

Overlapping Events

by Sophia



WHAT'S COVERED

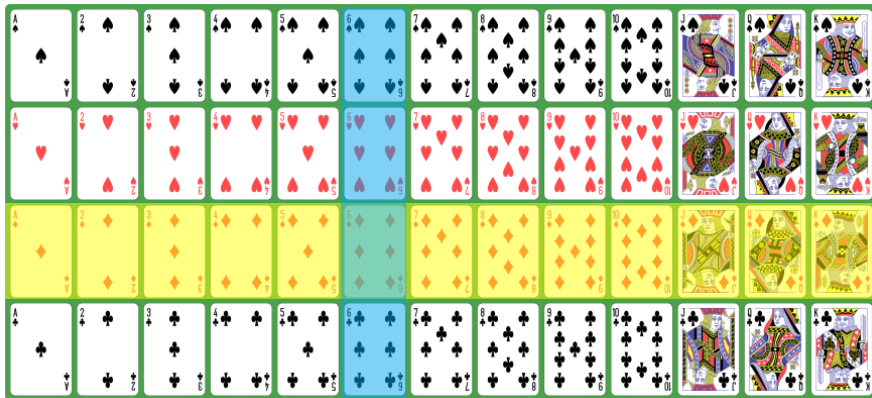
This tutorial will explain overlapping and non-overlapping events. Our discussion breaks down as follows:

1. Overlapping Events
2. Non-Overlapping Events
3. Using a Venn Diagram

1. Overlapping Events

Overlapping events refers to two events that can both occur at the same time. Let's look at an example.

In picking a card from a deck, you might pick a six, or you might pick a diamond. You might also pick a six of diamonds, which has both the characteristics of being a six and a diamond.



The events six and diamond are considered overlapping events. The event six has four outcomes. The event diamond has 13 outcomes. There's at least one outcome that's the same for both of them. The event six and diamond can happen at the same time if you pick the six of diamonds.



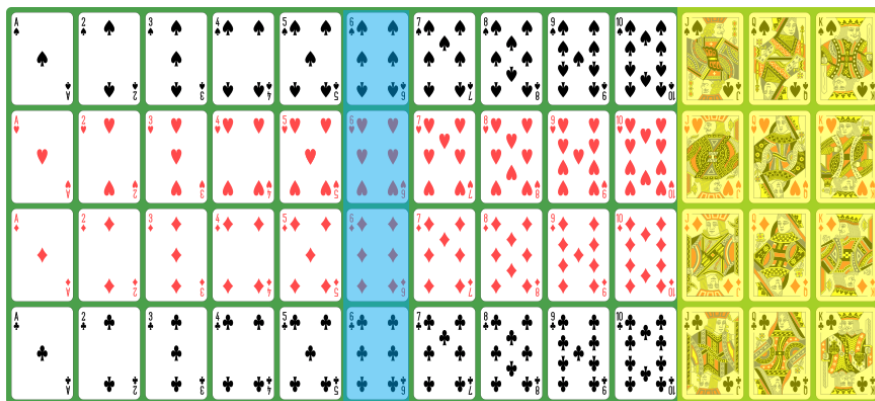
TERM TO KNOW

Overlapping Events

Two events that can occur in a single trial of a chance experiment

2. Non-Overlapping Events

Conversely, **non-overlapping events** are events that can't happen at the same time. The events six and face card, for example, are non-overlapping. If you pick a six, it is not possible to also be picking a face card, and vice versa—if you're picking a face card, you're not picking a six.



HINT

Disjoint and mutually exclusive are two other terms that are used for non-overlapping events. These are both very common terms.



TERM TO KNOW

Non-Overlapping Events

Two events that cannot both occur in a single trial of a chance experiment. If one event occurs, the other event must not also occur.

3. Using a Venn Diagram

You can show either overlap or non-overlap in a Venn diagram.

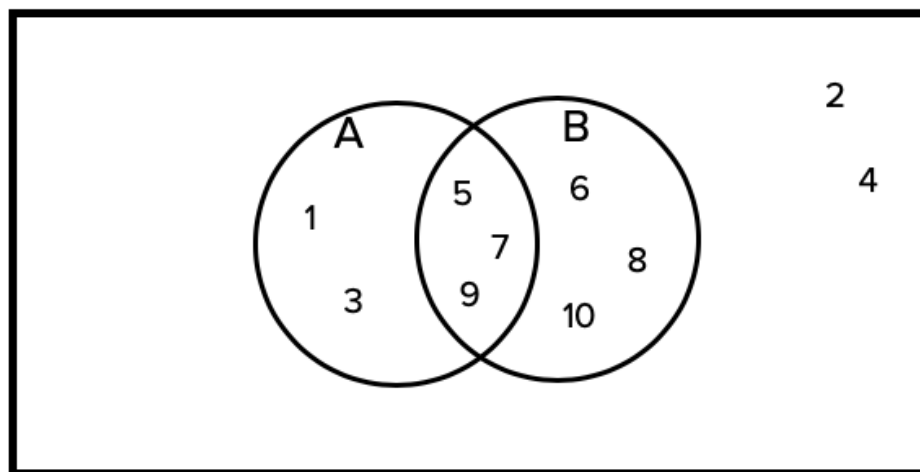
Suppose you have these two events from spinning the following spinner.



Event A is landing on an odd number, and Event B is landing on a number larger than 4.

Venn Diagram for Overlapping Events

Event A: Landing on "Odd"
Event B: Landing on "Larger Than 4"

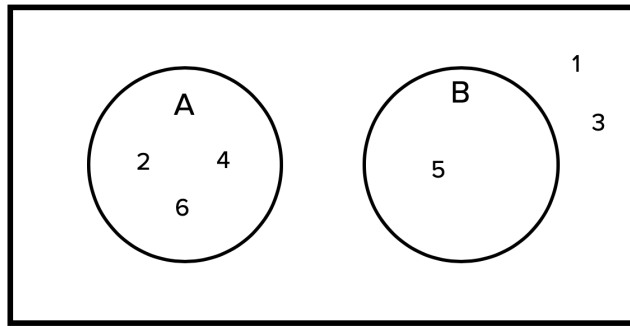


If you're landing on an odd number, some outcomes are also larger than 4. In a Venn diagram, you show those as two circles that overlap.

Suppose you have these two events from rolling a die. Event A is rolling an even, and Event B is rolling a five is event B.

Venn Diagram for Non-Overlapping Events

Event A: Rolling "Even"
Event B: Rolling "5"



If you're rolling an even, you're certainly not rolling a five, and if you're rolling a five, you're certainly not rolling an even number. In a Venn diagram, you show those as two circles that do not overlap.

Non-overlapping events can't be independent. With independent events, knowing what happened with event A doesn't change the probability that B will occur, whereas with disjoint or mutually exclusive events, knowing that event A occurred changes the probability of B. In fact, we know what the occurrence of event A changes the probability of B: it changes it to zero because B can't happen if A has occurred.



SUMMARY

Often, two randomly selected events will be overlapping, which means they can happen at the same time. However, non-overlapping events (also known as disjoint events or mutually exclusive events) cannot happen at the same time. This means that if one happens, then the other one doesn't happen.

Good luck!

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TERMS TO KNOW

Non-overlapping/Disjoint/Mutually Exclusive Events

Two events that cannot both occur in a single trial of a chance experiment. If one event occurs, the other event must not also occur.

overlapping events

Two events that can occur in a single trial of a chance experiment.