

# MATH 11: Discussion Week 5

Apr. 2019

Handout and its solution could be found at <https://kimukook.github.io/teaching/math11sp19/>

**Binomial distribution** Suppose you are practicing shooting arrow. The probability of score is  $P(\text{score}) = 0.7$ .

(a) What is the probability that exactly shooting two scores in five attempts?

(b) What is the probability that you have at least scored two times in five attempts?

**Exponential distribution 3.** The life of a certain battery is believed to be given by an exponential distribution and the average life is believed to be 3 years.

(a) What is the probability that a randomly selected battery will last longer than 2 years?

(b) In a pack of 10 batteries, what is the probability at least one of them will last longer than 2 years?

**Continuous random variable** 1. The random variable  $X$  has density

$$f(x) = \begin{cases} kx^2, & \text{if } 0 \leq x \leq 3 \\ 0, & \text{o.w.} \end{cases}$$

(a) Determine the value of  $k$ .

(b) Compute the expected value of  $X$ .

2. Suppose some process is modelled by the probability distribution

$$f(x) = \begin{cases} \cos x, & \text{if } 0 \leq x \leq \frac{\pi}{2} \\ 0, & \text{o.w.} \end{cases}$$

(a) Show that this function meets both requirements of a density function.

(b) What is  $P(X \geq \frac{\pi}{4})$ ?

(c) What is  $P(X = \frac{\pi}{6})$ ?