

Monday, January 28

Clicker Questions

Clicker Question 1

That other identity

Which of the following identities is correct?

- A. $\cot^2 x + \csc^2 x = 1$
- B. $\tan^2 x + \sec^2 x = 1$
- C. $\cot^2 x - \csc^2 x = 1$
- D. $\sec^2 x - \tan^2 x = 1$
- E. $\tan^2 x - \sec^2 x = 1$

Easier than memorizing!

Divide both sides of

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

by $\cos^2 x$ to get

$$\tan^2 x + 1 = \sec^2 x.$$

Clicker Question 2

Trickier than it seems

Evaluate $\int \tan x \, dx$.

- A. $(\tan x)/(\sec x) + C$
- B. $\ln |\sec x + \tan x| + C$
- C. $-\ln |\cos x| + C$
- D. $1/(1 + x^2) + C$
- E. $\sec^2 x + C$

A sneaky substitution: $u = \cos x$

$$\begin{aligned}\int \tan x \, dx &= \int \frac{\sin x \, dx}{\cos x} \\ &= \int \frac{-du}{u} \\ &= -\ln |u| + C \\ &= -\ln |\cos x| + C.\end{aligned}$$