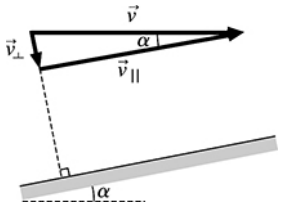
3.41. **Visualize:** A 3% grade rises 3 m for every 100 m horizontal distance. The angle of the ground is thus $\alpha = \tan^{-1}(3/100) = \tan^{-1}(0.03) = 1.72°$.

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



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