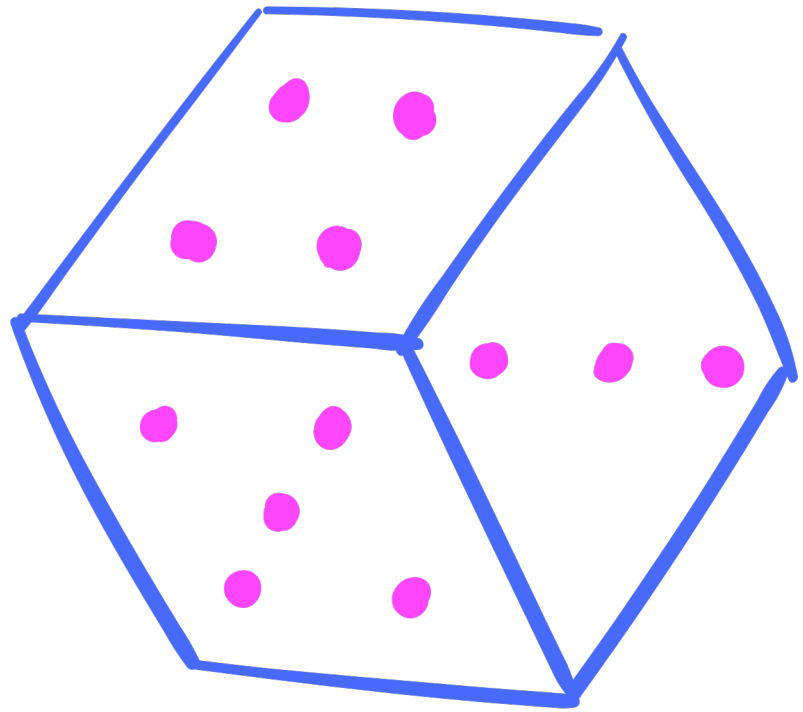
