

DEPARTMENT OF STATISTICS AND DEMOGRAPHY

SUPPLEMENTARY EXAMINATION, 2008/9

COURSE TITLE: DESCRIPTIVE STATISTICS

COURSE CODE: ST 132

TIME ALLOWED: TWO (2) HOURS

**INSTRUCTION: ANSWER ANY FOUR QUESTIONS
ALL QUESTIONS CARRY EQUAL MARKS (15 MARKS)**

SPECIAL REQUIREMENTS: SCIENTIFIC CALCULATORS AND STATISTICAL TABLES

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INVIGILATOR**

Question 1

The following data elements represent the amount of time (in seconds) that 30 randomly selected customers spent in line before being served at a bank

(a) Develop a frequency distribution for the above data with a class width of 60 and a lower class limit for the first class of 60. **(7 marks)**

(b) From the frequency distribution in (a), construct a cumulative frequency distribution, relative frequency distribution and a Percent frequency distribution. **(5 marks)**

(c) How many people waited in the line for less than 3.5 minutes? **(3 marks)**

183 121 140 198 199 62 135 60 175 320 110
 185 85 172 235 250 242 193 75 263 295 146
 160 210 165 179 359 220 170 90

Question 2

A student wishes to investigate if the level of noise emanating from a certain firm affects the price of the houses in its proximity. She sampled 10 houses of similar characteristics near the firm and obtained the following data of prices of houses (in thousand rand) and the level of noise in decibel as shown below.

Noise level (dBa)	82	60	60	82	74	72	80	68	62	80
Price (R'000)	560	860	820	640	660	720	600	740	760	640

From the data:

- (a) Calculate the Pearson's correlation coefficient and comment on the result. **(5 marks)**
 (b) Find the least squares regression line. **(7 marks)**
 (c) Estimate the price of a house similar in characteristics to those used with a noise level of 85 dBa. **(3 marks)**

Question 3

(a) Over a long period of time it has been observed that a given marksman can hit a target on a single trial with probability equal to 0.8. Suppose he fires four shots at the target. What is the probability that he will hit the target:

- (i) exactly two times?
- (ii) at least once?

(4+4 marks)

(b) The average number of traffic accidents on a certain section of highway is two per week. Assume that the number of accidents follows a Poisson distribution with an average of two accidents per week.

- (i) Find the probability of no accidents on this section of highway during a 1-week period?
- (ii) Find the probability of at most three accidents on this section of highway during a 1-week period?

(3+4 marks)

Question 4

(a) The life span of an automatic washer is approximately normally distributed, with mean and standard deviation equal to 3.1 and 1.2 years, respectively. If this type of washer is guaranteed for 1 year, what fraction of original sales will require replacement?

(7 marks)

(b) The average length of time required to complete a college achievement test was found to equal 70 minutes, with a standard deviation of 12 minutes. When should the test be terminated if you wish to allow sufficient time for 90% of the students to complete the test? (Assume that the time required to complete the test is normally distributed)

(8 marks)

Question 5

During the inaugural season of Major League Soccer in the United States, the medical teams documented 256 injuries that caused a loss of participation time to the players. The results of this investigation are shown in the table:

Severity	Practice (P)	Game (G)	Total
Minor (A)	66	88	154
Moderate (B)	23	44	67
Major (C)	12	23	35
Total	101	155	256

If one individual is drawn at random from this group of 256 soccer players, find the following probabilities:

- (a) $P(A)$
- (b) $P(G)$
- (c) $P(A \cap G)$
- (d) $P(C|P)$
- (e) $P(G|B)$
- (f) $P(G|C)$
- (g) $P(C \cup P)$
- (h) $P(C \cup G)$

(1+1+1+2+2+2+3+3 marks)

END OF EXAM!!

