

Why Need New Rules?

We want to choose a uniformly random real number between 0 and 1.

What's the probability the number is between 0.4 and 0.5?

The probability density function

For Continuous random variables, the analogous object is the “probability density function” we write $f_X(k)$ instead of $p_X(k)$

Idea: Make it “work right” for **events** since single outcomes don’t make sense.

$$\mathbb{P}(0 \leq X \leq 1) = 1$$

integrating is analogous to sum.

$$\mathbb{P}(X \text{ is negative}) = 0$$

$$\mathbb{P}(.4 \leq X \leq .5) = .1$$