Extra Credit Assignment 2 - MTH 5111 - Real Analysis 2 - Dr. Kanishka Perera - Spring 2025

Name: _____

This extra credit assignment is worth 25 points. Please email me your work by Friday, April 11. No late work will be accepted.

Let $(X, \mathcal{M}, \mu)$ be a measure space with $\mu(X) < \infty$ and let $f : X \to \mathbb{R}$ be a measurable function. Calculate, justifying all steps, the limit

$$\lim_{n\to\infty} \int_X |\sin(f(x))|^n \, d\mu.$$

Show that, in general, this result is false if $\mu(X) = \infty$.