MATH2403A____ 2-27-2000 TEST 1 NAME:_____
INSTRUCTOR:_____ STUDENT NO:_____

1. Given the differential equation $y''(x) - 12y'(x) + 36y(x) = 0$, find
(a) the auxilliary equation _____
(b) the characteristic-values (the r-roots) $r_1 =$ _____, $r_2 =$ _____,
(c) two solutions $y_1 =$ _____, , $y_2 =$ _____.
(d) Show that these two solutions are linearly independent.
(e) Find a general solution.

2. Find a particular solution for $y''(x) - 12\,y'(x) + 36\,y(x) = 36\,sin(6x)$.

3. Find a particular solution for $y''(x) - 12y'(x) + 36\,y(x) = 36\,e^{6x}$.

4. Given the differential equation $y^{(4)}(x) - 16\,y(x) = 0$, obtain
(a) the auxilliary equation _____
(b) the characteristic-values (the r-roots)
(c) the general solution in terms of real-valued functions.

5. Consider the equation, $x^2y''(x) - 12\,y(x) = 0$, for $x > 0$. (E)
(a) Explain whether you can find a solution for (E) of the form $y = e^{rx}$. (F_1)
(b) Explain whether you can find solutions for (E) of the form $y(x) = x^r$ (F_2)
where r is a constant.