Physics 160
Spring 2012
Homework Assignments

- HW #11 - Due May 7.

  Mastering Physics: 5 questions from chapter 13.

  Written Question: None.

- HW #10 - Due April 23.

  Mastering Physics: 7 problems from chapter 10.

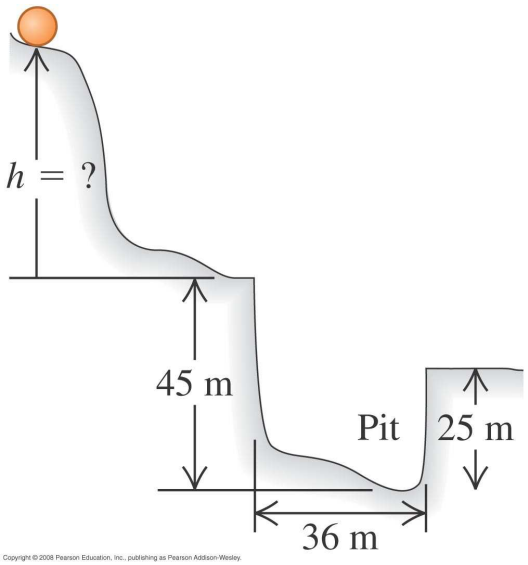
  Written Question, 10.86: A uniform drawbridge $8.00\,m$ long is attached to the roadway by a frictionless hinge at one end, and it can be raised by a cable attached to the other end. The bridge is at rest, suspended at $60.0°$ above the horizontal, when the cable suddenly breaks. (a) Find the angular acceleration of the drawbridge just after the cable breaks. (Gravity behaves as though it all acts at the center of mass.) (b) Could you use the equation $\omega = \omega_0 + \alpha t$ to calculate the angular speed of the drawbridge at a later time? Explain why. (c) What is the angular speed of the drawbridge as it becomes horizontal?

- HW #9 - April 16.

  Mastering Physics: 7 problems from chapter 9.

  Written Question, 10.80: A uniform marble rolls without slipping down the path shown in Fig. P10.80, starting from rest. (a) Find

the minimum height h required for the marble not to fall into the pit. (b) The moment of inertia of the marble depends on its radius. Explain why the answer to part (a) does not depend on the radius of the marble. (c) Solve part (a) for a block that slides without friction instead of the rolling marble. How does the minimum h in this case compare to the answer in part (a)?



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- HW #8 - Due April 2.

  Mastering Physics: 8 problems from chapter 8.

  Written Question, 8.101: Neutron Decay. A neutron at rest decays (breaks up) to a proton and an electron. Energy is released in the decay and appears as kinetic energy of the proton and electron. The mass of a proton is 1836 times the mass of an electron. What fraction of the total energy released goes into the kinetic energy of the proton?

- HW #7 - Due March 26.

  Mastering Physics: 6 problems from chapter 7.

  Written Question, 7.60: These data are from a computer simulation for a batted baseball with mass $0.145\,kg$, including air resistance:

t	x	y	v_x	v_y
0	0	0	$30.0\,m/s$	$40.0\,m/s$
$3.05\,s$	$70.2\,m$	$53.6\,m$	$18.6\,m/s$	0
$6.59\,s$	$124.4\,m$	0	$11.9\,m/s$	$-28.7\,m/s$

  (a) How much work was done by the air on the baseball as it moved from its initial position to its maximum height? (b) How much work was done by the air on the baseball as it moved from its maximum height back to the starting elevation? (c) Explain why the magnitude of the answer in part (b) is smaller than the magnitude of the answer in part (a).

- HW #6 - Due March 21.

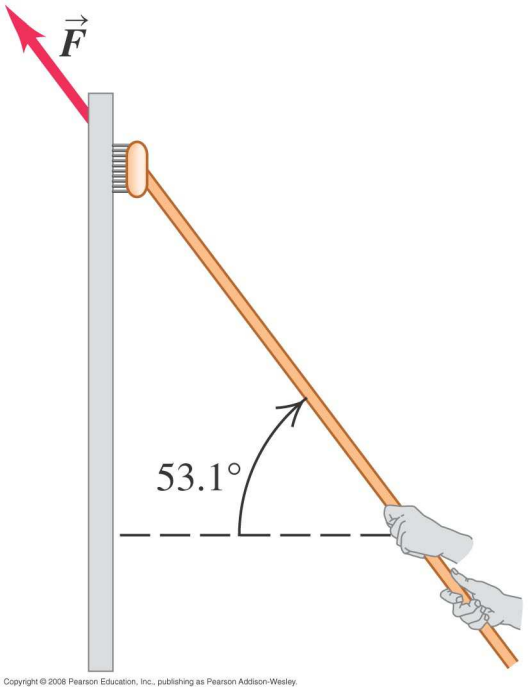
  Mastering Physics: 9 problems from chapters 5 and 6.

