Math 244 Midterm 2

Name: _____

1. Solve $y' = x^2y^2 + y^2$.

2. Solve $x^2y'' - 2y = 3$.

3. Solve $y'' + 3y = e^{-x}$.

4. Let $y(t)$ be the displacement from equilibrium of a mass of 1kg that is hanging on a spring. At rest, this mass of 1kg mass stretches this spring $10/4$ meter (use $g = 10$ here). Assuming friction is given by a term of the form $4y'(t)$ and assuming no external force, find $y(t)$ if $y(0) = 1$ and $y'(0) = 0$.

5. Let $A = \begin{bmatrix} 2 & 2 & 2 \\ 1 & 1 & 1 \\ 0 & 0 & 0 \end{bmatrix}$. Diagonalize A or state why A cannot be diagonalized.