

Probabilities of compound events

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

events over lap

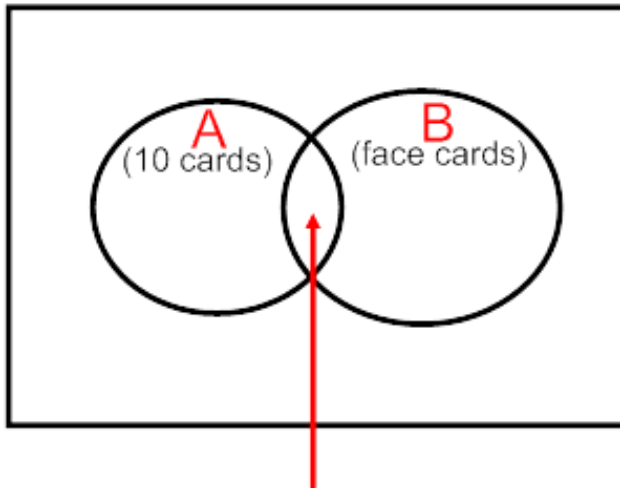
$$P(A \text{ or } B) = P(A) + P(B)$$

disjoint or mutually exclusive events
no over lap

Use Venn diagrams to calculate the probabilities

Example of disjoint event:

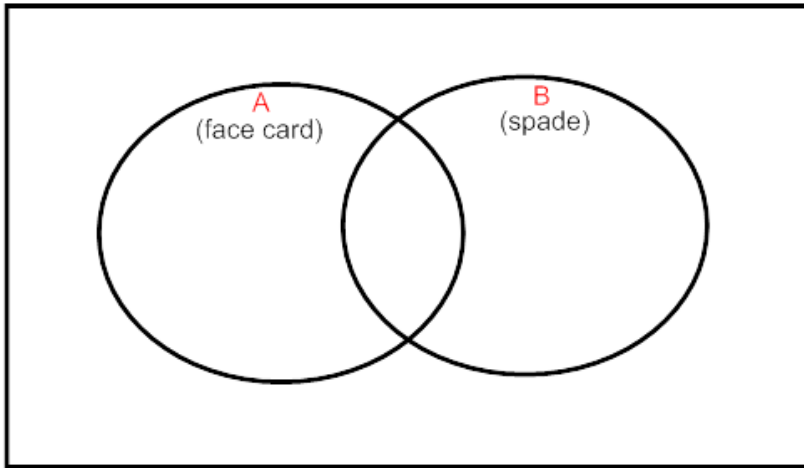
A card is randomly selected from a standard deck of 52 cards. What is the probability that it is a 10 or face card?



What does this represent?

Example of overlapping event:

A card is randomly selected from a standard deck of 52 cards. What is the probability that it is a face card or a spade?



Independent events: if the occurrence of one has no effect on the occurrence of the other.

Probability of independent events:

$$P(A \text{ and } B) = P(A) \cdot P(B)$$

For a fundraiser, a class sells 150 raffle tickets for a mall gift certificate and 200 raffle tickets for a booklet of movie passes. You buy 5 raffle tickets for each prize. What is the probability that you win both prizes.

Find the probability of spinning the given colors:

a) green, then blue

b) blue, then red

c) blue, then green, then red

Dependent events: if the occurrence of one has an effect on the occurrence of the other.

Probability of dependent events:

$$P(A \text{ and } B) = P(A) \cdot P(B | A)$$

A bag contains 4 blue marbles, 3 red marbles and 2 white marbles. What is the probability of selecting a blue marble and then a white marble?

Independent / Dependent Events Replacement / without Replacement

Find the probability of drawing the given cards from a standard deck of 52 cards (a) with replacement (b) without replacement

1. A spade, then a club

a)

b)

2. A jack, then another jack

a)

b)

Probability Tree Diagram

Using observations made of drivers arriving at a certain high school, a study reports that 69% of adults wear seat belts while driving. A high school student also in the car wears a seat belt 66% of the time when the adult wears a seat belt, and 26% of the time when the adult does not wear a seat belt. What is the probability that a high school student in the study wears a seat belt.

You are off to soccer, and love being the Goalkeeper, but that depends who is the Coach today:

*with Coach Sam the probability of being Goalkeeper is 0.5

*with Coach Alex the probability of being Goalkeeper is 0.3

Sam is Coach more often...about 6 out of every 10 games.

What is the probability you will be a Goalkeeper today?