MA 216 Assignment 2

Due 15 November 2006

1. Solve
$$x'(t) = 22x(t) - 49y(t),$$
$$y'(t) = 9x(t) - 20y(t).$$

2. Solve
$$x'(t) = 11x(t) - 30y(t),$$
$$y'(t) = 4x(t) - 11y(t).$$

3. Solve
$$x'(t) = 15x(t) - 8y(t),$$
$$y'(t) = 20x(t) - 9y(t).$$

4. Under what conditions on a, b, c and d is it true that *all* solutions of
$$x'(t) = ax(t) + by(t)$$
$$y'(t) = cx(t) + dy(t)$$
satisfy
$$\lim_{t\to+\infty} x(t) = 0 = \lim_{t\to+\infty} y(t)?$$

5. Find a basis for the vector space of solutions to
$$x'''(t) - x''(t) - x'(t) + x(t) = 0.$$