3.41. Visualize: A 3% grade rises 3 m for every 100 m horizontal distance. The angle of the ground is thus \( \alpha = \tan^{-1}(3/100) = \tan^{-1}(0.03) = 1.72^\circ \).

Establish a tilted coordinate system with one axis parallel to the ground and the other axis perpendicular to the ground.

\[ \begin{align*}
\vec{v} &= \vec{v}_\perp + \vec{v}_\parallel \\
\vec{v}_\perp &= \vec{V}_\perp \\
\vec{v}_\parallel &= \vec{V}_\parallel
\end{align*} \]

Solve: From the figure, the magnitude of the component vector of \( \vec{v} \) perpendicular to the ground is \( v_\perp = v \sin \alpha = 15.0 \text{ m/s} \).

But this is only the size. We also have to note that the direction of \( \vec{v}_\perp \) is down, so the component is \( v_\perp = -15.0 \text{ m/s} \).