Math 242, Spring 1994, Exam 2

SHOW your work. $\boxed{CIRCLE}$ your answer. CHECK your answers. Each problem is worth 10 points

1. State the Existence and Uniqueness Theorem for first order differential equations.

2. Solve the Initial Value Problem $y' = xe^x$, $y(0) = 0$.

3. Solve the Initial Value Problem $xy' + 2y = 3x$, $y(1) = 5$.

4. Solve $(x - y)y' = (x + y)$.

5. Solve $y' = y + y^3$.

6. Solve $y' = \sqrt{x + y}$.

7. Solve $y'' + y' - 6y = 0$.

8. Solve $y'' + 6y' + 9y = 0$.

9. Solve $y''' - y'' + 9y' - 9y = 0$.

10. A damped spring moving without external forces satisfies the Initial Value Problem

$$x'' + 2x' + 5 = 0 \quad x(0) = 3 \quad x'(0) = 5.$$

    (a) Find $x(t)$.
    (b) Graph $x(t)$.