$$f(x+\delta) = f(x) + f'(x)\delta + \frac{1}{2}f''(x)\delta^2 + \frac{1}{6}f'''(x)\delta^3 + \frac{1}{24}f^{(4)}(x)\delta^4 + +O(\delta^5)$$
$$f(x-\delta) = f(x) - f'(x)\delta + \frac{1}{2}f''(x)\delta^2 - \frac{1}{6}f'''(x)\delta^3 + \frac{1}{24}f^{(4)}(x)\delta^4 + O(\delta^5)$$
$$f(x+2\delta) = f(x) + 2f'(x)\delta + 2f''(x)\delta^2 + \frac{4}{3}f'''(x)\delta^3 + \frac{2}{3}f^{(4)}(x)\delta^4 + O(\delta^5)$$
$$f(x-2\delta) = f(x) - 2f'(x)\delta + 2f''(x)\delta^2 - \frac{4}{3}f'''(x)\delta^3 + \frac{2}{3}f^{(4)}(x)\delta^4 + O(\delta^5)$$

$$f(x+\delta) - f(x-\delta) = 2f'(x)\delta + \frac{1}{3}f'''(x)\delta^3 + O(\delta^5)$$
$$f(x+2\delta) - f(x-2\delta) = 4f'(x)\delta + \frac{8}{3}f'''(x)\delta^3 + O(\delta^5)$$

$$\Rightarrow \quad 8 \times [f(x+\delta) - f(x-\delta)] - [f(x+2\delta) - f(x-2\delta)] = 12f'(x)\delta + O(\delta^5)$$

$$f'(x) \simeq \frac{8[f(x+\delta) - f(x-\delta)] - [f(x+2\delta) - f(x-2\delta)]}{12\delta}$$