Instructor: Dr. Igor Gorelyshev

DURATION OF THE EXAM: ONE HOUR AND 30 MINUTES

This is a closed book exam. Solve all questions. Only faculty approved calculators are allowed.   Good luck!

PROBLEM No. 1. Solve the linear homogeneous differential equations:

$$y'' - 2y' - 2y = 0$$

PROBLEM No. 2. Solve the following differential equations by the method of undetermined coefficients:

a. $y'' - 4y' + 4y = x^2$

b. $y'' + 3y' = 3xe^{-3x}$

PROBLEM No. 3. Solve the following differential equation by the method of variation of parameters:

$$y'' + 4y = \frac{1}{\sin 2x}$$

PROBLEM No. 4. Solve the following Cauchy equation:

$$x^2 y'' + 3xy' + y = 0$$