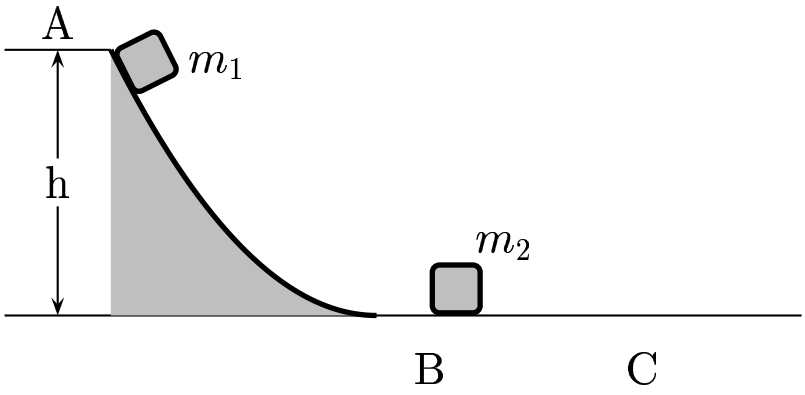
Consider the setup shown where block m_1 moves down a smooth curved surface collides with the block m_2 .



After a head-on elastic collision, what is the speed of m_2 , if $m_1 = m_2 = m$?

A) $v = \sqrt{g\,h}$.
B) $v = \sqrt{2\,g\,h}$.
C) $v = 2\,\sqrt{g\,h}$.

Immediately before the collision, conservation of energy implies that $\frac{1}{2}\,m\,v_1^2 = m\,g\,h$.

After the elastic head-on collision, the velocity of block-2 is given by $v_2' = 2\,v_{cm} - v_2$.

For the present case, $m_1 = m_2$ and initially the block-2 is at rest, $v_{cm} = \frac{m\,v_1 + m\,v_2}{2\,m} = \frac{v_1}{2}$.

Thus $v_2' = 2\,\frac{v_1}{2} - 0 = v_1 = \sqrt{2\,g\,h}$.

Answer **B**.