

Department of Mathematical Sciences  
KFUPM  
Term 042

**MATH 202/ Quiz#3/ Time allowed=50 minutes**

Name:

ID#:

**Q 1.** Given that the function  $y_1 = x^2 \cos(\ln x)$  is a solution of the differential equation  $x^2 y'' - 3xy' + 5y = 0$  on the interval  $I = (0, +\infty)$ , find a second nontrivial solution  $y_2$ . After verifying that  $y_1, y_2$  form a fundamental set of solutions, give the general solution of the equation on  $I$ .

**Q 2.** Solve the following differential equations:

a)  $y'' + 4y' + 2y = 0$ ,      b)  $y'' + 4y' + 4y = 0$ ,      c)  $y'' + 3y' + 3y = 0$ .

**Q 3.** Solve the following differential equations:

a)  $y''' - y'' - 8y' + 12y = 0$ ,      b)  $y^{(4)} - 16y = 0$ .