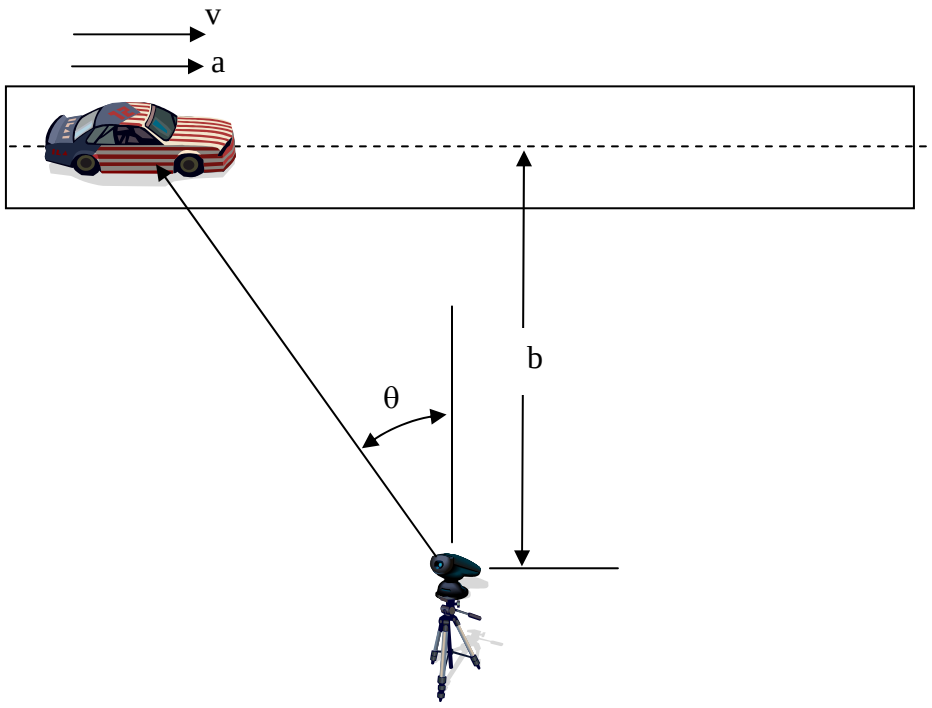
Homework (LE 4)

Problem 4.1

To study the performance of a race car, a high speed camera is positioned at A. The camera is mounted on a mechanism which permits it to record the motion of the car as the car travels on straightaway BC. Determine the speed and the magnitude of the acceleration in terms of b, θ, $\dot{\theta}$, and $\ddot{\theta}$.



Answers: $v = \left| \frac{b\dot{\theta}}{\cos^2\theta} \right|$ and $a = \frac{b}{\cos^2\theta}\left|\ddot{\theta} + 2\tan\theta\dot{\theta}^2\right|$

Problem 4.2

Do Problem 3.11 in the notes.

Hint: Solve for $\ddot{r}$ and then use the chair rule $\ddot{r} = \frac{d\dot{r}}{dt} = \dot{r}\frac{d\dot{r}}{dr}$ and then separate variables and integrate.