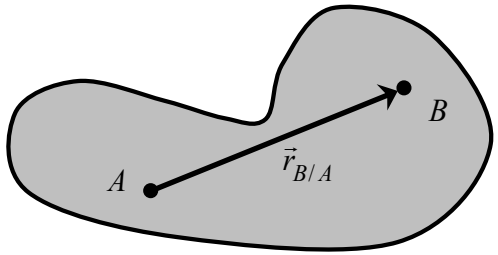
Summary: Rigid Body Kinematics 1

PROBLEM: Two points A and B on the same rigid body undergoing planar motion.

$$\vec{v}_B = \vec{v}_A + \vec{\omega} \times \vec{r}_{B/A}$$

$$\vec{a}_B = \vec{a}_A + \vec{\alpha} \times \vec{r}_{B/A} + \vec{\omega} \times \left(\vec{\omega} \times \vec{r}_{B/A} \right)$$



COMMENTS:

- $\vec{\omega}$ and $\vec{\alpha}$ are the *angular velocity* and *angular acceleration* vectors of the body. These are the same for ANY two points A and B.
- $\vec{r}_{B/A}$ points *FROM* point A *TO* point B.
- If A and B lie in the same plane, then: $\vec{a}_B = \vec{a}_A + \vec{\alpha} \times \vec{r}_{B/A} - \omega^2 \vec{r}_{B/A}$
- From where did these equations come? From the general motion of two points (Chapter 1) with the constraint that $\left| \vec{r}_{B/A} \right|$ = *constant*.