

Exercise 1. Let X be a random variable that takes on n distinct values. How elements does the corresponding σ -field \mathcal{F}_X have?

Exercise 2. For this problem we consider the probability space $([0, 1), \mathcal{B}_{[0,1)}, m_{[0,1)})$. Let X and Y be random variables on the set $[0, 1)$ defined by $X(x) = 1$ when x is rational and 0 otherwise, and $Y(x)$ is the first digit of x . Show that X and Y are independent random variables.

Also complete exercises 3.1 through 3.8.