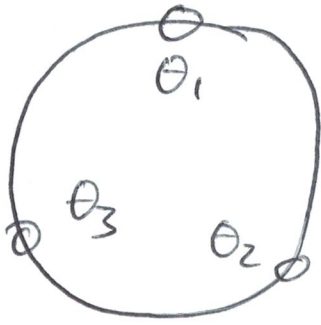


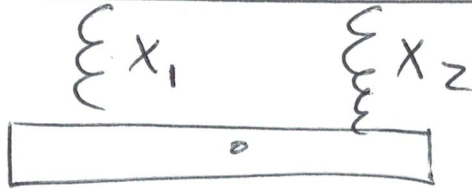
#1



$$T = \frac{M}{2} [\dot{\theta}_1^2 + \dot{\theta}_2^2 + \dot{\theta}_3^2] r^2$$

$$V = \frac{K}{2} r^2 [(\theta_1 - \theta_2)^2 + (\theta_2 - \theta_3)^2 + (\theta_3 - \theta_1)^2]$$

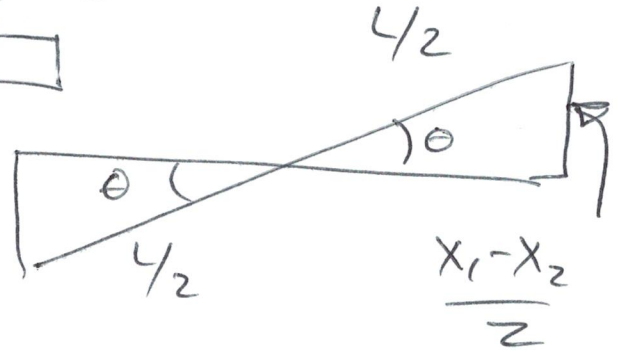
#2



$$T = \frac{1}{2} M \dot{X}^2$$

$$X = \frac{(x_1 + x_2)}{2}$$

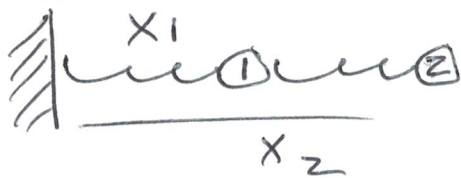
$$\sin \theta \approx \theta = \frac{x_1 - x_2}{L}$$



$$T = \frac{1}{2} I \omega^2 = \frac{1}{2} \left(\frac{1}{12} M L^2 \right) \theta^2$$

$$V = \frac{1}{2} K (x_1^2 + x_2^2) + mgh \quad h = \left(\frac{x_1 + x_2}{2} \right)$$

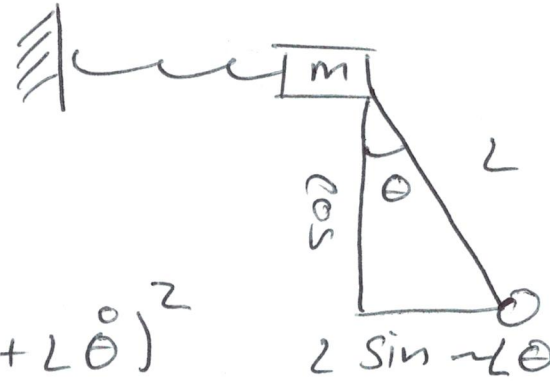
#3



$$T = \frac{1}{2} m (\dot{x}_1^2 + \dot{x}_2^2)$$

$$V = \frac{1}{2} K_1 x_1^2 + \frac{1}{2} K_2 (x_1 - x_2)^2$$

#4



$$x_2 \approx x_1 + L\theta$$

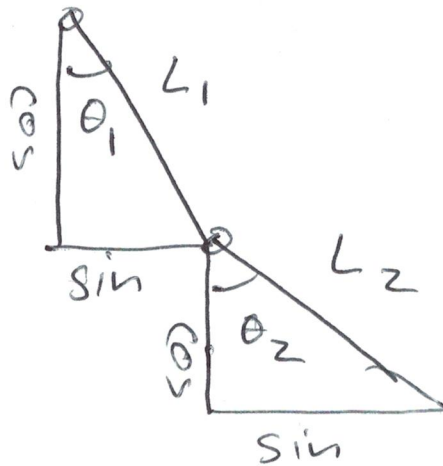
$$T_1 = \frac{1}{2} m \dot{x}_1^2$$

$$T_2 = \frac{1}{2} M (\dot{x}_1 + L\dot{\theta})^2$$

$$V_2 = Mgh = MgL(1 - \cos\theta) \approx MgL\theta^2$$

$$V_1 = \frac{1}{2} k x_1^2$$

#7



$$x_1 = L_1 \sin\theta_1$$

$$y_1 = -L_1 \cos\theta_1$$

$$x_2 = x_1 + L_2 \sin\theta_2$$

$$y_2 = y_1 + L_2 \cos\theta_2$$

$$x_3 = x_2 + L_3 \sin\theta_3$$

$$y_3 = y_2 + L_3 \cos\theta_3$$

$$T = \frac{m_1}{2} \dot{v}_1^2 + \frac{m_2}{2} \dot{v}_2^2 + \dots$$

$$v_1^2 = \dot{x}_1^2 + \dot{y}_1^2$$

$$v_2^2 = \dot{x}_2^2 + \dot{y}_2^2$$

$$V = mgh = mgy = m_1 g y_1 + m_2 g y_2 + m_3 g y_3 + \dots$$