

Question #15837

The object is released from some point, with initial velocity of zero. Hence, the acceleration is only the acceleration of gravitational force: $a = g \cos \theta$, where θ is the angle of the incline.

First, let's find the initial height, from which the object was released. To do this, use the law of conservation of energy for points, where we have the given velocity $v = 1.9 \text{ m/s}$, and where the ball has no velocity: $mgh = \frac{mv^2}{2} + mgh'$ (here, $h' = 2.75 \text{ m}$). Then, the sine of incline might

be found as $\sin \theta = \frac{h-h'}{S}$ (where S is the distance, the object has moved by given time t' -

$S = g \cos \theta t'^2$). This gives $\sin 2\theta = \frac{v^2}{g^2 t'^2}$, and calculating, $\theta \approx 0.23 \text{ degrees}$. Hence, the acceleration is $a = g \cos \theta \approx 1 \frac{\text{m}}{\text{s}^2}$.