
Problem of the Week

Number Nine

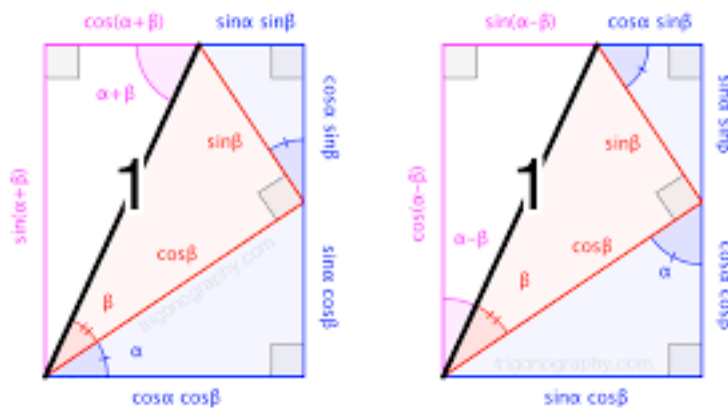
April 3, 2017

Folks, I'm just going to get right down to business. On the left we have a cool way of visualizing the basic trig identities:

$$\sin(\alpha + \beta) = \sin \alpha \cos \beta + \sin \beta \cos \alpha$$

$$\cos(\alpha + \beta) = \cos \alpha \cos \beta - \sin \alpha \sin \beta$$

On the right we have the same identities, with β replaced with $-\beta$. Stare at the diagrams until you are clear on what they show!



Here's this week's problem:

Suppose that $f(x)$ and $g(x)$ are distinct linear functions and that

$$f(f(x)) = g(g(x)) = 4x + 3.$$

Find the value of the product of $f(1)$ and $g(1)$.

When you think you have the problem figured out, follow the instructions on the other side of the page.

*Submissions are due to Jason Rosenhouse by 5:00 on **Friday, April 7**. Solutions, complete with a brief explanation, should be written on the back of an official POTW handout. Place your name, e-mail address, and the section numbers and professors of any math courses you are taking, in the **upper right corner** of the front of the page. One weekly winner will receive a five-dollar gift card from Starbucks. Solutions will be posted at the POTW website:*

<http://educ.jmu.edu/~rosenhjd/POTW/Spring17/homepage.html>