LISTA 6 — Rafaella Junqueira

Questão 1:

Calcular $I = \int_0^{0,8} f(x)\,dx$

x	f(x)
0,0	1,0
0,2	1,2408
0,4	1,5735
0,6	2,0333
0,8	2,6965

$I = f(c)(b-a)$

$= 1,2408(0,4-0) + 2,0333\,(0,8-0,4)$

$= 1,2408 \cdot 0,4 + 2,0333 \cdot 0,4$

$= 0,49632 + 0,81332$

$\boxed{I = 1,30964}$

Questão 2:

$$I = \int_0^4 (3x^3 - 3x + 1)\,dx = \frac{3}{4}x^4 - \frac{3x^2}{2} + x \Big|_0^4$$

x_1	x_2	x_3	x_4	x_5
1	1	19	73	181

$$I = \frac{h}{2}\left[1 + 2\cdot 1 + 2\cdot 19 + 2\cdot 73 + 181\right]$$

$= 0,5 \times 368 \rightarrow I = 184$

$$\varepsilon = \frac{184 - 172}{172} \cdot 100$$

$\boxed{\varepsilon = 6,97\,\%}$

Questão 3

* Trapézios

$$I = \frac{0,1}{2}\left[1 + 2(1,10517) + 2(1,22140) + 2(1,34986) + 2(1,49182) + 2(1,64872) + 2(1,82212) + 2(1,01375) + 2(2,22554) + 2(2,45960) + 2,71828\right]$$

$\boxed{I = 1,71971}$

$$\int_0^1 e^x dx = e^x \Big|_0^1 = 2,71828 - 1 = \boxed{1,71828}$$

* Simpsons

$$I = \frac{0,1}{3}\left[1 + 4,(1,10517 + 1,34986 + 1,64872 + 2,01375 + 2,43960) + 2(1,22140 + 1,49182 + 1,82212 + 2,22554) + 2,71828\right]$$

$$= 8,3771 + 6,76088 + 2,71828$$

$$\boxed{I = 1,718281667}$$

Questão 4

$$I = \int_0^{10} e^{-x} dx = -e^{-x} \Big|_0^{10} = -e^{-10} + 1 = 0,999854601$$

$$\int_{-1}^{1} f(t)\,dt = c_1 f(t_1) + c_2 f(t_2) \qquad \begin{cases} c_1 = c_2 = 1 \\ t_1 = -t_2 = \sqrt{\frac{1}{3}} \end{cases}$$

$$f(t) = \frac{b-a}{2} \times f\left(\frac{b-at}{3} + \frac{b+a}{2}\right)$$

$$f(t) = 5e^{-(5t+5)}$$

$$f(+\sqrt{1/3}) = 5e^{-(5\cdot\sqrt{1/3}+5)} = 5e^{-7,88967} = 0,0018784 4$$

$$f(-\sqrt{1/3}) = 5e^{-(-5\sqrt{1/3}+5)} = 0,60422$$

$$I = c_1 f(t_1) + c_2 f(t_2) = 0,0018784 4 + 0,60422 = \boxed{0,606098}$$