

## Short Test Probability Theory, February 25, 2022

**Name:**

**Student number:**

Please write your answers on this paper. You may use a simple calculator for this test, but this is not necessary. You don't have to work out powers, fractions, binomial coefficients, products, sums etc.

Your grade is given by  $(2 + \text{number of points})/2$ . Explain your answers carefully!

**Exercise 1** A fair die is tossed five times. Let  $A$  be the event that '4' comes up at least once and let  $B$  be the event that the outcome '2' occurs exactly 3 times.

- (a) [3 points] Compute  $P(A)$ .
- (b) [3 points] Compute  $P(B)$ .
- (c) [6 points] Compute  $P(A \cup B)$ .

**Exercise 2** [6 points] An urn contains 4 red balls and 3 white balls. Take 3 balls from the urn, without replacement and one by one (so with order). Let  $X$  be the total number of white balls obtained and let  $W_1$  be the event that the first ball is white. Compute  $P(W_1 | X = 2)$ .