

# Exercise sheet 4

Probability and Statistics, MTH102

1. If a pair of dice are rolled. Let  $X$  denote the sum of the values on the dice. Compute  $E[X]$ .
2. A pair of dice are rolled. Every time at least one of the dice shows up a 6, a person gets 10 points, and every time at least one of the dice shows up a 1, a person 2 points are deducted. Represent this as a random variable  $X$  and compute  $E[X]$ .
3. Let  $X$  denote the the difference between the number of heads and tails when tossing a coin  $n$  times. What are the possible values that the random variable  $X$  can take? If  $n = 4$ , what is the probability mass function?
4. If  $X$  is a random variable that can take the values  $-1, 0$ , or  $1$ . Let  $P(X = -1) = 1/7$ ,  $P(X = 0) = 2/7$ , and  $P(X = 1) = 4/7$ . Let  $Y$  denote the random variable so that  $Y = X^2$ . Compute  $E[Y]$ .
5. A biased coin with probability of head appearing being  $p$  is tossed  $n$  times. Let  $X$  denote the number of times a head appeared. Assume  $E[X^2] = \sum x_i^2 p(x_i)$  and compute  $E[X^2]$