



1st SEM. 2008/2009

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UNIVERSITY OF SWAZILAND

FINAL 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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THE CHIEF INVIGILATOR**

Question 1

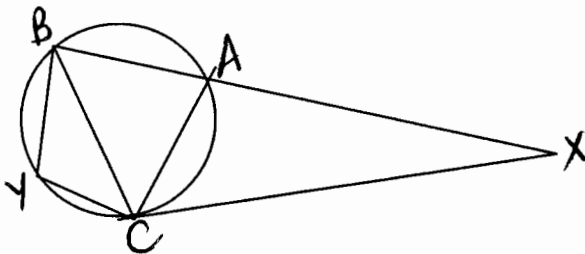
- a. Factorize $\frac{1}{x^2} + \frac{2}{xy} + \frac{1}{y^2}$
- b. Suppose a certain species of bees increase in number according to the exponential equation $q = 15 e^{0.3t}$, where t is measured in days.
In how many days, correct to the nearest tenth, will there be 485 bees?
- c. Find the solution set of the equation
$$\frac{1}{x+2} + \frac{1}{x-3} - = 0$$
- d. Find the solution set of system of simultaneous equation.

$$\frac{x-2}{2} + \frac{y-1}{4} = \frac{13}{12}$$

$$\frac{2-x}{2} + \frac{3+y}{3} = \frac{11}{6}$$

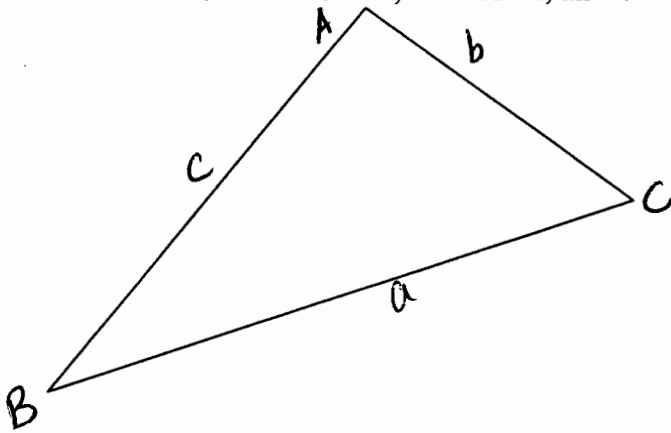
Question 2

- a. Find the solution of exponential equation
 $(3/4)^x = 64/27$
- b. Find the solution set of logarithmic equation.
 $\log_2^{(x+5)} + 4 \log_2^2 = 7$
- c. In the figure, XC is a tangent and Y is the mid-point of the arc BC.
If $\angle X = 28^\circ$ and $\angle BCA = 2 \angle ACX$,
calculate $\angle CBA$ and $\angle CBY$.



Question 3

- I. Given that $y = -2x^2 + 3x + 6$, calculate
- the gradient of the tangent to the curve of y at the point where $x = -1$.
 - the value of x for which y has its maximum value.
 - the value of x for which y has its minimum value.
- II. Solve $\triangle ABC$ if $a = 70$ mm, $b = 40$ mm, and $C = 64^\circ$.

**Question 4**

- a. Evaluate the following definite integral;

$$\int_2^3 (4x^2 + 6x - 5) dx$$

- b. Find the inverse of the matrix $\begin{pmatrix} 0.5 & -0.1 \\ -2 & -4 \end{pmatrix}$

- 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