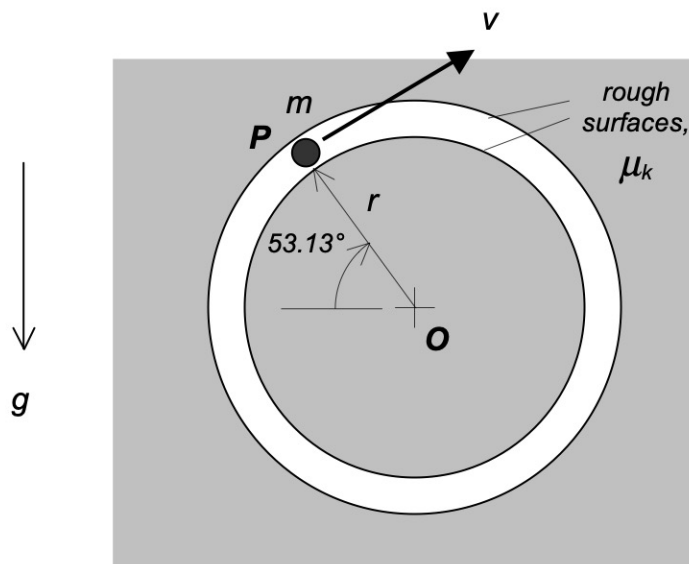


**Homework H.4.A**

**Given:** Particle P (of mass  $m$ ) moves within a vertical plane inside a rough, circular slot. The coefficient of kinetic friction between particle P and the slot is  $\mu_k$ , and the radius of the slot is  $r$ . At the position shown below, the speed of P is known to be  $v$ .

**Find:** For this position:

- (a) Determine the numerical value of the normal contact force of the slot on P;
- (b) Determine the rate of change of speed of P.



Use the following parameters in your analysis:  $m = 8$  kg,  $\mu_k = 0.2$ ,  $r = 2$  m and  $v = 3$  m/s.