

# Problems from 2024

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April 4, 2024

## Abstract

Welcome to my 2024 problem set, a collection of math problems that I encountered and found interesting throughout the year. I hope you find them challenging and enjoy solving these as much as I did!

## 4 April

### 4.1

I found this problem in the GRE Mathematics Test Practice Book for 2023 available from ETS.

In the complex plane, let  $C$  be the circle  $\{z = 1 + e^{i\theta} : 0 \leq \theta \leq 2\pi\}$ , oriented counterclockwise. What is the value of  $\frac{1}{2\pi i} \int_C \left(\frac{\sin z}{z-1}\right)^2 dz$ ?