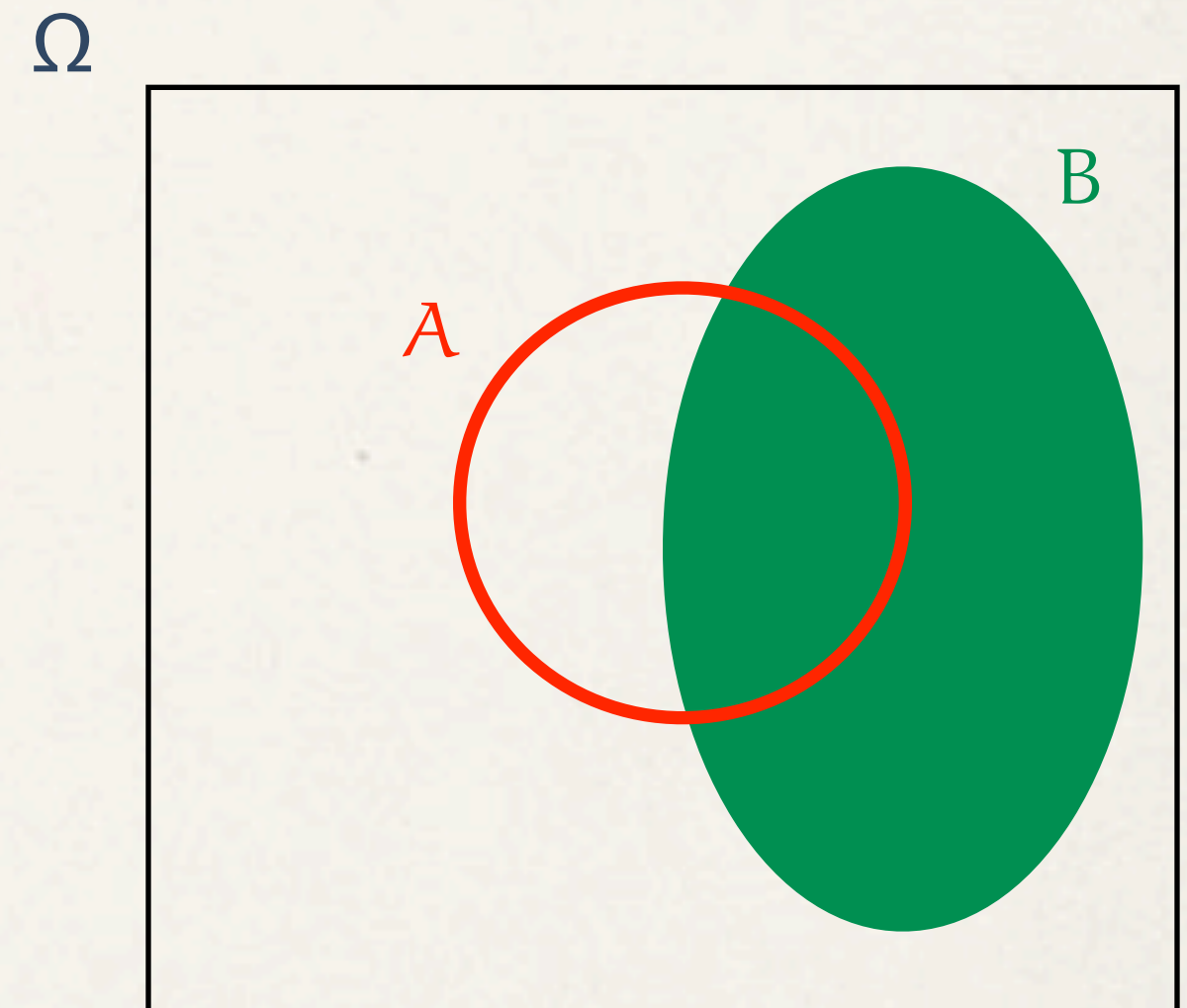


Conditional probability

The **conditional probability** of an event A given that an event B of positive probability has occurred (in short, the probability of A given B) is denoted $\mathbf{P}(A \mid B)$ and defined by

