Calculus

Trigonometric Integrals

(Q1.) $\int \sin x \cos^3 x \, dx$ vs. $\int \sin^2 x \cos^3 x \, dx$

(Q2.) $\int_0^{\frac{\pi}{2}} \cos^2 \theta \, d\theta$

(Q3.) $\int \tan x \sec^3 x \, dx$ (a) do it with $\tan x$ and $\sec x$ (b) do it with $\sin x$ and $\cos x$

(Q4.) $\int \tan^4 x \sec^6 x \, dx$

(Q5.) $\int \sin(8x)\cos(5x) \, dx$ hint: $\sin A \cos B = \frac{1}{2}\big(\sin(A-B)+\sin(A+B)\big)$

(Q6.) $\int \cos^5 x \, dx$

(Q7.) $\int \sin^2 x \cos^2 x \, dx$

(Q8.) $\int \cos^2 x \tan^3 x \, dx$

(Q9.) $\int t \sin^2 t \, dt$

(Q10.) $\int \frac{1-\tan^2 x}{\sec^2 x} \, dx$

(Q11.) $\int \frac{\cos x + \sin(2x)}{\sin x} \, dx$

(Q12.) $\int \csc x \sec x \, dx$

(Q13.) $\int \tan^3 x \, dx$ (a) do it with $\tan x$ and $\sec x$ (b) do it with $\sin x$ and $\cos x$

(Q14.) $\int \sec^5 x \, dx$

Optional Challenges:

$$\int \frac{\sin x + 2\cos x}{3\sin x + 4\cos x} \, dx$$

Reference: Sect 7.2, Single Variable Calculus by James Stewart, 8th edition