



1<sup>st</sup> SEM. 2009

page 1 of 7

**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 sciences 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 QUESTION ONE AND CHOOSE ANY OTHER TWO FROM THE REMAINING FOUR QUESTIONS

**2. ALL QUESTIONS CARRIES 25 MARKS BUT QUESTION ONE CARRIES 50 MARKS**

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**Question I, choose the correct answer.**

- 1.1 A shopkeeper buys an article for E20 and sells it for E 25 his percentages profit is
- a. 20%
  - b. 30%
  - c. 25%
  - d. 80%

- 1.2  $\frac{9x^2 - 25}{9x^2 - 9x - 10}$  is equal to
- a.  $\frac{1 - 5x}{1 - 9x}$
  - b.  $\frac{3x + 5}{3x - 2}$
  - c.  $\frac{5}{2}$
  - d. 2

- 1.3 .The smallest of three consecutive even numbers is m. twice the square of the largest is greater the sum of the squares of the other numbers by 244.hence
- a.  $2(m+2)^2 = (m+1)^2 + m^2 + 244$
  - b.  $2(m+2)^2 - (m+2)^2 + m^2 = 244$
  - c.  $2(m+2)^2 = (m+2)^2 + m^2 + 244$
  - d.  $2(m+2)^2 - (m+2)^2 + m^2 = 244$

- 1.4. If the angle A is obtuse and  $\sin A = \frac{60}{61}$  then  $\cos A$  is equal to
- a. 11/61
  - b. 11/60
  - c. - 11/61
  - d. - 11/60

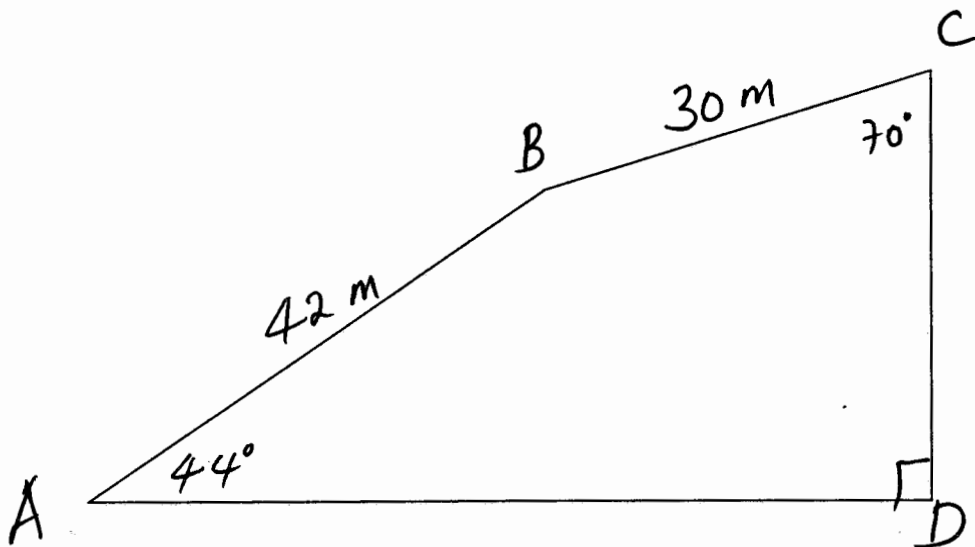
1.5 In the figure below, the expression for the length DC is

