This list is intended as the start of a study guide. There is no guarantee that because a topic is listed here that it will be on the final exam, nor is there a guarantee that every problem on the final is represented in the list below. I've broken down the topics into three categories: problem solving, tasks, and basic computations. You can expect to find all of these categories represented on the final. The midterm will cover all materials from the midterms, as well as Chapter 5 sections 4, 5, 6, and 8.

Problem Solving
- Related rates.
- Optimization problems.
- Finding areas using definite integrals.
- Use calculus ideas to help sketch the graph of a function.
- Other word problems, possibly involving the tasks below.

Tasks:
- Write a definite integral as a limit of Riemann sums, or vice-versa.
- Find critical points/local extrema/points of inflection of a function.
- Compute a rate of change using derivatives.
- Use a position function to compute a velocity, or vice versa.
- Compute an acceleration from a velocity or compute a velocity knowing an acceleration.
- Use the linearization to compute approximate values of a function.
- Find the tangent line to the graph of a differentiable function, or maybe even an implicitly defined function.
- Find the second derivative of an implicitly defined function, or the derivative of an inverse function.
- Apply one iteration of Newton's method by hand.
- Use the chain rule and fundamental theorem of calculus combined, e.g. $\frac{d}{dx}\int_x^{x^2}\sin(s)ds$.
- Find the net change of a function or an average function value using an integral.
- Compute an approximate definite integral using a numerical method.
- Determine if a piecewise defined function is continuous.
- Compute vertical and horizontal asymptotes using limits.
- Compute a derivative from the definition using limits.

Computations:
- The Chain Rule.
- The Product and Quotient Rules.
- Derivatives of exponential/trig/logarithmic/inverse trig functions.
- Implicit differentiation.
- Integration via substitution.

- Basic indefinite integrals.
- Standard limits.
- Limits at infinity or infinite limits.