

"Either/Or" Probability for Non-Overlapping Events

by Sophia



WHAT'S COVERED

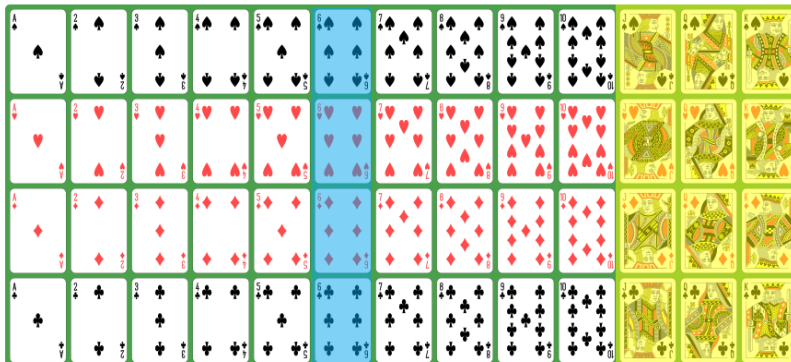
This tutorial will explain the rule for finding the probability of at least one of two or more non-overlapping events happening. Our discussion breaks down as follows:

1. "Or" Probability for Non-Overlapping Events

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When finding **"either/or" probability for non-overlapping events**, we need to consider the two parts of this term. "Either/Or" refers to a scenario in which either one or both of two events happen. However, non-overlapping means they can't both happen at the same time, therefore, exactly *one* of them happens: either event A OR event B, but not both A and B.

⇒ **EXAMPLE** Suppose you have a standard deck of 52 cards. You have two mutually exclusive, or non-overlapping events, like selecting a six and selecting a face card. These events can't both happen at the same time. If you are selecting a six, then you are not selecting a face card and vice versa.



What's the probability of selecting a six *or* a face card?

Well, there are 4 sixes and 12 face cards, so 16 out of 52.

$$P(6 \text{ or Face}) = \frac{4}{52} + \frac{12}{52} = \frac{16}{52}$$

It would appear, then, that for non-overlapping events, you can calculate the "or" probability as the individual probabilities added together.



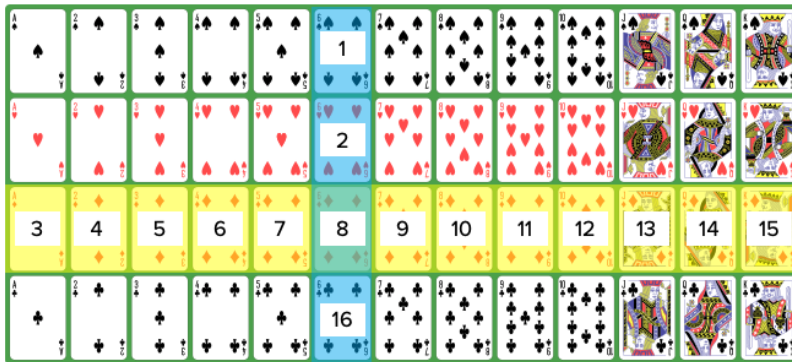
FORMULA TO KNOW

Either/Or Probability for Non-Overlapping Events

$$P(A \text{ or } B) = P(A) + P(B)$$

It is important to note, however, that this formula doesn't work if you have overlapping events.

↪ **EXAMPLE** Referring back to our deck of cards, what is the probability of a six or diamond?



If you counted out all the cards that were either sixes or diamonds, you would end up with 16 out of 52 cards. However, that's not the same as adding the probability of a six (4 out of 52) with the probability of a diamond (13 out of 52), which would give you 17 out of 52.

$$\frac{16}{52} \neq \frac{4}{52} + \frac{13}{52}$$

$$P(6 \text{ or diamond}) \neq P(6) + P(\text{diamond})$$

This formula only works for non-overlapping events.



TERM TO KNOW

Either/Or Probability for Non-Overlapping Events

The probability that either of two non-overlapping events occurs is the sum of their individual probabilities. Also known as the "Special Addition Rule".



SUMMARY

If two events A and B are mutually exclusive--meaning they can't happen at the same time--then the probability that either A or B happens is equal to the probability of A plus the probability of B. The "special addition rule for non-overlapping events" states that the probability that either of two non-overlapping events occurs is the sum of their individual probabilities. This is a special addition rule

because there will be a different addition rule for cases in which the events are overlapping.

Good luck!

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