UNIVERSITY OF SWAZILAND

Supplementary EXAMINATION PAPER

PROGRAMME: BSc. in Agricultural Economics and
                            Agribusiness Management Year I
BSc. in Agricultural Education Year I
                            BSc. in Agronomy Year I
                            BSc. in Animal Science Year I
                            BSc. in Food Science, Nutrition and Technology Year I
                            BSc. in Home Economics Year I
                            BSc. in Home Economics Education Year I
                            BSc. in Horticulture Year I
                            BSc. in Land and Water Management 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

                        2.ALL QUESTIONS CARRIES 25 MARKS.

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Question 1

a) A line is to be divided into 3 parts in the ratio 3:4:5. If the line is 960cm long find the length of each part?

b) Factorize $x^2 + 6x + 9$

c) Suppose a certain species of bees increase in number according to the exponential equation $q = 25\ e^{0.4t}$, where t is measured in days. In how many days, correct to the nearest tenth, will there be 500 bees?

d). Find the solution set of system of simultaneous equation.

$$\begin{cases} 2x - 3y = 8 \\ x - y = 1 \end{cases}$$

e) Find the solution set of $2x^2 + 4x - 9 = 1$.

Question 2

a) Find the solution of exponential equation
$$3^x = 27$$

b) Find the solution set of logarithmic equation.
$$\log_2{}^{(x+5)} + 4\log_2{}^2 = 3$$

c) AC is a diameter of a circle center o and CD is a chord, M is the mid-point of CD. The tangent at A meets MO produced at T. Prove that

I) $\triangle CMO$ is similar to $\triangle TAO$

ii) TA. MO = AO. MC

Question 3

a) If $\sin A = \dfrac{5}{13}$ then find $\cos A$?

b) Two straight line PQ and RS cut at X. If PX = RX and
   <SPX = < QRX, Prove that $\triangle SPX \equiv \triangle QRX$

c) Given that $y = -2x^2 + 3x + 6$, calculate
   i) the gradient of the tangent to the curve of y at the point
      Where x=-1.
   ii) The value of x for which y has its maximum value.

   iii) The value of x for which y has its minimum value.

d) In the following fig. AC is parallel to the tangent DE. Prove that
   i) $\triangle$ ADC is isosceles;
   ii) < ABC = 2 < DAC
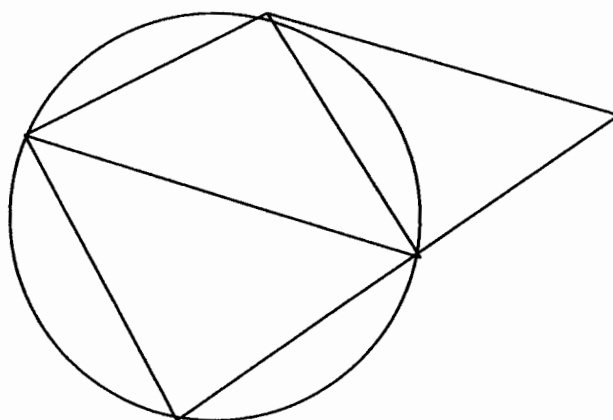
Question 4

a .Evaluate the following definite integral;

$$\int_{2}^{5}(x+5)x^3\,dx$$

b. Find the inverse of the matrix $\begin{pmatrix} 2 & 7 \\ 4 & 6 \end{pmatrix}$

c. Sketch the graph of the given quadratic equation using the intercepts and the
   Coordinates of the vertex
   $$y = x^2 - 2x - 1$$

END OF PAPER