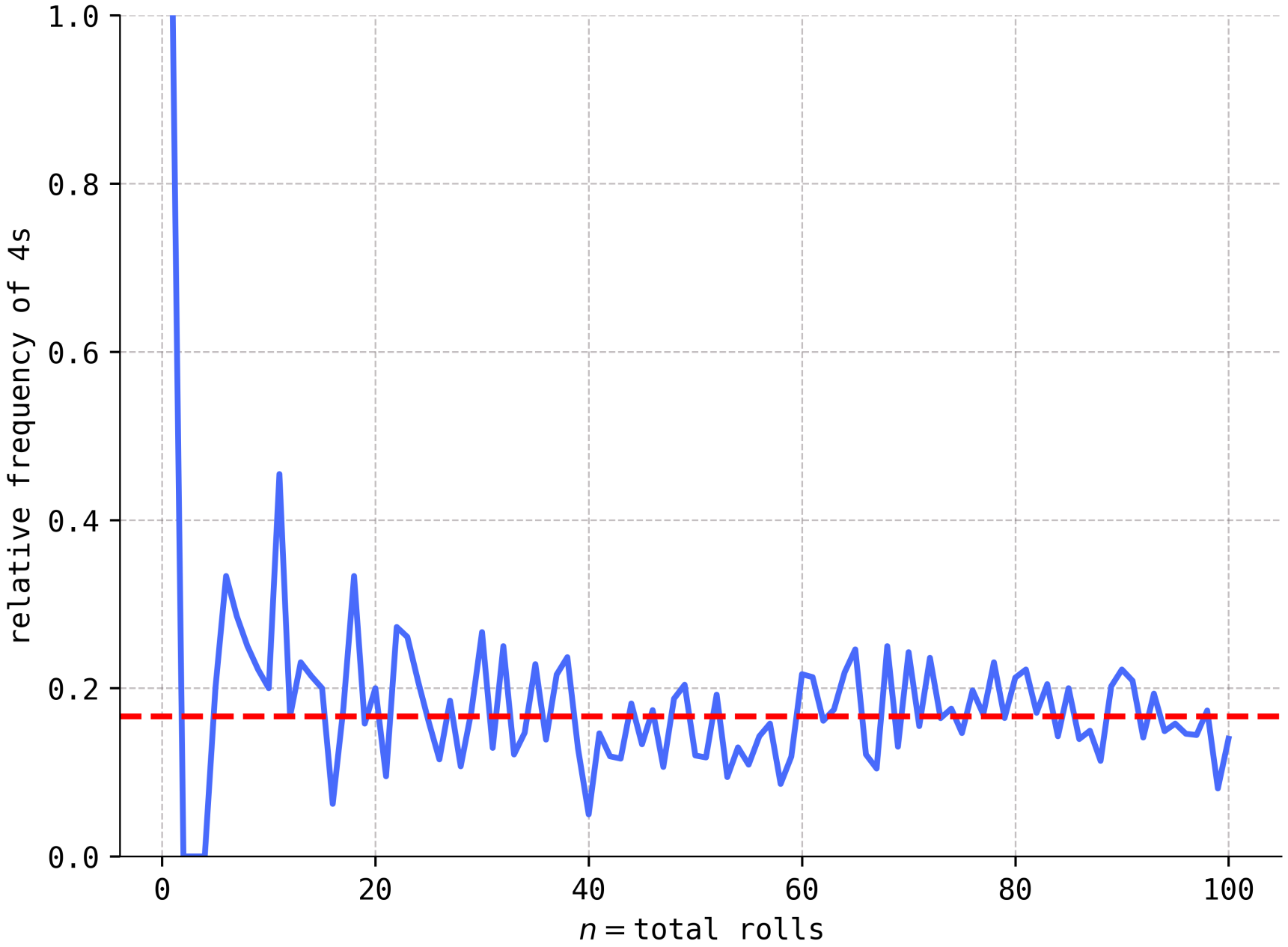
2.1. What is probability?

