Babcock University Centre for Open Distance and e-Learning (BUCODeL)

AUTHENTIC ASSESSMENT

BSAD 112: BUSINESS MATHEMATICS II

COURSE CODE: BSAD 112

COURSE TITLE: BUSINESS MATHEMATICS II

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TOPIC: FUNCTIONS OF REAL VARIABLES

LEARNING OUTCOMES:

At the end of this topic, learners are expected to:

1. Recognize real numbers
2. Analyze various types of functions.
3. Solve problems relating to composite functions
4. Substitute for each function to obtain total score.

Assessment Description (Task) (6 marks)

Suppose the cost of manufacturing q units of a certain commodity is given as a function $C(q) = q^3 - 30q^2 + 500q + 200$.

What is the cost of manufacturing 10 units of commodity? (6marks)

GRADING RUBRICS

	REALISTIC OBJECTIVES	POOR	EXCELLENT
1.	Identify the value for q	Not identifying the values for q **0 mark**	Proper identification of the value for q **1 mark**
2.	Substitute correctly the values of q	Not substituting the correct values of q **0 mark**	Substitute correctly the values of q **2 marks**
3.	Put the powers into consideration in the function	The powers are **not** properly put into	The powers are put into consideration in the cost function

		consideration in the cost function **0 mark**	**2 marks**
4.	Final answer for the task	Incorrect final answer to the task **0 mark**	Correct final answer to the task **1 mark**

TOPIC: LIMITS OF A FUNCTION

LEARNING OUTCOMES:

At the end of this topic, you are expected to:

1. Define the limit of a function
2. Resolve related problems using the factorization.
3. Solve limit of a function using L'hopital's method.

Assessment Description (Task) (12 marks)

Prove that this function is defined using both factorization and L'hopital's method:

g (x)=$x2-4x-2$,

x→2

GRADING RUBRICS

	REALISTIC OBJECTIVES	POOR	EXCELLENT
1.	Identify the value for x	**Not** properly identifying the value for x **0 mark**	Identify the value for x **3 marks**
2.	State the formula for the L'hopital's method correctly	**Incorrectly** stating the formula for the L'hopital's method **0 mark**	State the formula for the L'hopital's method correctly **4 marks**

3.	Substitute the values of the limit function correctly	**Incorrectly** substituting the values of the limit function **0 mark**	Correctly substituting the values of the limit function **4 marks**
4.	Final answer for the task	Not stating the correct final answer **0 mark**	Correct final answer for the task **1 mark**

TOPIC: DIFFERENTIATION

LEARNING OUTCOMES:

At end of this topic, you should be able to:

1. Use these rules in solving different differentiation problems:

   a. Constant Function Rule
   b. Linear Function Rule
   c. Power Function Rule
   d. Rules for Sums and Differences
   e. Higher Order Derivatives
   f. Product Rule
   g. Quotient Rule
   h. Chain Rule

2. Differentiate by using First Principles

Assessment Description (Task) (15 marks)

Let $c(x)= 1/8x^2+3x+98$ be the total cost function for the commodity.

- Find the average cost and marginal average cost for the commodity.
- From what level of production is Marginal Average Cost (MAC) = 0
- From what level of production does Marginal Cost (MC) = Average Cost (AC)

GRADING RUBRICS

	REALISTIC OBJECTIVES	POOR	EXCELLENT
1.	Differentiate the function using applicable rules of differentiation	Differentiate the function **without** using applicable rules of differentiation	Differentiate the function using applicable rules of differentiation

		0 mark	**2 marks**
2.	Give the formula for the average cost	State the **wrong** formula for the average cost **0 mark**	States the **right** formula for the average cost **1 mark**
3.	Solve for average cost	Does **not** solve for average cost **0 mark**	Solve for average cost **3 marks**
4.	State the formula for marginal cost	Does **not** **s**tate the appropriate formula for marginal cost **0 mark**	States the appropriate formula for marginal cost **1 mark**
5.	Solve for marginal cost by substituting appropriate values	Does **not** solve for marginal cost by substituting appropriate vales **0 marks**	Solve for marginal cost by substituting appropriate values **2 marks**
6.	Solve for marginal average cost to obtain the level of production	Solve for any **other function** than marginal average cost function **0 marks**	Solve for marginal average cost to obtain the level of production **3 marks**

7.	Equate the values of marginal cost to average cost to obtain the maximum production level of the stated cost function	Solution that **does not** include equating the values of marginal cost to average cost to obtain the maximum production level of the stated cost function **0 mark**	**Equate** the values of marginal cost to average cost to obtain the maximum production level of the stated cost function **3 marks**

TOPIC: INCREASING AND DECREASING FUNCTIONS

LEARNING OUTCOMES:

At the end of this topic, you should be able to:

- Interpret increasing and decreasing function
- Solve application problems relating to increasing and decreasing functions

Assessment Description (Task) (10 marks)

Given $Y = 4x^2 - 10x + 100$. Determine whether the function is increasing at x= 10 or x=5

GRADING RUBRIC

1	**Criteria**	**Poor**	**Excellent**
1	Differentiating the function with respect to x	**Not** differentiating the function with respect to x **0 mark**	Differentiating the function appropriately with respect to x **4 marks**
2	Substituting x=10 and x=5 into	**Not** properly substituting the values of x into the differentiated equation, thus arriving at the wrong solution to the problem. **0 mark**	Properly substituting the values of x into the differentiated equation and solving the equation to arrive at a solution. **4 marks**

3	Identifying if the function is increasing or decreasing at the point where x=10 and x=5	**Not** recognizing if the function is increasing or decreasing where x=10 and x=5 **0 mark**	Appropriately Identifying if the function is increasing or decreasing at the point where x=10 and x=5 **2 marks**

TOPIC: EXTREME VALUES

LEARNING OUTCOMES:

At the end of this topic, you should be able to:

1. Determine extreme values
2. Solve application problems relating to extreme values

Assessment Description (Task) (15 marks)

The demand equation for Dangote spaghetti is given as P=2x - 0.001x^2. Find the value of x and the corresponding price that maximizes the revenue

GRADING RUBRIC

	Criteria	**(Poor)**	**(Excellent)**
1	Using the price equation to derive a revenue function	**Not** accurately deriving the revenue function from the price equation **0 mark**	Accurately using the price equation to arrive at a revenue function **4 marks**
2	Properly differentiate the derived revenue function.	**Inaccurate** differentiation of the derived revenue function. **0 mark**	**Accurately** differentiate the derived revenue equation. **4 marks**
3	Solve the differentiated revenue	**Not solving** the	Solving the differentiated

	function when equated to zero to get x	differentiated revenue function when equated to zero to get x **0 mark**	revenue function when equated to zero to get x **4 marks**
4	Using the value of x to arrive at the maximum price and maximum revenue	Solving for a **different** value for the maximum price and maximum revenue apart from the value in the third step. **0 mark**	Using the value of x to arrive at the maximum price and maximum revenue **3 marks**

Total score: 15 marks