N. 3 a)

$$T = \frac{b_i - a_i}{2}\left(f(a_i) + f(b_i)\right) = \frac{h}{2}\left(f(a_i) + f(b_i)\right); \quad h = b_i - a_i$$

$$E = \int_{a_i}^{b_i} f(x)\,dx - T = -\frac{1}{12} h^3 f''(\xi); \quad \xi \in [a_i, b_i]$$

$$E_r = -\frac{1}{12}\left(\frac{h}{2}\right)^3 f''(\xi_r) \qquad \xi_r \in [m_i, b_i]$$

$$E_l = -\frac{1}{12}\left(\frac{h}{2}\right)^3 f''(\xi_l) \qquad \xi_l \in [a_i, m_i]$$

$$\tilde{T} = T_r + T_l$$

$$\tilde{E} = E_r + E_l = -\frac{1}{12}\left(\frac{1}{2}\right)^2 h^3 \frac{f''(\xi_r) + f''(\xi_l)}{2}$$

mit $f''(\xi_r) \approx f''(\xi_l) \approx f''(\xi)$ folgt

$$\tilde{E} \approx \frac{1}{4} E$$

$$\Rightarrow \tilde{I} - I = E - \tilde{E} \approx \frac{3}{4} E \approx 3\tilde{E}$$

$$\Rightarrow \tilde{F} = \frac{1}{3}\left|\tilde{I} - T\right| \;//$$