

MATH 55 - WORKSHEET 5 (WEDNESDAY)

- 1 Show that if the random variable X has the geometric distribution with parameter p then $p(X \geq j) = (1 - p)^{j-1}$ for any positive integer j .
- 2 Let X be the number appearing on the first die when two fair dice are rolled and let Y be the sum of the numbers appearing on the two dice. Show that $E(X)E(Y) \neq E(XY)$.
- 3 What is the variance of the number of times a 6 appears when a fair die is rolled 10 times?
- 4 Provide an example that shows that the variance of the sum of two random variables is not necessarily equal to the sum of their variances when the random variables are not independent.

5 When m balls are distributed into n bins uniformly at random, what is the probability that the first bin remains empty?

6 What is the expected number of bins that remain empty when m balls are distributed into n bins uniformly at random?