

The
Management
University
of Africa



Sponsored by the Kenya Institute of Management

UNDERGRADUATE UNIVERSITY EXAMINATIONS

SCHOOL OF EDUCATION (SOE)

DEGREE OF BACHELOR OF EDUCATION ARTS

MTH 225: ANALYTICAL GEOMETRY

DATE: 27TH JULY 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) Given that the end points of a line segment DE are located at D (- 8, -4) and E (-5, -12), determine the equation of the line that is the perpendicular bisector of DE **(5 marks)**
- b) Sketch the graph of a circle represented by the equation $x^2 + y^2 - 2x - 4y - 4 = 0$. Clearly label the centre, radius, end points of horizontal diameter and vertical diameter **(8 marks)**
- c) Sketch the graph and describe the characteristics of the relation whose equation is $y = x^2 - 8x + 15$ **(7 marks)**
- d) Sketch the graph of the relation $25x^2 + 36y^2 = 900$ **(5 marks)**

QUESTION TWO

- a) Find the slope – intercept form of an equation for the line that passes through (-3, -7) and parallel to the graph of $-x - 5y = 9$ **(4 marks)**
- b) Find the equation for the line that passes through (-1, -2) and (4,1) **(3 marks)**
- c) A quadrilateral ABCD has vertices A (4, 7), B (6, 5) C (4, 1) and D (2, 5). Prove that this quadrilateral is a kite by calculation **(8 marks)**

QUESTION THREE

- a) Find the centre and radius of the circle that passes through the points (1, 1), (2, 4) and (5, 3) **(8 marks)**
- b) Sketch the graph and describe the characteristics of the relation whose equation is $x = y^2 + 8y + 15$ **(7 marks)**

QUESTION FOUR

a) Sketch the graph of the equation of the ellipse given by $4x^2 + 9y^2 - 16x + 36y - 92 = 0$

(9 marks)

b) Find the equation of the ellipse that has foci at (0, -2) and (0, 2) with the minor axis 6 units in length

(6 marks)

QUESTION FIVE

a) Sketch the graph of the equation of the hyperbola given by $9y^2 - x^2 + 54y + 4x + 68 = 0$

(8 marks)

b) For the hyperbola defined by $7x^2 - 9y^2 - 14x + 72y - 200 = 0$, find the coordinates of the centre and vertices

(7 marks)

QUESTION SIX

a) Find the eccentricity of the ellipse for the given equation $9x^2 + 25y^2 = 225$ **(7marks)**

b) Find the length and equation of the latus rectum of the hyperbola

$9x^2 - 16y^2 - 90x + 64y + 17 = 0$ **(8 marks)**