Week in Review Session ♯4 (Sections 3.1-3.3)

1. Verify that the functions y_1 and y_2 are solutions of the given differential equation. Do they constitute a fundamental set of solutions?

$$x^2y'' - x(x+2)y' + (x+2)y = 0, \qquad x > 0 \quad y_1(x) = x, \quad y_2(x) = xe^x.$$

2. If the Wronskian of f and g is $3e^{4t}$ and $f(t) = e^{2t}$, find $g(t)$

3. Solve the initial value problem

$$y'' - y' - 2y = 0, \qquad y(0) = \alpha, \quad y'(0) = 2.$$

Find α so that the solution approaches zero as $t \to \infty$.

4. Find the solution to the given initial value problem.

$$y'' - 2y' + 5y = 0 \qquad y(\pi/2) = 0, \quad y'(\pi/2) = 2.$$

5. Solve the initial value problem

$$t^2y'' + 3ty' - 3y = 0, \qquad y(1) = 3, \quad y'(1) = 3/2$$

given that $y_1(t) = t$ is a solution of the equation.

6. If the differential equation

$$ty'' + 2y' + te^t y = 0$$

has a fundamental set of solutions y_1 and y_2 and $W(y_1, y_2)(1) = 2$, find the value of $W(y_1, y_2)(5)$.