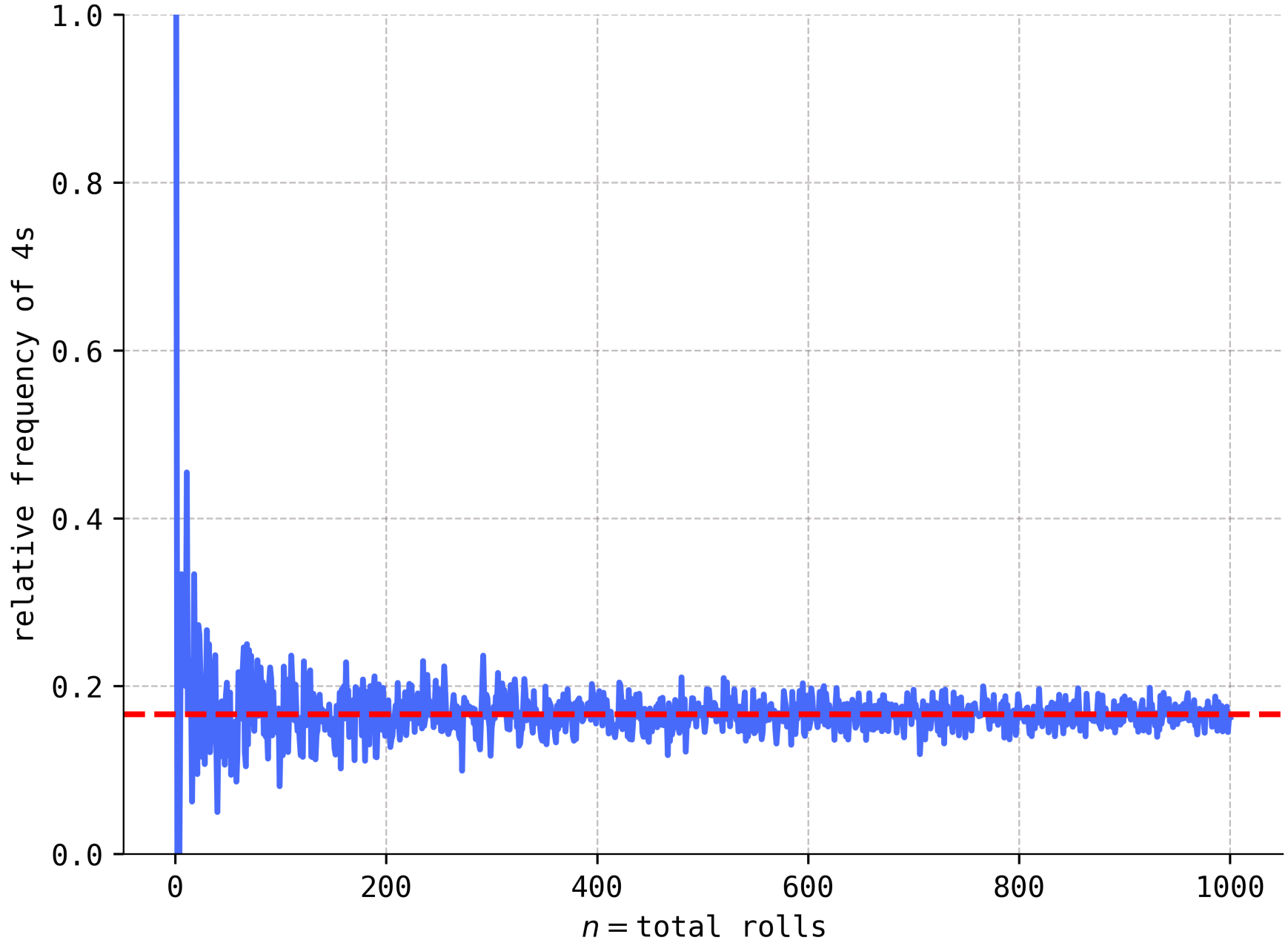
> The interpretation that conceptualizes probabilities as measurements of *degrees of belief* is called the *subjective* or *Bayesian interpretation* of probability.

