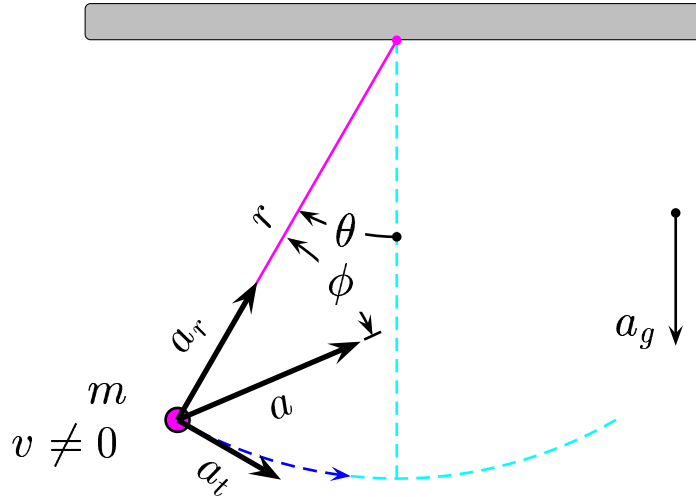
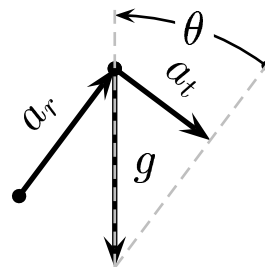


A simple pendulum consists of a string of a length r and a ball attached to its end. Consider the case where the string is making an angle θ with the vertical and the tangential velocity is pointing toward the vertical line.



The tangential acceleration is given by

- A) $a_{\text{tangential}} = g \sin \theta$.
- B) $a_{\text{tangential}} = g \cos \theta$.
- C) $a_{\text{tangential}} = -g \sin \theta$.
- D) $a_{\text{tangential}} = -g \cos \theta$.



The tangential acceleration is opposite to that of $s = r \theta$. The magnitudes of the tangential acceleration and the radial acceleration are

$$a_t = a_g \sin \theta = -g \sin \theta \quad \text{and} \quad a_r = \frac{v^2}{r}.$$

Answer **C**.