Math 308 Exam 1 Information

It is advised that you read over the lecture notes and work the problems solved in class; work Homework Assignments # 1-4; attempt the additional suggested problems listed in the Class Announcements.

Key Topics for Exam 1

- Direction field, autonomous equations, equilibrium points, analysis of behavior of solutions of autonomous differential equations when $t \to +\infty$ or $t \to -\infty$ on the base of the direction fields (equations of type considered in section 1.1 and section 2.5, see also homework #1);
- Separable equations (section 2.2);
- Linear nonhomogeneous equations of first order: method of integrating factor (section 2.1);
- Modeling with first order differential equation (falling of a hailstone in the presence of an air resistance, mixing of a substance in a tank or in a pond, section 2.3)
- To know to determine an interval in which a solution of a linear nonhomogeneous differential equation of first order is certain to exist without solving the equation (section 2.4);
- Exact equations and integrating factors (section 2.6);
- Fundamental set of solutions of linear homogeneous equations of second order; the Wronskian (section 3.2);
- Linear homogeneous equations of second order with constant coefficient in all possible cases (two distinct real roots, complex roots, repeated root) (sections 3.1, 3.2, and 3.4);
- Method of reduction of order (section 3.4);
- Linear non-homogeneous equations of second order: general solution via a particular solution and the general solutions of the corresponding homogeneous equation (section 3.5);
- Method of undetermined coefficients (section 3.5).

For all types of differential equations above you have to be able to find the general solution, to find solutions of given initial value problems and to know to determine the intervals in which these solutions are defined or to analyze the behavior of the solution at $+\infty$ or $-\infty$.