quiz # 2

PUT YOUR SECTION'S NUMBER ON YOUR BOOKLET PLEASE:

13 (T 11) 14 (T 12:30) 15 (T 5) 16 (T 9:30)

Exercise 1 Find the general solution of the given differential equation (do not find the constants)

a) $y'' - 2y' - 3y = (x^2 + 1)e^{-x}$

b) $y''' + 3y'' + 4y' + 12y = e^{3x} + \cos(2x)$

c) $y^{(8)} - 16y^{(4)} = 3x + 1 + x^2 e^{-2x} + e^x \cos(3x)$

Exercise 2 Solve the initial-value problem

$$x^2 \frac{dy}{dx} - 2xy = 3y^4 , \quad y(1) = \frac{1}{2}$$

give the largest interval I on which the solution is defined.

Exercise 3 Use an appropriate substitution to solve

$$xy' = y \ln(xy)$$

Exercise 4 Solve the DE
$$y'' - 2y' + y = \frac{e^x}{1 + x^2}$$

by variation of parameters.

Exercise 5 Consider the DE

$$(E) : \quad x^4 y'' + x^3 y' - 4x^2 y = 1$$

a. Check that $y_1 = x^2$ is a solution of the associated homogeneous equation.

b. Let $y_2 = x^2 u(x)$. Show that u satisfies a first order DE, then solve it.

c. Give the general solution of (E) on $]0, +\infty[$.

   (clearly indicates y_c and y_p)