

Quiz 12; Tuesday, November 29
MATH 54 with Ming Gu
GSI: Eric Hallman

Student name:

You have 15 minutes to complete the quiz. Calculators are not permitted.

For any two piecewise continuous functions f and g on the interval $[-\pi, \pi]$, define $\langle f, g \rangle = \frac{1}{\pi} \int_{-\pi}^{\pi} f(x)g(x) dx$ and $\|f\|^2 = \langle f, f \rangle$.

1. (6 points) Find $\|\sin x\|$.

2. (6 points) Show that $\sin 2x$ and $\cos 4x$ are orthogonal. (Hint: use what you know about odd and even functions.)

3. (Zero bonus points) Show that $\sin mx$ and $\sin nx$ are orthogonal whenever $m \neq n$.