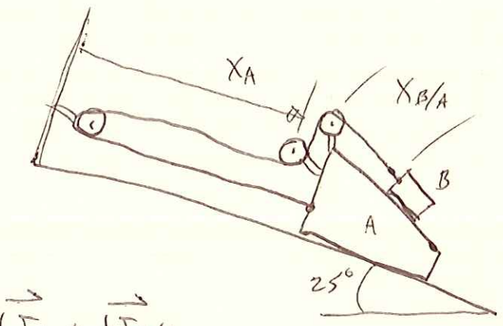
PROB. 11-123

$|\vec{v}_A| = 8 \frac{in}{s}$, $|\vec{a}_A| = 6 \frac{in}{s^2}$ DOWN INCLINE

FIND $\vec{v}_B$ AND $\vec{a}_B$



$2X_A + X_{B/A} = \text{CONSTANT}$

$2v_A + v_{B/A} = 0$

$2a_A + a_{B/A} = 0$

$v_{B/A} = -16 \frac{in}{s}$ UP THE PLANE

$a_{B/A} = -12 \frac{in}{s^2}$

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

$\vec{v}_A = (8\cos 25)\hat{i} + (8 \sin 25)\hat{j}$

$= (7.250)\hat{i} + (-3381)\hat{j} \frac{in}{s}$

$\vec{v}_{B/A} = (-16\cos 40)\hat{i} + (16 \sin 40)\hat{j}$

$\vec{v}_{B/A} = (-12.26)\hat{i} + (10.28)\hat{j} \frac{in}{s}$

$\vec{v}_B = (-5.01)\hat{i} + (6.899)\hat{j}$

$|\vec{v}_B| = 8.526 \frac{in}{s}$, $\theta = 54.0°$ $\measuredangle = 126°$

$\vec{a}_b = \vec{a}_A + \vec{a}_{B/A}$

$\vec{a}_A = (6\cos 25)\hat{i} + (-6 \sin 25)\hat{j} = (5.438)\hat{i} + (-2.536)\hat{j} \frac{in}{s^2}$

$\vec{a}_{B/A} = (-12\cos 40)\hat{i} + (12 \sin 40)\hat{j} = (-9.192)\hat{i} + (7.713)\hat{j} \frac{in}{s^2}$

$\vec{a}_B = (-3.754)\hat{i} + (5.177)\hat{j} \frac{in}{s^2}$

$|\vec{a}_B| = 6.395 \frac{in}{s^2}$, $\theta = 54.0°$