Midterm 3 Study Guide

This is meant to be a representative sampling of the key concepts you will need to know, and it is not meant to be exhaustive. You should make sure that you are comfortable with all practice problems and homework assignments.

1. All the things related to computations of integrals of partial fractions: long division, partial fraction decomposition, computing the resulting integrals.
2. Improper integrals at infinity
3. Improper integrals at finite points
4. p-power functions and their improper integrals near 0 and near infinity
5. Comparison test for improper integrals
6. Numerical Integration via trapezoid rule, midpoint rule, Simpson's rule
7. Error bounds for numerical integration
8. Arc length and Surface area computations (9.1)
9. Taylor polynomials and Maclaurin polynomials
10. Taylor's theorem about the Taylor remainder
11. Error bounds for Taylor polynomials
12. Parametric curves
13. Arc length via parametric curves

More theoretical questions (I will ask you at least one of these):

1. Describe the derivation of the formula for arc length (9.1)
2. Proof of Taylor's theorem for the Taylor remainder
3. Explanation for the formula for the slope of the tangent line $\frac{dy}{dx}$ when the curve is given in parametric form (12.1).