

## I.3 Numerical differentiation

We all know how to differentiate a function analytically...

However, sometimes there are reasons to do this numerically:

- very complicated function (error prone)
  - ... e.g. quasi-Newton methods  $\rightsquigarrow$  Chap. 2
- function not known analytically
  - ... e.g. numerical solution of differential equations  $\rightsquigarrow$  Chap. 3 & 4

Idea: Find IP  $p[f|x_0, \dots, x_n]$  approx. the function  $f(x)$  and compute

$$f(x) \approx p[f|x_0, \dots, x_n](x)$$

$$f'(x) \approx p'[f|x_0, \dots, x_n](x)$$

$$f''(x) \approx p''[f|x_0, \dots, x_n](x)$$

⋮