Homework

1. Show that is a solution to the harmonic oscillator
2. A simple oscillator whose natural frequency () is 5 rad/sec is displaced 0.03m from it’s equilibrium position and released. Find (a) the initial acceleration (b) the amplitude of the resulting motion and (c) the maximum speed obtained.
3. Consider the waveform propagating on a string of linear density 0.1 g/cm where y, and x are in centimeters and t is in seconds. a) what are the amplitude, phase speed (c), frequency, wavelength and wave number? (b) what is the particle speed (i.e. velocity) of the element at x =0 and t =0?
4. Write functions in Python for the displacement, velocity, and acceleration of a harmonic oscillator assuming a solution of the wave equation as
   1. Include informative doc strings and input variables s, m, and t, and set the default inputs for A and B equal to 1
   2. Using numpy linspace create a timeseries from 0 to 13 that has a length of 200 units.
   3. Using mass of 50kg and a spring stiffness 50 N/m calculate the acceleration, velocity, and displacement for your system using the functions you created above.
   4. Using the matplotlib.pyplot library (or any other you prefer) plot the acceleration, velocity, and displacement as a function of t together.