Vocabulary

* Sample Space: ALL possible outcomes
* Independent Event: an event that DOES NOT change the possible outcomes (sample space)
* Dependent Event: an event that DOES change the possible outcomes (sample space)

Examples of Independent Events

Rolling a dice

Spinning a spinner

Anything with replacement

Examples of Dependent Events

Choosing a starting lineup

Anything without replacement

Example Questions

1. I have a bag of 4 blue marbles, 3 red marbles, and 1 yellow marble. Each time I pick a marble, I put it back in the bag.
	1. Is this an independent event or a dependent event?
	2. What is the probability that I choose a red marble?
	3. What is the probability that I choose a red marble, and then choose a yellow marble?
2. I have the same bag of marbles (4 blue, 3 red, 1 yellow), but this time when I choose a marble, I leave it on the table after I choose.
	1. Is this an independent event or a dependent event?
	2. What is the probability that I choose a red marble?
	3. What is the probability that I choose a red marble, and then choose a yellow marble?
	4. What is the probability that I choose a two blue marbles?
3. I draw cards from a standard deck of cards with replacement.
	1. Is this an independent event or dependent event?
	2. What is the probability that I draw a 3 of clubs?
	3. What is the probability that I choose a red card, and then a black card?
	4. What is the probability that I choose a face card, then an Ace, and then a 2?
4. I draw cards from a standard deck of cards without replacement.
	1. Is this an independent event or dependent event?
	2. What is the probability that I draw a 3 of clubs?
	3. What is the probability that I draw a red card?
	4. What is the probability that I choose a red card, and then a black card?
	5. What is the probability that I choose a face card, then an Ace, and then a 2?

Two events are independent if at least one of the following is true.

* You are told that the two events are independent.
* $P\left(A \right|B)=P(A)$
* $P\left(B \right| A)=P(B)$

Useful Formulas:

* $P\left(A and B\right)=P\left(A\right)\*P(B)$
* $P\left(A or B\right)=P\left(A\right)+P\left(B\right)-P\left(A and B\right)$
* $P\left(A and B\right)=P\left(A\right)\*P\left(B \right| A)$
* $P\left(A \right|B)=\frac{P(A and B)}{P(B)}$

Example Questions

1. A and B are independent events. $P\left(A\right)=\frac{8}{24}$ and $P\left(B\right)=\frac{2}{24}$
	1. Find $P\left(A and B\right)$
	2. Find $P\left(A or B\right)$
	3. Find $P\left(A | B\right)$
	4. Find $P\left(B | A\right)$
2. If$ P\left(A\right)=\frac{2}{7}$ and $P\left(B\right)=\frac{3}{7}$, are A and B independent events? Prove it.