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

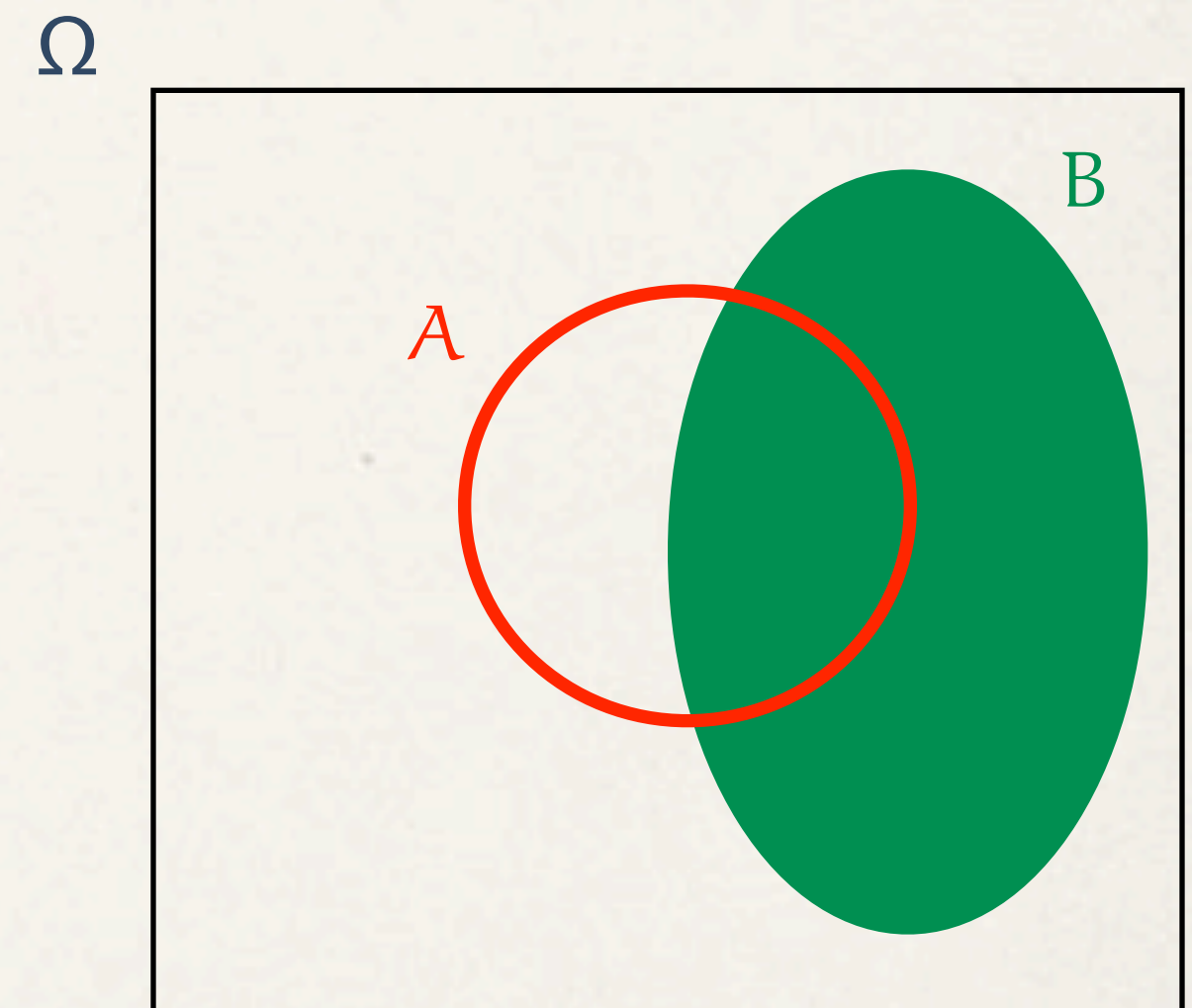


Conditional probability

The **conditional probability** of an event A given that an event B of positive probability has occurred (in short, the probability of A given B) is denoted $\mathbf{P}(A \mid B)$ and defined by

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

- The conditional probability $\mathbf{P}(A \mid B)$ is *undefined* if $\mathbf{P}(B) = 0$.

