1. Find the velocity and acceleration of the pin in the slot in terms of \( \theta \) and its derivatives. The expressions should be developed using the most economical notation as possible using multiple reference frames. This is step 5 of the six step process.

\[
\begin{align*}
0 \vec{r}' &= x \hat{b}_1 = R \hat{a}_2 + R \hat{a}_1 + R \hat{a}_3, \\
0 \vec{v}' &= \frac{d}{dt} (x \hat{b}_1) + \omega \times (x \hat{b}_1)
\end{align*}
\]

\[
\begin{align*}
0 \vec{a}' &= \frac{d}{dt} (\omega \times (x \hat{b}_1))
\end{align*}
\]