

Short Test Probability Theory, March 11, 2022 16.30-17.15

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 [9 points] Suppose we flip a fair coin 3 times. Let A be the event that we obtain heads at most once and let B be the event that we obtain heads at least once and tails at least once. Are A and B independent?

Exercise 2 [9 points] We have an urn with 3 red balls and 2 blue balls. We pick a sample of three balls *without replacement* and put these balls in a second urn that was previously empty. Then we sample three balls from the second urn *with replacement*. Let X be the number of blue balls taken from the first urn and let Y be the number of blue balls taken from the second urn. Compute $P(X = 1 | Y = 2)$.