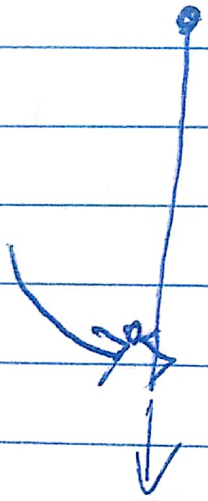

Given: $\dot{\theta}, \dot{r}, r$

$$v = \dot{r}u_r + r\dot{\theta}u_\theta$$

$$a = \ddot{r}u_r + 2\dot{r}\dot{\theta}u_\theta + r\ddot{\theta}u_\theta - r\dot{\theta}^2 u_r$$

$$a = -r\dot{\theta}^2 u_r + 2\dot{r}\dot{\theta}u_\theta$$

$$\|a\| = \sqrt{(r\dot{\theta}^2)^2 + (2\dot{r}\dot{\theta})^2}$$

$$T = ma + mg$$