recap

Sample space set of possible outcomes. $\omega \in \Omega$ (ω = one outcome
Ω = set of possible events)

event subset of sample space.

Generally two ways to calculate probability:

① counting if every $\omega \in \Omega$ is equally likely!!

$$P[A] = \frac{|A|}{|\Omega|}$$ so just count numerator and denominator and divide.

② treat an event as a series of smaller events that need to happen

lot of the time, it won't matter if you consider order to matter or not, but be consistent in both halves of fraction.

Flip a fair coin 5 times, find $P[\text{exactly 4 heads}]$ →

or $\binom{5}{4}\left(\frac{1}{2}\right)^4\left(\frac{1}{2}\right)^1$ by method ②

Flip a coin that comes up as H 60% of the time, 5 times, find $P[\text{exactly 4 heads}]$

$$\frac{\binom{5}{4}}{2^5}$$

← pick locations for the 4 heads

← all possibilities

→ $\binom{5}{4}\left(\frac{3}{5}\right)^4\left(\frac{2}{5}\right)^1$

ensure that the 4 locations for H actually end up H

ensure that the 1 location for T actually ends up T