MAP 2302, Exam II, Spring 2015

Name:________________________

Student signature:________________________

Write final answers on this sheet. Turn in all relevant work on separate sheets.

(1) Use the method of undetermined coefficients to find the form of a particular solution y_p to the following ODEs. **Do not solve the equation!**

(a) $y'' - 2y' + 2y = e^t$
(b) $y'' - 2y' + 2y = te^t\cos(t) + t^2e^t\sin(t)$
(c) $y'' + 4y' + 4y = e^{-2t}$
(d) $y'' + 4y' + 4y = e^{-2t} + e^t$

(2) Find the general solution to the following ODE for $t < 0$.

$$t^2y'' + 4ty' + 2y = \sin(t)$$

(3) If y_1, y_2 are solutions to $y'' + t^2y' + e^ty = 0$ on $(-\infty, \infty)$ can $W[y_1, y_2](t) = t$ be their Wronskian?

(4) Verify that $y_1(t) = t$ is a solution to

$$(1 - t^2)y'' - 2ty' + 2y = 0.$$

Then find the general solution to that ODE for $t > 1$.

(5) Solve the IVP

$$y'' + 5y' + 6y = \sin(t) \quad , y(0) = 1, y'(0) = -1.$$