PHY 106   Test 1   June 25, 2004   20 minutes
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1. the position of an object undergoing SHM is given by $x(t) = 5\cos(4\pi t)$ cm .

    a)   Calculate the period and frequency of this motion.

    b)   Sketch the position and velocity of the mass vs. time. (One graph above the other) Label important points on the *t*-axis.

    c)   What is the first time after t=0 that the particle is at its equilibrium position? In what direction is it moving at that time?

    d) What is the maximum speed of the mass?

    e) At what time after t=0 does the maximum speed occur?

2. A 3-kg mass causes a vertical spring to stretch 12.0 cm.
    a)   Explain why you would expect SHM if the mass is pulled down from this stretched position and released.

    b)   Calculate the period of oscillation of this system

    c)   Calculate the maximum acceleration of the mass.

    d)   The mass breaks in half, with one half remaining attached to the spring. Compare the frequency, amplitude and total energy of the oscillator before the mass splits to their values after the mass splits.