

5 - JUN 2023

GD102/DMG102

BINDURA UNIVERSITY OF SCIENCE EDUCATION
DEVELOPMENT STUDIES AND DISASTER MANAGEMENT

DG102: STATISTICS FOR DEVELOPMENT STUDIES

DMG102: STATISTICS FOR DISASTER MANAGEMENT

Time: 3 hours

Candidates may attempt any **THREE** questions. Each question should start on a fresh page.

1. (a) In a computer game, the probability that the player hits the target is 0.4 for each attempt and the result of each attempt is independent of all others. Find:
 - i. The probability that he hits the target for the first time on the fourth attempt [6]
 - ii. The mean number of attempts needed to hit the target [2]
 - iii. The standard deviation of the number of attempts [2]
 - iv. The probability that he takes more than seven attempts to hit the target [3]
- (b) The lengths of metal strips are normally distributed with a mean of 120cm and a standard deviation of 10 cm. find the probability that a strip selected at random has a length:
 - i. Greater than 105cm [3]
 - ii. Within 5cm of the mean [3]

Strips that are shorter than L are rejected. Estimate the value of L , correct to one decimal place, if 9% or all strips are rejected. In a sample of 500 strips, estimate the number having a length over 126cm. [6]

2. The price \$ x of a certain cassette recorder is increased by \$2 every six months. The number of recorders sold during the six months before the next increase is y thousand. The values covering the eight consecutive periods are shown in the table.

x	40	42	44	46	48	50	52	54
y	12.8	11.6	11.3	10.3	10.7	9.1	8.9	9.2

- (a) Plot a scatter diagram for the data. [7]
 - (b) Obtain the regression line of y on x giving values of a and b correct to 3sf. plot this on your scatter diagram. [8]
 - (c) Calculate the product moment coefficient of correlation and interpret it. [8]
 - (d) Estimate the number of recorders sold when the price is \$58 [2]
3. In a survey 50 oranges were noted and recorded in the following table. Each value was given to the nearest gram.

86	101	114	118	87	92	93	116
105	102	97	93	101	111	96	117
100	106	118	101	107	96	101	102
104	92	99	107	98	105	113	100
103	108	92	109	95	100	103	110
113	99	106	116	101	105	86	88
108	92						

- (a) Construct a frequency distribution table using equal class intervals of width 5g and taking the first interval as 85-89. [5]
 - (b) Draw a histogram to illustrate the data and write down the modal class. [10]
 - (c) Draw a stem plot to illustrate the data and write down the modal class. [4]
 - (d) Calculate the mean, variance and standard deviation. [2,2,2]
4. (a) A continuous random variable X has a probability density function f given by:

$$f(x) = kx^2 \quad 0 \leq x \leq 4$$

- i. Find the value of k , and sketch $y = f(x)$ [5]

- ii. Calculate the mean and variance of X [5]
iii. c) Find $P(1 < X < 2)$ [3]
- (b) In an investigation into eye color and left- or right handedness the following results were obtained:

		Handedness	
		Left	Left
Eye Color	Blue	15	85
	Brown	20	80

Is there evidence, at 5% level, of an association between eye color and left or right handedness? [12]

END OF EXAM