Show all work!!!!
Report all numbers to three significant figures!
Use the conversion constants and data given on the front page.

Block 1 is launched up the frictionless plane at an initial velocity of \( v_0 = 1.25 \text{ m/s} \). Block 2 is released from rest at the same time as block 1 is launched.

(a) Find the location of the collision between blocks 1 and 2. Measure this up the plane from the initial position of block 1. Assume the blocks are small.

(b) If the collision between blocks 1 and 2 is completely inelastic, find the velocity after the collision. Take up the plane as positive. If you cannot do (a), do (b) symbolically.

\[
\begin{align*}
\Sigma F_x &= m_1 g \sin \theta = m_1 a \\
\Rightarrow a &= -g \sin \theta = -4.14 \text{ m/s}^2 \\
\end{align*}
\]

\( \text{Kinematics} \)
\[ \begin{align*}
x_1 &= \frac{1}{2} at^2 + v_0 t \\
x_2 &= \frac{1}{2} at^2 + d
\end{align*} \]
\( \Rightarrow x_1 = x_2 \Rightarrow \frac{1}{2} at^2 + v_0 t = \frac{1}{2} at^2 + d \)
\( \Rightarrow t = \frac{d}{v_0} = 4.80 \text{ sec} \)

\( \Rightarrow x_2(t) = \frac{1}{2} (-4.14 \text{ m/s}^2)(4.80)^2 + 6.00 \text{ m} = -41.7 \text{ m} \)

\( \text{Conserv. Momentum} \)
\[ \frac{m_1 v_1 + m_2 v_2}{m_1 + m_2} = (m_1 + m_2) v_f \Rightarrow v_f = \frac{m_1 v_1 + m_2 v_2}{m_1 + m_2} \]

\( \text{Kinematics} \)
\[ \begin{align*}
v_1 &= at + v_0 \\
v_2 &= at
\end{align*} \]
\[ \Rightarrow \begin{align*}
v_1 &= -18.6 \text{ m/s} \\
v_2 &= -19.9 \text{ m/s}
\end{align*} \]
\( v_f = -19.1 \text{ m/s} \)