

DTP-Math-Circle: Session 3—Conditional probability

Sept 30 2022

1 Two-digit primes

What is the probability that

- (a) a given random two-digit natural number is prime ?
- (b) a given random two-digit natural number ending with 7 is prime ?
- (c) a given random two-digit prime number ends with a 7 ?

Let us denote

- A: "a two-digit number is prime"
- B: "a two-digit number ends with 7"

Then calculate the following:

- (d) the probabilities $P(A)$ and $P(B)$
- (e) the probability of A and B, denoted by $P(A,B)$
- (f) the probability of A given B, denoted as $P(A|B)$
- (g) the probability of B given A, denoted as $P(B|A)$

You should notice that

- $P(A|B) = P(A,B)/P(B)$
- $P(B|A) = P(A,B)/P(A)$

These are called conditional probabilities.