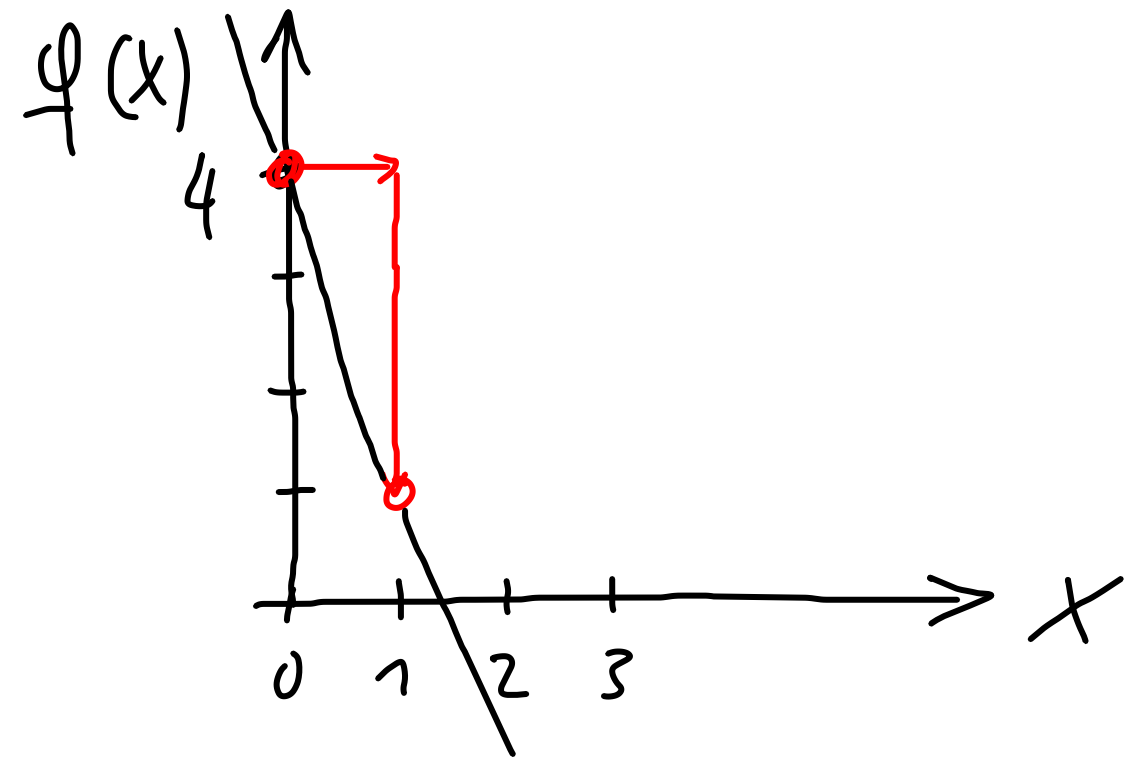


Physics hour 01

1) Funktion $f(x) = -3x + 4$

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Steigung y-Achsen-Abschnitt

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2) Funktion $f(x) = 5x - 3 \rightarrow$ Gerade Ⓐ

3) Funktion ⓓ

4) Schiefer Wurf: $h(x) = -2x^2 + 3x$

Bei welchem x ist $h(x) = 0$?

$$-2x^2 + 3x = 0$$

$$x(-2x + 3) = 0 \quad x = 0$$

$$-2x + 3 = 0 \quad ; \quad 2x = 3 \quad ; \quad x = \frac{3}{2} = 1,5$$

5) Schiefer Wurf $h(x) = -2x^2 + 3x$

ges. max. Wurfhöhe

Max.: $h'(x) = -4x + 3 \stackrel{!}{=} 0 \rightarrow 4x = 3 ; x = \frac{3}{4} = 0,75$

$$h(x=0,75) = -2 \left(\frac{3}{4}\right)^2 + 3 \cdot \frac{3}{4}$$

$$= -2 \cdot \frac{9}{16} + \frac{9}{4} = -\frac{18}{16} + \frac{36}{16} = \frac{18}{16} = \frac{9}{8} = 1,125$$

6) Ableiten:

- $f(t) = t^3 - 2t^2 + 4t + 5 \rightarrow \dot{f}(t) = 3t^2 - 4t + 4$

$$f(t) = (t-1) \cdot (t+1)$$

$$\rightarrow \dot{f}(t) = 1 \cdot (t+1) + (t-1) \cdot 1 = t+1+t-1 = 2t$$

$$f(t) = \sin(3 \cdot t)$$

$$\rightarrow \dot{f}(t) = \cos(3t) \cdot 3 = 3 \cdot \cos(3t)$$

$$f(t) = e^{-t/\tau}$$

$$\rightarrow \dot{f}(t) = e^{-t/\tau} \cdot \left(-\frac{1}{\tau}\right) = -\frac{1}{\tau} \cdot e^{-t/\tau}$$

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7) Integrieren

$$\cdot \int 3x^2 dx = 3 \cdot \frac{x^3}{3} = x^3$$

$$\cdot \int \sin(2x) dx = -\cos(2x) \cdot \frac{1}{2} = -\frac{1}{2} \cdot \cos(2x)$$

$$\cdot \int_0^1 x dx = \left[\frac{x^2}{2} \right]_0^1 = \frac{1^2}{2} - \frac{0^2}{2} = \frac{1}{2}$$

$$\cdot \int_{-2}^2 1 dx = \left[x \right]_{-2}^2 = 2 - (-2) = 4$$

8) Vektorrechnung

$$\begin{pmatrix} 3 \\ 1 \\ 2 \end{pmatrix} \cdot \begin{pmatrix} 2 \\ 3 \\ 1 \end{pmatrix} = 3 \cdot 2 + 1 \cdot 3 + 2 \cdot 1 = 6 + 3 + 2 = 11$$

$$\left| \begin{pmatrix} 1 \\ 2 \\ 2 \end{pmatrix} \right| = \sqrt{1^2 + 2^2 + 2^2} \\ = \sqrt{1 + 4 + 4} \\ = \sqrt{9} = 3$$

$$\begin{pmatrix} 1 \\ 1 \\ 0 \\ 1 \\ 1 \end{pmatrix} \times \begin{pmatrix} 0 \\ 1 \\ 1 \\ 0 \\ 1 \end{pmatrix} = \begin{pmatrix} 1 \cdot 1 - 0 \cdot 1 \\ 0 \cdot 0 - 1 \cdot 1 \\ 1 \cdot 1 - 1 \cdot 0 \end{pmatrix} = \begin{pmatrix} 1 \\ -1 \\ 1 \end{pmatrix}$$