1. Write the following functions as a product of two trigonometric functions.

    (a) $\cos(2t) + \cos(3t)$

    (b) $\cos(2t) + \sin(3t)$. Hint: $\cos(z) = \sin(z + \pi/2)$ and $\sin(z) = \cos(z - \pi/2)$.

2. [3.8.9] An undamped spring-mass system with a mass that weighs 6 lb and a spring constant of 1 lb/in is suddenly set in motion at $t = 0$ by an external force of $4 \cos 7t$ lb. Determine the position of the mass $u(t)$ (in) at time t (s), expressing $u(t)$ as a product of two trigonometric functions.

3. Now, modify the system in #2 so that the damping constant is $\gamma = 1\text{lb} \cdot \text{s}/\text{in}$. Find the forced response $U(t)$, expressed in the form $U(t) = R\cos(7t - \delta)$. How does the magnitude of the forced response compare with that of the static response? Is this system demonstrating resonance?