Math 285 - Intro Differential Equations
Spring 2011, sections G1 and X1
Midterm 1 Review Sheet

Midterm 1 covers material from the beginning of the semester up to Monday February 21, lectures and homework. The emphasis is on solving equations and on applications, not on the theory.

Here is a more or less complete list of topics.

- §1.4 Separable equations $\frac{dy}{dx} = g(x)h(y)$.

- §1.5 Linear first-order equations $y' + p(x)y = q(x)$, with the integrating factor $e^{\int p(x)\,dx}$.

- §1.6 Substitutions, in particular "homogeneous" equations $\frac{dy}{dx} = F(\frac{y}{x})$ with substitution $v = \frac{y}{x}$ and Bernouilli equations $y' + p(x)y = q(x)y^n$ with substitution $v = y^{1-n}$.

- §2.1 Population growth, logistic equation $P' = kP(M - P)$, extinction-explosion equation $P' = kP(P - M)$.

- §2.3 Acceleration-velocity models, resistance proportional to v^p. (No need to remember formulas by heart.)

- §3.1/3.2 Linear equations: Structure theorems 4 and 5 in §3.2.

- §3.1/3.3 Constant coefficients: All cases, i.e. theorems 1, 2, 3 in §3.3.