Candidate Name	Centre Number	Candidate Number

ZIMSEC
For Performance Measurement

ZIMBABWE SCHOOL EXAMINATIONS COUNCIL

General Certificate of Education Ordinary Level

STATISTICS 4073/1

PAPER 1

SPECIMEN PAPER 2 hours 30 minutes

Candidates answer on the question paper
Additional materials: Electronic calculator
Mathematical Set

Allow candidates 5 minutes to count pages before the examination.

This booklet should not be punched or stapled and pages should not be removed.

TIME 2 hours 30 minutes

INSTRUCTIONS TO CANDIDATES

Write your name, Centre number and candidate number in the spaces at the top.
Write your centre and candidate number in the boxes on the top right corner of every page of this paper.
Check if the booklet has all the pages and ask the invigilator for a replacement if there are duplicate or missing pages.

Answer **all** questions.
Write your answers in the spaces provided on the question paper.
If working is needed for any question it must be shown in the space below that question.
Omission of essential working will result in loss of marks. Decimal answers which are not exact should be given to three significant figures unless stated otherwise.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets [ ] at the end of each question.

This specimen paper consists of 16 printed pages.

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Answer all questions

1 Below is a set of numbers;

0 3 1 2 3 1 2 0 0 1

2 3 2 1 0 0 1 4 1 4

Complete the table using the tally system.

number	**tally**
0	
1	
2	
3	
4	

[3]

2 Define the following statistical terms:

(a) estimation,

_____

_____ [1]

(b) percentile,

_____

_____ [1]

(c) randomness.

_____

_____ [1]

3 Round off 0,003 265 7 correct to the specified degree of accuracy.

(a) two decimal places_____

(b) one significant figure_____

(c) nearest whole number_____ [3]

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4 **(a)** Define **convenient sampling**.

_____

_____ [1]

(b) Give any **two** advantages of using the **convenient sampling** method over other sampling methods.

1._____

_____

2._____

_____ [2]

5 Determine whether the following examples are discrete or continuous variables.

example	**variable**
age (at last birthday)	
speed	
capacity	
fools' day	

[4]

6 Consider the following table showing the marks obtained by a student in six consecutive tests.

test	1	2	3	4	5	6
mark	8	7	11	15	13	16

(a) Calculate the 3-point Moving Averages, correct to 1 decimal place.

_____ [3]

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(b) State **one** disadvantage of using the Moving Average method as a way of smoothening a time series.

_____

_____ [1]

7 Given the measurements, $300\ m + 40\ m$, calculate the

(a) absolute error,

_____ [2]

(b) relative error.

_____ [2]

8 **(a)** The degree of linear relationship between two variables is statistically known as _____. [1]

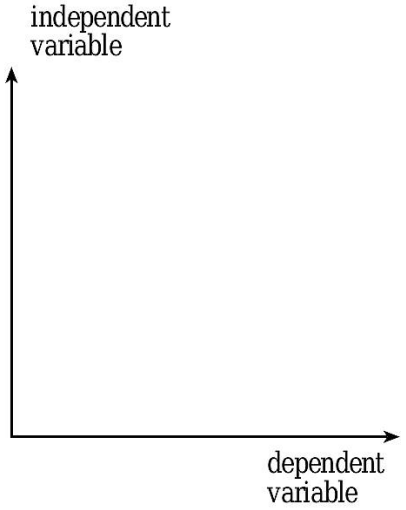
(b) When the value of the dependant variable increases as the value of the independent variable also increases, there is a _____ linear relationship. [1]

(c) When the dependent variable decreases as the independent variable increases there is a _____ linear relationship. [1]

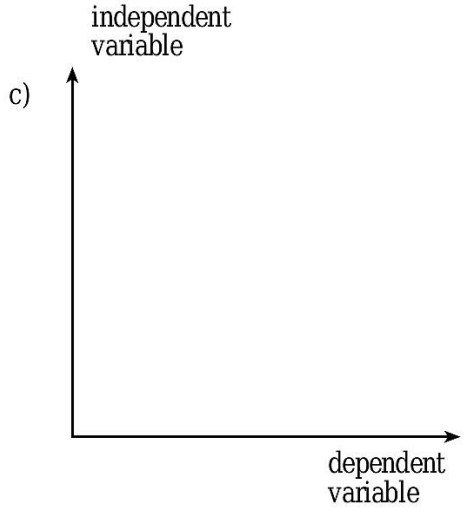
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(d) Using the descriptions in (b) and (c), sketch graphs on the axes provided to show the linear relationships.

b)



c)



[2]

9 In 2009 the costs of 2 litres cooking oil, a 10 kg bag of mealie meal and a 2 kg packet of sugar were \$3, \$5,50 and \$2, respectively. In 2017 the costs changed to \$3,50, \$6,10 and \$1,80, respectively.

