

7. [12 points] For each of the following give an example, as indicated, and provide a short (one or two sentence) explanation of why your answer is correct.
- a. [4 points] Give an example of an initial value problem with a linear, second-order, homogeneous differential equation for which there is no guarantee of a unique solution.
- b. [4 points] Give an example of a linear, second-order, constant-coefficient, nonhomogeneous differential for which we cannot use the method of undetermined coefficients. What form will the general solution to your equation take?
- c. [4 points] Give an example of a linear, second-order, nonhomogeneous differential equation for which the Laplace transform of the dependent variable y could be $\mathcal{L}\{y(t)\} = Y(s) = \frac{1}{s+1} + \frac{1}{s+2} + \frac{1}{s+3}$.