Why probability needs counting

Lesson 1 · Module 0 — Counting · Probability & Statistics · dailymaths.uk/probstat

Practice problems

1. If you roll a single six-sided die, what is the probability of rolling a number greater than 4?
2. A bag contains 4 red, 5 green, and 11 blue marbles. What is the probability of picking a marble that is NOT blue?
3. You flip a fair coin three times. What is the probability of getting exactly two heads?

Solutions

1. If you roll a single six-sided die, what is the probability of rolling a number greater than 4?

   - Identify the sample space: $S = \{1, 2, 3, 4, 5, 6\}$, so the total number of outcomes is 6.
   - Identify the successful outcomes: the numbers greater than 4 are 5 and 6, so there are 2 successful outcomes.
   - Apply the probability ratio: $P = \frac{2}{6}$.

   Answer: 1/3

2. A bag contains 4 red, 5 green, and 11 blue marbles. What is the probability of picking a marble that is NOT blue?

   - Calculate the total number of marbles: $4 + 5 + 11 = 20$.
   - Identify the successful outcomes (not blue): these are the red and green marbles, so $4+5 = 9$.
   - Apply the probability ratio: $P = \frac{9}{20}$.

   Answer: 0.45

3. You flip a fair coin three times. What is the probability of getting exactly two heads?

   - List the total sample space: $HHH, HHT, HTH, THH, HTT, THT, TTH, TTT$. There are $2^3 = 8$ outcomes.
   - Count the outcomes with exactly two heads: HHT, HTH, THH. There are 3 such outcomes.
   - Apply the probability ratio: $P = \frac{3}{8}$.

   Answer: 0.375
