**THE UNITED REPUBLIC OF TANZANIA**

**PRESIDENT’S OFFICE**

**REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT**

**FORM SIX ZONAL MOCK EXAMINATION – RUVUMA**

**142/1 ADVANCED MATHEMATICS 1**

**Time: 3 Hours Wednesday, 26th January 2022 a.m.**

**Instructions**

1. This paper consists of **ten (10)** questions, each carrying ten (10) marks.
2. Answer **all** questions.
3. Each question carries ten (10) marks.
4. Mathematical tables and non- programmable calculators may be used.
5. All necessary work done in answering each question must be shown clearly.
6. Cellular phones and any unauthorized materials are not allowed in the examination room.
7. Write your **examination number** on every page of your answer booklet(s) provided
8. (a) Use a non – programmable scientific calculator to evaluate:



(b) The current in a certain circuit is given by . Find , if

, ,  and .   
 Write your answer in 5 decimal places).

(c) By using statistical function of your scientific calculator find:

(i) The mean (ii) The variance (iii) Standard deviation of the following data.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Values | 4.5 | 14.5 | 24.5 | 34.5 | 44.5 | 54.5 | 64.5 | 74.5 | 84.5 |
| Frequency | 809 | 796 | 667 | 707 | 715 | 198 | 504 | 295 | 97 |

1. (a) By using definitions of and , prove that   
     and hence use it to simplify 

(b) Solve the equation 

(c) Given that , find the numerical value of   
  to four decimal places

1. YUNDILA MWELEKA Company Limited has two bottling plants one located at MATEKA and the other at LIZABONI. Each plant produces three drinks; NGONI, JEMA and MABOBO. The number of bottles produced per day are as shown below.

|  |  |  |  |
| --- | --- | --- | --- |
| DRINK/PLANT | MATEKA | LIZABONI | DEMAND |
| NGONI | 1,500 | 1,500 | 20,000 |
| JEMA | 3,000 | 1,000 | 40,000 |
| MABOBO | 2,000 | 5,000 | 44,000 |

The operating cost per day for plants of MATEKA and LIZABONI are Tsh 50,000/= and Tshs 20,000/= respectively.

1. For how many days should each plant be run so as to minimize the production cost which will still meeting the market demand?
2. Find the overall minimum cost.
3. (a) A zoologist weigh 200 eggs and records the weight in the following frequency  
    distribution.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Weight (g) | 24 – 29 | 30 – 35 | 36 – 41 | 42 – 47 | 48 – 53 |
| Number of eggs | 22 | 45 | 72 | 43 | 18 |

1. Find the arithmetic mean and
2. The standard deviation using coding method
3. Find the upper quartile, lower quartile and inter – quartile range of the numbers below.

9, 12, 14, 3, 5, 24, 6, 3, 20, 8, 19.

1. (a) Given that and .   
    Use the number line to find 

(b) Simplify giving reasons the statements:

1. 
2. 
3. Given that  and  where elements are . Find;
4.  (ii)  (iii) (iv) 
5. (a) The function and are defined as and . Show that
6. Function composition is not associative.
7. 

(b) The function is defined as . Find

1. The turning point.
2. The equations of asymptotes.
3. Intercepts of the graph.
4. Sketch the graph of .
5. (a) Use the secant method to find the root near at the equation , correct to 3  
    decimal places starting with  and 

(b) Verify that the equation has root lying between 2 nad 3 then obtain the  
 approximate root in two (2) iterations using Newton Raphson method.

(c) Evaluate 

1. By trapezoidal rule with five ordinates.
2. By Simpson’s rule with 4 strips.
3. Find the approximate value of  reffering to your better result from the two methods above.
4. (a) (i) Find the equation of the bisectors of the two intrsecting lines whose equations are  
    and .

(ii) Find the equation of the locus of points which is equidistant from the lines and

(b) Prove that the length of the perpendicular from the point to the line

is 

1. (a) Evaluate
2. 
3. 

(b) The area enclosed between the line , the the line and the line  
 is rotated through four right angles about the . Find the volume  
 generated.

1. (a) The equation of the curve is given parametricall by the equation.

 , . Find  at the point 

1. A company that manufactiures dog food wishes to peakthe food closed cyndrical tins. What should be the dimensions of each tin if each is to have a volume of 128 cm3 and minimum possible surface area?