Would appreciate some help on the following type of question please

How do I express the following inhomogeneous system of first-order

differential equations for x(t) and y(t) in matrix form?

ẋ = −2x − y + 12t + 12,

ẏ= 2x−5y−5

How do I express the corresponding homogeneous system of differential equations, also in matrix form?

How do I find the eigenvalues of the matrix of coefficients and an eigenvector corresponding to each eigenvalue. From this how would I write down

the complementary function for the system of differential equations?

How would you calculate a particular integral for the inhomogeneous system, and then find the general solution?

How would I determine the particular solution of the initial-value problem with the initial conditions x(0) = 3 and y(0) = 2

I have another problem below but on a similar topic:

If an object moves in the plane in such a way that its Cartesian coordinates (x, y) at time t satisfy the following homogeneous system of second-order differential equations:

ẍ = −2x − y,

ẏ = 2x−5y  *(the ẏ here should have two dots on it but I cannot find the character)*

How would I:

Express the system in matrix form?

Find the general solution of the system?

I think this system undergoes simple harmonic motion in a straight line in two distinct ways but why?

And for each such simple harmonic motion how do I determine the angular frequency and the vector giving the direction of motion?