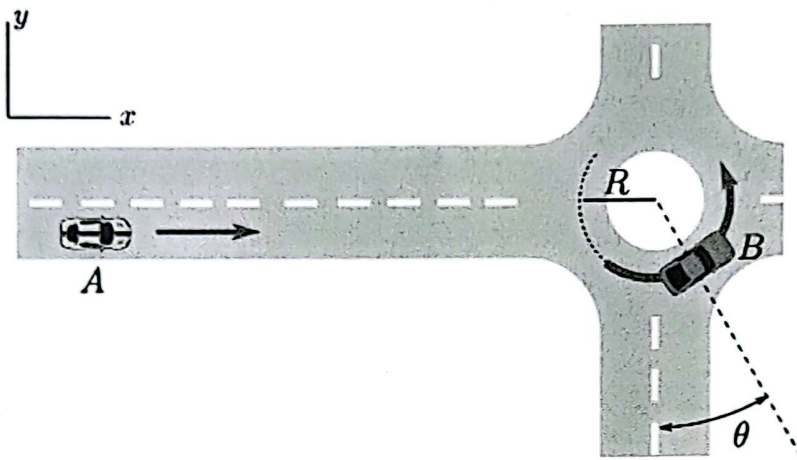


2D Kinematic Problem



find \vec{v}_{BA} , \vec{a}_{BA}

$$\begin{aligned}\vec{v}_{BA} &= \vec{v}_{BG} + \vec{v}_{GA} \\ &= \vec{v}_{BG} - \vec{v}_{AG}\end{aligned}$$

$$\vec{a}_{BA} = \vec{a}_{BG} - \vec{a}_{AG}$$

While car B is turning in a circle of radius $R = 10$ m, car A is slowing down. At the moment shown, when $\theta = 30^\circ$, the speed of both cars is 2.2 m/s. The speed of car A is decreasing at a rate of 1.2 m/s², while the speed of car B is increasing at a rate of 1.2 m/s².

Using the coordinate system shown, determine the velocity and acceleration vectors of car B relative to car A .

$$\vec{v}_{AG} = (2.2 \text{ m/s}) \hat{i} \quad \vec{a}_{AG} = -(1.2 \text{ m/s}^2) \hat{i}$$

$$\vec{v}_{BG} = (2.2 \text{ m/s}) \hat{u}$$



$$\hat{u} = \hat{i} \cos \theta + \hat{j} \sin \theta$$

$$\vec{a}_{BG} = (1.2 \text{ m/s}^2) \hat{u} + \frac{v^2}{R} \hat{u}_c$$

$$\hat{u}_c = -\hat{i} \sin \theta + \hat{j} \cos \theta$$

