MATH 170C ASSIGNMENT 6

(1) (§8.11, 3) Find the general solution of the system
$$\begin{cases} x_1' = 3x_1 - 5x_2 \\ x_2' = 2x_1 + x_2 \end{cases}$$

(2) (§8.12, 3) Determine whether this problem is stiff:
$$\begin{cases} x'' = -20x' - 19x, \\ x(0) = 2, \\ x'(0) = -20 \end{cases}$$

(3) (§8.12, 4) Consider the multistep method
$$x_n + \alpha x_{n-1} - (1+\alpha)x_{n-2} = \frac{1}{2}h[-\alpha f_n + (4+3\alpha)f_{n-1}]$$

Determine α so that the method is stable, consistent, convergent, A-stable and of second order.