Universidade de Aveiro
Departamento de Matemática

Cálculo I - C **2024/2025**

Soluções do Exame de Recurso (Versão 1)

1. (a) $D_{f^{-1}} = [\pi, \frac{3\pi}{2}]$ e $CD_{f^{-1}} = [0, 1]$.

   (b) 1.

   (c) 2e.

   (d) $F'(0) = -1$.

   (e) $\frac{2}{3}$.

   (f) $y = \dfrac{C}{|x|\mathrm{e}^{x^2}}, \ C \in \mathbb{R}$.

2. —

3. (a) $-x^2 \cos x + 2x\mathrm{sen}\, x + 2\cos x + C, \ C \in \mathbb{R}$.
   (b) $\ln|x| - \frac{1}{x} - \frac{1}{2}\ln(x^2+1) - \mathrm{arctg}\, x + C, \ C \in \mathbb{R}$.

4. Convergente.

5. $\frac{9}{2}$.

6. $y = x\ln(x^2 + C)$, $C \in \mathbb{R}$.

7. (a) $y_h = C_1 + C_2\mathrm{e}^{-\frac{1}{2}x} + C_3 x\mathrm{e}^{-\frac{1}{2}x}, \quad C_1, C_2, C_3 \in \mathbb{R}$.
   (b) $y_p = \frac{1}{50}\mathrm{e}^{2x}$
   (c) $y = y_h + y_p = C_1 + C_2\mathrm{e}^{-\frac{1}{2}x} + C_3 x\mathrm{e}^{-\frac{1}{2}x} + \frac{1}{50}\mathrm{e}^{2x}, \quad C_1, C_2, C_3 \in \mathbb{R}$.

8. (a) —
   (b) $y(t) = \mathrm{e}^t + t\mathrm{e}^t$, $t \geq 0$.