[27] 1.) A mass weighing 1 kg stretches a spring 9.8m. If the mass is pulled down an additional 2m and then set in motion with an upward velocity of 2m/sec, and if there is no damping, determine the position $u$ of the mass at any time $t$. Find the frequency, period, and amplitude of the motion.

Answer

position: ____________________________________________

frequency = ___________  period = ___________  amplitude = ___________
2.) Find the general solution to the following differential equation:

\[ 4y' = t(y^2 - 4) \]
3.) Find the general solution to the following differential equation:

\[ ty' + 3y = t^5 \]
4.) Draw a direction field for the following differential equation:

\[ y' = (y + 3)(y - 2) \]

Find the equilibrium solution(s) and determine if asymptotically stable, semistable, or unstable.

5.) Suppose that the general solution to \( y'' - y = 0 \) is \( c_1 e^t + c_2 e^{-t} \). Find the general solution to \( y'' - y = \cos(t) \)

Answer 5.)
6.) Calculate the Wronskian of \( f(x) = e^x \) and \( g(x) = e^{x-1} \). Are \( f \) and \( g \) linearly dependent or linearly independent?

7.) Match the following differential equation to its graph:

[3] 7i.) \( y'' + 2y' + y = 0, \ y(0) = 0.1, \ y'(0) = 0.2 \)

[3] 7ii) \( y'' + 2y' + 10y = 0, \ y(0) = 0.1, \ y'(0) = 0.2 \)

[3] 7iii) \( y'' + 10y = 0, \ y(0) = 0.1, \ y'(0) = 0.2 \)