

Conditional Probability



By the end of this lesson, I will be able to answer the following questions...

1. What is conditional probability and how do I use it?
2. How is conditional probability different from standard probability models?

Vocabulary

1. Conditional Probability Notation:

$$P(A|B) = \frac{P(A \cap B)}{P(B)}$$



trying to
find

know

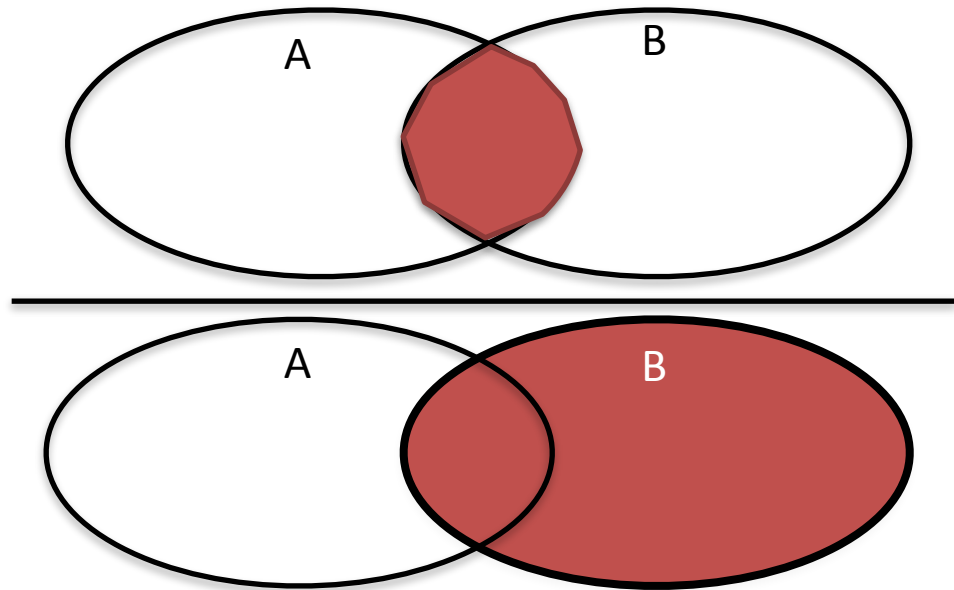
P(A|B)

read "probability of A given B"

Prerequisite Skills with Practice

“The Probability of A given that B has already occurred”

$$P(A|B) = \frac{P(A \cap B)}{P(B)}$$

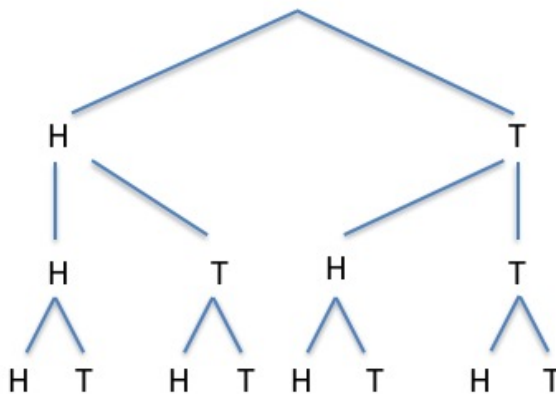
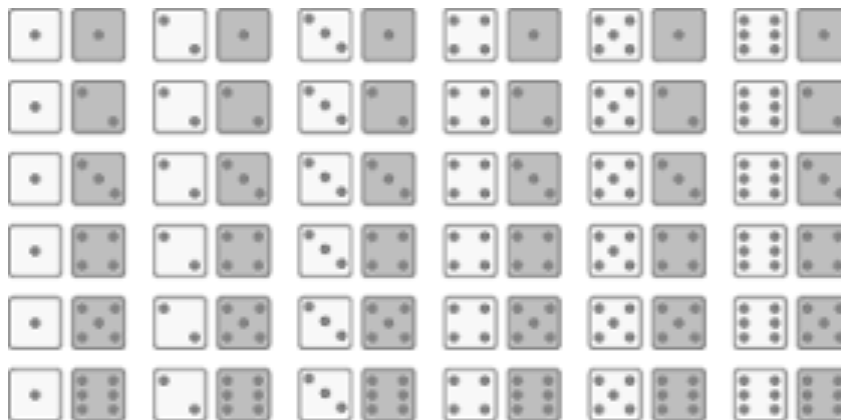


Alexis rolls a pair of six sided dice. What is the probability that both numbers are odd if their sum is 6?