(a) Calculate, correct to 3 significant figures, the Simple Aggregate Cost Index for the commodities using 2009 as the base year.

_____ [3]

(b) Comment on your results in **(a).**

_____

_____ [1]

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(c) State **one** disadvantage of using the Simple Aggregate Cost Index.

_____

_____ [1]

10 **(a)** State any **two** methods used to collect data.

1._____

2._____ [2]

(b) Give any **three** rules which should be observed when drafting a questionnaire.

1._____

_____

2._____

_____

3._____

_____ [3]

11 A book shelf contains 4 graph books, 6 squared and 10 writing exercise books. Two books are taken at random from the shelf without replacement.

Giving the answer as a fraction in its lowest terms, calculate the probability that

(a) both are graph books,

_____ [2]

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(b) one is squared and the other is a writing exercise book.

_____ [3]

12 The following table shows the distribution of breakdowns of vehicles on a section of a road during a certain month.

number of breakdowns (*x*)	0	1	2	3	4
number of days (*f*)	1	8	6	7	3

Calculate, giving answers correct to 1 decimal place, the

(a) mean number of breakdowns per day,

[2]

(b) standard deviation of the breakdowns.

_____ [4]

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13 The following table shows the masses of Statistics students at a certain college.

mass (m) kg	**frequency**
$m \leq 20$	2
$20 < m \leq 30$	8
$30 < m \leq 40$	7
$40 < m \leq 50$	12
$50 < m \leq 60$	18
$60 < m \leq 70$	10
$70 < m \leq 80$	7

(a) Construct a cumulative frequency table for the data.

[3]

(b) Calculate an estimate of the median, correct to one decimal place.

[3]

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14 The mean and standard deviation of a set of numbers are p and q respectively. Give an expression, in terms of p and/or q, of the new mean and standard deviation when

(a) each number is decreased by a constant k,

mean_____

standard deviation_____ [2]

(b) each number is divided by 3,

mean_____

standard deviation_____ [2]

(c) each number is repeated.

mean_____

standard deviation_____ [2]

15 The following table shows the probability density function of a discrete random variable X.

X	-6	-4	-2	0	2	4	6
$P(X = n)$	$\frac{1}{16}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{8}$	$\frac{1}{16}$	d

(a) Calculate the value of d.

_____ [2]

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(b) Hence find E(X).

_____ [2]

(c) Find Var(X).

_____ [3]

16 Two variables X and Y are such that the mean point $(\bar{x};\bar{y}) = (35;45)$ and the two semi-averages are (12;22) and (60;70). X and Y are related by the equation of the form $y = \boldsymbol{m}x + \boldsymbol{c}$.

(a) Find the values of $\boldsymbol{m}$ and $\boldsymbol{c}$.

[4]

(b) Hence write down the equation of the line of best fit.

_____ [1]

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(c) Use the equation in **(b)** to estimate the corresponding y-value when the x-value is 85

_____ [2]

17 The following table gives the amount spent by five students during an educational tour.

name	Grace	Peter	Wilson	Pretty	Tinotenda
amount ($)	16	24	12	30	8

(a) Given that the data has to be presented on a pie chart, calculate the sector angles for each student's expenditure.

