Score:	Name:

HW6 - Due 03/12/2008
ODE - spring 2008

1) Find x such that

$$x^{(3)} - x^{(2)} + 4x' - 4x = 0 \tag{1}$$

and $x(0) = -x'(0) = x^{(2)} = 1$.

2) What is the smallest $n > 0$ for which there is a differential equation

$$x^{(n)} + a_1 x^{(n-1)} + ... + a_n x = 0 \tag{2}$$

having among its solution $\sin 2t$, $\quad 4t^2 e^{2t}$ and $-e^{-t}$. Find the constant a_1, ... a_n.

3) Find a real valued function x such that

$$x'' + 4x = cos(2t) \tag{3}$$

and $x(0) = x'(0) = 1$.

4) Let $q(t)$ be a polynomial of degree m. Show that any equation

$$x^{(n)} + a_1 x^{(n-1)} + ... + a_n x = q(t) \tag{4}$$

has a solution which is a polynomial.