Difference Formulas

Central Difference:

$$f'(x) = \frac{f(x+h) - f(x-h)}{2h} + O(h^2)$$

$$f''(x) = \frac{f(x+h) - 2f(x) + f(x-h)}{h^2} + O(h^2)$$

Forward Difference:

$$f'(x) = \frac{f(x+h) - f(x)}{h} + O(h)$$

$$f'(x) = \frac{-3f(x) + 4f(x+h) - f(x+2h)}{2h} + O(h^2)$$

Backward Difference:

$$f'(x) = \frac{f(x) - f(x-h)}{h} + O(h)$$

$$f'(x) = \frac{3f(x) - 4f(x-h) + f(x-2h)}{2h} + O(h^2)$$