an example you'll get sick of:
rolling a die



> “Well, since the die is fair and symmetric, there’s an equal chance of rolling any number. And since there are six possible numbers that we could roll, the probability of rolling any one particular number is one in six.”


1.0
0.8
0.6
0.4
0.2
0.0
relative frequency of 4s
0
20
40
60
80
100
n = total rolls


1.0
0.8
0.6
0.4
0.2
0.0
relative frequency of 4s
0
200
400
600
800
1000
n = total rolls

> The interpretation that conceptualizes probabilities as long-run relative frequencies is called the *frequentist interpretation* of probability.

2.2. A first look at the axiomatic framework

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Axiom 2.1 (Probability)

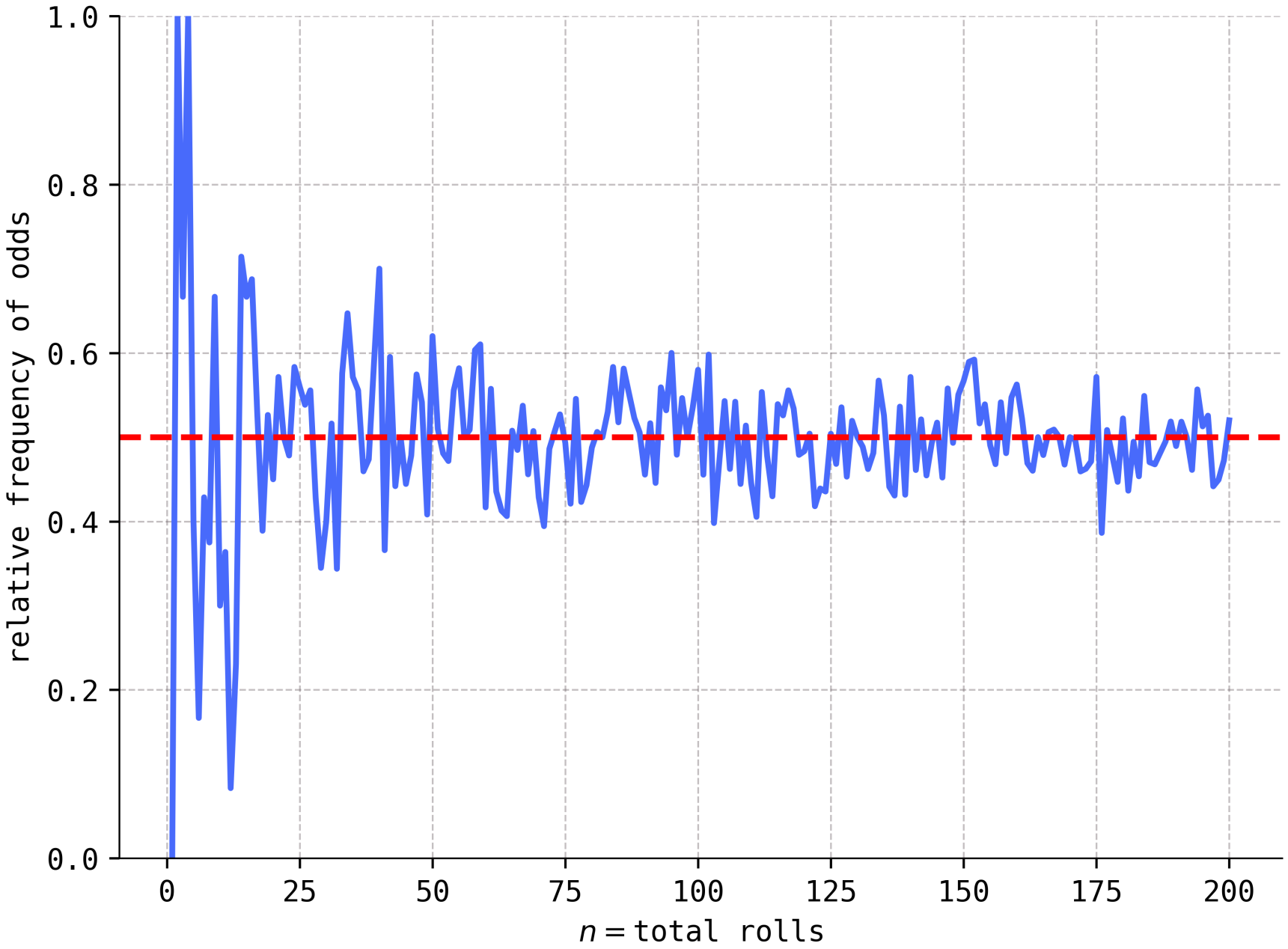
Probabilities are represented by real numbers between 0 and 1, inclusive.