Grace _____

Peter _____

Wilson _____

Pretty _____

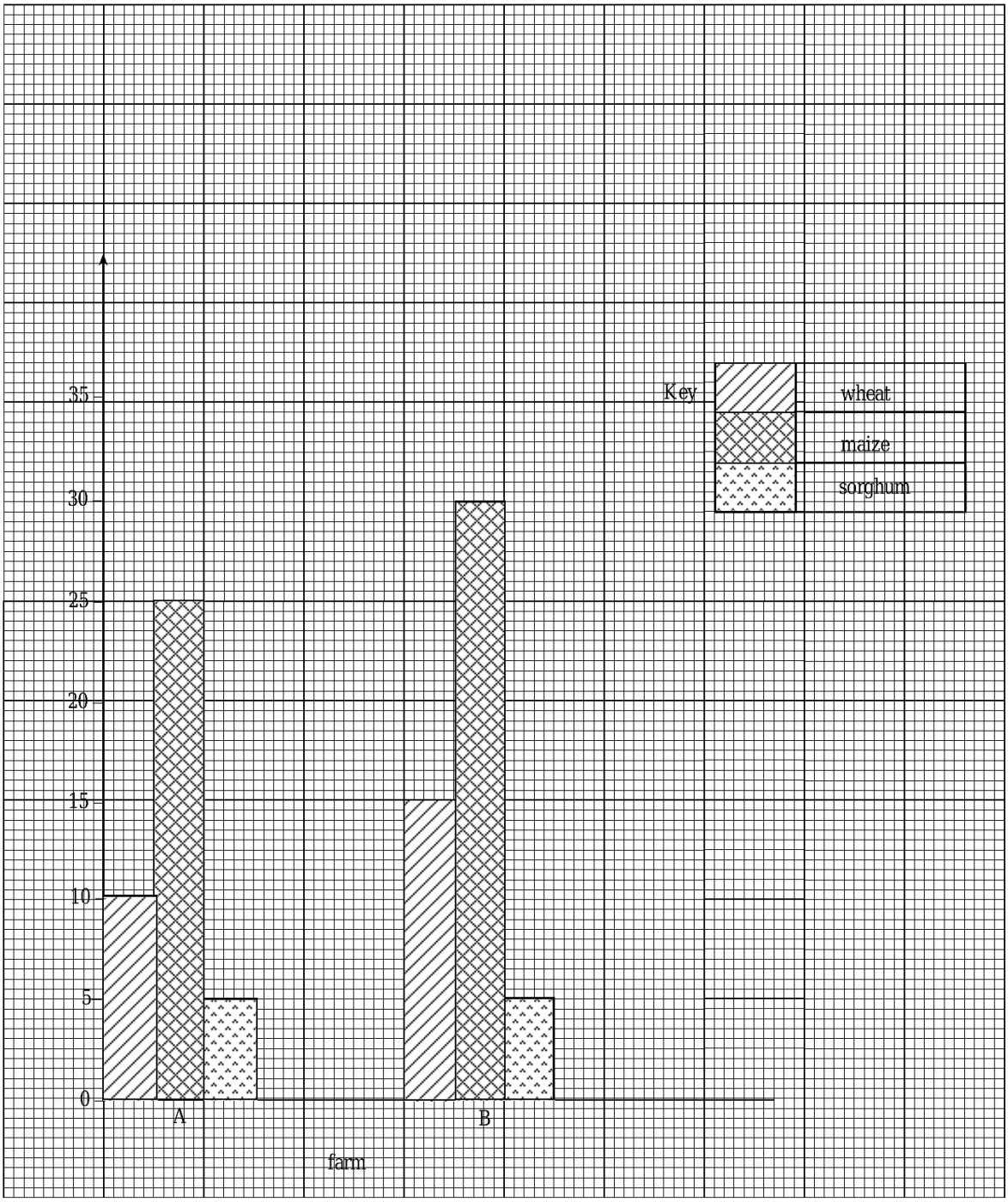
Tinotenda _____ [3]

(b) Hence draw a pie chart of radius 4cm to represent the data.

[4]

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18 The bar chart shows crop production in tonnes for the 2016-2017 farming season obtained at two farms, A and B.



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(a) Write down the special name given to the bar chart.

