Math 260 – Quiz # 8b

Name: _Solution_   Sr #: _____

1. Consider the following DE: $2y'' + 5y' - 3y = 4\sin x$

   (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: $100y'' - 20y' + y = 0$

   $$100\lambda^2 - 20\lambda + 1 = 0$$

   $$\lambda = \frac{20 \pm \sqrt{400 - 400}}{200} = \frac{1}{10}$$

   Note that λ is repeated root, i.e. $\lambda = \frac{1}{10}, \frac{1}{10}$

   $\therefore$ The solution is $y = C_1 e^{\frac{x}{10}} + C_2 x e^{\frac{x}{10}}$