a)

$$f(x+\Delta x) \approx f(x) + \Delta x f'(x) + \frac{\Delta x^2}{2} f''(x)$$

$$f(x-\Delta x) \approx f(x) - \Delta x f'(x) + \frac{\Delta x^2}{2} f''(x)$$

$$f(x+\Delta x) - f(x-\Delta x) = 2\Delta x f'(x)$$

$$\frac{f(x+\Delta x) - f(x-\Delta x)}{2\Delta x} = f'(x)$$

$$f(x+\Delta x) = 2\Delta x f'(x) + f(x-\Delta x)$$

b)

$$f(x) = f_{true}(x) + \varepsilon(x)$$

$$f'(x) \cong \frac{f(x+\Delta x) - f(x)}{\Delta x} = A$$

$$f(x+\Delta x) = f(x) + \Delta x f'(x)$$

$$f(x+\Delta x) = f_{true}(x) + \varepsilon(x) + \Delta x \left(\cdots \right)$$

$$= \cdots$$