$$\sin^2 x = \frac{1}{2}(1-\cos(2x))$$
$$\cos^2 x = \frac{1}{2}(1+\cos(2x))$$

Know how to do $\int \sin^m x \cos^n x\,dx$ and $\int \tan^m x \sec^n x\,dx$ for different cases of $m$ and $n$ being even and odd.
Know how to do integrals listed on page 500.

$$\frac{d}{dx}(\sin^{-1}x) = \frac{1}{\sqrt{1-x^2}} \qquad \frac{d}{dx}(\cos^{-1}x) = \frac{-1}{\sqrt{1-x^2}}$$
$$\frac{d}{dx}(\csc^{-1}x) = \frac{-1}{x\sqrt{x^2-1}} \qquad \frac{d}{dx}(\sec^{-1}x) = \frac{1}{x\sqrt{1-x^2}}$$
$$\frac{d}{dx}(\tan^{-1}x) = \frac{1}{1+x^2} \qquad \frac{d}{dx}(\cot^{-1}x) = \frac{-1}{1+x^2}$$

Look at problems 7, 15, 25, 43, 57, 63

## §7.3 Trigonometric Substitutions.

Know the table on page 484.
Be careful when you make substitutions! Remember that for definite integrals (ones with limits) changing variables means you must change limit values too. Also, for indefinite integrals, remember to "undo" all the substitutions at the end so that your final answer is in terms of the original variables. Also – don't forget that "$dx$" changes with substitution!!

Look at problems 7, 21, 27, 41

## §7.4 Integration of Rational Functions by Partial Fractions

The point is to rewrite $\frac{P(x)}{Q(x)}$ as the sum of things we can integrate. There are three steps to doing this:

1. If $\deg P \geq \deg Q$, divide: $\frac{P(x)}{Q(x)} = S(x) + \frac{R(x)}{Q(x)}$
2. Factor $Q$
3. Write $\frac{R(x)}{Q(x)}$ as the sum of partial fractions.