4b

$$\frac{df(x_0)}{dx} = N_2(h/9) + \frac{1}{27}K_3 h^3 + \cdots$$

$$= N_2(h/9) + C_3 h^3 + C_4 h^4 + C_5 h^5 + \cdots$$

$$= N_2(h/9) + O(h^3)$$

SAY $\dfrac{f(x_0+h) - f(x_0)}{h} \equiv N_0(h)$

THEN $N_2(h/9) = \dfrac{9N_1(h/3) - N_1(h/9)}{8}$

$$= \frac{1}{8}\left[9\left(\frac{3N_0(h) - N_0(h/3)}{2}\right) - \left(\frac{3N_0(h/3) - N_0(h/9)}{2}\right)\right]$$

$$= \frac{9}{16}\left[3\left(\frac{f(x_0+h) - f(x_0)}{h}\right) - \left(\frac{f(x_0+h/3) - f(x_0)}{h/3}\right) - \cdots\right.$$

$$\left. \cdots - 3\left(\frac{f(x_0+h/3) - f(x_0)}{h/3}\right) + \left(\frac{f(x_0+h/9) - f(x_0)}{h/9}\right)\right]$$