**4ª LISTA DE EXERCÍCIOS - Métodos Matemáticos**
**(Fator Integrante)**
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**1)** Resolva as equações diferenciais:

**a)** $x\frac{dy}{dx}+2y=3$ ; R: $y=\frac{3}{2}+cx^{-2}$.

**b)** $y'=2y+x^2+5$; R: $y=-\frac{1}{2}(x^2+x+\frac{11}{2})+c\,e^{2x}$.

**c)** $xdy=(x\,\mathrm{sen}(x)-y)dx$; R: $y=\frac{1}{x}\mathrm{sen}(x)-\cos(x)+\frac{c}{x}$.

**d)** $(1+x^2)dy+(xy+x^3+x)dx=0$; R: $y=-\frac{1}{3}(1+x^2)\ +\frac{c}{\sqrt{1+x^2}}$.

**e)** $\cos(x)\frac{dy}{dx}+y\,\mathrm{sen}(x)=1$; R: $y=\mathrm{sen}(x)+c\cos(x)$.

**f)** $\cos^2(x)\,\mathrm{sen}(x)dy+(y\cos^3(x)-1)dx=0$; R: $y=\sec(x)+c\,\mathrm{cossec}(x)$.

**g)** $(1-\cos(x))dy+(2y\,\mathrm{sen}(x)-\mathrm{tg}(x))dx=0$;
R: $y=[1-\cos(x)]^{-2}(\ln|\sec(x)|+\cos(x)+c)$.

**h)** $e^{\frac{x^2}{2}+x}[\,x+x^2(x+1)\,]=\frac{dy}{dx}+(x+1)y$; R: $y=\frac{1}{2}x^2e^{\frac{x^2}{2}+x}+ce^{-\frac{x^2}{2}-x}$;

**i)** $x\frac{dy}{dx}+2y=e^x+\ln(x)$; R: $y=\frac{e^x}{x}-\frac{e^x}{x^2}+\frac{1}{2}\ln(x)-\frac{1}{4}+\frac{c}{x^2}$.

**j)** $\frac{dy}{dx}+y=\frac{1-e^{-2x}}{e^x+e^{-x}}$; R: $y=e^{-x}\{Ln\,|\,e^x+e^{-x}\,|+c\}$.