Basic Probability

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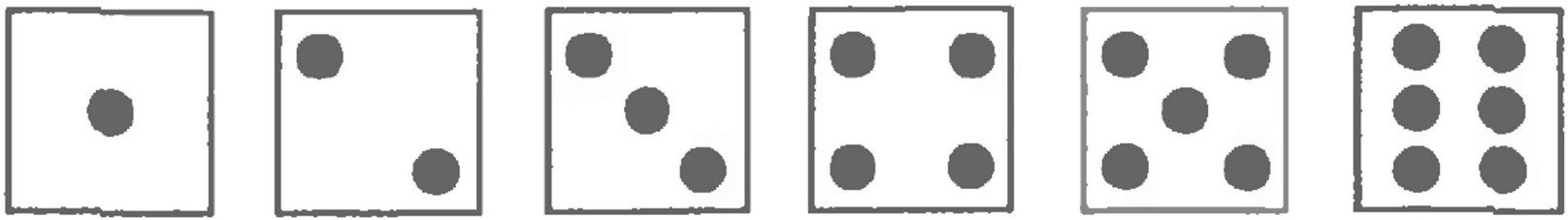
Quiz 1

- A dice, the singular of dice, is a cube with six faces numbered 1, 2, 3, 4, 5, and 6. What is the chance of getting 1 when rolling a dice?

- Sample space of the throw of a single dice



- P(E) = 1/6

  E is the event of getting 1

Quiz 2

- We roll a fair dice. What is the chance of not rolling a 2?

- **Subtraction rule**

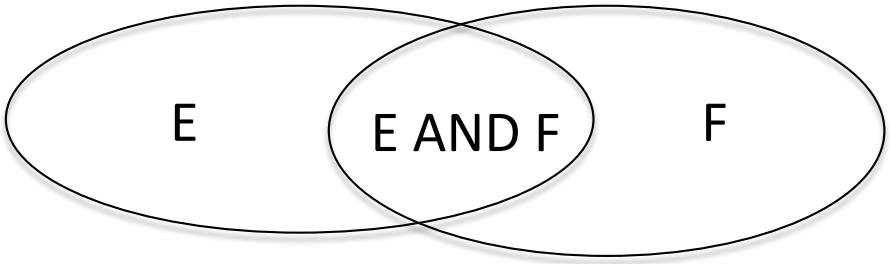
$$P(\mathrm{E}) = 1 - P(\mathrm{NOT\ E})$$

Quiz 3

- Two people A and B roll dice. What is the chance that A gets 1 or B gets 5?

- **Addition rule**

$$P(E \text{ OR } F) = P(E) + P(F) - P(E \text{ AND } F)$$



$$P = 1/6 + 1/6 - 1/36 = 11/36$$

Quiz 4

- What is a chance of getting 1 or 2 if we throw a single dice?

- **Addition rule**

  P(E OR F) = P(E) + P(F) – P(E AND F)

  If two events are mutually exclusive

  - P(E OR F) = P(E) + P(F)

Quiz 5: Conditional probability

- I roll two dice. What is chance that the sum of two dice is 3 if I get 1 in the first dice?

- $P(\mathrm{E}|\mathrm{F})$
  - E: sum of two dices is 3
  - F: getting 1 in the first dice

$$P(\mathrm{E}|\mathrm{F}) = \frac{P(\mathrm{E\ AND\ F})}{P(\mathrm{F})}$$

Multiplication rule

$$P(\mathrm{E}|\mathrm{F}) = \frac{P(\mathrm{E\ AND\ F})}{P(\mathrm{F})}$$

$$P(\mathrm{E\ AND\ F}) = P(\mathrm{E}|\mathrm{F})P(\mathrm{F})$$

Independence

- We throw two dice. What is the chance of getting 1 in the first die and 4 in the second die?

- If E and F are independent

$$P(\text{E AND F}) = P(\text{E})P(\text{F})$$

Personal probability

- What does it mean when someone says, “I 80% sure that I will win this match?”

- It is Personal probability

  An individual personal assessment of an outcome’s likelihood

Books

- OpenIntro Statistics

  https://www.openintro.org/book/os/

- Introduction to Probability, Charles M. Grinstead, J. Laurie Snell