

S. 116 Nr. 5a) Analysis

$$f(x) = a \cdot (x-1) \cdot (x+1) \cdot (x+2)$$

$$f(2) = -6$$

$$f(2) = 12a$$

$$-6 = 12a$$

$$a = -\frac{1}{2}$$

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

$$= -\frac{1}{2} x^3 - x^2 + \frac{1}{2} x + 1$$

Extremstellen:

$$f'(x) = -\frac{3}{2} x^2 - 2x + \frac{1}{2}$$

$$f''(x) = -3x - 2$$

$$f'(x) = 0$$

$$0 = -\frac{3}{2} x^2 - 2x + \frac{1}{2}$$

$$0 = x^2 + \frac{4}{3} x - \frac{2}{6}$$

$$x_{1,2} = -\frac{2}{3} \pm \sqrt{\left(\frac{2}{3}\right)^2 + \frac{2}{6}}$$

$$x_1 = 0,215$$

$$x_2 = -1,55$$

$$f''(x) = -3x - 2$$

$$f''(0,215) = -3(0,215) - 2$$

$$= -2,645 \Rightarrow \text{Maximum}$$

$$f''(-1,55) = 2,65 \Rightarrow \text{Minimum}$$

$$f(0,215) = -\frac{1}{2} (0,215)^3 - (0,215)^2 + \frac{1}{2} \cdot (0,215) + 1 = 1,056$$

$$f(-1,55) = -0,315$$

$$\text{Max } (0,215 | 1,056) \quad \text{Min } (-1,55 | -0,315)$$

