Homework 14 (v02)

1. Section 8.3: Problems 11, 17, 27, 28, 29, 29.5: $\int \frac{\cos^3 x}{\sqrt{1+\sin x}}\,dx$, 33, 34, 37, 45, 57, 63, 65, 67.

   v02: Problems 27, 28, 29, 29.5: $\int \frac{\cos^3 x}{\sqrt{1+\sin x}}\,dx$, 34, 37, 45, 57, 63, 65, 67.

2. Section 8.3: Derive the reduction formula from $\int (\tan^m x)(\sec^n x)\,dx$ to $\int (\tan^m x)(\sec^{n-2} x)\,dx$.

3. Section 8.4: Problems 3, 5, 13, 23, 35, 37, 45, 47, 54, 57 (just solve it with one method of your choice).

   v02: Problems 5, 13, 23, 37, 45, 47, 54, 57 (just solve it with one method of your choice).

4. Section 8.5: Problems 1, 3, 21, 23, 29, 32,

   v02: Problems 3, 23, 29, 32,

5. Chap 8, Additional and Advanced Exercises: Problems 41, 43, 45, 47.

   v02: Problems 45, 47.

   Hints:

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

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

   Alternatively, turn $\int \tan^m \sec^n dx$ into $\int \sin^m \cos^{-m-n} dx$ or turn $\int \sin^m \cos^{-m-n} dx$ into $\int \tan^m \sec^n dx$ and proceed.

   $\sqrt{1+\sin x} = \pm\sqrt{2}\sin(\frac{x}{2} - \frac{\pi}{4})$, $\sqrt{1-\sin x} = \pm\sqrt{2}\cos(\frac{x}{2} - \frac{\pi}{4})$.

   $\frac{1}{\sqrt{1\pm\sin x}} = \frac{\sqrt{1\mp\sin x}}{|\cos x|}$, $\frac{1}{\sqrt{1\pm\cos x}} = \frac{\sqrt{1\mp\cos x}}{|\sin x|}$.

   $\sqrt{1\pm\sin x} = \frac{|\cos x|}{\sqrt{1\mp\sin x}}$, $\sqrt{1\pm\cos x} = \frac{|\sin x|}{\sqrt{1\mp\cos x}}$,