# UNIVERSITY OF SWAZILAND

## FINAL EXAMINATION PAPER

**PROGRAMME:**  BSc. in Agricultural & Biosystems Engineering Year I
BSc. in Agricultural Economics and Agribusiness
    Management  Year I
BSc. in Agricultural Education Year I
BSc. in Agricultural Extension Year I
BSc. in Agronomy Year I
BSc. in Animal Science Year I
BSc. in Animal Science Dairy Year I
BSc. in Food Science, Nutrition and Technology Year I
BSc. in consumer science Year I
BSc. in Consumer sciences Education Year I
BSc. in Horticulture Year I
BSc. in Textiles Apparel Design and Management Year I

**COURSE CODE:**  AEM 101

**TITLE OF PAPER:** MATHEMATICS

**TIME ALLOWED:** 2:00 HOURS

**INSTRUCTION:** 1. ANSWER ALL QUESTIONS

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THE CHIEF INVIGILATOR**

**Question 1**. (25 points)

1.1 Simplify $\frac{3}{x+1} + \frac{2x-1}{(x+1)(x+2)} + \frac{2}{x+2}$

(8 points)

1.2 Factorize $(a+b)^2 - 4c^2$

( 8 points)

1. 3   Calculate the selling price when:
   a) Cost price is E500.00 and profit per cent is 40%.
   b) Cost price is E40.00 and profit per cent is 300%.

(9 points)

**Question 2 ( 25 points)**

2.1 solve the simultaneous equations
   2x+4y=6
   x-4y =1

(8 points)

2.2 Part of a garden consists of a square lawn with a path 1.5 metres wide around its perimerter. If the lawn area is two-thirds of the total area find the length of a side of the lawn.

(8 points)

2.3. Solve the equation $\frac{2}{x+1} - \frac{1}{2x-1} = \frac{1}{x}$

(9 points)

**Question 3 ( 25 points)**

3.1  The curve $y = 2x^2 + \frac{k}{x}$ has a gradient of 5 when x= 2.
Calculate
   a) the value of k
   b) the minimum value of y.  (8 points)

3.2. Find the solution set of system of simultaneous equation.
   2x + 5y =45
   x y = 35

(8 points)

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3.3 Solve the following logarithmic equations

a) $2log_4^x = log_4^{2x^2-4}$.

b) $log_3^{x^2+2} = 1 + log_3^{x+2}$

(9 points)

**Question 4 ( 25 points)**

4.1 Differentiate the following:

a) $y = 3x^4 - 2x + 99$

b) $y = \sqrt{x} + \frac{1}{\sqrt{x}}$

(8 points)

4.2 Given that $y = 60x + 3x^2 - 4x^3$, calculate

a) the gradient of the tangent to the curve of y at the point where x = 2;

b) the value of x for which y has its maximum value;

c) the value of x for which y has its minimum value.

(9 points)

4.3. Evaluate $\int_0^1 x^3 + x - 6 \, dx$

(8 points)

# END OF PAPER