

Universidade de Aveiro
Departamento de Matemática

Cálculo I - C

2025/2026

Soluções do Exame Final (Época Normal)(Versão 1)

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

(b) 1

(c) f tem um máximo global.

(d) $\frac{39}{32}$

(e) 3

(f) $y = \frac{1}{2} \ln(2e^x + C), C \in \mathbb{R}$.

2. —

3. (a) $\frac{x^2+5}{2} \ln(5 + x^2) - \frac{x^2}{2} + C, C \in \mathbb{R}$

(b) $2 \ln|x-1| - \ln(4+x^2) - \arctg\left(\frac{x}{2}\right) + C, C \in \mathbb{R}$.

4. $\frac{\pi^2 + 16}{32}$

5. —

6. —

7. $y = -\frac{x}{\ln x + C}, C \in \mathbb{R}$ ou $y = 0$ (solução singular).

8. (a) $y_h = C_1 e^x + C_2 x e^x, C_1, C_2 \in \mathbb{R}$.

(b) $y_p = -\frac{1}{2} \operatorname{sen} x$.

(c) $y = C_1 e^x + C_2 x e^x - \frac{1}{2} \operatorname{sen} x, C_1, C_2 \in \mathbb{R}$.

9. $y(t) = e^{-3t} (t + 2t^2), t \geq 0$.