**5.** [14 points] For the first two of the following, identify each as true or false, by circling "True" or "False" as appropriate, and provide a short (one sentence) explanation indicating why you selected that answer. For the last give a short answer explaining the indicated question.

   a. [4 points] For some constant ω and k, a solution to the mechanical system $y'' + 2y' + ky = \cos(\omega t)$ could be that shown to the right.

   True   False
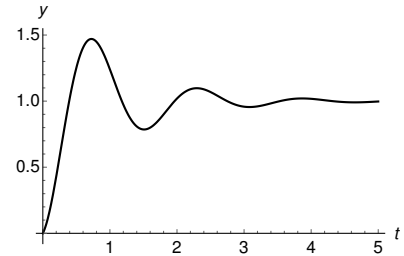
   b. [4 points] Let $F(s) = \frac{s^2+1}{s^2+3s+5}$. There is some piecewise continuous function $f(t)$, of exponential order, for which $\mathcal{L}\{f(t)\} = F(s)$.

   True   False

   c. [6 points] Your friends Anna and Andrew are solving the two problems $y'' + 0.1y' + y = 0$, $y(0) = 0$, $y'(0) = 1$ and $z'' + 0.1z' + z = \delta(t-3)$, $z(0) = 0$, $z'(0) = 0$. Anna thinks that $z(t) = y(t-3)$, while Andrew thinks they are different. Explain why they are both partly correct.