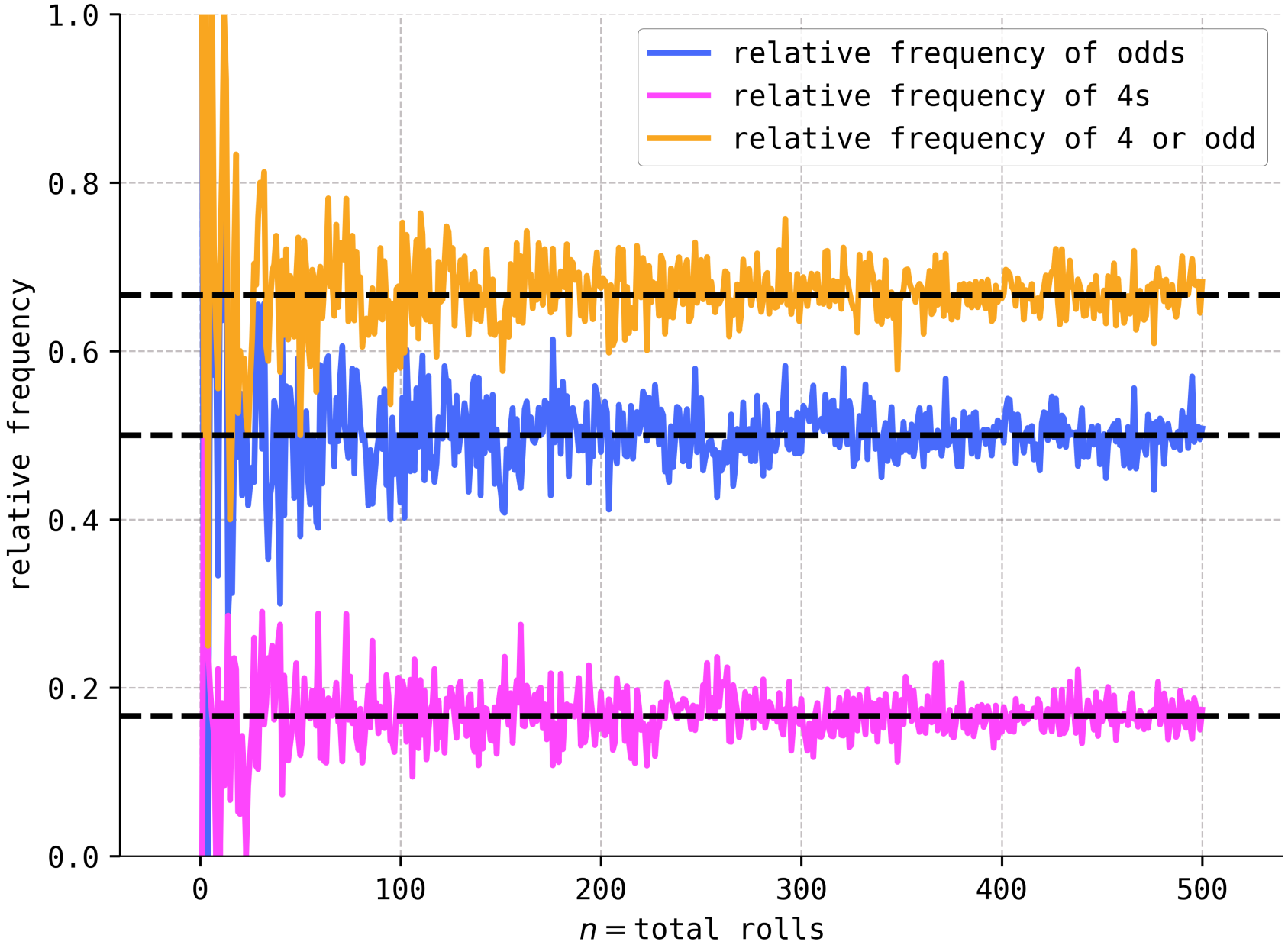
Axiom 2.2 (Probability)

The probability that *some* outcome occurs is 1.

Axiom 2.3 (Probability)

The probability of one or the other of two *disjoint* events occurring is the sum of the individual probabilities.


1.0
0.8
0.6
0.4
0.2
0.0
relative frequency of odds
0
25
50
75
100
125
150
175
200
n = total rolls

