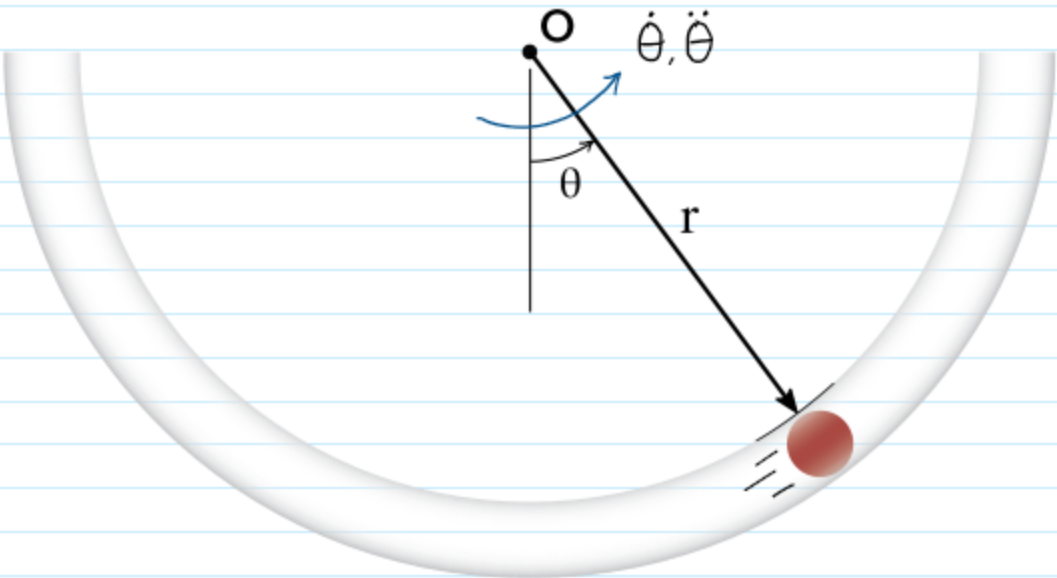
21-P-KM-GD-011






A particle travels along a semi-circular path of radius $r$ m. The particle has an angular velocity of $\dot{\theta}$ and an angular acceleration of $\ddot{\theta}$.

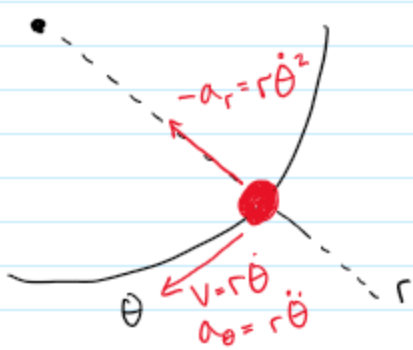
What are the radial and transverse components of velocity and acceleration for the particle?

given

$r, \dot{\theta}, \ddot{\theta}$

find

$v_r, v_\theta, a_r, a_\theta$




$r = r_0$

$\dot{r} = 0$
$\ddot{r} = 0$
} the radius of the particle's path does not change

$v_r = \dot{r} = 0$

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

$v_\theta = r\dot{\theta}$

$a_\theta = r\ddot{\theta}$