

11.7 – Events Involving *And*; Conditional Probability

Events A and B are **independent** if the outcome of one has no effect on the probability of the outcome of the other.

Multiplication Rule for Independent Events

If A and B are independent events, then

$$P(A \text{ and } B) = P(A) \cdot P(B).$$

(Can generalize for more than 2 events)

Examples

The Multiplication Rule for any two events

For any two events A and B ,

$$P(A \text{ and } B) = P(A) \cdot P(B | A)$$

$P(B | A)$ means the Probability of event B occurring given that event A has already occurred. If A and B are independent then the $P(B | A) = P(B)$

Examples

The **Conditional Probability** is a probability that depends on a condition already occurring. The conditional probability that event B occurs given that event A has already occurred is denoted $P(B|A)$ and is found using either

$$P(B|A) = \frac{\text{number of outcomes in } A \text{ and } B}{\text{number of outcomes in } A} \quad \text{or} \quad P(B|A) = \frac{P(A \text{ and } B)}{P(A)}$$

Examples

	Wore Seat Belt	No Seat Belt	Total
Driver Survived	412,368	162,527	574,895
Passive	510	1601	2111
Total	412,878	164,128	577,006

