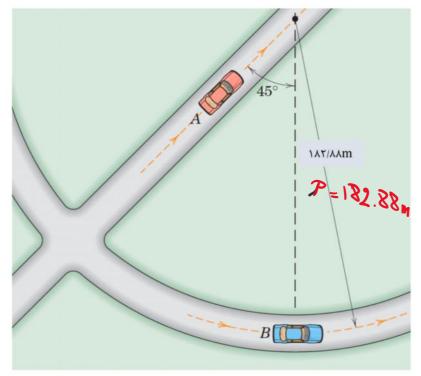
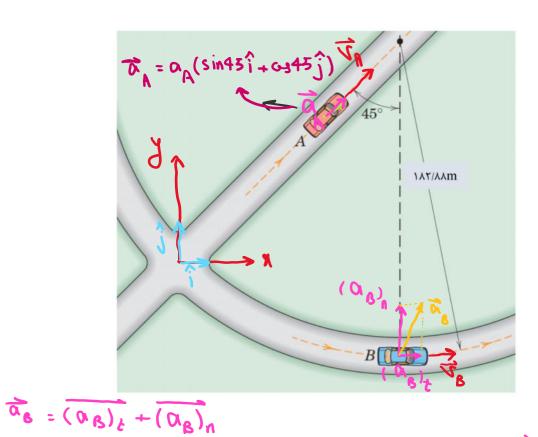
Dynamics Meriam 6ed, 2-194

Wednesday, November 24, 2021 11:19 AM

For the instant represented, car A has an acceleration in the direction of its motion, and car B has a speed of 45 mi/hr which is increasing. If the acceleration of B as observed from A is zero for this instant, determine the acceleration of A and the rate at which the speed of B is changing.

$$V_{B} = 20.117 \frac{1}{S}$$





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$$\vec{\alpha}_{R} = 0$$
 s $\alpha_{R} = \text{constant}$, $\vec{v}_{B} = 20.117 \frac{m}{s}$ $\{\vec{\alpha}_{R} = ? \vec{\alpha}_{R} = ?$

$$\vec{\alpha}_{B} = \vec{\alpha}_{A} + \vec{\alpha}_{B}$$
 $\Rightarrow \vec{\alpha}_{B} = \vec{\alpha}_{A}$ \times

$$(\Omega_B)_n = \frac{V_B^2}{P} = \frac{20.117^2}{182.88} = 9.213 \frac{m}{5}$$

$$\times \rightarrow \overline{\alpha}_{\mathcal{B}} = \alpha_{\mathcal{B}} \left(\sin 45 \hat{i} + \cos 45 \hat{j} \right) = \overline{\alpha}_{\mathcal{A}} \Rightarrow \begin{cases} \alpha_{\mathcal{B}} \sin 45 = (\alpha_{\mathcal{B}})_{\eta} \\ \alpha_{\mathcal{B}} \cos 45 = (\alpha_{\mathcal{B}})_{t} \end{cases}$$

$$\frac{\alpha_{B} \sin 45}{\alpha_{B} \cos 45} = \frac{(\alpha_{B})_{n}}{(\alpha_{B})_{\xi}} = > t \text{ an } 45 = \frac{(\alpha_{B})_{n}}{(\alpha_{B})_{\xi}} = | => (\alpha_{B})_{n} = 2.213$$

$$\vec{\alpha}_{B} = 2.213 \left(\sin 45 \hat{i} + \cos 45 \hat{j} \right)$$

$$\vec{\alpha}_{R} = 2.213 \left(\sin 45 \hat{i} + \cos 45 \hat{j} \right)$$

$$|\vec{\alpha}_{R}| = |\vec{\alpha}_{B}| = \sqrt{(2.213 \sin 45)^{2} + (2.213 \cos 45)^{2}} = 2.213\sqrt{2} = 3.130 \frac{m}{52}$$