Continued from LaTex Part:

$$f'(x) \approx L'(x) = \sum_{j=-3}^{3} f_j \, \ell_j'(x)$$

$$\ell_j'(x) = \ell_j(x) \cdot \sum_{m \neq 0,j} \frac{1}{x - x_m} = \prod_{m \neq 0,j} \frac{x - x_m}{x_j - x_m} \sum_{m \neq 0,j} \frac{1}{x - x_m}$$

$$\ell_j'(x^*) = \prod_{m \neq 0,j} \frac{x^* - x_m}{x_j - x_m} \sum_{m \neq 0 j} \frac{1}{x^* - x_m} = \frac{1}{jh} \prod_{m \neq j,0} \frac{-m}{m-j}, \text{ let } a_j = \ell_j'(x^*)$$

$$\boxed{a_j = \frac{1}{jh} \prod_{m \neq j,0} \frac{m}{m-j}}$$

$$a_{-3} = \frac{1}{-3h} \left(\frac{-2}{-2+3}\right)\left(\frac{-1}{-1+3}\right)\left(\frac{1}{1+3}\right)\left(\frac{2}{2+3}\right)\left(\frac{3}{3+3}\right)$$

$$= \frac{1}{-3h} \cancel{(-2)}\cancel{\left(\frac{-1}{2}\right)}\left(\frac{1}{4}\right)\left(\frac{2}{5}\right)\cancel{\left(\frac{1}{2}\right)}$$

$$= \frac{-1}{3h}\left(\frac{1}{20}\right) = \boxed{\frac{-1}{60h}}$$

$$a_{-2} = \frac{1}{-2h}\left(\frac{-3}{-3+2}\right)\left(\frac{-1}{-1+2}\right)\left(\frac{1}{1+2}\right)\left(\frac{2}{2+2}\right)\left(\frac{3}{3+2}\right)$$

$$= \frac{1}{+2h} \cancel{(3)}\cancel{(-1)}\cancel{\left(\frac{1}{3}\right)}\left(\frac{1}{2}\right)\left(\frac{3}{5}\right)$$

$$= \frac{1}{2h}\left(\frac{1}{2}\right)\left(\frac{3}{5}\right) = \boxed{\frac{3}{20h}}$$