Solutions of homework set #1.

1) \( m \ddot{x} = F = F \cdot \dot{x} = m \ddot{x} \dot{x} = \frac{d}{dt} \frac{1}{2} m \dot{x}^2 \)

2) \( L_1: \quad \ddot{\theta} = 0 \)
   \( L_2: \quad \ddot{\theta} = 0 \)

3) \( L_2 - L_1 = q \ddot{\theta} = \frac{d}{dt} \frac{1}{2} q^2 \)

differ by a total derivative \( = 1 \)
   e.g. of motion are the same