

MATHEMATICS 2

WORK SHEET 04

Exercise 1. Solve the following ordinary differential equations

① $xy' = y + 1.$

② $xy' = e^y.$

Exercise 2. Solve the following linear first order ordinary differential equation

$$y' + y = x^2.$$

Exercise 3. Let

$$y'' + 2y' + y = x^2e^x.$$

be a second order linear equation.

- ① Solve the corresponding homogeneous equation.
- ② Find a particular integral y_i .
- ③ Deduce the general solution $y = y_c + y_i$.

Exercise 4. Solve the following second order linear differential equations.

① $y'' + y' + y = 0.$

② $y'' + y = e^x.$

Exercise 5. Solve the following second order linear ordinary differential equation

$$y'' - 2y' + y = 0,$$

where $y(0) = 0$ and $y'(0) = -3$.