MATH 217 Linear Algebra and Differantial Equations
FINAL EXAM

1. Find the general solution of the following Bernoulli equation:
$y' - \frac{2y}{x} = 2x\sqrt{y}$.
2. Find an integrating factor and solve the given equation:
$2\left(\cos^2 y \cdot \cos 2y - x\right) dy - \sin 2y dx = 0$.
3. Solve the following differential equations using the method of variation of parameters:
$xy'' - y' = x^3$.
4. Solve the following differential equations using the method of undetermined coefficients:
$y'' + y = 4\sin x$.
5. Solve the following Cauchy-Euler equation using the substitution $x = e^t$:
$x^2y'' + 3xy' + y = 0$.