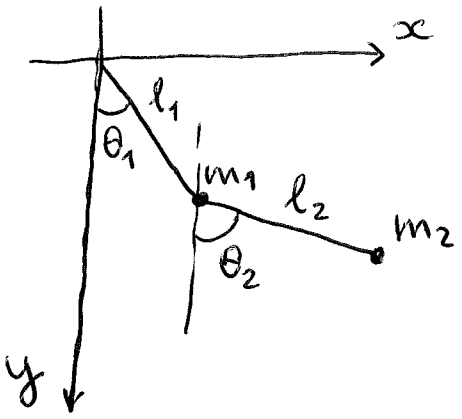
HW #1

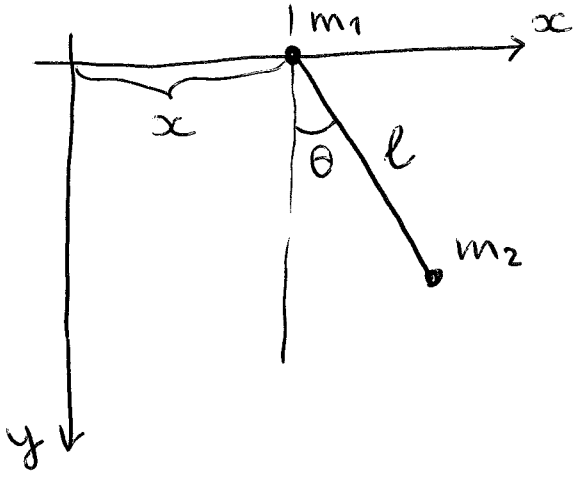
(1.) Find the Lagrangian $\mathcal{L}$ for the double pendulum:



generalized coords:

$\{\theta_1, \theta_2\}$

(2.) Find the Lagrangian $\mathcal{L}$ for the sliding pendulum:



generalized coords:

$\{x, \theta\}$

Note: m_1 can slide along the x-axis (no friction)

(3.) Goldstein Ch. 1, Ex. 12 (escape velocity)

Note: $G = 6.67 \times 10^{-11} \frac{m^3}{kg \cdot s^2}$, ⇐ gravit'l const

$M = 5.98 \times 10^{24}\, kg$ ⇐ Earth's mass

$R = 6.38 \times 10^{6}\, m$ ⇐ Earth's radius

(4.) Goldstein Ch. 1, Ex. 13 (rockets)

Note: $v' = 2.1 \frac{km}{s}$ (typo in book!)

$\| \quad$

$|\vec{v}'|$