

Kapitel 4.6

Newton-Verfahren

→ (numerisches) Lösen von Gleichungen

$$x_1 = x_0 - \frac{f(x_0)}{f'(x_0)}$$

Beispiel 4.21

$$x^2 = 2$$

$$f(x) = x^2 - 2 = 0$$

$$f'(x) = 2x$$

$$x_0 = 1$$

$$f(1) = 1 - 2 = -1$$

$$f'(1) = 2$$

$$x_1 = 1 - \frac{-1}{2} = 1.5$$

$$x_1 = 1.5 \quad f(1.5) = 2.25 - 2 = 0.25 \quad f'(1.5) = 3 \quad x_2 = 1.5 - \frac{0.25}{3}$$

TR: (SHIFT + RCL) + BUCHSTABEN

Aufgabe 1

$$f(x) = x^2 + x - 1$$

$$f'(x) = 2x + 1$$

$$x_0 = -1 \quad f(-1) = -1$$

$$f'(-1) = -1$$

$$x_1 = -1 - 1 = -2$$

$$x_1 = -2 \quad f(-2) = 1$$

$$f'(-2) = -3$$

$$x_2 = -2 + \frac{1}{3} = -\frac{5}{3}$$

$$x_2 = -\frac{5}{3} \quad f(-\frac{5}{3}) = \frac{1}{9}$$

$$f'(-\frac{5}{3}) = -\frac{7}{3}$$

$$x_3 = -1.6$$