**Homework1**

**1.** Is a bouncing ball an example of simple harmonic motion?

Is the daily movement of a student from home to school

and back simple harmonic motion? Why or why not?

2. A ball dropped from a height of 4.00 m makes a perfectly

elastic collision with the ground. Assuming no mechanical

energy is lost due to air resistance,

(a) show that the ensuing motion is periodic and

(b) determine the period of the motion.

(c) Is the motion simple harmonic? Explain.

3. In an engine, a piston oscillates with simple harmonic motion

so that its position varies according to the expression

where x is in centimeters and t is in seconds. At t = 0,

find:

(a) the position of the piston,

(b) its velocity, and

(c) its acceleration.

(d) Find the period and amplitude of the motion.

4. The position of a particle is given by the expression

where x is in meters and t is in seconds.

Determine (a) the frequency and period of the motion,

(b) the amplitude of the motion,

(c) the phase constant, and

(d) the position of the particle at t= 0.250 s.