What is the probability of A or B occurring, with examples?

Authored by
stats writer

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The probability of A or B occurring refers to the likelihood that either event A or event B will happen. It is represented by the mathematical formula P(A or B) and is expressed as a decimal or percentage ranging from 0 to 1. This probability can be calculated by adding the individual probabilities of A and B and subtracting the probability of both events happening simultaneously.

For example, if the probability of event A is 0.6 and the probability of event B is 0.4, the probability of A or B occurring is 0.6 + 0.4 - (0.6 x 0.4) = 0.76 or 76%. This means that there is a 76% chance that either event A or event B will occur.

Another example could be the probability of winning a prize in a raffle. Let's say there are 100 tickets sold and 10 prizes to be won. The probability of winning a prize would be 10/100 or 0.1, which can also be expressed as a 10% chance. This means that there is a 10% chance that you will win a prize in the raffle.

In summary, the probability of A or B occurring is a mathematical concept used to determine the likelihood of either event A or event B happening. It is important in understanding and predicting outcomes in various situations, such as gambling, insurance, and scientific experiments.

Find the Probability of A or B (With Examples)

Given two events, A and B, to "find the probability of A or B" means to find the probability that either event A or event B occurs.

We typically write this probability in one of two ways:

P(A or B) - Written formP(A∪B) - Notation form

The way we calculate this probability depends on whether or not events A and B are or not. Two events are mutually exclusive if they cannot occur at the same time.

If A and B are mutually exclusive, then the formula we use to calculate P(A∪B) is:

Mutually Exclusive Events:P(A∪B) = P(A) + P(B)

If A and B are not mutually exclusive, then the formula we use to calculate P(A∪B) is:

Not Mutually Exclusive Events:P(A∪B) = P(A) + P(B) - P(A∩B)

Note that P(A∩B) is the probability that event A and event B both occur.

The following examples show how to use these formulas in practice.

Examples: P(A∪B) for Mutually Exclusive Events

Example 1: What is the probability of rolling a dice and getting either a 2 or a 5?

Solution: If we define event A as getting a 2 and event B as getting a 5, then these two events are mutually exclusive because we can't roll a 2 *and* a 5 at the same time. Thus, the probability that we roll either a 2 or a 5 is

calculated as:

$P(A \cup B) = (1/6) + (1/6) = 2/6 = 1/3$.

Example 2: Suppose an urn contains 3 red balls, 2 green balls, and 5 yellow balls. If we randomly select one ball, what is the probability of selecting either a red or green ball?

Solution: If we define event A as selecting a red ball and event B as selecting a green ball, then these two events are mutually exclusive because we can't select a ball that is both red and green. Thus, the probability that we select either a red or green ball is calculated as:

$P(A \cup B) = (3/10) + (2/10) = 5/10 = 1/2$.

Examples: $P(A \cup B)$ for Not Mutually Exclusive Events

The following examples show how to calculate $P(A \cup B)$ when A and B are not mutually exclusive events.

Example 1: If we randomly select a card from a standard 52-card deck, what is the probability of choosing either a Spade or a Queen?

Solution: In this example, it's possible to choose a card

that is both a Spade *and* a Queen, thus these two events are not mutually exclusive.

If we let event A be the event of choosing a Spade and event B be the event of choosing a Queen, then we have the following probabilities:

$P(A) = 13/52 P(B) = 4/52 P(A \cap B) = 1/52$

Thus, the probability of choosing either a Spade or a Queen is calculated as:

$P(A \cup B) = P(A) + P(B) - P(A \cap B) = (13/52) + (4/52) - (1/52) = 16/52 = 4/13$.

Example 2: If we roll a dice, what is the probability that it lands on a number greater than 3 or an even number?

Solution: In this example, it's possible for the dice to land on a number that is both greater than 3 *and* even, thus these two events are not mutually exclusive.

If we let event A be the event of rolling a number greater than 3 and event B be the event of rolling an even number, then we have the following probabilities:

P(A) = 3/6P(B) = 3/6P(A∩B) = 2/6

Thus, the probability that the dice lands on a number greater than 3 or an even number is calculated as:

P(A∪B) = P(A) + P(B) - P(A∩B) = (3/6) + (3/6) - (2/6) = 4/6 = 2/3.