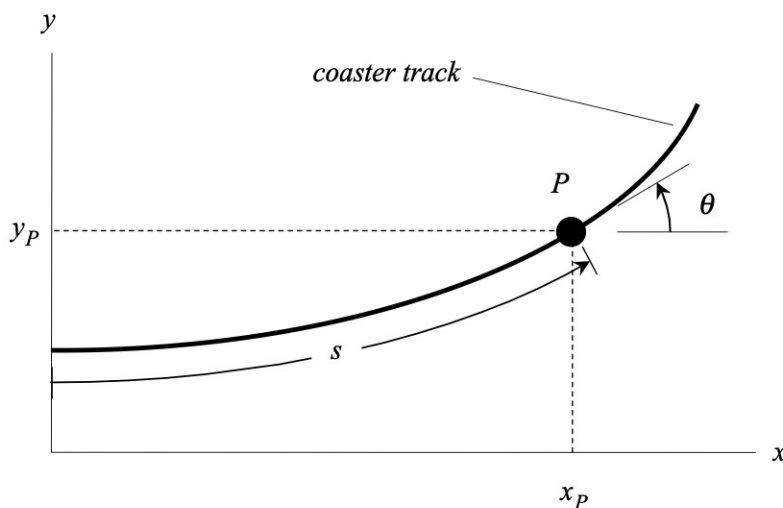


Homework H.1.C

Given: Cart P travels on a rollercoaster track. Let s represent the distance traveled by P on this track, where s has units of feet. In terms of the distance s , the radius of curvature of the track, the angle of the tangent to the track and the speed of P are known to be $\rho = 1/b s$, $\theta = b s^2/2$ and $v(s) = d - c s^2$, respectively.

Find: For this problem:

- Determine the path variable components of velocity and acceleration of P as a function of s .
- Evaluate your results in (a) above for $s = 100$ ft. Make a sketch of the velocity and acceleration vectors at this position.



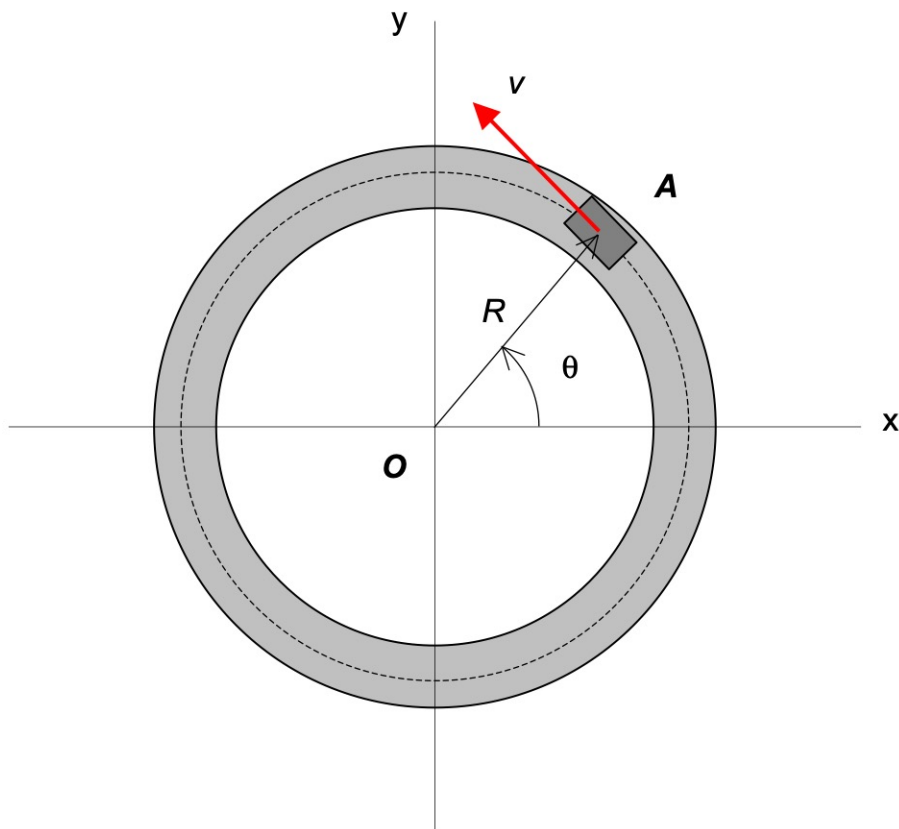
Use the following parameters in your analysis: $b = 1 \times 10^{-4}/ft^2$, $d = 150$ ft/s and $c = 1 \times 10^{-2}/ft \cdot s$.

Homework H.1.D

Given: An automobile A is traveling on a circular path centered at O and having a radius of R . The automobile has a speed of v and is changing this speed at a rate of \dot{v} .

Find: For this problem:

- Determine the acceleration of A. Write this as a vector in terms of its x - y components.
- Make a sketch of the acceleration vector for A.
- Determine the magnitude of the acceleration of A in terms of the number of “g’s” experienced by a passenger in the automobile.



Use the following parameters in your analysis: $R = 75$ m, $\theta = 135^\circ$, $v = 10$ m/s and $\dot{v} = -6$ m/s².