_____ [1]

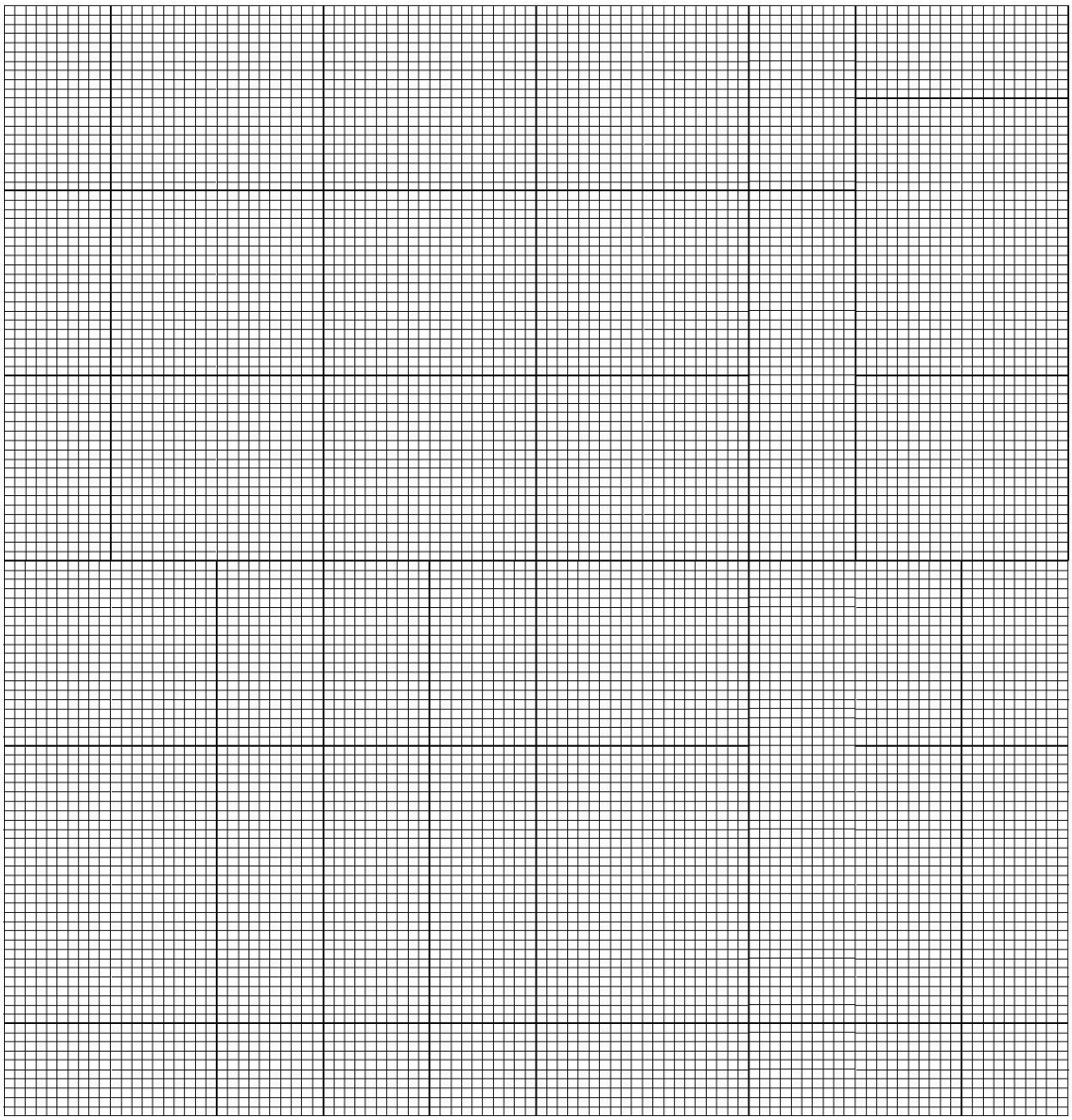
(b) The following table shows the crop production, in tonnes, at the two farms.

crop	**crop production (tonnes)**	
	farm A	**farm B**
wheat		
maize		
sorghum		

Use the bar chart to fill in the table, indicating the number of tonnes for each crop produced at the two farms. [3]

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(c) Hence, construct a percentage bar chart to represent the crop production for farm B only. Use a vertical scale of 2 cm to represent 10%.



[4]

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19 The following data gives a summary of a survey done on a particular city.

age (years)	population	deaths	ASDR	standard population
0-20	17 000	200	11,8	32%
21-30	35 000	*a*	20	19%
31-55	49 000	640	13.1	42%
56+	6 000	90	*b*	7%

(a) Find the missing values *a* and *b*.

_____ [3]

(b) Calculate the crude death rate,

_____ [2]

(c) Calculate the standardised death rate.

_____ [3]

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(d) Comment on the results in **(b)** and **(c).**

_____

_____ [1]

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