Math 141 Test 1 Preparation

1. The test covers sections 4.4, 7.1-7.5, and 7.8.
2. The test will be based on homework, class work, and class examples, so use these as a study guide.
3. The following is a list (perhaps not exhaustive) of items that you need to memorize:
   a) The integration by parts formula.
   b) The trigonometric substitutions on page 486.
   c) The trig identities $\sin^2 x + \cos^2 x = 1$, $\sec^2 x = \tan^2 x + 1$, $\cos^2 x = \frac{1+\cos 2x}{2}$, $\sin^2 x = \frac{1-\cos 2x}{2}$, reciprocal identities, and the trig functions as they relate to a right triangle.
   d) Partial fraction decomposition.
   e) The integral table on page 503 (with the exception of integrals 19 and 20).
   f) L'Hospital's Rule.
4. Study suggestions:
   a) The first part of the test consists of evaluating integrals. It's up to you to come with a method of integration that works.
      i). When integrating, if substitution doesn't work, then I usually try integration by parts second.
      ii) If the integral involves a square root, trigonometric substitution often works (but not always).
      iii) If the integral involves a quotient where the degree of numerator is larger than the degree of the denominator, then try long division.
      iv) If the integral involves a quotient that is a "proper" rational function, then try partial fraction decomposition.
   b) Read section 7.5 for more helpful tips on integration.
   c) Practice recognizing which integration method to use.
   d) The second part of the test is about evaluating limits using L'Hospital's Rule and/or evaluating improper integrals. Make sure you use the appropriate notation when setting up limits that correspond to improper integrals.