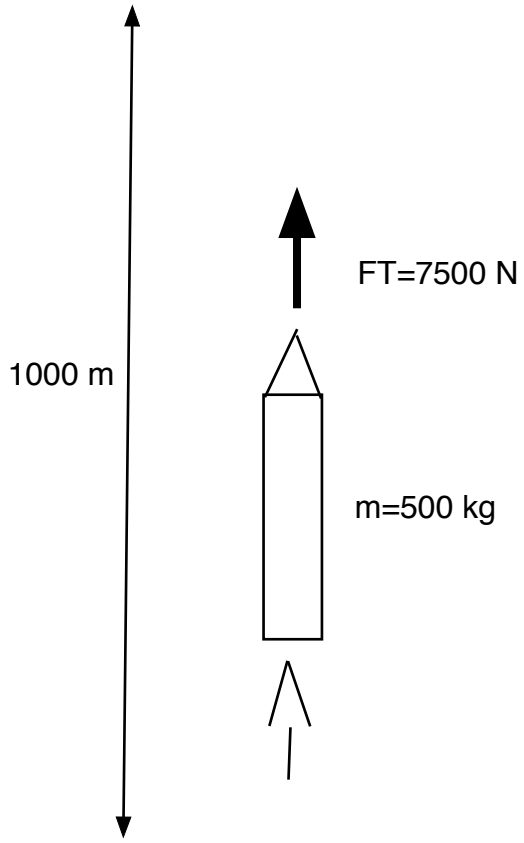
# Honors Physics A
# Work and Energy Assessment

**In order to get a 3, you need to do 3 of the following problems correctly. To get a 4, correctly do at least two of the level 4 problems.**

## Work and Energy 1

A 500 kg rocket is launched from rest on the ground with a constant force of thrust of 7500 N. When it reaches an altitude of 1000 m, it has a velocity of 25 m/s (hint: this is less than it would have been without atmospheric drag). How much energy has been dissipated as heat due to drag with the atmosphere when it reaches 1000 m?

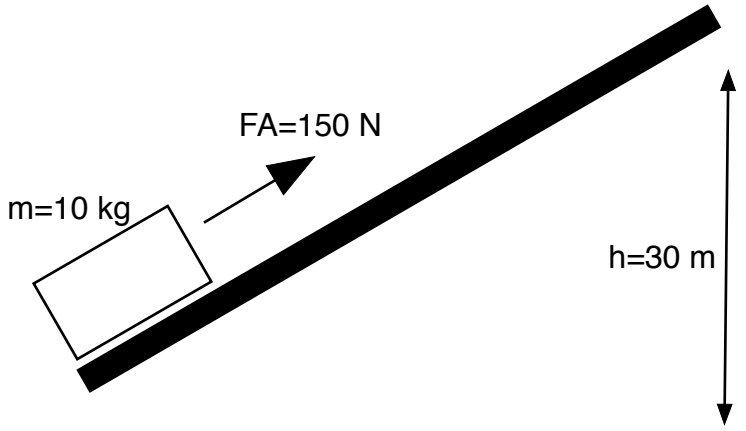



**Level 4**

What is the value of the average drag force that the rocket experiences on its way to 1000 m?

# Work and Energy 2

A 10 kg mass is accelerated up a frictionless incline by a 150 N force. What is the velocity of the mass when it reaches a height of 30 m? *The object travels 60 m up the plane of the incline.*




**Level 4**

What is the velocity of the at a height of 30 m if it is subject to a friction force of 75 N during its travel up the ramp?

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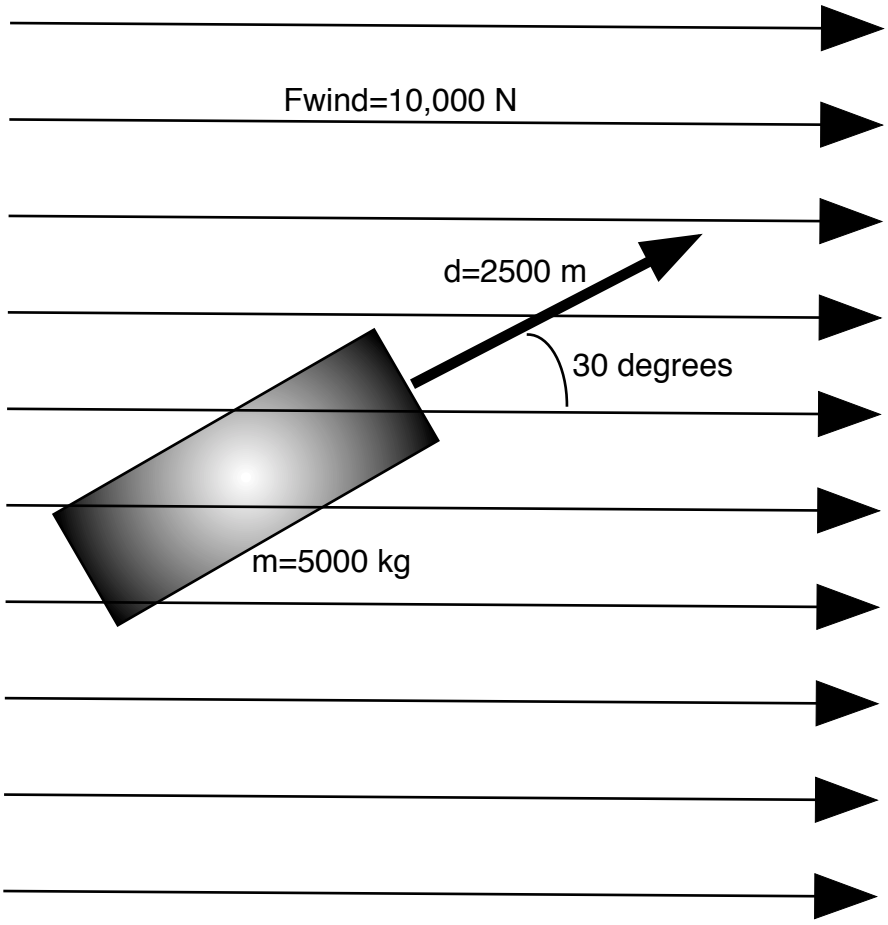
# Work and Energy 3

A 5000 kg boat sails at a constant 3 m/s for 2500 m downwind. The wind exerts 10,000 N of force on the sails and the boat travels at 30 degrees with respect to it. When the boat has travelled the 2500 m, how much energy has been dissipated by drag with the water.




**Level 4**

What is the power that the wind provides to the boat?

# Work and Energy 4 (Level 4)

A 25 kg cannonball is launched directly upward with an initial velocity of 40 m/s. It is subject to a constant average drag force of 100 N. How high, h, does the cannon ball rise before coming to a stop?