



KENYATTA UNIVERSITY

UNIVERSITY EXAMINATIONS 2008/2009

INSTITUTE OF OPEN LEARNING

EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE

SMA 103 : ANALYTIC GEOMETRY

DATE: TUESDAY 16TH FEBRUARY 2010

TIME: 2.00 P.M. – 4.00 P.M.

INSTRUCTIONS

Answer Question ONE and any other TWO Questions.

1.
 - a) Show that line segments joining A(-5, 3), B(6, 0) and C(5,5) form a right triangle. (5 marks)
 - b) Find the equation of the circle where the points (3, 8) and (-3, 0) are the ends of a diameter. (4 marks)
 - c) Find the vertex, focus and the equation of the directrix of the parabola $8y = 12 - 4x + x^2$. (6 marks)
 - d) Determine the equation of the ellipse with vertices at (1, 5) and (1, -1), and foci at (1, 4) and (1, 0). (7 marks)
 - e) Find the equation of the hyperbola with asymptotes $x-y=-1$ and $x+y = -3$ and vertex (3, -1) (4 marks)
 - f) Find the rectangular equation of each of the given equations
 - i) $r \cos \theta = 4$ (2 marks)
 - ii) $r^2 = 16 \cos 2\theta$ (2 marks)
2.
 - a) Find an equation of the line with slope 2 and tangent to the circle of radius 5 with centre at the origin. (6 marks)
 - b) Show that the two circles $x^2 + y^2 - 3x + 2y - 3 = 0$ and $x^2 + y^2 + 2x + y + 1 = 0$ are orthogonal. (8 marks)

- c) Find the length of a tangent to the circle
 $(x - 2)^2 + (y - 4)^2 = 7$ from (7, 9). (6 marks)
3. a) Find the equation of the parabola with vertex (-2, -4) and directrix $x = 3$. (6 marks)
- b) Reduce the following equation of a parabola to standard form; write the coordinates of vertex and focus; write the equations of directrix and axis; hence sketch its graph. $x^2 - 3y + 3 = 0$ (8 marks)
- c) Find the equation of the tangent to $(y - 2)^2 = -3(x + 1)$ with slope $1/2$. (3 marks)
4. a) Find the coordinates of the vertices foci and centre, equations of the directions of the ellipse.
 $9x^2 - 90x + 25y^2 - 150y + 225 = 0$ (11 marks)
- b) Find the equation of the ellipse with foci at (-2, 1) and (4, 1), and a major axis of 10. (7 marks)
- c) Write the following equation $x^2 + y^2 = 16$ in polar coordinates. (2 marks)
5. a) Find the equation of the hyperbola with foci at (1, 2) and (11, 2) with a transverse axis of 8. (9 marks)
- b) Find the centre, foci, vertices, equations of asymptotes, directrices of the hyperbola
 $2x^2 - y^2 - 4x - 4y - 4 = 0$
Hence sketch its graph. (11 marks)