Homework 15

1. Section 8.3: Problems 11, 17, 27, 29, 33, 34, 37, 45, 57, 63, 65, 67.
2. Section 8.4: Problems 3, 5, 13, 23, 35, 37, 45, 47, 54, 57 (just solve it with one method of your choice).
3. Section 8.5: Problems 1, 3, 21, 23, 29, 32, 35, 37, 39, 41, 45, 47.
4. Chap 8, Additional and Advanced Exercises: Problems 41, 43, 45, 47, 49.
5. Overall practice on techniques of integration: (Important) As time permits, do as many as you can in odd-numbered problems in Chap 8, Practice Exercises problems 69-115 (page 545). and Section 8.1: Problems 9, 11, 13, 15, 19, 25, 33, 39, 48. They contain all the integration techniques and it is a good practice to figure out which one(s) to use for each problem.

   Hints:
   $\int e^{ax}\cos(bx)dx$ or $\int e^{ax}\sin(bx)dx$: integration by part twice.

   $\int \dfrac{f(x)}{g(x)}dx$ where $f(x)$ and $g(x)$ are polynomials: if $\deg f \geq \deg g$, carry out the division, find the quotient and ratio, make sure that $\deg f < \deg g$ afterwards.

   Computations involving antiderivative of $\tan^2 x$: try $\tan^2 x = \sec^2 x - 1$

   $\int f(x)\ln x dx$: try $y = \ln x$, $x = e^y$ and proceed.

   $\int \dfrac{\sin^{2l} x}{\cos^{2k+1}}dx$: multiply the factor $\dfrac{\cos x}{\cos x}$ and proceed. May need the technique of partial fraction (section 8.5) in the end.

   Similarly for $\int \dfrac{\cos^{2k} x}{\sin^{2l+1}}dx$ $(\times\dfrac{\sin x}{\sin x})$, $\int \dfrac{\tan^{2k+1} x}{\sec^n x}dx$ $(\times\dfrac{\sec x}{\sec x})$, $\int \dfrac{\sec^n x}{\tan^{2k+1} x}dx$ $(\times\dfrac{\tan x}{\tan x})$, or $\int \dfrac{\tan^m x}{\sec^{2l}}dx$ $(\times\dfrac{\sec^2 x}{\sec^2 x})$.