PRINT Your Name:____________________

Quiz 2 — January 20, 2012 – Section 7 – 11:15 – 12:05

Remove everything from your desk except this page and a pencil or pen.

Circle your answer. **Show your work. Check your answer.**
The quiz is worth 5 points.

Find $\int \sec^6 t dt$.

Answer: Save $\sec^2 t$. Convert the remaining $\sec^4 t$ to $\tan t$'s using $\tan^2 t + 1 = \sec^2 t$. Let $u = \tan t$. It follows that $du = \sec^2 t dt$. The original problem is equal to

$$\int \left(\tan^2 t + 1\right)^2 \sec^2 t dt = \int (u^2+1)^2 du = \int (u^4 + 2u^2 + 1) du = \frac{u^5}{5} + \frac{2u^3}{3} + u + C$$

$$= \boxed{\frac{\tan^5 t}{5} + \frac{2\tan^3 t}{3} + \tan t + C}.$$

<u>Check</u>. The derivative of the proposed answer is

$$\tan^4 t \sec^2 t + 2\tan^2 t \sec^2 t + \sec^2 t = \sec^2 t(\tan^4 + 2\tan^2 t + 1) = \sec^2 t(\tan^2 t + 1)^2$$

$$= \sec^2 t \sec^4 t. \checkmark$$