Evaluate each integral. Check by differentiating.

1. $\displaystyle\int \cos^3 x \sin^4 x \; dx$

2. $\displaystyle\int \cos^2(5x) \sin^3(5x) \; dx$

3. (**) $\displaystyle\int \sin^4 x \cos^2 x \; dx$

4. $\displaystyle\int \sec^2 x \tan^4 x \; dx$

5. (**) $\displaystyle\int x \sec^3(2x^2 - 1) \tan^5(2x^2 - 1) \; dx$

6. (*) $\displaystyle\int_0^{\pi/6} \sec^2 x \tan x \; dx$

7. (*) $\displaystyle\int \sec x \; dx$

Hint: Multiply top and bottom by $\sec x + \tan x$.