Difficulty: 2/4 Interest: 2/4

Let $f_{n,m} : [n] \to [m]$ be a uniformly random function. Consider the convex hull around $\{(1, f(1)), \ldots (n, f(n))\}$

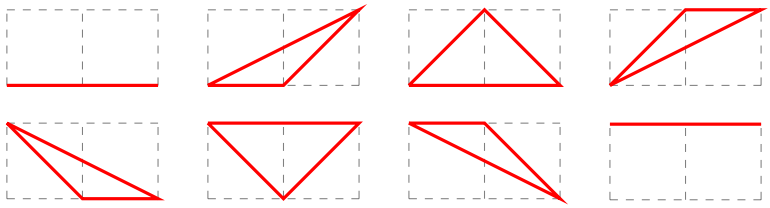

Figure 1: Examples of $f_{3,2}$. Here the expected number of vertices on a convex hull is 2.75

Question. What is the probability of seeing a k-gon (for some fixed k), when given a uniformly random function $f_{n,m}$?

Related.

1. What if $f_{n,n}$ is restricted to be a permutation?
2. What if $f_{n,m}$ is injective?