

$$1) \quad f(x) = \frac{x^2}{x+3} \quad x_0=0; \quad x_1=1,5; \quad x_2=3$$

$$f(x_0) = f(0) = 0$$

$$f(x_1) = f(1,5) = \frac{(1,5)^2}{1,5+3} = 0,5$$

$$f(x_2) = f(3) = 1,5.$$

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task 3-6 on code.

$$2) \quad P_2(x) = \sum_{j=0}^2 f(x_j) L_j(x), \quad L_j(x) = \prod_{m \neq j} \frac{x - x_m}{x_j - x_m}$$

$$L_0(x) \text{ for } x_0=0,$$

$$L_0(x) = \frac{x - x_1}{x_0 - x_1} \cdot \frac{x - x_2}{x_0 - x_2} = \frac{x - 1,5}{-1,5} \cdot \frac{x - 3}{-3}$$

$$L_0(x) = \frac{(x - 1,5)(x - 3)}{4,5}.$$

$$L_1(x) = L_1,5.$$

$$L_1(x) = \frac{x}{1,5} \cdot \frac{x - 3}{-1,5} = \frac{x(x - 3)}{-2,25}.$$

$$L_2(x) = 3$$

$$L_2(x) = \frac{x}{3} \cdot \frac{x - 1,5}{1,5} = \frac{x(x - 1,5)}{4,5}.$$

now  $P_2$

$$P_2 = \frac{1}{2} \cdot \frac{x(x - 3)}{-2,25} + \frac{3}{2} \cdot \frac{x(x - 1,5)}{4,5}$$

$$\text{First term: } \frac{1}{2} \cdot \frac{1}{2,25} = -\frac{2}{5} \quad -\frac{2}{5}x(x - 3). \quad \cancel{\frac{1}{2}x(x - 1,5)}$$

$$\text{Second term: } \frac{3}{2} \cdot \frac{2}{3} = 1 \quad \frac{1}{3}x(x - 1,5)$$



$$P_2(x) = \left(-\frac{2}{3} + \frac{1}{3}\right)x^2 + \left(\frac{2}{3} - \frac{1}{2}\right)x. \Rightarrow P_2(x) = \frac{1}{3}x^2 + \frac{1}{6}x.$$

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