MATH 310: EXAM 1 TOPICS AND SAMPLE PROBLEMS

- Differential Equations and Mathematical Models (section 1.1): # 3, 27, 33, 45
- Integrals as General and Particular Solutions (section 1.2): # 5, 15, 24, 25, 35
- Slope Fields and Solution Curves (section 1.3): # 11, 21, 29
- Separable Equations and Applications (section 1.4): # 1, 9, 21, 25, 33, 35, 39, 43
- Linear First-Order Equations (section 1.5): # 5, 15, 27, 33, 37
- Population Models (section 2.1): # 1, 9, 17, 26, 27
- Equilibrium Solutions and Stability (section 2.2): # 3, 9, 11, 13, 17 (investigate stability and sketch solution curves), 29
- Acceleration-Velocity Models (section 2.3): # 1, 3, 5, 9, 19
- Numerical Approximation: Euler's method (section 2.4): # 5
- Improved Euler's method (section 2.5): # 5
- The Runge-Kutta method (section 2.6): # 5
- Second order DEs with constant coefficients (section 3.1): # 9, 17 pg. 144
- Existence and uniqueness of solutions, principle of linear superposition, Wronskian (section 3.2): # 1, 6, 8, 13, 17, 24 pg. 155

Please also review classification of differential equations: order of a differential equation, whether it is linear or nonlinear. If DE is linear, is it homogeneous or non-homogeneous.