



*(Knowledge for Development)*

**KIBABII UNIVERSITY**  
**UNIVERSITY EXAMINATIONS**  
**2019/2020 ACADEMIC YEAR**  
**FIRST YEAR SECOND SEMESTER**  
**SPECIAL/SUPPLEMENTARY EXAMINATION**  
**FOR THE DIPLOMA IN EDUCATION**  
**MATHEMATICS**

**COURSE CODE:** EDM 109

**COURSE TITLE:** GRAPHS OF BASIC CURVES AND POLAR  
COORDINATES

**DATE:** 05/02/2021

**TIME:** 2 PM -4 PM

---

**INSTRUCTIONS TO CANDIDATES**

Answer Question One and Any other TWO Questions

TIME: 2 Hours

This Paper Consists of 2 Printed Pages. Please Turn Over.

**Question One (20 Marks)**

- a) Draw the graph of the function  $y=x^2+4x-5$  for  $-7 \leq x \leq 3$ . Use the graph to solve the equation  $x^2+4x-5=0$ . (6 marks)
- b) Find the center of the hyperbola  $3y^2-4x^2-16-8x=0$ . (5 marks)
- c) Convert  $P(4,9)$  to polar coordinates. (5 marks)
- d) Complete the table below on conic sections and eccentricity (e). (4 marks)

Eccentricity	Conic section
$e=0$	
$0 < e < 1$	
$e=1$	
	Hyperbola

**QUESTION TWO (20 Marks)**

- a) Graph  $r = \frac{2}{4 - \cos \theta}$  (10 marks)
- b) Prove that the equation  $4x^2+y^2-8x+2y+1=0$  represents an ellipse. Find its eccentricity and foci. (10 marks)

**QUESTION THREE (20 Marks)**

- a) Calculate the coordinates of foci of the hyperbola  $(x+3)^2/16 - (y-2)^2/9 = 1$  (10 marks)
- b) Express  $4x^2-y^2-24x-4y+28=0$  in standard form hence compute the coordinates of foci of the parabola (10 marks)

**QUESTION FOUR (20 Marks)**

- a) Draw the graph of  $y = 2x^3+x^2-5x+2$  for the interval  $-3 \leq x \leq 3$ . By drawing a suitable straight line using the same axes, solve  $2x^3+x^2-5x+2=6x+12$  (10 marks)
- b) Draw the graph of  $y = (3x+1)(2x-5)$  for the domain  $-1 \leq x \leq 4$ . Use your graph to solve  $6x^2-19x-9=0$  (10 marks)

**QUESTION FIVE (20 Marks)**

Graph the following standard polar curves

- a)  $r = 3 \cos \theta$  (5 marks)
- b)  $r = 2 + 2 \sin \theta$  (5 marks)
- c)  $r = \cos 3 \theta$  (5 marks)
- d)  $r = \sin 2 \theta$  (5 marks)