Section 6.2 - Trigonometric Integrals Worksheet

Recall that the Pythagorean identity

$$\sin^2 x + \cos^2 x = 1$$

can be used to evaluate integrals of the form $\int \sin^m x \cos^n x \, dx$ as long as either m or n is odd. Practice this technique with the following integral:

1. $\int \sin^5 x \cos^2 x \, dx$

Now we will develop a similar strategy for integrals of the form $\int \tan^m x \sec^n x \, dx$. What do you get when you divide both sides of the Pythagorean identity by $\cos^2 x$? Simplify your answer and write the new identity here:

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(it should be in terms of $\tan x$ and $\sec x$).

Now try the following integrals. Work with your group to develop a strategy for using the new identity (also called a Pythagorean identity since it comes directly from the other one) to solve these: [1]

2. $\int \tan^6 x \sec^2 x \, dx$

over for more fun!

[1] Hint. You may want to recall the derivatives of $\tan x$ and of $\sec x$ before you begin.

$(\tan x)' =$ ______________________ $(\sec x)' =$ ______________________

Write your new identity again here, for reference:

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3. $\displaystyle\int \tan^2 x \sec^6 x \, dx$

4. $\displaystyle\int \tan^3 x \sec x \, dx$

Can you think of situations where your strategy will not work for integrals like $\displaystyle\int \tan^m x \sec^n x \, dx$?