

(Due Wednesday 10/17/2018 right before class)

&

(Your homework shall be stapled if it contains multiple pages.)

FALL/2018/MA526: HOMEWORK 8

Instructor: Guangqu Zheng¹; Grader: Chessa Mccalla²

Total points: 20.

Note to students: You may want to use the normal table that was distributed in the class. This table is also available on the instructor's teaching webpage.

Q1 (2pt) Look up the normal table and find the value k such that

$$\mathbb{P}(-1.44 < Z < k) = 0.24466,$$

where $Z \sim \mathcal{N}(0,1)$ is a standard normal random variable.

Q2 (6pt) Given a normal distribution with mean 30 and variance 36, find

- (a) the normal curve area to the right of $x = 17$;
- (b) the normal curve area between $x = 32$ and $x = 41$;
- (c) the value of x that has 80% of the normal curve area to the left.

Q3 (4pt) A drug manufacturer claims that a certain drug cures a blood disease, on the average, 80% of the time. To check the claim, government testers use the drug on a sample of 100 individuals and decide to accept the claim if 75 or more are cured.

- (a) What is the probability that the claim will be rejected when the cure probability is, in fact, 0.8?
- (b) What is the probability that the claim will be accepted by the government when the cure probability is as low as 0.7

Keyword: normal approximation, binomial distribution

Q4 (4pt) The life, in years, of a certain type of electrical switch has an exponential distribution with an average life 2 years. If 100 of these switches are installed in different systems, what is the probability that at most 2 fail during the first year?

Q5 (4pt) Let X be a lognormal(0, 100) random variable, that is, X is a positive random variable and $\log X$ is a normal random variable with mean 0 and standard deviation 10. Denote by F the cumulative distributional function of X , then find the following values:

$$F(\log 10) \quad \text{and} \quad F(0).$$

It is enough for you to express the above values in term of the standard normal CDF. If you find their approximate value using the normal table, it will be nice.

¹gzheng90@ku.edu; Office hours: MWF 3:00-3:50; Office = 641 Snow Hall

²chessa_m@ku.edu