MATH 341 Fall 2023
Review: Test 2

Below is a list of specific problems that one might reasonably expect to see on the second test. I don't promise that every exam problem will match with something on this sheet. Rather, my intention is for this to be an overview of the most important skills and understanding I expect you to have developed.

- Some important terms and concepts:

improper integral	piecewise continuous	exponential order
unit step function	delta function	periodic function

- Determine if a function is piecewise continuous and/or of exponential order. You may be asked to sketch the function.
- Use the definition to compute the Laplace transform of a given function. (You will need to know the definition).
- Use a table and/or "bag of tricks", facts about Laplace transforms, and possibly partial fractions to find a Laplace transform or inverse Laplace transform. The table and "bag" will be provided to you at the exam, but I reserve the right to white out a few entries in your table and ask you to find the entries yourselves.
- Apply the Laplace transform to an initial value problem. Solve the resulting equation and find the inverse Laplace transform, thus solving the given initial value problem.
- Find Laplace transforms involving discontinuous functions (possibly by rewriting the function in terms of unit step functions).
- Use Laplace transform to solve initial value problems involving discontinuous functions (again, possibly using unit step functions).
- Use convolution to solve a linear IVPs whose right side is not specified.
- Use Laplace transform to compute convolutions.
- Evaluate integrals involving the delta function.
- Find Laplace transforms involving the delta function.
- Use Laplace transform to solve initial value problems involving the delta function.

The following topics, although interesting, need not be a part of your test preparation: Mechanical Vibrations (in 4.9–4.10); Control theory (in 7.5); Integro-differential equations (in 7.7); Transfer function and Impulse Response function (in 7.7 and 7.8). You do not need to memorize the formula for the transform of a periodic function.