$r = At + B$ $\qquad$ $\theta = Ct^2 + D$

$\dot{r} = A$ $\qquad$ $\dot{\theta} = 2Ct$

$\ddot{r} = 0$ $\qquad$ $\ddot{\theta} = 2C$

$$a_\theta = r\ddot{\theta} + 2\dot{r}\dot{\theta}$$

$$a_r = -r\dot{\theta}^2$$

$$a_{net} = \sqrt{a_\theta^2 + a_r^2}$$

$$F_{net} = m \cdot a_{net}$$