Write down $\ell$ of a box on a smooth inclined plane $(m, L)$. Use it to solve for the box acceleration along the plane.

1. d.o.f., $x \rightarrow$ coordinate

\[
T = \frac{1}{2} \dot{m} \dot{x}^2 \quad U = -mgx \sin \theta
\]

\[
L = \frac{1}{2} \dot{m} \dot{x}^2 + mgx \sin \theta
\]

\[
\ell \ell = \frac{p^2}{2m} - mgx \sin \theta \]

\[
\frac{\partial \ell}{\partial p} = \frac{p}{m} = \dot{\theta}
\]

\[
\frac{\partial \ell}{\partial \theta} = -p = -mg \sin \theta \Rightarrow \dot{x} = g \sin \theta
\]