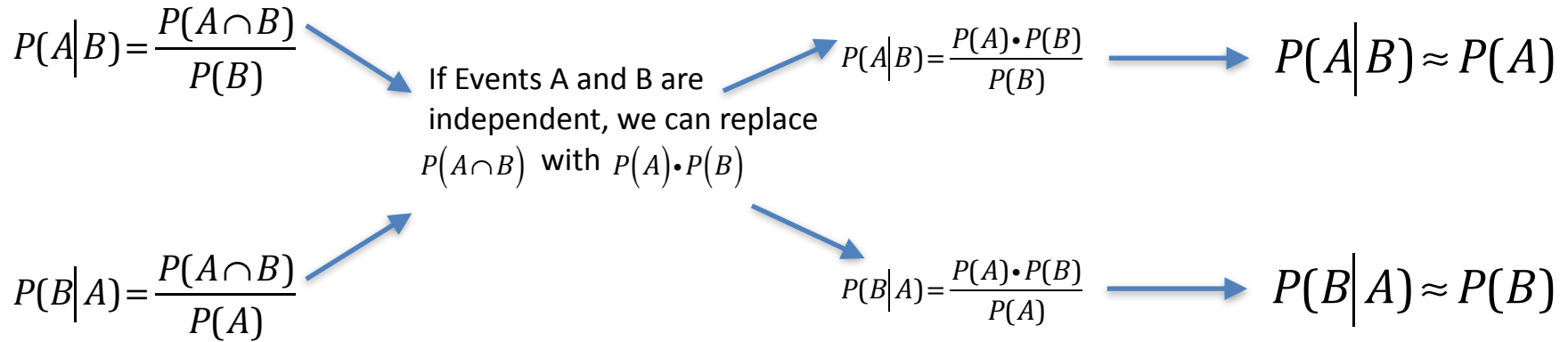
Interpret your answer in terms of a uniform probability model.

$$P(A|B) = \frac{P(A \cap B)}{P(B)}$$

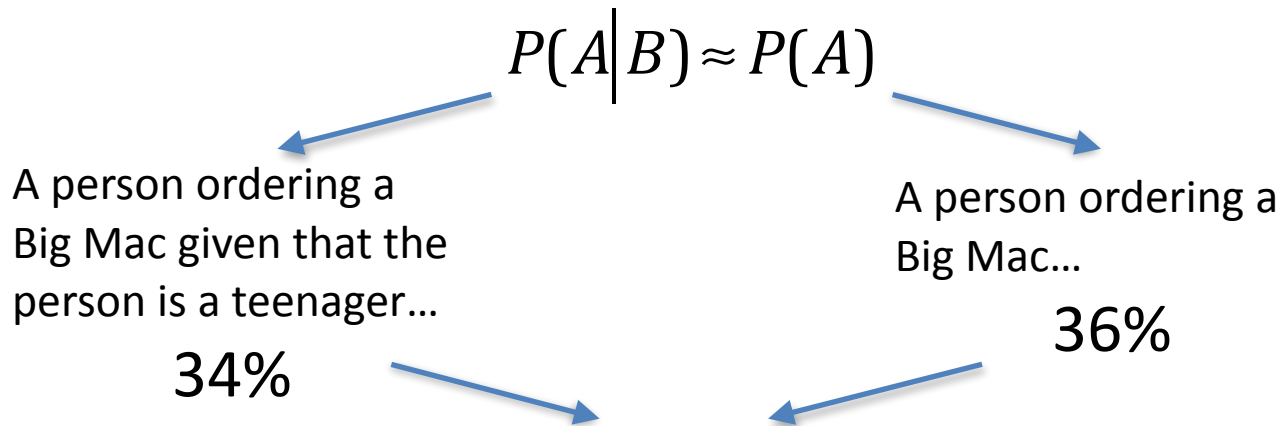
Naya tosses a coin 3 times. What is the probability that she gets all heads if the first toss is heads? What is the probability that the first toss is heads if she gets all heads?



Showing **independence** using conditional probabilities.



The last statement is an approximate usually within 5% of one another. This means some event A is just as likely to happen if event B already happened.



Since these events are approximately likely to happen, the events are independent

Researchers surveyed recent graduates of two different universities about their annual incomes. The following two-way table displays data for the 300 graduates who responded to the survey.

Annual income	University A	University B	TOTAL
Under \$20,000	36	24	60
\$20,000 to 39,999	109	56	165
\$40,000 and over	35	40	75
TOTAL	180	120	300

Suppose we want to determine if the events "income is \$40,000 and over" and "attended University B" independent?"

$$P(\$40,000 \text{ and over}) =$$

$$P(\$40,000 \text{ and over} \mid \text{Uni. B}) =$$

Suppose we want to determine if the events "income is under \$20,000" and "attended University B" independent?"

$$P(\text{under } \$20,000) =$$

$$P(\text{under } \$20,000 \mid \text{Uni. B}) =$$

THE END



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