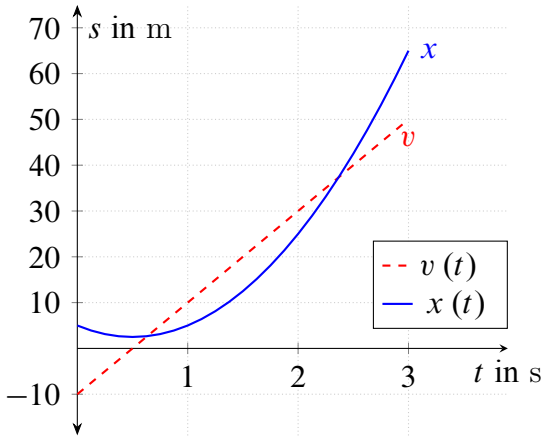
11. Gleichmäßig beschleunigte Bewegung

$$x(t) = x_0 + v_0 t + \frac{1}{2} a t^2$$

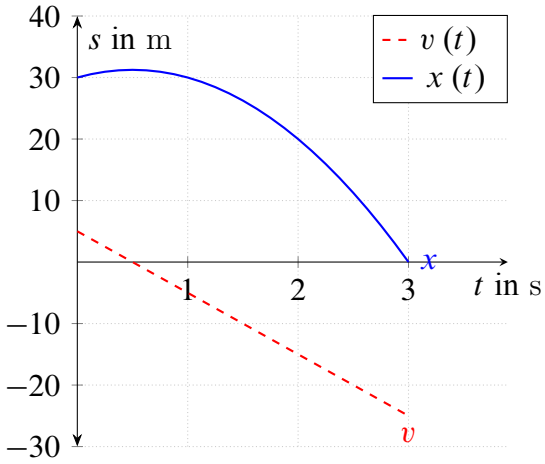
a) $x(0s) = 5\ \text{m}, \quad x(1s) = 5\ \text{m}, \quad x(3s) = 65\ \text{m}$



$$v(t) = -10 + 20t$$
$$x(t) = 5 - 10t + 10t^2$$

$$x_0 = \underline{\underline{5\ \text{m}}}$$
$$v_0 = \underline{\underline{-10\ \text{m/s}}}$$
$$a = \underline{\underline{20\ \text{m/s}^2}}$$

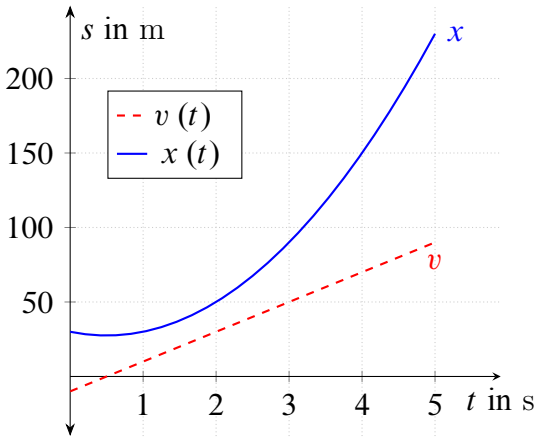
b) $v(0s) = 5\ \text{m/s}, \quad x(1s) = 30\ \text{m}, \quad x(2s) = 20\ \text{m}$



$$v(t) = 5 - 10t$$
$$x(t) = 30 + 5t - 5t^2$$

$$x_0 = \underline{\underline{30\ \text{m}}}$$
$$v_0 = \underline{\underline{5\ \text{m/s}}}$$
$$a = \underline{\underline{-10\ \text{m/s}^2}}$$

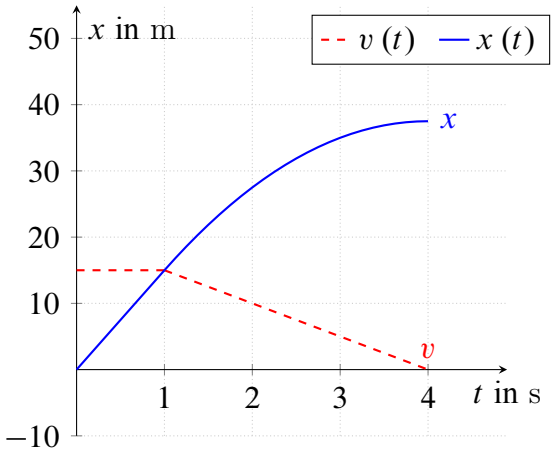
c) $v\,(0) = -10\ \mathrm{m/s}, \quad v\,(2s) = 30\ \mathrm{m/s}, \quad x\,(5s) = 230\ \mathrm{m}$



$$v(t) = -10 + 20t$$
$$x(t) = 30 - 10t + 10t^2$$

$$x_0 = \underline{\underline{30\ \mathrm{m}}}$$
$$v_0 = \underline{\underline{-10\ \mathrm{m/s}}}$$
$$a = \underline{\underline{20\ \mathrm{m/s^2}}}$$

12. Bremsvorgang an einer Ampel



a)

$$v(t) = \begin{cases} 15 & \text{für } 0 \le t < 1, \\ -5t + 20 & \text{für } 1 \le t \le 4. \end{cases}$$

b)

$$x(t) = \begin{cases} 15t & \text{für } 0 \le t < 1, \\ -2.5t^2 + 20t - 2.5 & \text{für } 1 \le t \le 4, \end{cases}$$

c) $t_2 = \underline{\underline{4\ \mathrm{s}}}; \quad x_2 = \underline{\underline{37.5\ \mathrm{m}}}$

13. Fahrstuhl

a) $s_1 = x(2) - x(0) = \underline{\underline{4\ \text{m}}}$

b) $s_2 = x(9) - x(2) = \underline{\underline{28\ \text{m}}}$

c) $s_3 = x(11) - x(9) = \underline{\underline{4\ \text{m}}}$

d) $\dfrac{s_1 + s_2 + s_3}{4} + 3 = \underline{\underline{12\ \text{Stockwerke}}}$

$$a(t) = \begin{cases} 2 & \text{für } 0 \le t \le 2, \\ 0 & \text{für } 2 < t \le 9, \\ -2 & \text{für } 9 < t \le 11. \end{cases}$$

$$v(t) = \begin{cases} 2t & \text{für } 0 \le t \le 2, \\ 4 & \text{für } 2 < t \le 9, \\ -2t + 22 & \text{für } 9 < t \le 11. \end{cases}$$

$$x(t) = \begin{cases} t^2 & \text{für } 0 \le t \le 2, \\ 4t - 4 & \text{für } 2 < t \le 9, \\ -t^2 + 22t - 85 & \text{für } 9 < t \le 11. \end{cases}$$