4. [12 points] Consider the differential equation \( x'' + ax' + bx = A_0 \cos(\omega t) \), modeling displacement \( x \) of the mass in the mass-spring system shown to the right. In this equation, \( a, b, A_0 \) and \( \omega \) are constant parameters.

a. [6 points] If a representative graph of \( x \) as a function of time \( t \) is shown in the figure to the right, can you determine if any of \( a, b, A_0 \) or \( \omega \) must be zero or must be non-zero? Must any of \( a, b, A_0 \) or \( \omega \) be related in any way? Can you tell what value any of them must have?

b. [6 points] If a representative graph of \( x \) as a function of time \( t \) is shown in the figure to the right, can you determine if any of \( a, b, A_0 \) or \( \omega \) must be zero or must be non-zero? Must any of \( a, b, A_0 \) or \( \omega \) be related in any way? Can you tell what value any of them must have?