8)

$$L_0 = \frac{X - X_1}{X_0 - X_1} \cdot \frac{X - X_2}{X_0 - X_2}, \quad L_1 = \frac{(X - X_0)(X - X_2)}{(X_1 - X_0)(X_1 - X_2)}$$

$$L_2 = \frac{(X - X_0)(X - X_1)}{(X_2 - X_0)(X_2 - X_1)}$$

$$f(x_0)\frac{(x-x_1)(x-x_2)}{(x_0-x_1)(x_0-x_2)}+f(x_1)\frac{(x-x_0)(x-x_2)}{(x_1-x_0)(x_1-x_2)}+f(x_2)\frac{(x-x_0)(x-x_1)}{(x_2-x_0)(x_2-x_1)}=P(x)$$

$$P'(x)=\left((x-x_2)+(x-x_1)\right)\left(\frac{f(x_0)}{(x_0-x_1)(x_0-x_2)}\right)+\left((x-x_2)+(x-x_0)\right)\left(\frac{f(x_1)}{(x_1-x_0)(x_1-x_2)}\right)$$

$$+\left((x-x_1)+(x-x_0)\right)\left(\frac{f(x_2)}{(x_2-x_0)(x_2-x_1)}\right)$$

$$P'(x_0)=\frac{f(x_0)}{(x_0-x_1)}+\frac{f(x_0)}{(x_0-x_2)}+\frac{(x_0-x_2)f(x_1)}{(x_1-x_0)(x_1-x_2)}+\frac{(x_0-x_1)f(x_2)}{(x_2-x_0)(x_2-x_1)}$$

$$=-\frac{2f(x_0)}{2h}-\frac{f(x_0)}{2h}+\frac{4f(x_1)}{2h}-\frac{f(x_2)}{2h}$$

$$=\frac{1}{2h}\left(-3f(x_0)+4f(x_1)-f(x_2)\right)$$