

## Problem 24

Three distinct segments are chosen at random among the segments whose end-points are the vertices of a regular 12-gon. What is the probability that the lengths of these three segments are the three side lengths of a triangle with positive area?

一个正十二边形的顶点两两相连所形成的所有线段中，任意选择 3 根不同的线段（这 3 条线段中可能存在等长的线段），问这三根线段能够组成一个面积为正的三角形的概率是多少？

- (A)  $\frac{553}{715}$     (B)  $\frac{443}{572}$     (C)  $\frac{111}{143}$     (D)  $\frac{81}{104}$     (E)  $\frac{223}{286}$

## Problem 25

Let  $f: \mathbb{C} \rightarrow \mathbb{C}$  be defined by  $f(z) = z^2 + iz + 1$ . How many complex numbers  $z$  are there such that  $\text{Im}(z) > 0$  and both the real and the imaginary parts of  $f(z)$  are integers with absolute value at most 10?

$f$  是定义在复数域上的一个函数， $f: \mathbb{C} \rightarrow \mathbb{C}$ ，且  $f(z) = z^2 + iz + 1$ ，有多少个这样的复数  $z$  存在，满足  $\text{Im}(z) > 0$  ( $z$  的虚部大于 0)，且  $f(z)$  的实部和虚部都是绝对值至多为 10 的整数？

- (A) 399    (B) 401    (C) 413    (D) 431    (E) 441