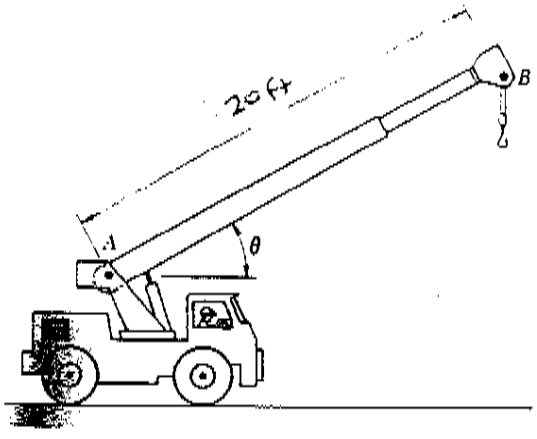
**ME 230 - Dynamics**
Tutorial 7

Your Name:_____
Section No.:_____

Partners:_____ _____ _____
_____ _____ _____

## 2-D Kinematics

**1)** At the instant shown, the length of the boom is being decreased at the constant rate of 6 in/sec and the boom is being lowered at the constant rate of 0.075 rad/sec. Knowing that $\theta = 30°$, determine: a) the velocity of point B, and b) the acceleration of point B.




Choose and indicate appropriate reference frame(s).

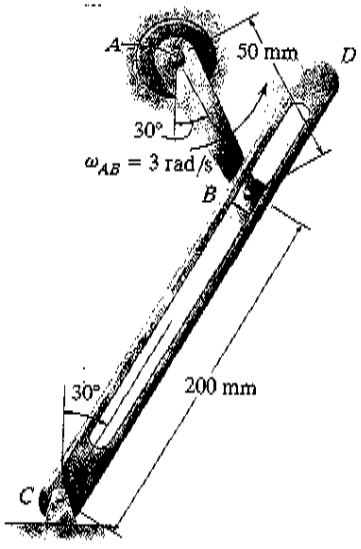
Write the position vector $\vec{r}_B(t)$ for the boom tip in terms of symbols you define for the coordinate system you select.

Determine the velocity vector $\vec{v}_B(t)$ for the boom tip.

Determine the acceleration $\vec{a}_B(t)$ for the boom tip.

Numerically evaluate your equations to determine the velocity vector $\vec{v}_B(t)$ and the acceleration vector $\vec{a}_B(t)$ for the boom tip at the instant shown.

2. The block B of the mechanism is confined to move within the slot in member CD. If AB is rotating at constant rate $\omega_{AB} = 3$ rad/s, determine the angular velocity and angular acceleration of member CD at the instant shown.




Choose and indicate appropriate reference frame(s).

Determine the velocity and acceleration of B using the position vector from A

Determine the velocity and acceleration of B in terms of a rotating frame anchored to bar CD

Write the velocity of B in terms of the velocity of C using the rotating frame. Solve the angular velocity of the bar CD.

Write the acceleration of B in terms of the acceleration of C using the rotating frame. Solve for the angular acceleration of bar CD.