odds

odds and probability

example

odds

- The odds of an event are the ratio of how likely the event is to occur and how likely it is to not occur.
- Let p denote probability that an event occurs, its complement that it doesn't occur is then $(1 - p)$

$$\text{odds} = \frac{p}{1 - p}$$

- Relationship odds and probability:
  - the odds are greater (less) than 1 if and only if the probability is greater (less) than 0.5
  - The odds are exactly 1 if and only if the probability is 0.5.

example

Let's say you attend a meeting of five people, including yourself. You each write your name on a piece of paper for a randomly drawn door prize. Your chance, or probability, of winning the prize is 1/5 (0.20). Your odds of winning, however, are 1 to 4 (1:4). There is one piece of paper with your name and four without, so you have one chance of winning and four chances to lose.

odds ratio and relative risk

- The odds ratio (OR) compares the odds of an event between two different groups.

$$\text{OR} = \frac{\frac{p_1}{1-p_1}}{\frac{p_2}{1-p_2}}$$

- OR > 1 (< 1) implies first event (numerator) has greater (smaller) risk of occurring
- An OR of 1 implies risk is equal for both events