

UNIVERSITY OF SWAZILAND

MAIN EXAMINATION PAPER 2012

TITLE OF PAPER : DESCRIPTIVE STATISTICS

COURSE CODE : ST 132

TIME ALLOWED : TWO (2) HOURS

REQUIREMENTS : CALCULATOR

INSTRUCTIONS : THIS PAPER HAS FIVE (5) QUESTIONS AND TWO SECTIONS. ANSWER ALL QUESTIONS IN SECTION ONE, ANY THREE (3) QUESTIONS IN SECTION TWO

SECTION ONE
(ANSWER ALL QUESTIONS)

Question 1

[10 marks, 1 mark each]

Fill in the dashes with one of the following (i) *parameter*, (ii) *census*, (iii) *sample*, (iv) *population*, (v) *statistic*, (vi) *nominal*, (vii) *standard deviation*, (viii) *ratio*, (ix) *histogram*, (x) *qualitative variable(s)*, (xi) *quantitative variable(s)*, (xii) *discrete variable(s)*, (xiii) *continuous variable(s)*, (xiv) *skewed*, (xv) *frequency distribution*.

- (a) A distribution of data is if it is not symmetric and extends to one side more than the other.
- (b) A is a descriptive measure of a sample.
- (c) Income is an example of a type variable.
- (d) The of a set of sample values is a measure of variation of the values about the mean.
- (e) allows for classification of individuals based on some characteristic.
- (f) A is the complete collection of all elements to be studied.
- (g) A is a list of all individuals in a population along with certain characteristics of each individual.
- (h) provide numerical measures of individuals.
- (i) A is a quantitative variable that has either a finite number of possible values or countable number of possible values.
- (j) A is a descriptive measure of a population.

SECTION TWO
(ANSWER ANY THREE QUESTIONS)

Question 2

[30 marks, 8+4+2+7+4+5]

- (a) The following are the daily numbers of cars rented by a car rental company in 90 business days.

Car rentals	Number of days
20-24	3
25-29	10
30-34	21
35-39	28
40-44	14
45-49	9
50-54	5

- (i) Calculate the coefficient of skewness.
(ii) Estimate the quartile deviation.
- (b) The following table shows the number of guests registered weekly at a health spa and the weekly wage expense for general maintenance workers of the spa's buildings and grounds during the eight-week period.

Week	Number of guests (in hundreds)	Weekly wage expense (in thousands of Emalangeni)
1	3.2	6.8
2	2.9	7.0
3	3.7	7.1
4	2.5	7.8
5	3.3	6.3
6	2.7	7.6
7	2.9	5.8
8	3.4	7.2

You can use these given results: $\sum x^2 = 76.74$, $\sum y^2 = 389.42$, $\sum xy = 170.44$

- (i) Identify the dependent variable (y) and the independent variable (x).
(ii) Determine the regression equation. Interpret the regression coefficients.
(iii) Estimate the weekly wage expense if there were 300 guests.
(iv) Compute the coefficient of determination and interpret its value.

Question 3

[30 marks, 16+4+4+6]

- (a) Following are quarterly data showing the operating revenues from international operations of air passenger carriers in millions of Emalangeni for four recent years.

Year	Quarter			
	I	II	III	IV
2007		1354	1673	1414
2008	1449	1603	1992	1574
2009	1329	1627	1932	1501
2010	1366	1601		

- (i) Deseasonalise the data.
(ii) What do the deseasonalized data show about the number of visitors to the park.
- (b) For a certain data set with $n = 8$ observations $\sum_i x_i = 55.6$ and $\sum_i x_i^2 = 389.42$. Compute the coefficient of variation.
- (c) The consumer price index for medical services had percentage changes 4.5 percent, 3.5 percent, 2.8 percent, and 3.2 percent for the years 2005-2008. Find the average percentage change in prices for medical services over this time period.

Question 4

[30 marks, 8+3+3+6+5+5]

- (a) Consider the basic food items in the following table, with their unit price and per capita annual consumption:

Food Items	Unit price (in Emalangeni)		Consumption	
	2008	2009	2008	2009
Milk (litres)	7.29	7.89	117	98
Bread (loaves)	4.25	4.45	56	64
Sugar (kg)	2.19	2.45	28	20
Maize meal (kg)	5.59	5.25	58	64

- (i) Compute the Paasche's price and consumption indices and interpret them.
(ii) Which food item showed the largest price change from 2008 to 2009?
(iii) Which food item showed the largest consumption change from 2008 to 2009?
- (b) For the months of January through December of 2010, a departmental store has sales of 179, 166, 231, 244, 244, 243, 222, 302, 263, 273, 321, and 536 thousands of Emalangeni. Construct a monthly index of these sales using May 2010 as the base month.
- (c) A dealer invests SZL5000 in a certain stock at a price of SZL10.00 per share, SZL2500 at SZL12.50 per share, and SZL2500 at SZL8.00 per share. Determine the average price per share of his portfolio.
- (d) During a month 12 agents of Takitsi Real Estate firm sold an average of $6\frac{1}{2}$ single-family homes, the 6 agents of Lulata Properties sold an average of 4 single-family homes, and the 2 agents of Rest Easy Homes sold an average of 6 single-family homes. What was the overall average of single family homes sold by these agents during the month.

Question 5

[30 marks, 2+6+4+4+4+4+6]

- (a) A random sample of 350 inexpensive electronic toys which are produced in Hong Kong, Japan and Korea are examined by an importer in Swaziland to determine the quality of the toys, with the following results

Quality	Geographic location		
	Hong Kong	Japan	Korea
Acceptable ^a	104	64	74
Imperfect, but saleable	29	17	24
Defective	16	10	7

^aSaleable

You must define the respective event(s) in each case and must use one of the probability rules to compute the following probabilities:

- (i) What is the probability of selecting a toy to examine and finding it is defective?
 - (ii) What is the probability of selecting a toy to examine and finding the toy to be produced in Japan and it is saleable?
 - (iii) Two toys are selected for examination. What is the probability that both are imperfect?
 - (iv) What is the probability of selecting a toy from Hong Kong or the toy is defective?
 - (v) Given that a toy from Korea is selected for examination, what is the probability it is imperfect but saleable?
- (b) The following are the numbers of private trucks which used the Mahamba Border post on 15 consecutive days: 85, 74, 67, 77, 71, 79, 82, 93, 73, 64, 77, 72, 70, 90, and 69.
- (i) Construct a stem and leaf diagram of the data.
 - (ii) Compute the third decile and 55th percentile.