Forward difference formulas of order $O(h)$:

$$f'(x_0) = \frac{f_1 - f_0}{h} - \frac{hf''(c)}{2}$$

$$f''(x_0) = \frac{f_0 - 2f_1 + f_2}{h^2} - hf'''(c)$$

$$f'''(x_0) = \frac{-f_0 + 3f_1 - 3f_2 + f_3}{h^3} - \frac{3hf^{(4)}(c)}{2}$$

Backward difference formulas of order $O(h)$:

$$f'(x_0) = \frac{f_0 - f_{-1}}{h} + \frac{hf''(c)}{2}$$

$$f''(x_0) = \frac{f_0 - 2f_{-1} + f_{-2}}{h^2} + hf'''(c)$$

$$f'''(x_0) = \frac{f_0 - 3f_{-1} + 3f_{-2} - f_{-3}}{h^3} + \frac{3hf^{(4)}(c)}{2}$$

Forward difference formulas of order $O(h^2)$:

$$\circledast \quad f'(x_0) = \frac{-3f_0 + 4f_1 - f_2}{2h} + \frac{h^2 f'''(c)}{3}$$

$$f''(x_0) = \frac{2f_0 - 5f_1 + 4f_2 - f_3}{h^2} + \frac{11h^2 f^{(4)}(c)}{12}$$

Backward difference formulas of order $O(h^2)$:

$$\circledast \quad f'(x_0) = \frac{3f_0 - 4f_{-1} + f_{-2}}{2h} + \frac{h^2 f'''(c)}{3}$$

$$f''(x_0) = \frac{2f_0 - 5f_{-1} + 4f_{-2} - f_{-3}}{h^2} + \frac{11h^2 f^{(4)}(c)}{12}$$

Central difference formulas of order $O(h^2)$:

$$\circledast \quad f'(x_0) = \frac{f_1 - f_{-1}}{2h} - \frac{h^2 f'''(c)}{6}$$

$$\circledast \quad f''(x_0) = \frac{f_1 - 2f_0 + f_{-1}}{h^2} - \frac{h^2 f^{(4)}(c)}{12}$$

$$f'''(x_0) = \frac{f_2 - 2f_1 + 2f_{-1} - f_{-2}}{2h^3} - \frac{h^2 f^{(5)}(c)}{4}$$

Central difference formulas of order $O(h^4)$:

$\circledast$ $f'(x_0) = \dfrac{-f_2 + 8f_1 - 8f_{-1} + f_{-2}}{12h} + \dfrac{h^4 f^{(5)}(c)}{30}$

$f''(x_0) = \dfrac{-f_2 + 16f_1 - 30f_0 + 16f_{-1} - f_{-2}}{12h^2} + \dfrac{h^4 f^{(6)}(c)}{90}$

More difference formulas:

$f'(x_0) = \dfrac{f_1 - f_{-2}}{3h} + \dfrac{hf''(c)}{2}$

$f'(x_0) = \dfrac{f_2 - f_{-1}}{3h} - \dfrac{hf''(c)}{2}$

$f''(x_0) = \dfrac{f_2 - 3f_0 + 2f_{-1}}{3h^2} - \dfrac{hf'''(c)}{3}$

$f''(x_0) = \dfrac{f_3 - 4f_0 + 3f_{-1}}{6h^2} - \dfrac{2hf'''(c)}{3}$