



1<sup>st</sup> SEM. 2011

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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 consumer science Year I**
  - BSc. in Consumer science education Year I**
  - BSc. in Horticulture Year I**
  - BSc. in Agricultural & bios stems Engineering 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 POINTS.**

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**Question 1**

1.1 Two villages have populations of 336 and 240 respectively. The two villages are to share a grant of E10728 in proportion to their populations.

Calculate how much each Village receives? (6 POINTS)

1.2 Calculate the profit per cent when:

a) Cost price is E1.50 and selling price is E 1.80.

b) Cost price is 30c and selling price is 35c. (7 POINTS)

1.3 Find the solution set of  $(\frac{1}{2})^x = 64/4$ ? (6 POINTS)

1.4 Factorize  $a^6 - b^6$  (6 POINTS)

**Question 2**

2.1 A man works x hours per weekday except Saturday when he works y hours.

If he works z hours on Sunday how many hours does he work per week?

(6 POINTS)

2.2 Solve the equation

$$\frac{6}{x} - \frac{2}{y} = \frac{1}{2}$$

$$\frac{4}{x} - \frac{3}{y} = 0$$

(hint: let  $X = 1/x$  and  $Y = 1/y$ ) (7 POINTS)

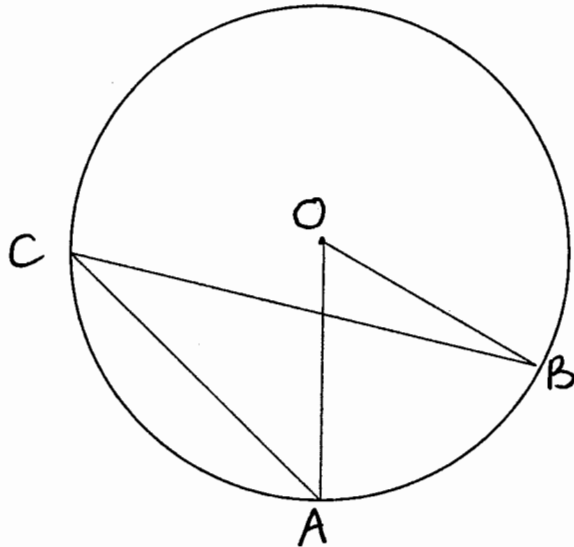
2.3 Find the solution set of

$$\log_2^{(x+6)} + \log_2^{(x-2)} = 2 \quad (6 \text{ POINTS})$$

2.4 .How long will it take the earth's population to double if it continuous to grow at the rate of 2 percent per year compounded continuously? (6 POINTS)

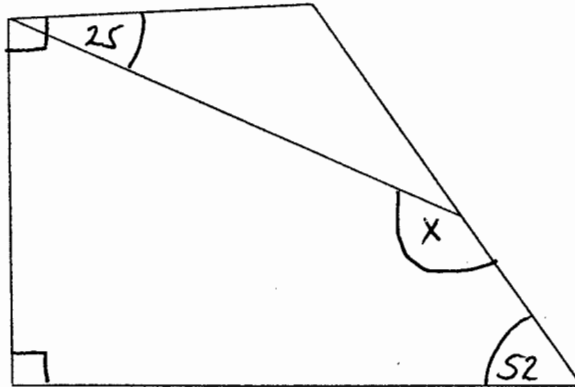
**Question 3**

3.1 In the figure below, O is the center of the circle. If  $\angle AOB = 60^\circ$ , find  $\angle ACB$ .  
**(6 POINTS)**



3.1 If  $\sin B = \frac{5}{13}$  then find  $\cos B$  and  $\tan B$ . **(3 POINTS)**

3.2 Calculate the angle  $x$  in the following figure. **(3 POINTS)**

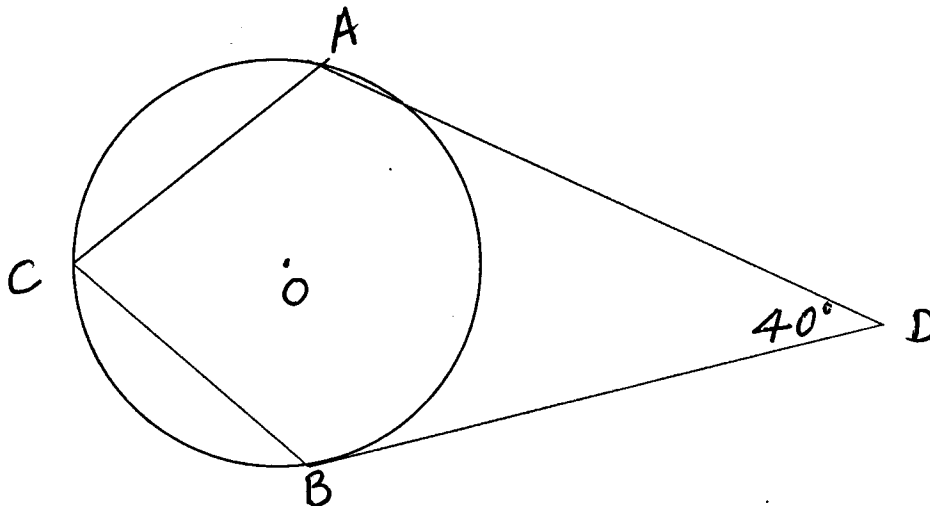


3.3 Given that  $y = x^3 - x + 100$ , calculate

3.31 the gradient of the tangent to the curve of  $y$  at the point  
Where  $x = 1$

3.33 The value of  $x$  for which  $y$  has its maximum and/ or minimum value.  
(7 POINTS)

3.4 In the following fig. AD and BD are tangents to the circle whose centre is O.  
If  $\angle ADB = 40^\circ$ , Find  $\angle ACB$ ?  
(6 POINTS)



#### Question 4

4.1 A farmer uses 100m of hurdles to make a rectangular cattle pen. If he makes a pen of length  $x$  metres, show that the area enclosed is  $(50x - x^2)$  square .

Find the value of  $x$  so that the area shall be maximum? (7 POINTS)

4.2 Evaluate the following definite integral;

(6 POINTS)

$$\int_0^1 x^2 + 2x + 20 dx$$

4.2. Evaluate  $\sin A \cos B - \sin B \cos A$  given that  $\sin A = 3/5$  and  $\tan B = 4/3$ .

A and B are both acute angles.

(6 POINTS)

4.3. A man standing on top of a cliff 50 m high is in line with buoys whose angles of depression are  $18^\circ$  and  $20^\circ$  . Calculate the distance between the two buoys?

(6 POINTS)

**END OF PAPER**