Friday, January 27

Announcements

WeBWorK #4 is now open

- Due Wednesday, February 1 at 9pm
- Covers material from “Unit 4”—see syllabus web page

You can retrieve your Quiz #1 online, later this evening

- Go to Connect and record your "quiz code"
- Go to quizzes web page, click the link, follow instructions
- If you want a quiz regrade, follow the instructions on the quizzes web page

Quiz #2 will take place here on Friday, February 3

- Covers material from Units 3–4 (same material as WeBWorKs #3–4)
- You must bubble in your student number with a black pen
- You must bring your student ID to class on every quiz day, and take the quiz in the section you’re registered in

Friday, January 27

Clicker Questions

Clicker Question 1

Double-angle formula

Which identity is a correct identity?

A. $\cos 2x = 2\cos^2 x - 1$

B. $\cos 2x = \cos^2 x - \sin^2 x$

C. $\cos 2x = 1 - 2\sin^2 x$

D. $\cos 2x = 2\sin x \cos x$

E. none of the above

Three correct answers!

These formulas are all equivalent, because

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

Note that answers A and C can be rewritten as

$$\cos^2 x = \tfrac{1}{2}(1 + \cos 2x)$$

$$\sin^2 x = \tfrac{1}{2}(1 - \cos 2x).$$

Answer D was misleading: actually $\sin 2x = 2\sin x \cos x$.

Clicker Question 2

That other identity

Which of the following identities is correct?

A. $\cot^2\theta + \csc^2\theta = 1$

B. $\tan^2\theta + \sec^2\theta = 1$

C. $\cot^2\theta - \csc^2\theta = 1$

D. $\sec^2\theta - \tan^2\theta = 1$

E. $\tan^2\theta - \sec^2\theta = 1$

Easier than memorizing!

Divide both sides of

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

by $\cos^2\theta$ to get

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

- Trigonometry review: see the Appendix of the CLP notes

Clicker Question 3

Trickier than it seems

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

A. $(\tan x)/(\sec x) + C$

B. $-\log|\cos x| + C$

C. $\sec^2 x + C$

D. $\log|\sec x + \tan x| + C$

E. $1/(1+x^2) + C$

Or, if you prefer,

$$\log\left|\frac{1}{\cos x}\right| + C$$
$$= \log|\sec x| + C.$$

A sneaky substitution: $u = \cos x$

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