Oscillation Problems I

1. The position as a function for a 0.5 kg mass on the end of a spring is given by $x = 1.5\cos(3t)$.
    a. What is the maximum displacement of the mass from the equilibrium position?

    b. What is the period of this motion?
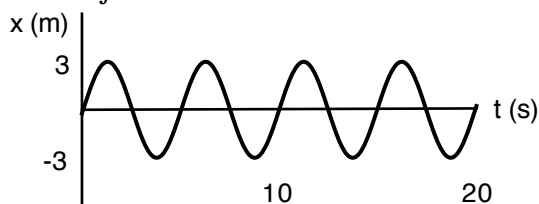
    c. What is the maximum speed of the mass?

2. A mass on a spring has an angular frequency of 5 rad/s and a maximum speed of 3 m/s.
    a. What is its maximum displacement?

    b. What is its maximum acceleration?

3. A mass on a spring has a maximum speed of 1.5 m/s and a maximum displacement of 25 cm. What is the period of oscillation?

4. A mass on a spring is oscillating with a frequency of 20 rpm. It also has a maximum acceleration of 1.5 m/s². What is the amplitude of the oscillation?

5. The position as a function of time for an oscillating object is shown. What is the maximum speed of the object?

Answers:
1. a) 1.5 m   b) 2/3 π s   c) 4.5 m/s   2. a) 0.6 m   b) 15 m/s²
3) 1/3 π s   4) 0.34 m   5) 2π m/s