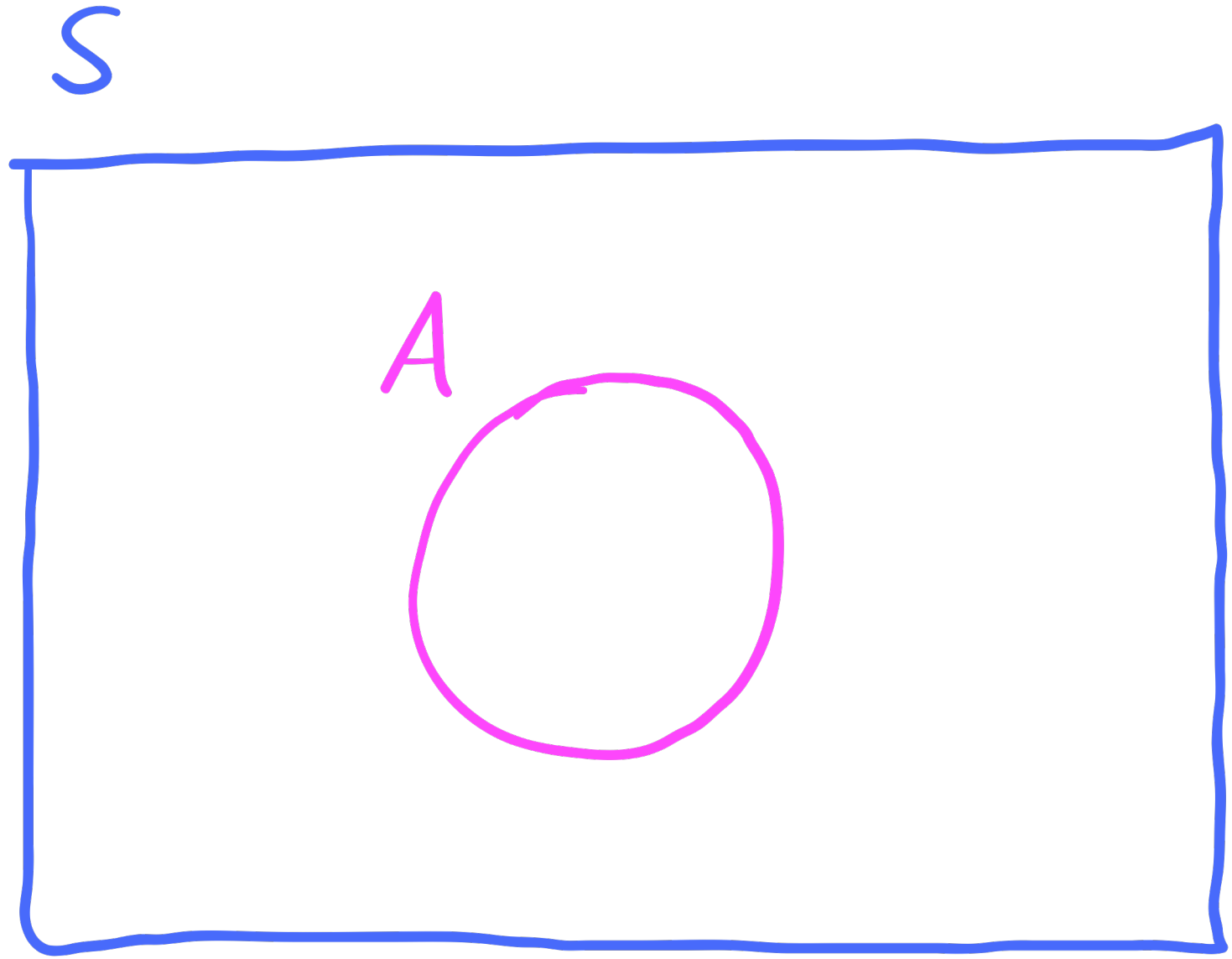

relative frequency of odds
relative frequency of 4s
relative frequency of 4 or odd
relative frequency
1.0
0.8
0.6
0.4
0.2
0.0
0
100
200
300
400
500
n = total rolls

