dx}{\sqrt{3 + 2x - x^2}} = \arcsen\left(\frac{x - 1}{2}\right) + C$$

$$3. \int \frac{dx}{\sqrt{x^2 - 6x + 10}} = \ln\left[x - 3 + \sqrt{(x - 3)^2 + 1}\right] + C$$

$$4. \int \frac{dx}{x^2 + 4x + 3} = \frac{1}{2} \ln\left(\frac{x + 1}{x + 3}\right) + C$$

$$5. \int \frac{(2x + 5)dx}{x^2 + 2x + 5} = \ln(x^2 + 2x + 5) + \frac{3}{2} \arctg\left(\frac{x + 1}{2}\right) + C$$