Math 202-Section 15   Quiz 4

Sr. Num.:   ID. Num.:   Name:

Q 1: [4 points] Use the existence and uniqueness theorem to find the largest interval I such that the following initial value problem has a unique solution.

$$(\cot x)y'' + (x-1)y = 4x; \quad y(1) = 0, \quad y'(1) = 1.$$

Q 2: a) [2 points] State whether the set $\{e^x, \ e^{-x}, \ \cosh x\}$ is linearly independent on $I = (-\infty, \infty)$.

b) [4 points] Given that $y_1 = x$, $y_2 = x^{-2}$, $y_3 = x^{-2}\ln x$ are solutions of the differential equation: $x^3y''' + 6x^2y'' + 4xy' - 4y = 0$, on the interval $I = (0, \infty)$, Show that $\{y_1, y_2, y_3\}$ is a fundamental set of solutions for the differential equation.