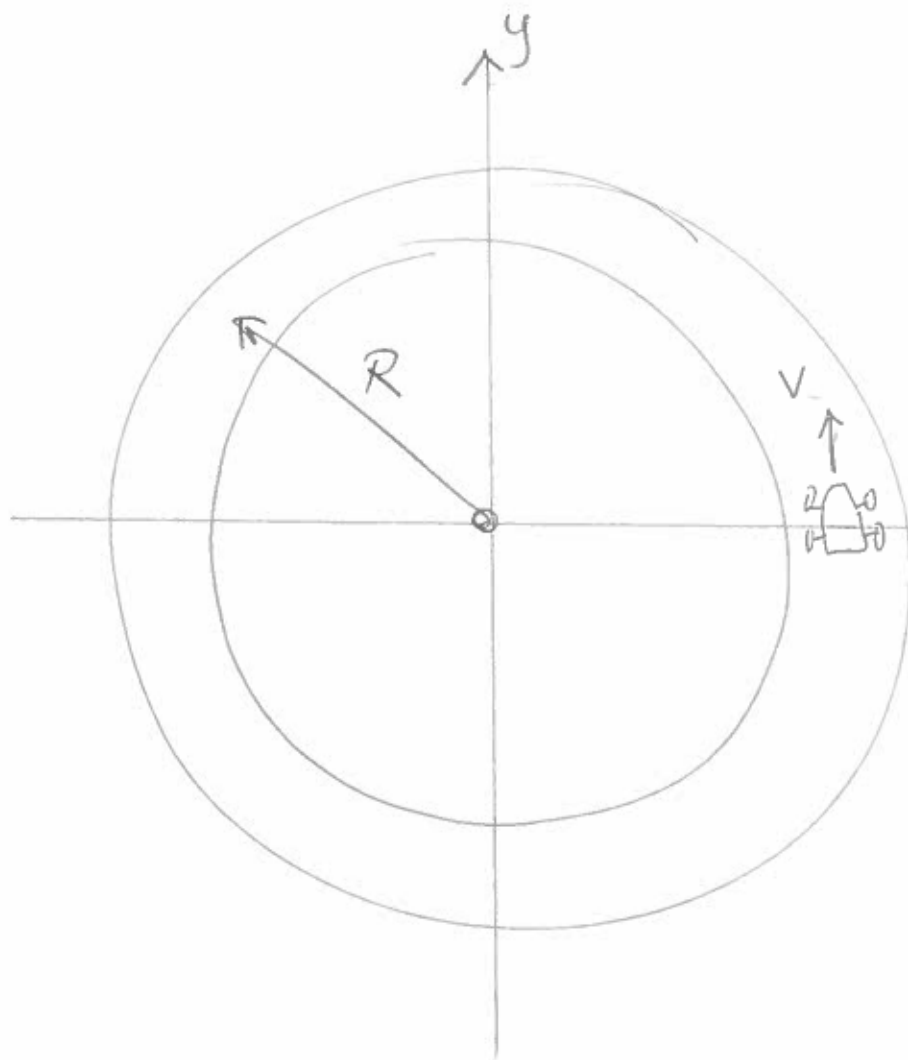




Joe Maserati drives his sports car of mass $m = 1200 \text{ kg}$ around a circular track of radius $R = 50 \text{ m}$.

a) If Joe drives at constant speed $v = 16 \frac{\text{m}}{\text{s}}$, his acceleration is

$$a = \frac{v^2}{R} = \frac{(16 \frac{\text{m}}{\text{s}})^2}{50 \text{ m}} = 5.1 \frac{\text{m}}{\text{s}^2}$$

b) At the moment shown, the acceleration — which always points to the center of the circle — is directed

← to the left

c) In order to achieve a lateral acceleration of $1 \text{ gee} = 9.8 \frac{\text{m}}{\text{s}^2}$, Joe must increase his speed to

$$a = \frac{v^2}{R} = 1 \text{ gee} \rightarrow v = \sqrt{aR} = \sqrt{(9.8 \frac{\text{m}}{\text{s}^2})(50 \text{ m})} = 22.1 \frac{\text{m}}{\text{s}}$$