

Math 51 Exam 1, Friday, October 17

A review session will be given on Wednesday October 15 during regular class time

The material you must know and some problems to practice

1. First Order Differential Equations

- Autonomous first order DE, 2.1.2
- Separable equation, 2.2
- Linear equation, 2.3
- Solutions by substitution 2.5

Study problems from Homework 1 and Homework 2

To practice you can do some of the following problems from the book:

Section 2.2.2, # 21, 22, 23, 27

Section 2.2, # 1-28

Section 2.3, # 1-30

2. Higher Order Differential Equations Only second order: use your notes from class

- Theory of linear equations (need to understand), 3.1
- Homogeneous linear equations with constant coefficients , 3.3
- Reduction of order 3.2
- Homogeneous Euler equation, 3.6
- Undetermined coefficients, 3.4
- Variation of parameters, 3.5
- Applications: Spring-mass system, 3.8

Study problems from Homework 3 and Homework 4

To practice you can do some of the following problems from the book:

Section 3.3, # 1-14, 29-34

Section 3.2, # 15, 16

Section 3.6, # 1-14, 25-30

Section 3.4, # 1-20, 27-34,

Section 3.5, #1-22 (non homogeneous Euler equation Section 3.6 # 19-24).

Note: You can prepare formula sheet (no more than **two pages**) which you can use in the exam. The following formulas are allowed:

- formula for the solution of the linear equation of the first order
- table for the fundamental set of solutions for the homogeneous linear equation of the second order with constant coefficients
- formula for the second solution in the method of reduction of order
- table for the solution of the Euler equation
- table for the method of underdetermined coefficients
- formula for the method of variation of parameters.

The handbook of formulas sold by the Math Department can also be used in the exam.