1) For the system:

$$y'' + 9y = 5\cos(\omega t)$$

(a) Find the frequency ω of the driving force that produces resonance.

(b) Find the general solution for the value of ω you found in (a).

2) For the system:

$$y'' + 3y = 2\cos(\omega t)$$

(a) Find the frequency ω of the driving force that produces resonance.

(b) Find the general solution for the value of ω you found in (a).

3) For the system:

$$y'' + 4y = 5\sin(\omega t)$$

(a) Find the frequency ω of the driving force that produces resonance.

(b) Find the general solution for the value of ω you found in (a).

4) For what value of k is the system:

$$y'' + ky = 3\cos(4t)$$

in resonance?

5) For the system:

$$y'' + 4y = \cos(\omega t)$$

(a) Find the frequency ω of the driving force that produces resonance.

(b) Find the general solution for the value of ω you found in (a).

(c) Use the general solution to find a particular solution for which:

$$y(0) = 0, y'(0) = 0$$

Sketch the particular solution and the straight lines
that bound the amplitude of oscillations. How does the amplitude
behave as t increases?