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**University Examinations 2015/2016**

FIRST YEAR FIRST SEMESTER EXAMINATION FOR CERTIFICATE IN BRIDGING MATHEMATICS

**SMA 0003: CALCULUS AND MATRICES**

 **DATE: AUGUST 2016 TIME: 11/2 HOURS**

**INSTRUCTIONS:** *Answer question* ***one*** *and any other* ***three*** *questions*

**QUESTION ONE (30MARKS)**

1. Given that list the members of the following sets:-
2.  (2 Marks)
3.  (2 Marks)
4. If find and simplify, where  (3 Marks)
5. Find the inverse of the function:  (3 Marks)
6. Given that and . Find$ fgh$ and  (3 Marks)
7. Evaluate the limit

 (3 Marks)

1. Find the derivative of the function:

 (3 Marks)

1. Find the equation of the tangent to the curve at the point (2,4), given that the equation of the curve is  (3 Marks)
2. Evaluate the integral

 (3 Marks)

1. For the equation of the curve given by find the turning points and state their nature. (3 Marks)
2. Given that and find A+B. (2 Marks)

**QUESTION TWO (10MARKS)**

1. Given that P is a set of whole numbers less than ten and Q is a set of even numbers less than twelve. Write down the members of the following sets:
2. P (1 Mark)
3. Q (1 Mark)
4.  (1 Mark)
5.  (1 Mark)
6. Use trapezoidal rule and strips of one unit width to estimate the area under the curve between the lines and  (4 Marks)
7. Determine the second derivative of the function  (2 Marks)

**QUESTION THREE (10 MARKS)**

1. Find the derivative of the function using an appropriate method:
2.  (3 Marks)
3.  (1 Mark)
4. Evaluate the limit

 (3 Marks)

1. Given that and express in its simplest form:-
2.  (2 Marks)
3. (fg) (1 Mark)

**QUESTION FOUR (10 MARKS)**

1. Use Simpson’s rule with ten strips to estimate area under the  the x-axis from the point $x=1$ and $x=11$. (4 Marks)
2. Use matrix method to solve the simultaneous equations

 (4 Marks)

1. Given that and 

Find:

1.  (1 Mark)
2.  (1 Mark)

**QUESTION FIVE (10 MARKS)**

1. The distance from a fixed point of a particle in motion is given by Find its:
2. Velocity after 2 seconds (2 Marks)
3. Acceleration after 4 seconds (2 Marks)
4. Find the second derivative of the function  (2 Marks)
5. Evaluate the limit

 (2 Marks)

1. Evaluate the integral:

 (2 Marks)

**QUESTION SIX (10 MARKS)**

1. Use mid-ordinate rule and strips of unit width to estimate the area under the curve between lines $x=1$ and $x=7$. (4 Marks)
2. Given that  Find the value of:
3.  (2 Marks)
4.  (2 Marks)
5. If find and simplify: and  (2 Marks)