



$$320N \rightarrow 757.68 \rightarrow 70 = a = 4$$

PHYS101 Tutorial 2 – PHYS101-21S2

$$v_f^2 = v_i^2 + 2ad = 0^2 + 2 \times 4 \times 200$$

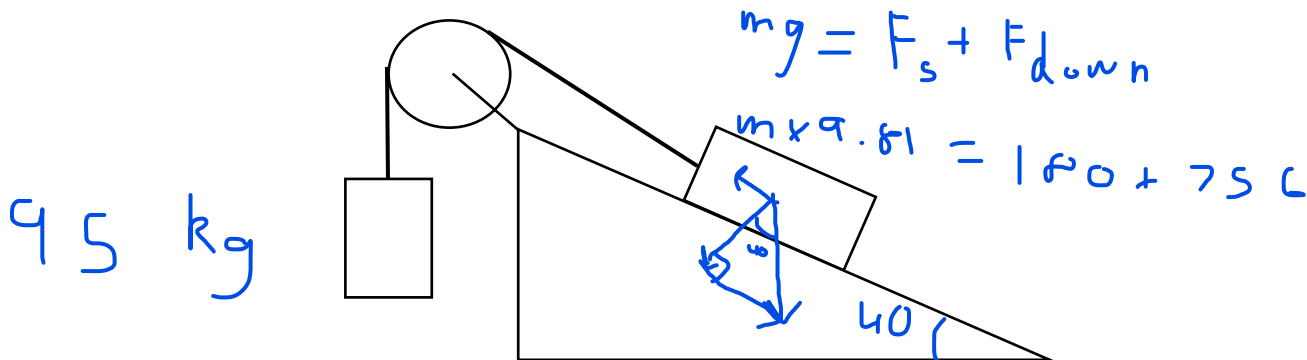
These questions are to be started in your tutorial session and the answers to be submitted post-tutorial via LEARN.

$$= 40$$

1. A skier with a mass of 70 kg is at rest. They begin descending a slope with an angle of 25 degrees and travel for 200 m before reaching level ground. Calculate the velocity of the skier when they reach this point. The interactions between the skier and the snow can be considered frictionless.



2. In the figure below the two masses are equally balanced on opposite sides of a pulley leading to no movement in either mass. The mass on the slope is 120 kg, the angle of the ramp is 40 degrees and the coefficient of static friction between the ramp and mass is 0.2. What is the largest value of the free hanging mass for which the blocks will not move? Assume the pulley is frictionless.



3. A student finds an unusually shaped rock on the ground and tries to determine its aerodynamic properties. They perform some tests at low velocities, but are unable to determine if the resistive force follows the v or v^2 relationship. They are able to determine that the rock has the properties $b = 22 \text{ kg/s}$ and $\frac{1}{2} (D\rho A) = 9 \text{ kg/m}$. Calculate the difference in resistive force based on the different equations for the following velocities: a) $v = 2 \text{ m/s}$ b) $v = 5 \text{ m/s}$ c) $v = 10 \text{ m/s}$ d) $v = 25 \text{ m/s}$. If the mass of the rock is 25 kg determine the difference in terminal velocity based on the two equations.

$$R = bv = 44N, 110N, 220N, 550N$$

$$v_1 = \frac{mg}{b} = 11.14$$

$$R = \frac{1}{2} D\rho A v^2 = 36N, 225N, 900N, 5625N$$

$$v_1 = \sqrt{\frac{2mg}{D\rho A}} = 5.22$$