Math 202 (071) Exam 1 (1.1-4.2)

Total Points: 25

Show your work.

Time: 90 min

1. Verify that the relation $x\sin y - e^x = 0$ is an implicit solution of $y' = \dfrac{e^x - \sin y}{x\cos y}$.

2. Solve: $yy' - e^x = 0$, $y(0) = 1$. Is the solution unique? Justify.

3. Find the general solution of $x\,y' + y = e^x$ for $x > 0$.

4. Solve $y' = \dfrac{3 - 2xy^2}{1 + 2x^2 y}$.

5. The function x^3 is a solution of $x^2 y'' - 4xy' + 6y = 0$. Use the method of reduction of order to find the general solution for $x > 0$.

6. If the functions $\sqrt{x}$, $\sqrt{x}\ln x$, and $3\sqrt{x}$ are solutions of a second order homogeneous linear differential equation. Find a fundamental set of solutions for this equation. Explain.

Distribution of points: Q1 = 2pt, Q2 = 5pts, Q3 = 5pts, Q4 = 5pts, Q5 = 5pts, Q6 = 3pts.