

MAT143 – Cálculo para Ciências Biológicas
Respostas da Lista de Exercícios 3

1. $[H^+] = 10^{-7}$.

2. (a)

$$f'(x) = \lim_{h \rightarrow 0} \frac{(x+h)^2 - x^2}{h} = \lim_{h \rightarrow 0} 2x + h = 2x.$$

(b)

$$\begin{aligned} f'(x) &= \lim_{h \rightarrow 0} \frac{\text{sen}(x+h) - \text{sen } x}{h} \\ &= \lim_{h \rightarrow 0} \frac{\text{sen } x(\cos h - 1) + \text{sen } h \cos x}{h} \\ &= \text{sen } x \lim_{h \rightarrow 0} \frac{\cos h - 1}{h} + \cos x \lim_{h \rightarrow 0} \frac{\text{sen } h}{h} \\ &= \text{sen } x \cdot 0 + \cos x \cdot 1 = \cos x. \end{aligned}$$

(c)

$$\begin{aligned} f'(x) &= \lim_{h \rightarrow 0} \frac{e^{x+h} - e^x}{h} \\ &= e^x \lim_{h \rightarrow 0} \frac{e^h - 1}{h} \\ &= e^x \cdot 1 \\ &= e^x. \end{aligned}$$

3. (a) $18x - 8$

(b) 1

(c) $\text{sen } x + x \cos x$

(d) $18x^2 - 6x + 4$

(e) $\frac{2}{(x+1)^2}$

(f) $\frac{2x^2 + 2x + 2}{(1-x^2)^2}$

(g) $-\frac{1}{\text{sen}^2 x} = -\text{csc}^2 x$

4. (a) x^3

(b) $\frac{4x^3}{3} + x^2 - 5x$

(c) $-\cos x$

5. $y = 7x - 10$

6. (3, 2) e (-3, -2).