

**KABARAK UNIVERSITY**

**UNIVERSITY EXAMINATIONS**

**MAIN CAMPUS**

**SECOND SEMESTER, 2020/2021 ACADEMIC YEAR**

**EXAMINATION FOR THE DEGREE OF BACHELOR OF COMPUTER SCIENCE**

**MATH 113: CALCULUS 1**

**STREAM: Y1S1 TIME:**

**EXAMINATION SESSION: JAN-APRIL DATE:**

**INSTRUCTIONS TO CANDIDATES**

1. **Answer Question 1 and any other two questions in the answer booklet provided.**
2. **Do not write on your question papers. All rough work should be done in your answer booklet.**
3. **Clearly indicate which question you are answering.**
4. **Write neatly and legibly.**
5. **Edit your work for language and grammar errors.**
6. **Follow all the instructions in the answer booklet**

**SECTION A: (COMPULSORY) TOTAL MARKS FOR THIS SECTION IS 30.**

**QUESTION ONE (30 MARKS)**

1. Differentiate from first principles 

[3Marks]

1. If  find 

[2Marks]

1. Differentiate: 

[3Marks]

1. Evaluate 

[3Marks]

1. Find the derivative of: 

[3Marks]

1. If f (t) = 4 ln t + 2, evaluate  when t = 0.25

[3Marks]

1. Find the equation of the tangent to the curve  at the point (1, −2)

[3Marks]

1. The parametric equations of a function are given by . Determine expressions for 

[6Marks]

1. Evaluate when x = −1 given

[4Marks]

**QUESTION TWO (20 MARKS)**

1. Determine the gradient of the curve  at the point

[5Marks]

1. Find the maximum and minimum values of the curve  by (a) examining the gradient on either side of the turningpoints, and (b) determining the sign of the second derivative

[10Marks]

1. Determine 

[5Marks]

**QUESTION THREE (20 MARKS)**

1. Differentiate the following with respect to the variable:

[4Marks]



1. The distance x metres moved by a car in a time t seconds is given by:. Determine the velocity and acceleration when (a) t = 0, and (b) t = 1.5 s

[6Marks]

1. Examine the continuity of  at 

[6Marks]

1. Given x = 5θ − 1 and y = 2θ(θ − 1), determine  in terms of θ

[4Marks]

**QUESTION FOUR (20 MARKS)**

1. Find the differential coefficient of: 

[4Marks]

1. Determine the differential coefficient of:

[4Marks]

1. Differentiate  with respect to x using logarithmic differentiation and evalualte  when x = 3.

[6Marks]

1. Determine  and  for the fnction 

[6Marks]

**QUESTION FIVE (20 MARKS)**

1. Differentiate: 

[6Marks]

1. Show that the differential equation  is satisfied when

[6Marks]

1. Find the diameter and height of a cylinder of maximum volume which can be cut from a sphere of radius 12 cm