  Written Question: None.

- HW #5 - Due March 5.

  Mastering Physics: 10 problems from chapters 4 and 5.

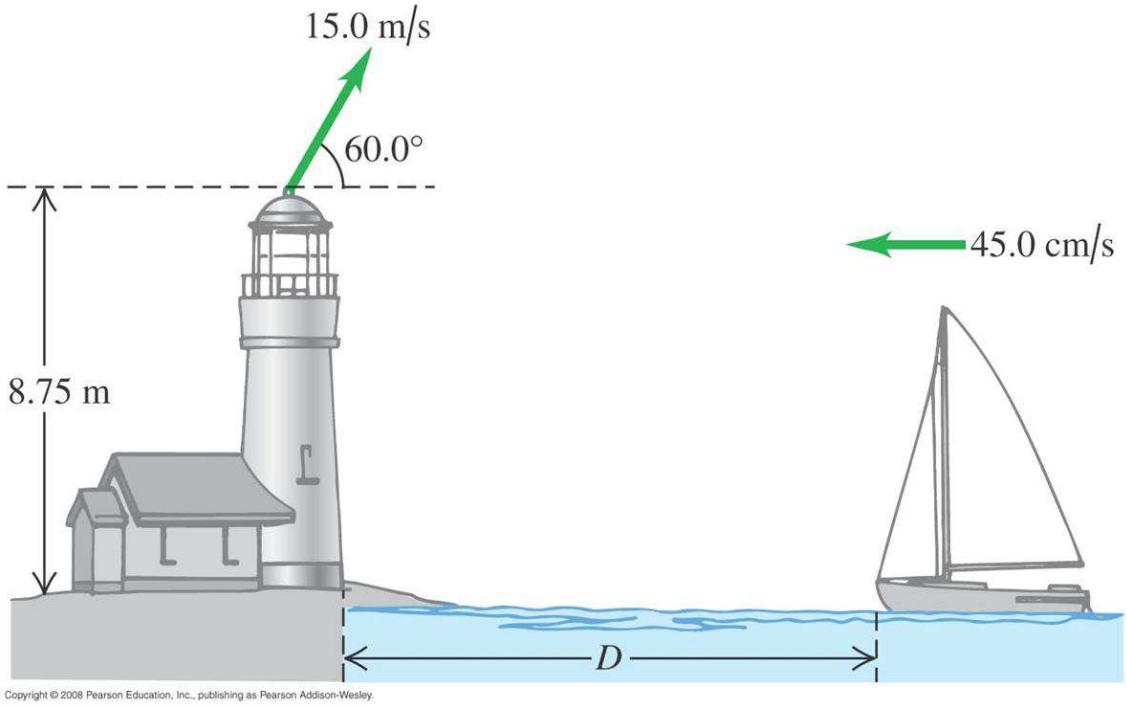
  Written Question, 5.74: A window washer pushes his scrub brush up a vertical window at constant speed by applying a force $\overrightarrow{\mathbf{F}}$ as shown in Fig. P5.74. The brush weighs $15.0\,N$ and the coefficient of kinetic friction is $\mu_k = 0.150$. Calculate (a) the magnitude of the force $\overrightarrow{\mathbf{F}}$ and (b) the normal force exerted by the window on the brush.



- HW #4 - Due February 20.

  Mastering Physics: 9 problems from chapters 1 and 3.

  Written Question, 3.56: As a ship is approaching the dock at $45.0\,cm/s$ an important piece of landing equipment needs to be thrown to it before it can dock. This equipment is thrown at $15.0\,m/s$ at $60.0°$ above the horizontal from the top of a tower at the edge of the water, $8.75\,m$ above the ships deck (Fig. P3.56). For this equipment to land at the front of the ship, at what distance D from the dock should the ship be when the equipment is thrown? Air resistance can be neglected.



- HW #3 - Due February 6.

  Mastering Physics: 3 Mastering Physics problems, 2.77, 2.85, 2.93.

  Written Question, 2.88: A physics teacher performing an outdoor demonstration suddenly falls from rest off a high cliff and simultaneously shouts "Help." When she has fallen for 3.0 s, she hears the echo of her shout from the valley floor below. The speed of sound is 340 m/s. (a) How tall is the cliff? (b) If air resistance is neglected, how fast will she be moving just before she hits the ground? (Her actual speed will be less than this, due to air resistance.)

- HW #2 - Due January 30.

Mastering Physics: 1.6, 2.4, 2.59, and 3 Mastering Physics Special Problems.

Written Question, 2.75: A marble is released from one rim of a hemispherical bowl of diameter 50 cm and rolls down and up to the opposite rim in 10.0 s. Find (a) the average speed and (b) the average velocity of the marble.

- HW #1 - Due January 23.

  Mastering Physics: Four introductory questions about Mastering Physics.

  Written Questions: None.