Math 315 Midterm Exam 1 Review Material

**Closed Book** Exam. No calculators allowed.

Coverage: Sections 1.1; 2.1-2,4,6-7,9.

1. Terminology - Understand and know how to use:
   differential equation, order, initial value, direction field,
   linear, nonlinear, exact, integrating factor, integral
curve, separable, autonomous, exponential growth,
logistic growth, asymptotically stable or unstable
equilibrium, homogeneous.

2. Techniques - Be able to use with simple problems:
   - solution of first order equations using separation of
     variables;
   - solution of first order linear equations using
     integrating factors;
   - direction field for qualitative analysis of solutions;
   - solution of exact first order equations;
   - use of initial value(s) to determine final solution;
   - determination and classification of equilibrium
     solutions.

3. "Facts” and Theorems - Be able to use:
   - existence and uniqueness theorem(s) for solutions
to first order equations;

4. Review Problems: odd problems from text sections
   1.1:1-7; 2.2:3-17; 2.4:3-17; 2.6:5-21; 2.7:3-9; 2.9:5-19.