Math 305 MAKEUP EXAM 2 Name_____
K.A. Pericak-Spector

[16] 1. Solve the following IVP.

$$\begin{aligned} 2y'yy'' + (y')^3 - y' &= 0 \\ y(0) &= \quad 1 \\ y'(0) &= -1 \end{aligned}$$

[16] 2. Solve the following IVP.

$$y'' + (y')^2 + 1 = 0$$
$$y(0) = 2$$
$$y'(0) = 1$$

[20] 3. Solve for y_h if

a) $y'' + 12y' + 32y = 0$

b) $y'' - 6y' + 9y = 0$

c) $y'' - 4y' + 20y = 0$

d) $y'' + 2y' - 6y = 0$

[16] 4. Consider the problem $x^2y'' - 5xy' + 9y = 0$.

a) Show $y = x^3$ is a solution.

b) Find the second solution.

[22] 5. Solve the IVP.

$$\begin{aligned} y'' + 6y' &= 72t^2 + 60t + 6 + 16\cos t - 15\sin t \\ y(0) &= 2 \\ y'(0) &= 0 \end{aligned}$$

[10] 6. Consider $y'' + \delta(xy' + y) = 0 = 0$. (This equation occurs in the study of the turbulent flow of a uniform stream poast a circular cylinder.

a) Show $y = e^{-\delta x^2/2}$ is one solution.

b) Find the second solution. (It will be in the form of an integral.)