Law of Large Numbers

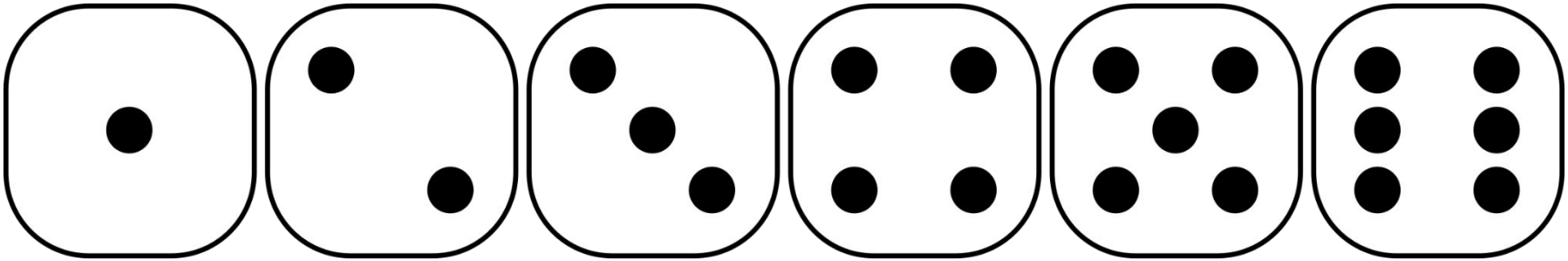
$$\overline{X}_n \xrightarrow{P} \mu \qquad \text{when } n \to \infty.$$

u = true probability

Xn = average of probabilities

n = trials

Experiment: Find the probability of rolling a 1 on a fair die.



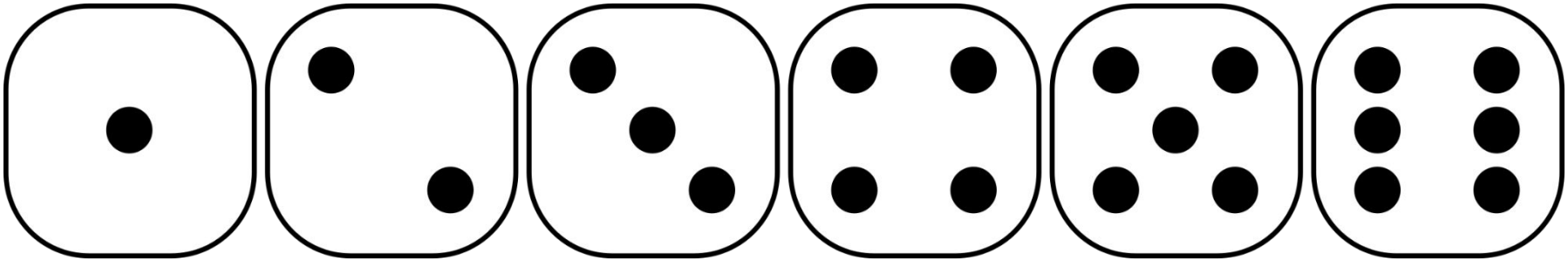
Real World Experiment Example:

First trial: Rolled a 5 – 0% for probability of rolling a 1 on f.d.

Second trial: Rolled a 1 – 50% probability of rolling a 1 on f.d.

Third trial: Rolled a 2 – 33% probability of rolling a 1 on f.d.

Experiment: Find the probability of rolling a 1 on a fair die.



Calculated Statistical Probability: *Known*

Probability of rolling a 1 on a fair die $-\frac{1}{6}$ or ~17% probability of rolling a 1 on f.d.

Law of Large Numbers

$\overline{X}_n \xrightarrow{P} \mu \quad \text{when } n \to \infty.$

As # of trials goes to infinity, our average probability will get closer to the real one.


SHARK TANK

Probability of Getting a Shark Tank Deal?

Unknown

DEAL

NO DEAL

Probability of Getting a Shark Tank Deal?

Success

Failure

Probability of Getting a Shark Tank Deal?

Success

Failure