This exam covers Chapters 1, 2, 4, and 5. In particular, the exam will focus on the following topics:

- Observing patterns, formulating conjectures, stating conjectures in complete mathematical sentences
- Derivatives, local linear approximations, higher order (Taylor) approximations
- Absolute and relative error
- Areas and antiderivatives, the "area-so-far" function
- Functions defined by integrals, using the chain rule combined with the FTC to compute their derivatives and approximate their values
- Using inscribed and circumscribed rectangles to approximate integrals, and using integrals to approximate sums
- Division algorithm and patterns with remainders

Recommended exercises for review:

- 1.2.2, 1.2.13 (induction)
- 5.1.5, 5.1.6 with $A(5)$ instead of $A(4)$ (area under curve)
- 5.2.4 with x^3 instead of x^2 (approx sum using integral)
- 5.3.6, 5.3.9(a) (fcns def by ints)
- 2.1.3, 2.1.10 (remainders)

as well as the following:

1. Let $f(x) = \sin x$. By looking at examples, make a conjecture about the n^{th} derivative of f. State your conjecture in a complete mathematical sentence.
2. (a) Find the Taylor polynomial of degree 4 at $x = 0$ of $y = \sin x$.
   (b) By looking at the pattern for the coefficients, make a conjecture about the Taylor polynomials of higher degree. State your conjecture in a complete mathematical sentence.