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

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

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

$$a_1 = \frac{1}{h}\left(\frac{-3}{-3-1}\right)\left(\frac{+\cancel{2}}{+\cancel{3}}\right)\left(\frac{\cancel{1}}{\cancel{2}}\right)\left(\frac{\cancel{2}}{\cancel{1}}\right)\left(\frac{\cancel{3}}{\cancel{2}}\right)$$

$$= \boxed{\frac{3}{4h}}$$

$$a_2 = \frac{1}{\cancel{2}h}\left(\frac{+3}{+5}\right)\left(\frac{\cancel{-2}}{-4}\right)\left(\frac{+1}{+\cancel{3}}\right)\left(\frac{\cancel{1}}{\cancel{-1}}\right)\left(\frac{\cancel{3}}{1}\right)$$

$$= \boxed{\frac{-3}{20h}}$$

$$a_3 = \frac{1}{3h}\left(\frac{1}{\cancel{2}}\right)\left(\frac{+\cancel{2}}{+5}\right)\left(\frac{+1}{4}\right)\left(\frac{+1}{\cancel{2}}\right)\left(\frac{+\cancel{2}}{1}\right)$$

$$= \frac{1}{60h}$$

$$f'(x) \approx L'(x) = \frac{-1}{60h}f(x^*-3h) + \frac{3}{20h}f(x^*-2h) - \frac{3}{4h}f(x^*-h)$$

$$+\frac{3}{4h}f(x^*+h) - \frac{3}{20h}f(x^*+2h) + \frac{1}{60h}f(x^*+3h)$$

$x^* = x_0$

$$L'(x) = \frac{3}{4}\,\frac{f(x_0+h)-f(x_0-h)}{h} - \frac{3}{20}\,\frac{f(x_0+2h)-f(x_0-2h)}{h} + \frac{1}{60}\,\frac{f(x+3h)-f(x-3h)}{h}$$