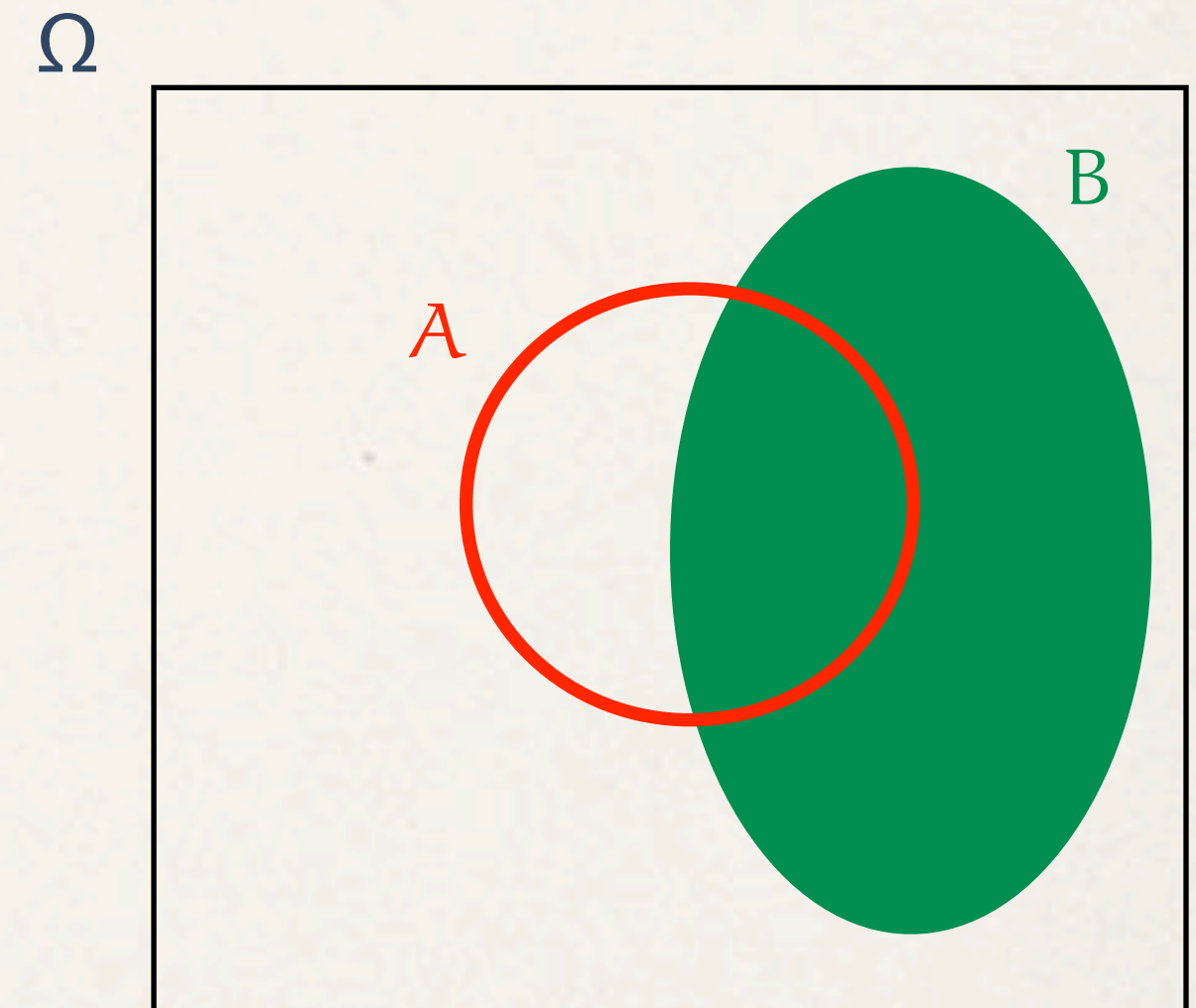


Conditional probability

The **conditional probability** of an event A given that an event B of positive probability has occurred (in short, the probability of A given B) is denoted $\mathbf{P}(A \mid B)$ and defined by

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

- The conditional probability $\mathbf{P}(A \mid B)$ is *undefined* if $\mathbf{P}(B) = 0$.
- The event B may be a *composite event* constructed via unions, intersections, and other set operations from other events.

