Problem Solving Day /Class Review

Ask any questions about past tests or final

Final, 8PM, Thursday, December 19, Room TBA

(A few people with un-reschedulable excuses will take a DIFFERENT final the afternoon of Tuesday, December 17, time/room TBA)

20 multiple choice questions

~50% new stuff (Chapters 9-11&13)

~50% old stuff (Chapters 2-5)

New Stuff (can request whatever)

- Chapter 13: Springs (A), Pendula (B), Waves (C)
- Chapter 9 (more questions): Density, Pressure, Continuity and Bernoulli Equations (C), Stress/Strain
- December 2, Chapter 10.0-10.3 only
- December 5, Chapter 11.0-2 & 11.4-6

Old Stuff

Chapter 2: Basic problem solving with kinematics

Chapter 3: Vectors and projectile motion (D)

Chapter 4: Newton's Laws, Forces, Inclines, Friction (E)

Chapter 5: Work, Conservation of Energy (extra)

A pendulum clock that works perfectly on Earth is taken to the Moon. Assume the free-fall acceleration on the Moon is 1.63 m/s².

Does the clock run fast or slow on the Moon?

Find the period on the Moon.

A liquid with density 1.65 g/cm³ flows through a horizontal pipe of varying cross section as in the figure below. In the first section, the cross-sectional area is 10.0 cm², the flow speed is 253 cm/s, and the pressure is 1.20 x 10⁵ Pa. In the second section, the cross-sectional area is 4.00 cm².
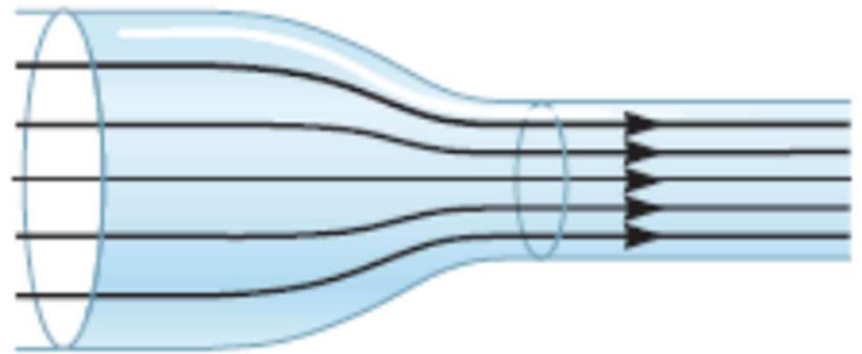
Calculate the smaller section's flow speed.

Calculate the smaller section's pressure.

A raw egg can be dropped from a third-floor window and land on a foam-rubber pad on the ground without breaking. A 65-g egg is dropped from a window located 35.2 m above the ground and a foam-rubber pad that is 15.0 cm thick stops the egg in 9.2 ms.

(a) By how much is the pad compressed?
(b) What is the average force exerted on the egg after it strikes the pad?

Questions We Didn't Get To

Another question I wrote

You throw a ball at a velocity of 12 m/s at an angle of 30 degrees with respect to the ground. If your hand is one meter above the ground when you let it go, how far horizontally from you does the ball first hit the ground?

Inclines and Friction

You are sledding on a snowy day. Let's assume the coefficient of friction is 0.1. If the incline of your sledding hill is 30 degrees with respect to the horizontal, what is your acceleration?

If you started from rest, how fast would you be going after 20 meters down the incline?

An object attached to a spring vibrates with a simple harmonic motion as shown by this x versus t graph. Find:

x (cm)
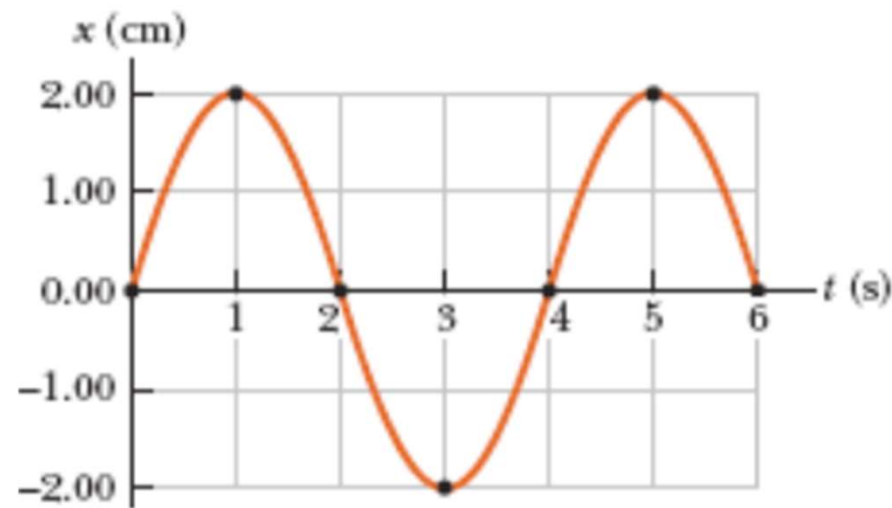
a) How far it was pulled from its equilibrium length
b) The period of oscillation
c) The angular frequence
d) The maximum velocity
e) The maximum energy
f) The maximum acceleration
g) The maximum spring force
h) The spring constant
i) The velocity at time 3.5 seconds