Math 141 sections 8.2 – 8.4 Things to Know

1) Start on the WebAssign homework ***right away*** – soon after the Lecture on each section.

If you let all of the WebAssign wait until just before it is due, you'll run out of time to finish and also run the risk of the servers being clogged up from everyone else who waited until the last minute.

2) important items for section 8.2

a) Know the Pythagorean identities: $\sin^2 x + \cos^2 x = 1 \Rightarrow \tan^2 x + 1 = \sec^2 x$.

b) Know the "reduction of powers" identities: $\sin^2 x = \dfrac{1-\cos 2x}{2}$ $\cos^2 x = \dfrac{1+\cos 2x}{2}$.

c) For integrals involving powers of sine and cosine:
i) When the power of cosine is odd, let $u = \sin x$, and use the "odd" $\cos x$ factored out as $du = \cos x\,dx$.
ii) When the power of sine is odd, let $u = \cos x$, and use the "odd" $\sin x$ factored out as $du = -\sin x\,dx$.
iii) When the powers of both sine and cosine are even, use the reduction of powers formulas above.

d) For integrals involving powers of secant and tangent:
i) When the power of secant is even, let $u = \tan x$, and then $du = \sec^2 x\,dx$.
ii) When the power of tangent is odd, let $u = \sec x$, and then $du = \sec x \tan x\,dx$.
iii) When the power of secant is odd and the power of tangent is even, convert everything to $\sec x$ and use the process of Example F.

3) important items for section 8.3

a) Go back to the Lecture outline, and know ***all*** of the triangle ratio stuff on the first page.

b) Carefully review the full lecture notes (also attached to the email). It has the Examples from the Lecture outline worked out in detail, as I would have done them had I been able to be there.

4) important items for section 8.4

a) Know how to integrate a rational function. Method: Rewrite the complicated rational function as the sum of simpler rational functions, i.e. ones which are easily integrated.
i) Use synthetic (long) division to get the degree of the numerator less than the degree of the denominator.
ii) Factor numerator and denominator into linear and irreducible quadratic factors. Reduce, if possible.
iii) Rewrite the original function as the sum of simpler fractions. (This is the hard part.)

b) When the denominator has [factor squared], the partial fraction decomposition must have two elements: denominator of [factor] ***and*** denominator of [factor squared].