

## PROBABILITY

*Problem 1.* What is the probability that a random integer between 1 and 10000 contains 8 in its decimal expansion?

*Problem 2.* Alice tossed a coin 10 times, and Bob tossed a coin 11 times. What is the probability that Bob has had more heads than Alice?

*Problem 3.* A box contains  $n$  white balls and  $m$  black balls. What is the probability that among  $k$  balls drawn randomly out of the box exactly  $r$  are white?

*Problem 4.* There are two boxes containing  $n$  balls each. One keeps drawing balls out of these two boxes randomly (i.e. both a box and a ball are chosen at random) until one box is empty. What is the probability that the other box contains exactly  $k$  balls at this moment?

*Problem 5.* Three hunters saw a fox and shot simultaneously. It is known that each of the hunters hits the target with probability  $1/3$ . What is the probability that the fox is shot?

*Problem 6.* Let  $n$  be a randomly chosen positive integer. What is the probability that the first digit of  $2^n$  is 1?

*Problem 7.* Two people agreed to meet between 10am and 11am on a bridge. Suppose that they come to the bridge at a random time between 10am and 11am, and wait for 10 minutes only. What is the probability that they meet?

*Problem 8.* Let  $A$ ,  $B$  and  $C$  be three random points on a circle. What is the probability that the triangle  $ABC$  is acute?