Two events are independent if the outcome of one event does not affect the outcome of the other event. For example, if you draw a card from a standard deck of playing cards but replace it before you draw again, the outcomes of the two draws are independent.

Two events are dependent if the outcome of one event affects the outcome of the other event. For example, if you draw a card from a standard deck of playing cards and do not replace it for the next draw, the outcomes of the two draws are dependent.

Example 1
Juan pulled a red card from the deck of regular playing cards. This probability is \( \frac{26}{52} \) or \( \frac{1}{2} \). He puts the card back into the deck. Will his chance of pulling a red card next time change?

No, his chance of pulling a red card next time will not change, because he replaced the card. There are still 26 red cards out of 52. This is an example of an independent event; his pulling out and replacing a red card does not affect any subsequent selections from the deck.

Example 2
Brett has a bag of 30 multi-colored candies. 15 are red, 6 are blue, 5 are green, 2 are yellow, and 2 are brown. If he pulls out a yellow candy and eats it, does this change his probability of pulling any other candy from the bag?

Yes, this changes the probability, because he now has only 29 candies in the bag and only 1 yellow candy. Originally, his probability of yellow was \( \frac{2}{30} \) or \( \frac{1}{15} \); it is now \( \frac{1}{29} \). Similarly, red was \( \frac{15}{30} \) or \( \frac{1}{2} \) and now is \( \frac{15}{29} \), better than \( \frac{1}{2} \). This is an example of a dependent event.

Problems
Decide whether these events are independent or dependent events.

1. Flipping a coin, and then flipping it again.
2. Taking a black 7 out of a deck of cards and not returning it, then taking out another card.
3. Taking a red licorice from a bag and eating it, then taking out another piece of licorice.

Answers
1. independent
2. dependent
3. dependent