Topics for Exam 1, MATH308-Spring 2017, Honors section

1. Separable equations (section 2.2 of the book and section 2 of the notes) including examples of equations that can be reduced to separable one (section 3 of the notes).

2. Linear nonhomogeneous equations of first order: method of integrating factor (section 2.1 of the book and section 4 of the notes); Bernoulli equations (see the corresponding notes). Model of mixing (from section 2.3 of the book and section 5 of the notes

3. Exact equations and integrating factors (section 2.6 and sections 6 and 7 of the notes);

4. Direction field (section 1.1 of the book and section 8 of the notes), existence and uniqueness theorem for nonlinear and linear equations (section 2.4 of the book and sections 9 of the notes) autonomous equations, equilibrium points, phase line, phase portrait on the line , stability of equilibrium points (section 10 of the notes and section 2.5 of the book);

5. Fundamental set of solutions of linear homogeneous equations of second order; the Wronskian and Abel's theorem (section 3.2 and section 11 of the notes);

6. Linear homogeneous equations of second order with constant coefficient in the case of two distinct real roots (sections 3.1 of the book and section 12 of the notes), the case of repeated roots (from section 3.4 and section 13 of the notes), the case of complex roots (from section 3.3 and section 14 of the notes)

It is recommended to review all examples given during the class (review carefully all sections from lecture notes mentioned above, i.e. sections $2-14$), all problems in homework assignments 1-4 (including bonus questions, except the one on Euler's broken lines method). Also it is preferable to review the problems and their solutions of the homework assignments 1-6 and problem 1 of homework assignment 7 from Fall 2015 posted on http://www.math.tamu.edu/ zelenko/F15308Hmwk.html, the homework assignments 1-6 from the Spring 15 term posted on
http://www.math.tamu.edu/ zelenko/S15308Hmwk.html.