Topics for Exam 1, MATH308-Fall 2013

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);

2. Separable equations (section 2.2)

3. Linear nonhomogeneous equations of first order: method of integrating factor (section 2.1);

4. Modeling with first order differential equation (falling of a hailstone in the presence of an air resistance (section 1.2), mixing of a substance in a tank or in a pond (section 2.3));

5. 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);

6. Exact equations and integrating factors (section 2.6);

7. Fundamental set of solutions of linear homogeneous equations of second order; the Wronskian (section 3.2);

8. Linear homogeneous equations of second order with constant coefficient in the case of two distinct real roots of characteristic polynomial (sections 3.1)

It is recommended to review all problems in homework assignments 1-5; the examples given during the class on the topics listed above. Also it is preferable to review the problems and their solutions from the previous terms: the homework assignments 1-5 of Fall 2012 term posted on http://www.math.tamu.edu/ zelenko/F12308Hmwk.html; the problems in homework assignments 1-6 of Summer 2012 term posted on http://www.math.tamu.edu/ zelenko/Su308Hmwk.html; the problems in homework assignments 1-3 of Spring 2012 term posted on http://www.math.tamu.edu/ zelenko/308Hmwk.html.