

Physics Assignment 2

1) Reading:

Knight 2.3 for Tuesday

You may also wish to read Knight 4.1-4.3 for a review of projectile motion and Knight 9.2-9.6 for a review of momentum conservation.

2) Mastering Physics: due Tuesday, September 30, by 10:00pm

3) Written questions: due Wednesday, October 1, by 10:00am to Lucia

For these questions, and for future homework and written exam questions, we would like you to write up the question as if you are explaining the answer to someone in a logical way. Use complete sentences, and make sure that each statement follows logically from the previous statement. If you are using some physical law, state it explicitly. To get full credit, you will not only need to have the correct answer, but also to provide a correct, logical explanation. For an example, see the sample solution for the first problem on the momentum worksheet.

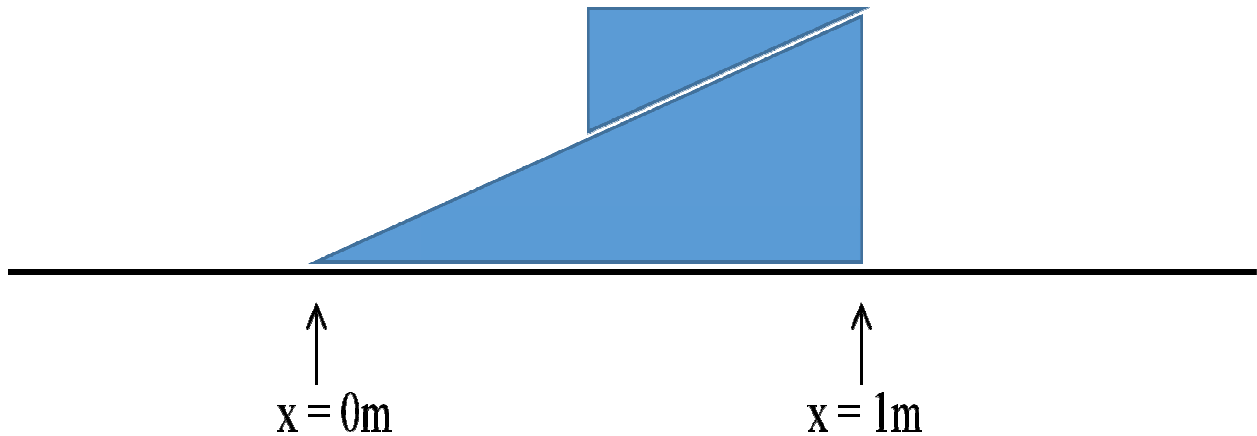
Problem 1:

Write up questions 1a and 1b of the first tutorial.

Problem 2:

On the final flight of the space shuttle Atlantis, astronauts brought along a sea cucumber as part of an astro-marine-biology experiment. When the sea cucumber was removed from its tank and allowed to float freely, it became nervous because of the zero-gravity environment and expelled its viscera (various internal organs).

If the sea cucumber (with initial mass 0.3kg) was initially stationary relative to the shuttle and if the viscera (mass 0.1kg) are observed to travel at 1m/s relative to the shuttle after being ejected, how long does it take until the sea cucumber and its insides are 2m apart? You may assume the viscera are expelled all at once.



Problem 3 (bonus):

The two blocks of ice shown have the same thickness (into the page), with the one on top being half the width and height of the other. The height of each block is half its width. The blocks are released from rest in the initial position shown.

a) Assuming that the two blocks slide without friction against each other and against the surface, at which x position does the top block first touch the horizontal surface?

b) If the horizontal surface is the surface of a scale and the larger block has a mass of 100kg, what weight does the scale read just after the blocks are released?

Hints are available upon request.