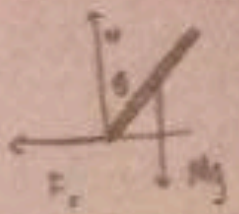
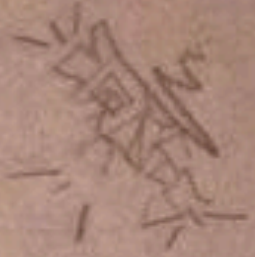
(b) $m\ddot{x} = F_r$



$m\ddot{y} = N - mg$



$x = \frac{L}{2}\sin\theta \Rightarrow \ddot{x} = \frac{L}{2}\left(-\sin\theta\,\dot{\theta}^2 + \cos\theta\,\ddot{\theta}\right)$

$y = \frac{L}{2}\cos\theta \Rightarrow \ddot{y} = -\frac{L}{2}\left(\cos\theta\,\dot{\theta}^2 + \sin\theta\,\ddot{\theta}\right)$

$F_r = \frac{ML}{2}\left(-\sin\theta\,\dot{\theta}^2 + \cos\theta\,\ddot{\theta}\right)$

$N = Mg - \frac{ML}{2}\left(\cos\theta\,\dot{\theta}^2 + \sin\theta\,\ddot{\theta}\right)$

$F_r = N \cdot \mu_e \Rightarrow \mu_e = \frac{F_r}{N}$

$$\Rightarrow \mu_e = \frac{\frac{ML}{2}\left(-\frac{\sqrt{2}}{2}\frac{3g}{L}\left(1-\frac{\sqrt{2}}{2}\right) - \frac{\sqrt{2}}{2}\frac{3g}{L}\frac{\sqrt{2}}{2}\right)}{M\left(\frac{g}{1} - \frac{L}{2}\left(\frac{\sqrt{2}}{2}\frac{3g}{L}\left(1-\frac{\sqrt{2}}{2}\right) + \frac{\sqrt{2}}{2}\frac{3g}{L}\frac{\sqrt{2}}{2}\right)\right)}$$

$$\mu_e = \frac{\left(-\frac{3\sqrt{2}}{4}\left(1-\frac{\sqrt{2}}{2}\right) + \frac{6}{8}\right)}{\left(1 - \left[\frac{\sqrt{2}}{4}3\left(1-\frac{\sqrt{2}}{2}\right) + \frac{1}{4}\cdot 3\right]\right)} = \frac{-\frac{6\sqrt{2}}{8} + \frac{6}{8} + \frac{6}{8}}{\left(\frac{8}{8} - \frac{6\sqrt{2}}{8} + \frac{6}{8} - \frac{6}{8}\right)} = \frac{\frac{12}{8}\left(1 - \frac{\sqrt{2}}{2}\right)}{\frac{2}{8}\left(4 - 3\sqrt{2}\right)}$$

$$\mu_e = \frac{6 - 3\sqrt{2}}{4 - 3\sqrt{2}}$$

3 ptos.