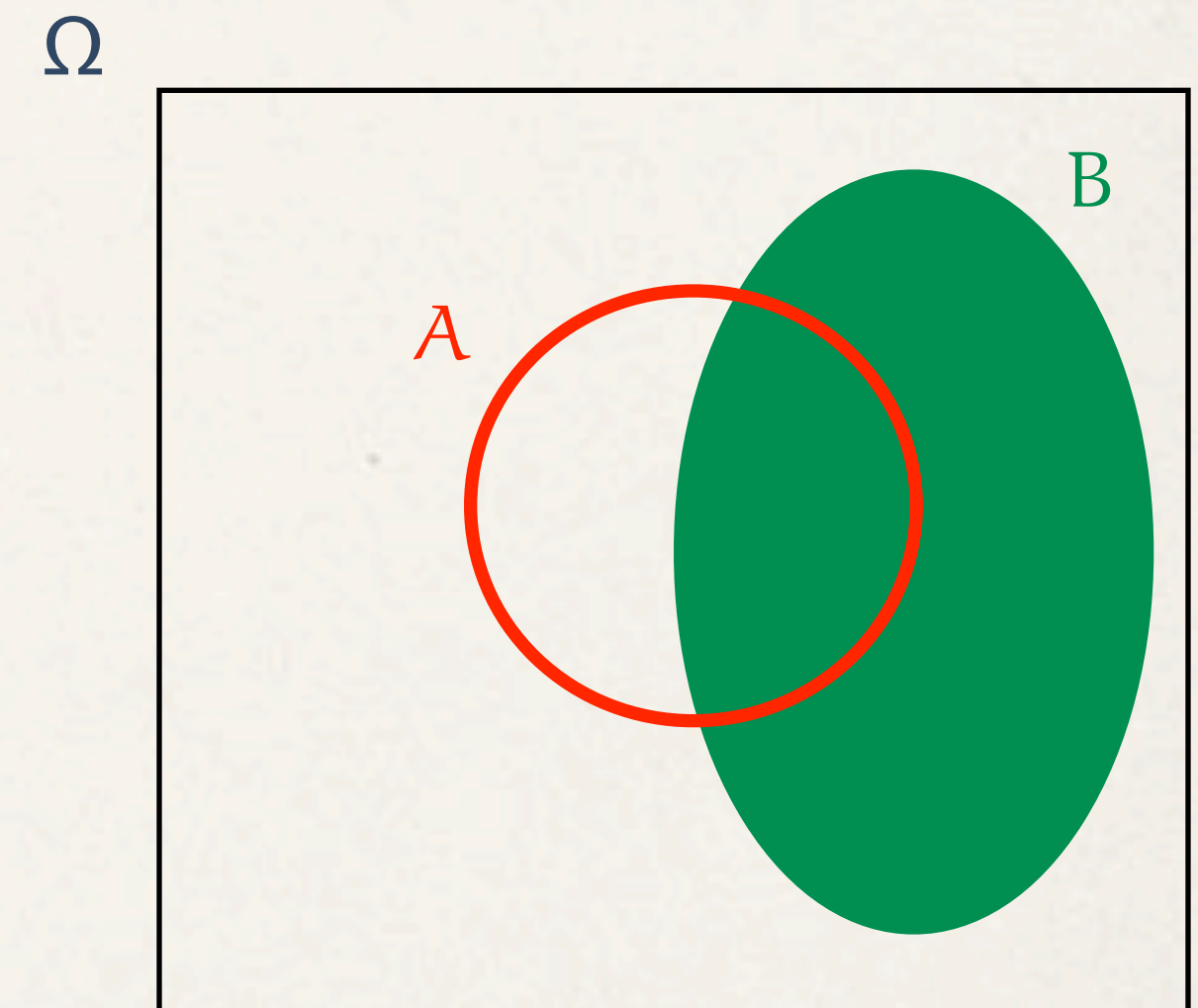


Conditional probability

The **conditional probability** of an event A given that an event B of positive probability has occurred (in short, the probability of A given B) is denoted $\mathbf{P}(A \mid B)$ and defined by

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

- The conditional probability $\mathbf{P}(A \mid B)$ is *undefined* if $\mathbf{P}(B) = 0$.
- The event B may be a *composite event* constructed via unions, intersections, and other set operations from other events.
- Conditional probability is *not symmetric*: in general, $\mathbf{P}(A \mid B) \neq \mathbf{P}(B \mid A)$.
What is $\mathbf{P}(B \mid A)$? When is $\mathbf{P}(B \mid A) = \mathbf{P}(A \mid B)$?



