

The
Management
University
of Africa



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UNDERGRADUATE UNIVERSITY EXAMINATIONS

SCHOOL OF EDUCATION (SOE)

DEGREE OF BACHELOR OF EDUCATION ARTS

MTH 434: TEST OF HYPOTHESIS

DATE: 4TH AUGUST 2026

DURATION: 2 HOURS

MAXIMUM MARKS: 70

INSTRUCTIONS:

1. Write your registration number on the answer booklet.
2. **DO NOT** write on this question paper.
3. This paper contains **SIX (6)** questions.
4. Question **ONE** is compulsory.
5. Answer any other **THREE** questions.
6. Question **ONE** carries **25 MARKS** and the rest carry **15 MARKS** each.
7. **Write all your answers in the Examination answer booklet provided**

QUESTION ONE

- a) A factory claims that the average battery life is 60 hours. A sample of 46 batteries has a mean of 57 hours. Population standard deviation is 9 hours. Test at 5 % significance level

(6 marks)

- b) In a survey 200 men interviewed, 120 liked a product while 300 women interviewed, liked the product. Test whether the proportions are significantly different at 5% significance level

(8 marks)

- c) Find the Pearson's correlation coefficient for the data in the table below

X	40	50	38	60	65	50	35
Y	38	60	55	70	60	48	30

(8**marks)**

- d) Demonstrate the types of alternative hypotheses

(3 marks)**QUESTION TWO**

- a) A teacher claims learners performance score on average is 75 marks.

A sample of 10 learners gives mean of 72 and standard deviation of 6.

Test at 5 % significance level

(5 marks)

- b) A manufacturing farm claims employees produce at least 50 items every day. A random sample of 49 has a mean number of 47 and the sample standard deviation is 7. Test at 1% significance level

(5 marks)

- c) A factory claims that 60% of customers like its product. A sample of 400 customers indicates 220 like it. Test at 1% significance level using the p-value method

(5 marks)

QUESTION THREE

- a) A shop seller claimed that the weight of coffee packets is 500 g on average. It was found that a sample of 64 packets gave a mean weight of 495 g and standard deviation was 16 g. Test at 5 % significance level whether the claim is true

(7 marks)

- b) A factory has two production machines. Machine A with sample size of 120 and a variance of 64 and Machine B with a sample size of 100 and a variance of 49. Test whether the variances differ significantly at 5 %

(8 marks)

QUESTION FOUR

Two groups of learners were taught using different methods. Test whether the variances differ significantly at 5 %

Group A	12	15	14	10	13	16	11	15
Group B	9	11	10	8	12	9	10	11

(15 marks)**QUESTION FIVE**

a) Calculate the Spearman's Rank correlation coefficient of the data in the table below

x	1	1	1	2	1	14	1	1	2	1	2
	2	5	3	0	5		9	3	1	8	0
y	2	2	1	1	2	17	2	1	2	2	2
	5	1	5	8	0		0	6	0	2	1

(7**marks)**

b) Suppose regression sum of squares is 500, error sum of squares is 200, number of predictors is 4 and sample size is 25, compute F

(8 marks)**QUESTION SIX**

a) Suppose Mr. Jones a teacher in Kathari Secondary school wants to know whether a training program improved learner scores as shown in the data below.

Learner	A	B	C	D	E	F	G	H
Before	50	48	60	55	52	49	58	61

After	55	46	65	58	50	54	60	59

Test whether the median difference between paired observations is zero, at 5% significance level.

(7 Marks)

b) A researcher studies whether education type influences product preference of product a and B as shown in the data below.

Education type	Product A	Product B
Formal	40	20
Non formal	30	10
Total	70	30

Compute Chi Square Test of independence at 5% significance level.

(8 marks)

MTH 434: TEST OF HYPOTHESIS TABLES AND FORMULAE

Tables and Formulae

1) Test statistic for proportions, $Z = \frac{\hat{p} - p}{\sqrt{\frac{pq}{n}}}$

2) Test statistic for mean, $Z = \frac{\bar{x} - \mu}{\frac{\sigma}{\sqrt{n}}}$

3) Hypothesis Test about population mean, $t = \frac{\bar{x} - \mu_0}{\frac{s}{\sqrt{n}}}$

4) Hypothesis Test about large proportions, $Z = \frac{p - p_0}{\sqrt{\frac{p_0(1-p_0)}{n}}}$

- 5) Test value for large sample test, $Z = \frac{(\overline{x_1 - x_2}) - (\mu_1 - \mu_2)}{\sqrt{\frac{\delta_1^2}{n_1} + \frac{\delta_2^2}{n_2}}}$
- 6) Test for dependent samples, $t = \frac{\overline{D} - \mu_D}{\frac{s_D}{\sqrt{n}}}$ with $df = n-1$, $\overline{D} = \frac{\sum D}{n}$
 and $SD = \sqrt{\frac{n \sum D^2 - (\sum D)^2}{n(n-1)}}$
- 7) Test for comparing two proportions, $Z = \frac{(\widehat{p_1} - \widehat{p_2}) - (p_1 - p_2)}{\sqrt{\overline{p}\overline{q}\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}}$ where
 $\overline{p} = \frac{x_1 + x_2}{n_1 + n_2}$, $\widehat{p_1} = \frac{x_1}{n_1}$, $\widehat{p_2} = \frac{x_2}{n_2}$, $\overline{q} = 1 - \overline{p}$
- 8) Test value in the sign Test, $z = \frac{x + 0.5 - \left(\frac{n}{2}\right)}{\sqrt{\frac{n}{2}}}$, where x = smaller
 number of positive or negative signs and n = sample size
- 9) $R_k = 1 - \frac{6 \sum D^2}{N(N^2 - 1)}$, Where r_k = rank correlation
- 10) a) Regression coefficient of x on y , $b_{xy} = \frac{N \sum XY - \sum X \sum Y}{N \sum Y^2 - (\sum Y)^2}$,
 Regression equation of x on y , $X - \overline{X} = b_{xy}(Y - \overline{Y})$
- b) Regression equation of x on y , $Y - \overline{Y} = b_{yx}(X - \overline{X})$ Regression
 coefficient of y on x , $b_{yx} = \frac{N \sum XY - \sum X \sum Y}{N \sum X^2 - (\sum X)^2}$

Two-tailed test	Right-tailed test	Left-tailed test
H0: $\mu = k$ H1: $\neq K$	H0: $\mu =$	H0: $\mu = k$ H1: $< K$

	k $H_1:$ $> K$	
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Note: Provide/attach graph papers (2)