(1) Find a basis for the subspace of solutions to the linear system

$$2y + z = 0$$
$$x + 6y - z = 0$$

(2) Find the general solution to $y^{(4)} + 6y''' + 13y'' = 0$.

(3) Solve the initial value problem $y'' + 2y' = 3 + 4\sin(2t)$, y(0) = 0, y'(0) = 2.