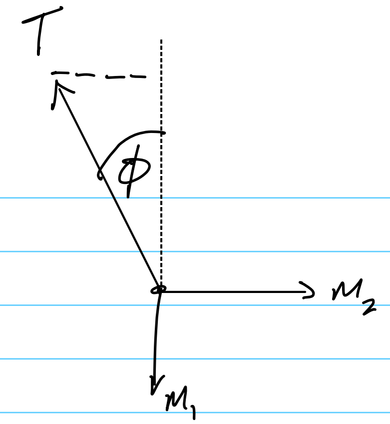
1. 

$m_1 = 65g \pm 0.2g$ $\quad T_1 = m_1 \cdot g$

$m_2 = 85g \pm 0.3g$ $\quad T_2 = m_2 \cdot g$

a) $\phi = \operatorname{Tan}^{-1}\left(\frac{-T_2}{T_1}\right)$ $\qquad T_3 = \sqrt{T_1^2 + T_2^2}$

$$\delta T_3 = \sqrt{\left(\frac{\partial T_3}{\partial m_1} dm_1\right)^2 + \left(\frac{\partial T_3}{\partial m_2} \cdot dm_2\right)^2}$$

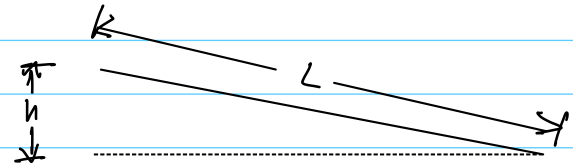
$$\delta \phi = \sqrt{\left(\frac{\partial \phi}{\partial T_1} \cdot dm_1\right)^2 + \left(\frac{\partial \phi}{\partial T_2} \cdot dm_2\right)^2}$$

where $\frac{\partial \phi}{\partial T_1} = \frac{-m_2(-m_1^{-2})}{1+\left(\frac{-m_2}{m_1}\right)^2}$ $\qquad \frac{\partial \phi}{\partial T_2} = -\frac{1}{m_1 + \frac{-m_2^2}{m_1}}$

$$\frac{\partial T_3}{m_1} = \frac{m_1 g}{\sqrt{m_1^2 + m_2^2}} \qquad \frac{\partial T_3}{m_2} = \frac{m_2 g}{\sqrt{m_1^2 + m_2^2}}$$

b) & c)

* see Mathematica *

2. 

$L = 1.25 \pm 0.002\,m$

$h = 0.037 \pm 0.001\,m$

a) A sphere rolls down distance $x = 0.85 \pm 0.005\,m$
Not acounting for moments of inertia

$$x = x_0 + v_0 t + \frac{1}{2} a t^2 \Rightarrow t = \sqrt{\frac{2x}{a}} \Rightarrow t = \sqrt{\frac{2xL}{gh}}$$

$$\delta t = \sqrt{\left(\frac{\partial t}{\partial x} \cdot dx\right)^2 + \left(\frac{\partial t}{\partial L} \cdot dL\right)^2 \left(\frac{\partial t}{\partial h} \cdot dh\right)^2}$$

$$\frac{\partial t}{\partial x} = \frac{\partial}{\partial x}\left(\frac{2xL}{gh}\right)^{1/2} = \frac{1}{2}\left(\frac{2xL}{gh}\right)^{-1/2} \cdot \frac{2L}{gh}$$

$$\frac{\partial t}{\partial L} = \frac{1}{2}\left(\frac{2xL}{gh}\right)^{-1/2} \cdot \frac{2x}{gh}$$

$$\frac{\partial t}{\partial h} = \frac{1}{2}\left(\frac{2xL}{gh}\right)^{-1/2} \cdot \frac{-2xh}{(gh)^2}$$

b)