Yaşar University

Department of Mathematics

MATH 2240 Probability and Statistics for Engineers

Final Exam 03.09.2021

1. (10) The amount of protein (in grams) for variety of fast-food sandwiches is reported here.

23	30	20	27	44	26	35	20	29	29
25	15	18	27	19	22	12	26	34	15
27	35	26	43	35	14	24	12	23	31
40	35	38	57	22	42	24	21	27	33

a) Construct the following table.

Class Limits	Boundaries	Frequencies	Cumulative Frequencies	Cumulative Relative Frequencies
10-17				
18-25				
26-33				
34-41				
42-49				
50-58				

b) Draw a histogram for the grouped data.

2. (15) A manufacturing firm employs three analytical plans for the design and development of a particular product. For cost reasons, all three are use at varying times. In fact, plans 1, 2, and 3 are used for 30%, 20%, and 50% of the products, respectively. The defect rate is different for three procedures as follows:

$P(D|P_1) = 0.01$ $P(D|P_2) = 0.03$ $P(D|P_3) = 0.02$

where $P(D|P_j)$ is the probability of a defective product, given plan j. If a random product was observed and found to be defective, which plan was most likely used and thus responsible?

3. (10) An LED light bulb has an exponentially distributed life expectancy, with a mean time of 5000 hours. What is the probability a light bulb will:

a) Last more than 4000 hours?

b) The bulb has already lasted 5000 hours. What is the probability it will last more than 8000 hours?

4. (5) 30% of the applicants for a certain position have advanced training in computer programming. Suppose that three jobs requiring advanced programming training are open. Find the probability that third qualified applicant is found on the sixth interview, if the applicants are interviewed sequentially and at random.

5. (15) number of students who belong to the dance company at each of several randomly selected small universities is shown below. Estimate the true population mean size of a university dance company with 99% confidence.

21	25	32	22	28	30	29	30
47	26	35	26	35	26	28	28
32	27	40					

6. (10) A survey of 85 families showed that 36 owned at least one DVD player. Find the 99% confidence interval of the true proportion of families who own at least one DVD player.

7. (10) A bank vice president feels that each savings account customer has, on average, three credit cards. The following distribution represents the number of credit cards people own. Find mean, variance. Is the vice president correct?

Number of cards X	0	1	2	3	4
Probability $P(X)$	0.18	0.44	0.27	0.08	0.03

8. (10) Of a company's mailings 1.5% are returned because of incorrect or incomplete addresses. In a mailing of 200 pieces, find the probability that at least one will be returned.

9. (15) The average number of years a person takes to complete a graduate degree program is 3. The standard deviation is 4 months. Assume the variable is normally distributed. If an individual enrolls in the program, find the probability that it will take
a) More than 4 years to complete the program
b) Less than 3 years to complete the program
c) Between 3.8 and 4.5 years to complete the program