Aufgabe 1:

a) $m \cdot \ddot{x} - 5 \cdot \dot{x}^2 - 570'000$ $\qquad m = 97'000kg$

$\Rightarrow m \cdot \frac{dv}{dt} = -5v^2 - 570'000$

$\Rightarrow dt = \frac{m}{-5v^2 - 570'000}\, dv$

$\Rightarrow \int_0^{t_E} 1 \cdot dt = \int_{100}^{0} \frac{m}{-5v^2 - 570'000}\, dv$

$\Rightarrow t_E = \int_{100}^{0} \frac{m}{-5v^2 - 570'000}\, dv = \underline{\underline{16.545s}}$

b) $m \cdot \frac{dv}{dt} = -5v^2 - 570'000$

$\Rightarrow m \cdot v \cdot \frac{dv}{dx} = -5v^2 - 570'000$

$\Rightarrow dx = \frac{m \cdot v}{-5v^2 - 570'000}\, dv$

$\Rightarrow \int_0^{x_E} 1 \cdot dx = \int_{100}^{0} \frac{m \cdot v}{-5v^2 - 570'000}\, dv$

$\Rightarrow x_E = \int_{100}^{0} \frac{m \cdot v}{-5v^2 - 570'000}\, dv = \underline{\underline{815.6m}}$