Carlos Luilquin Almida Santos
20150465

Trabalho 1   CIV

a) $\dfrac{dy}{dx} + xy = ay$

$a = 5 + 1$

$a = 6$

$\dfrac{dy}{dx} + xy = 6y$

$\dfrac{dy}{dx} = 6y - xy$

$\dfrac{dy}{dx} = y(6-x)$

$\displaystyle\int \dfrac{dy}{y} = \int (6-x)\,dx$

$\ln|y| = 6x - x^2/2 + C$

$e^{\ln|y|} = e^{(6x - x^2/2 + C)}$

$|y| = e^{6x - x^2/2 + C}$

$|y| = \pm\, e^{6x - x^2/2 + C}$

$|y| = e^{C} \cdot e^{6x - x^2/2}$

$|y| = K \cdot e^{6x - x^2/2}$

$y = \pm\, K \cdot e^{6x - x^2/2}$

$\therefore\ y = K \cdot e^{6x - x^2/2}$

b) $\qquad y = K \cdot e^{6x - x^2/2}$

$\dfrac{dy}{dx} + xy - 6y = 0$

$y' = K \cdot e^{u} \;\rightarrow\; y' = K e^{6x - x^2/2} \cdot (6-x)$

$u = 6x - x^2/2$

$\dfrac{du}{dx} = 6 - 2x/2$

$\dfrac{du}{dx} = 6 - x$

. Substituindo:

$(K e^{6x - x^2/2})(6-x) - (K \cdot e^{6x - x^2/2})(6-x) = 0$

$0 = 0$

$\therefore\ y = K \cdot e^{6x - x^2/2}$ é uma das possíveis soluções

e) $\quad y = Ke^{6x - x^2/2}$

$\dfrac{42-49}{2} = \dfrac{84-49}{2} = \dfrac{35}{2}$

$PVI: \quad y(x_0) = y_0$

$y_0 = 4 + 1 = 5$

$x_0 = 6 + 1 = 7$

$\quad y(7) = 5$

$5 = e^{6(7) - (7)^2/2} \cdot K$

$5 = e^{42 - 49/2} \cdot K$

$5 = e^{42 - 49/2} \cdot K$

$5 = Ke^{35/2}$

$$\boxed{K = 5/e^{35/2}}$$

$\therefore \quad y = (e^{6x - x^2/2}) \cdot 5/e^{35/2}$

d) Gráfico: Esboço