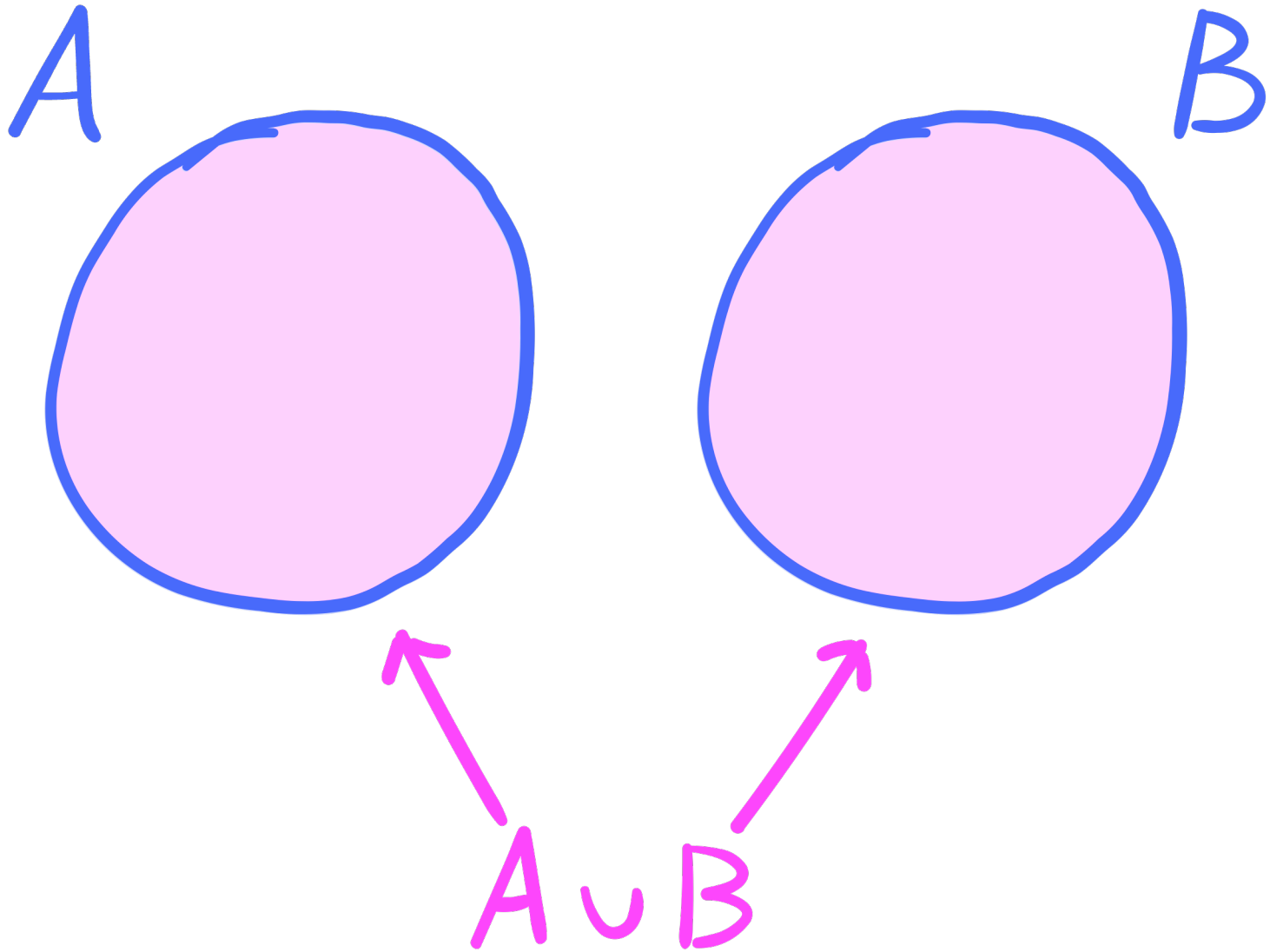
2.3. A crash course in set theory

Definition 2.1

A *set* is a set.

