

(Due Tuesday 04/16/2019 **right before** the class)

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

**SPRING/2019/MA526: HOMEWORK 9**

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**Total points: 20**

**Q1** (6pt) The lengths of time, in minutes, that 10 patients waited in a doctor's office before receiving treatment were recorded as follows:

5, 12, 9, 5, 10, 15, 6, 10, 7, 10.

Treating the data as a random sample, find (a) the sample mean; (b) the sample median; (c) sample variance.

**Q2** (4pt)(1) Let  $X$  be a random variable with probability mass function

$$f(x) = \begin{cases} 1/3 & x = 1, 2, 3 \\ 0, & elsewhere \end{cases}$$

Find the probability distribution of the random variable  $Y$  given by  $Y = 2X - 1$ .

(2) Suppose  $X$  follows a continuous uniform distribution from 1 to 10. Determine the conditional probability

$$\mathbb{P}(X > 2.5 | X \leq 8).$$

**Q3** (6pt) A coin is tossed 400 times. Use the normal curve approximation to find the probability of obtaining

- (a) between 185 and 210 heads inclusive;
- (b) exactly 205 heads;
- (c) fewer than 176 or more than 227 heads.

**Q4** (4pt) If all possible samples of size 16 are drawn from a normal population with mean equal to 50 and standard deviation equal to 5. Let us denote by  $\mu_0, \sigma_0$  the mean and standard deviation of the sample average  $\bar{X}$  respectively. So what is the probability that a sample mean  $\bar{X}$  will fall in the interval from  $\mu_0 - 1.9\sigma_0$  to  $\mu_0 - 0.4\sigma_0$ .

[Assume that the sample means can be measured to any degree of accuracy. ]

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