

Differentiability (part 2)

- Complete the definitions below of terms that we might use when talking about a differentiable function $f : I \rightarrow \mathbb{R}$ (where I is an interval).
 - A *root* or *zero* of f is
 - A *stationary point* of f is
 - A stationary point a of f is called a *local maximum* if
 - A *global minimum* of f is
 - A maximum and a minimum are the two types of
 - A stationary point that is neither a maximum or minimum is a
 - f is called *monotonic* or *monotone* if
 - An *inflection point* of f is
- Are the following functions increasing, decreasing, or non-monotonic? If they are monotone, are they *strictly* monotone?

a) e^x	c) $x^4 - 2$
b) $-4x + 3$	d) $1 - (x - 5)^3$
- Give a stationary point of the function $g(x) = x^3 - 2x^2 - 4x + 5$, and check whether it is a maximum or a minimum (or if it may be a saddle point).
- Compute the critical points of
 - $f(x) = \sqrt[3]{(x^2 - 1)}$
 - $f(x) = |x^2 + 4x - 12|$
- Use the Newton-Raphson method to find a zero of the function $f(x) = x^3 - x - 1$ to the nearest 0.01.
- Discuss: in what situations might Newton's method fail to find a root?