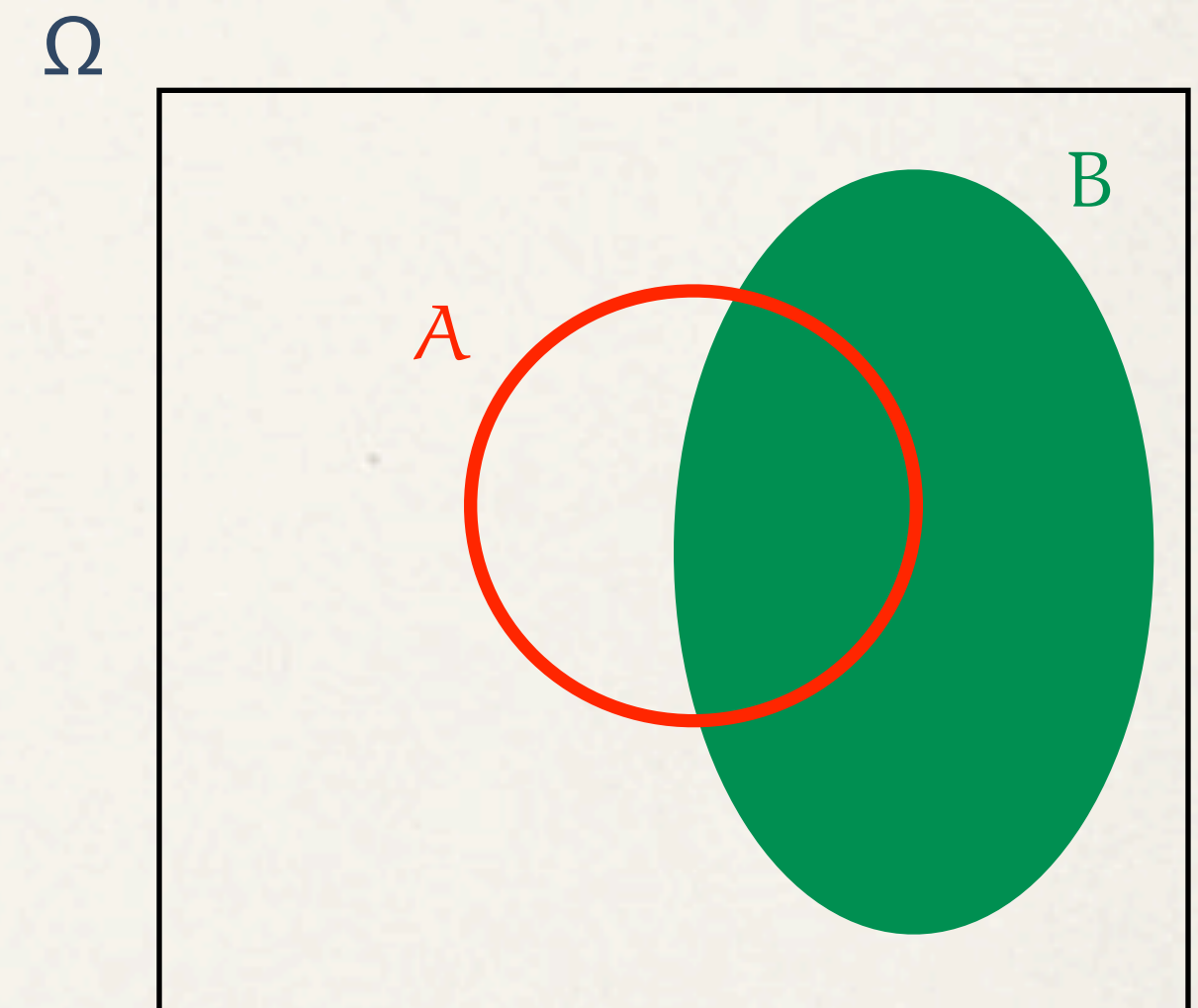
Conditional probability

The **conditional probability** of an event A given that an event B of positive probability has occurred (in short, the probability of A given B) is denoted $\mathbf{P}(A \mid B)$ and defined by

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

- The conditional probability $\mathbf{P}(A \mid B)$ is *undefined* if $\mathbf{P}(B) = 0$.
- The event B may be a *composite event* constructed via unions, intersections, and other set operations from other events.
- Conditional probability is *not symmetric*: in general, $\mathbf{P}(A \mid B) \neq \mathbf{P}(B \mid A)$.
What is $\mathbf{P}(B \mid A)$? When is $\mathbf{P}(B \mid A) = \mathbf{P}(A \mid B)$?

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



Conditional probability

The **conditional probability** of an event A given that an event B of positive probability has occurred (in short, the probability of A given B) is denoted $\mathbf{P}(A \mid B)$ and defined by

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

- The conditional probability $\mathbf{P}(A \mid B)$ is *undefined* if $\mathbf{P}(B) = 0$.
- The event B may be a *composite event* constructed via unions, intersections, and other set operations from other events.
- Conditional probability is *not symmetric*: in general, $\mathbf{P}(A \mid B) \neq \mathbf{P}(B \mid A)$.
What is $\mathbf{P}(B \mid A)$? When is $\mathbf{P}(B \mid A) = \mathbf{P}(A \mid B)$?

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

$\mathbf{P}(B \mid A) = \mathbf{P}(A \mid B)$ if, and only if, $\mathbf{P}(A) = \mathbf{P}(B)$.

