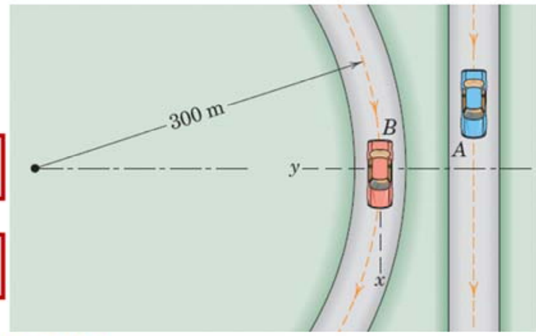
Another Exercise

$$\mathbf{r}_B = \mathbf{r}_A + \mathbf{r}_{B/A}$$

$$\mathbf{v}_B = \dot{\mathbf{r}}_B = \dot{\mathbf{r}}_A + \dot{\mathbf{r}}_{B/A}$$

$$\mathbf{a}_B = \dot{\mathbf{v}}_B = \ddot{\mathbf{r}}_B = \ddot{\mathbf{r}}_A + \ddot{\mathbf{r}}_{B/A}$$



Car ***A*** has a ***speed*** v_A= 100 km/h, which is increasing at the rate of 8 km/h each second. Car ***B*** has a ***speed*** v_B= 100 km/h, around the turn and is slowing down at the rate of 8 km/h each second.

Determine the ***acceleration*** that car ***B*** appears to have to an observer in car ***A***.

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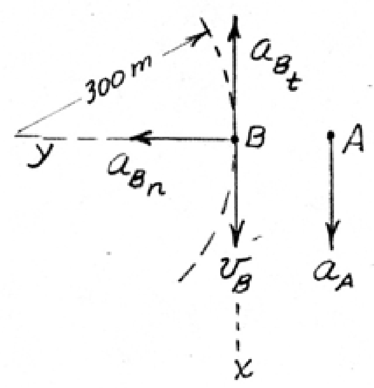
$a_{B_t} = \frac{8}{3.6} = 2.22\ m/s^2, \quad a_A = \frac{8}{3.6} = 2.22\ m/s^2$

$a_{B_n} = \frac{v_B^2}{\rho} = \frac{(100/3.6)^2}{300} = 2.57\ m/s^2$



$\underline{a}_B = \underline{a}_A + \underline{a}_{B/A}$

$-2.22\underline{i} + 2.57\underline{j} = 2.22\underline{i} + \underline{a}_{B/A}$

$\underline{a}_{B/A} = -4.44\underline{i} + 2.57\underline{j}\ \ m/s^2$