



Let  $f_{n,m}: [n] \rightarrow [m]$  be a uniformly random function, and consider the convex hull around the points  $\{(1, f_{n,m}(1)), \dots, (n, f_{n,m}(n))\}$  in  $\mathbb{Z}^2$ .

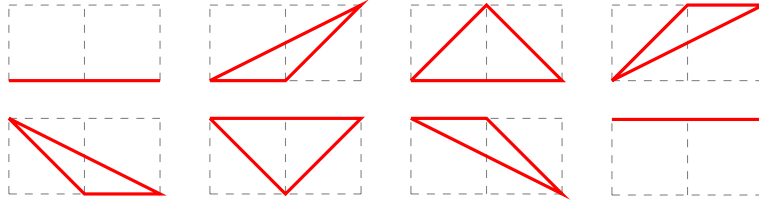


Figure 1: Examples of  $f_{3,2}$ . Here the expected number of sides on a convex hull is 2.75

**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 value of  $k$  has the highest probability?
2. What is the expected value of the number of sides?
3. What if  $f_{n,n}$  is restricted to be a permutation?
4. What if  $f_{n,m}$  is injective?