

1 Chapter 2

2.1: Know how to draw one-dimensional phase portraits when given an autonomous DE.

2.5: 1st order homogeneous DEs (be adept at recognizing them) and general u-substitution are fair game. Do not worry about using integrating factors and Bernoulli DEs.

2 Chapter 3

3.6: Cauchy-Euler Equation may very well show up.

3.7: Nonlinear DEs: Know your stuff for $F(x, y', y'') = 0$ and $F(y, y', y'') = 0$.

3.8: Free Undamped Motion and Free Damped Motion are all you need to know (no driven motion or series circuit stuff).

3.9: Be sure to know the initial conditions for the ends of various beams (p.167), along with the DE $EI \frac{d^4 y}{dx^4} = w_0$ for a constant load w_0 . Example 2, of nontrivial BVP solutions, is important. Example 3 (the thin vertical column, secured at both ends, buckling) is nice to know.

3 Chapter 4

Know your basic Laplace transforms and inverse Laplace transforms. Think about some questions like the one I asked on the sample final (i.e. questions like: find a function that is not of exponential order yet whose Laplace transform exists, and be able to justify why). Have proficient knowledge and intuition with the two big translation theorems from section 4.3, and remember the formulas for transforms of derivatives. Also, know 4.4.1 (derivatives of transforms) and 4.4.2 (transforms of integrals), but do not worry about 4.4.3 (transforms of periodic functions).

Be able to do very basic work (like on today's quiz) in explicitly writing out a function, rather than expressing the function in terms of unit step functions.

You will not be asked to pound out massive partial fractions problems, but know your basic partial fractions.

4 Chapter 5

Know how to distinguish between ordinary points, regular singular point, and irregular singular points. Know how to use the ratio test to find the radius of convergence of a power series. Also, know how to solve indicial equations for

$x = 0$ when $x = 0$ is a regular singular points. You will NOT have to painstakingly write out a power series solution. Legendre polynomials and Bessel functions will not be on the exam. Nor will Chapter 10.

*** Throughout all of this, it goes without saying that in solving DEs, you may need to know how to use undetermined coefficients.