

Math 260 – Quiz # 8

Name: Solution

Sr #: _____

1. Consider the following DE: $2y'' + 5y' - 3y = 2e^x + 5x$

(a) Write the associated homogeneous equation for this equation.

$$2y'' + 5y' - 3y = 0$$

(b) Write the characteristic equation of the equation in (a).

$$2\lambda^2 + 5\lambda - 3 = 0$$

(c) Find the general solution of the equation in (a).

$$2\lambda^2 + 5\lambda - 3 = 0$$

$$\Rightarrow \lambda = \frac{-5 \pm \sqrt{25 + 24}}{4} = \frac{-5 \pm 7}{4} = \left\{ \frac{1}{2}, -3 \right\}$$

The general solution is

$$y = C_1 e^{\frac{x}{2}} + C_2 e^{-3x}$$

2. Solve the DE: $y'' - 6y' + 13y = 0$

$$\lambda^2 - 6\lambda + 13 = 0$$

$$\Rightarrow \lambda = \frac{6 \pm \sqrt{36 - 52}}{2} = \frac{6 \pm \sqrt{-16}}{2} = 3 \pm 2i$$

 \therefore the solution is

$$y = e^{3x} (C_1 \cos 2x + C_2 \sin 2x)$$