MATH 217 – WORKSHEET 03

Q.1 Find the general solutions of the following second-order ODEs

(a) $y'' + 5y' + 6y = 0$

(b) $y'' + 2y' + y = 0$

(c) $y'' + 4y = 0$

(d) $y'' + 2y' + 5y = 0$

Q.2 Use these initial conditions in the corresponding ODEs of the previous question to find particular solutions.

(a) $y(0) = 1$, $y'(0) = -1$

(b) $y(0) = 1$, $y'(0) = 0$

(c) $y(0) = 2$, $y'(0) = 2$

(d) $y(0) = 3$, $y'(0) = 5$

Q.3 Find the general solutions of the following second-order ODEs

(a) $y'' + 5y' + 6y = 2e^{-x}$

(b) $y'' + 2y' + y = x$

(c) $y'' + 4y = \sin 2x$

(d) $y'' + 2y' + 5y = 16xe^{x}$

Q.4 Find a particular solution of each of the following differential equations.

(a) $y'' + 5y' + 6y = e^{-2x}$

(b) $y'' + 2y' + y = e^{-x} \ln x$

(c) $y'' + 4y = \tan 2x$

(d) $y'' + 2y' + 5y = e^{-x} \sec 2x$

Q.5 The equation $xy'' + 3y' = 0$ has the trivial solution $y_1(x) = 1$. Using the method of Section 4.4, find a second linearly independent solution y_2 and then find the general solution.