# CHAPTER 7: TRIG INTEGRALS

1. SINES AND COSINES
   (a) If $\sin(x)$ or $\cos(x)$ is to an odd power.
      i. Factor out a term from the odd power.
      ii. Use the identity $\sin^2(x) + \cos^2(x) = 1$.
      iii. Do a substitution ($u = \sin(x)$ or $u = \cos(x)$ as appropriate).

   (b) If $\sin(x)$ and $\cos(x)$ both have even powers.
      i. Simplify with half-angle identities

2. TANGENTS AND SECANTS
   (a) If $\sec(x)$ has an even power.
      i. Factor out $\sec^2(x)$.
      ii. Use the identity $\sec^2(x) = \tan^2(x) + 1$.
      iii. Do a substitution ($u = \tan(x)$).

   (b) If $\tan(x)$ has an odd power.
      i. Factor out $\sec(x)\tan(x)$.
      ii. Use the identity $\tan^2(x) = \sec^2(x) - 1$.
      iii. Do a substitution ($u = \sec(x)$).

3. NOTES
   (a) For $\cot(x)/\csc(x)$ the cases would nearly identical to $\tan(x)/\sec(x)$.
   (b) If you are given an integral that contains $\sin(x)/\cos(x)$ along with $\sec(x)/\tan(x)$, it is typically best to first change everything into $\sin(x)/\cos(x)$ (or change everything into $\sec(x)/\tan(x)$).
   (c) Remember that we have added the following to our table of known integrals:
      $\int \tan(x)\ dx = \ln|\sec(x)| + C$ (in 5.5)
      $\int \sec(x)\ dx = \ln|\sec(x) + \tan(x)| + C$ (in 7.2)
      $\int \sec^3(x)\ dx = \frac{1}{2}\left(\sec(x)\tan(x) + \ln|\sec(x) + \tan(x)|\right) + C$ (in 7.2)