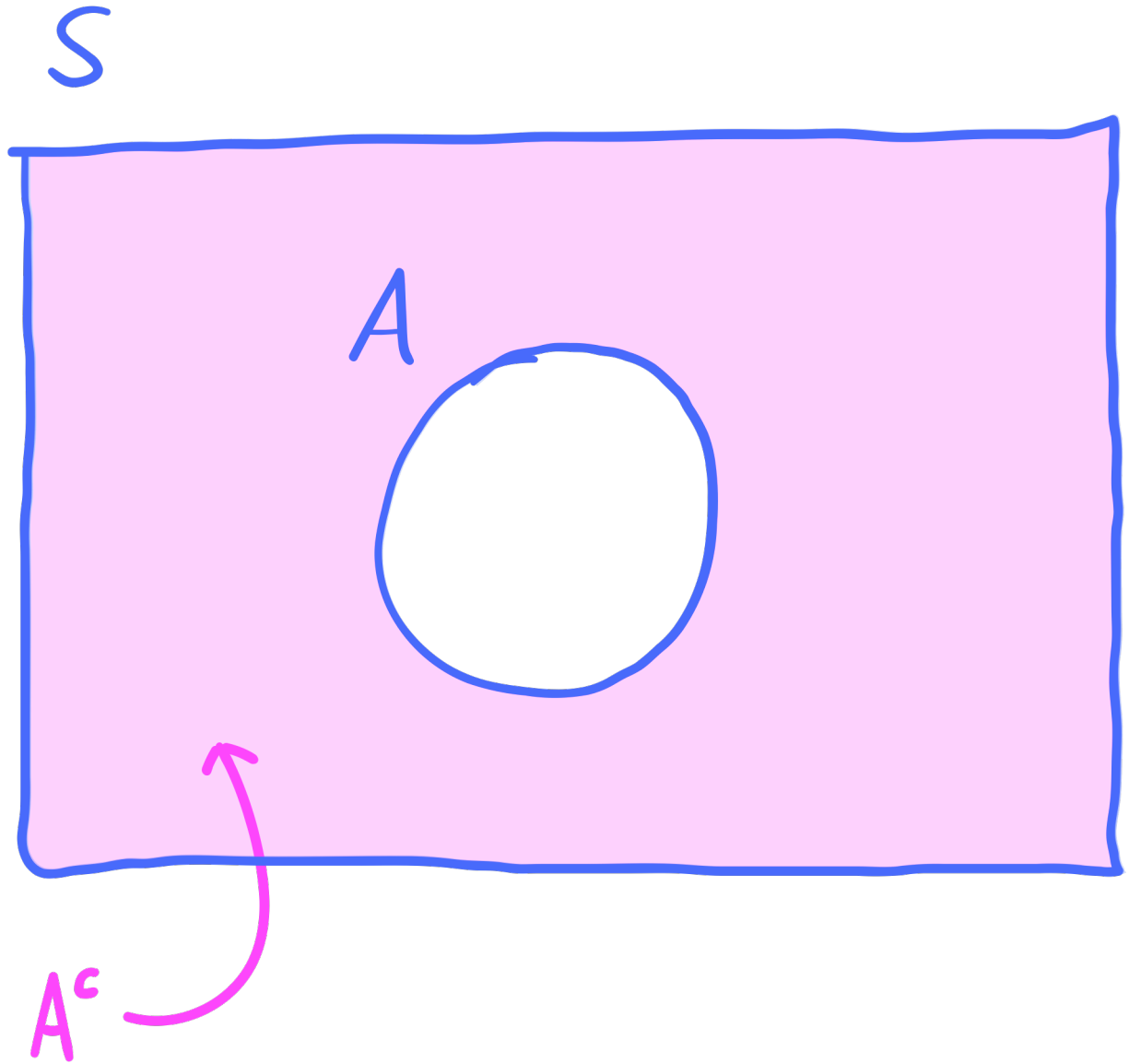
$A \subset S$:




A
B
A ∪ B

Definition 2.2

Two sets A and B are called *disjoint* if their intersection is empty, i.e., $A \cap B = \emptyset$.


S
A
A^c