a.  $30 \sin 70^\circ + 42 \cos 44^\circ$

b.  $30 \cos 70^\circ + 42 \sin 44^\circ$

c.  $\frac{30}{\sin 70^\circ} + \frac{42}{\cos 44^\circ}$

d.  $\frac{30}{\cos 70^\circ} + \frac{42}{\sin 44^\circ}$



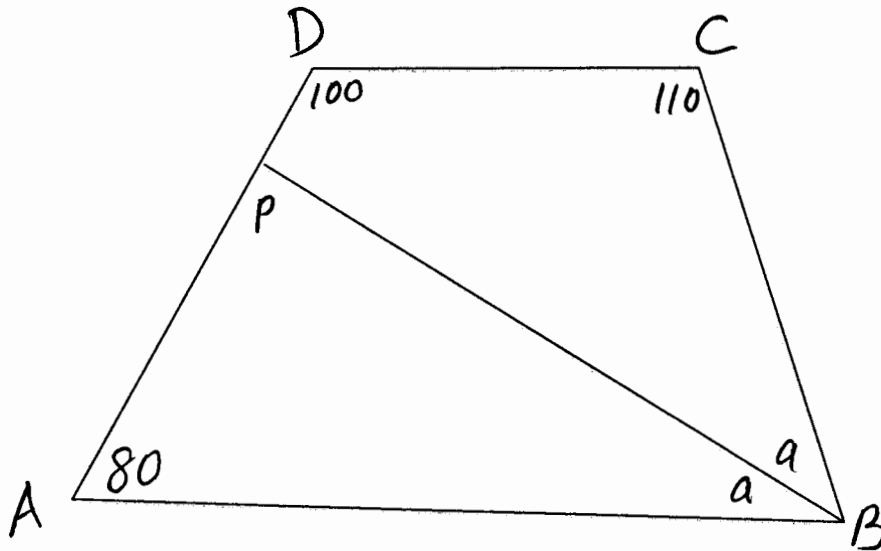
1.6 A quadrilateral has one pair of sides parallel. It is there for a

- a. rhombus
- b. parallelogram
- c. rectangle
- d. trapezium

1.7. A quadrilateral has diagonals which bisect at right angles. it is there for a

- a. rhombus
- b. trapezium
- c. rectangle
- d. parallelogram

1.8 In the figure below p is equal to  
a.  $120^{\circ}$  b.  $115^{\circ}$  c.  $60^{\circ}$  d.  $65^{\circ}$



1.9 A polygon has all its interior angles less than  $180^{\circ}$ . hence it is definitely a

- a. convex polygon
- b. regular polygon
- c. triangle
- d. re-entrant polygon

1.10 A regular five sided figure is inscribed in a circle .The angle subtended at the circumference by the figure is

- a.  $72^{\circ}$
- b.  $36^{\circ}$
- c.  $54^{\circ}$
- d.  $108^{\circ}$

**Question 2**

2.1. Factorize  $m^2 + 4m - 7$

2.2 Suppose a certain species of bees increase in number according to the exponential equation  $q = 10 e^{0.3t}$ , where  $t$  is measured in days.

In how many days, correct to the nearest tenth, will there be 585 bees?

2.3 Find the solution set of the equation  $x^2 - 7x + 3 = 0$ .

2.4 Find the solution set of system of simultaneous equation.

$$2x^2 - 3y^2 = 20$$

$$2x + y = 6$$

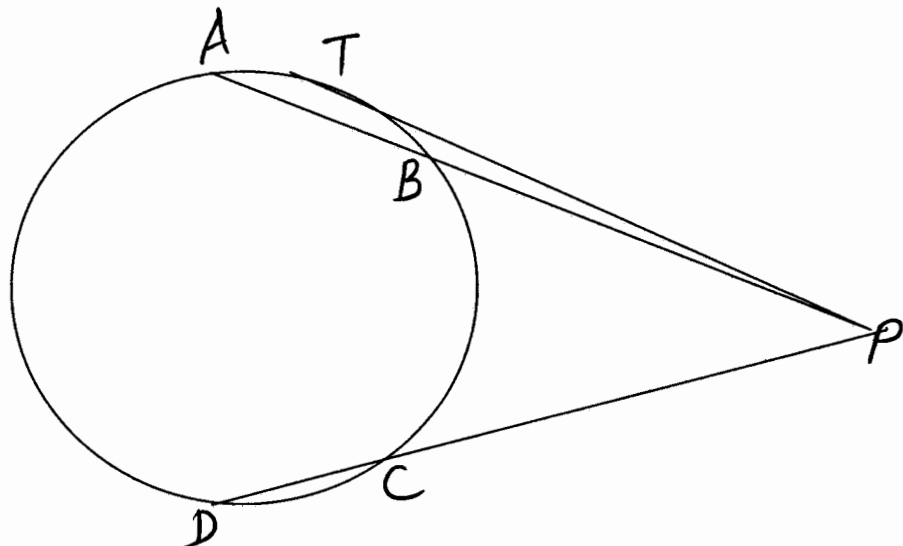
**Question 3**

3.1. Find the solution of exponential equation

$$\left(\frac{2}{3}\right)^x = \frac{9}{4}$$

3.2. Find the solution set of logarithmic equation.

$$\log_3^{(x+6)} + 4 \log_3^{(x-2)} = 2$$

3.3. In the figure below,  $BP = 8$  cm,  $DC = 7$  cm and  $CP = 9$  cm. calculate the lengths of the chord  $AB$  and the tangent  $PT$ .

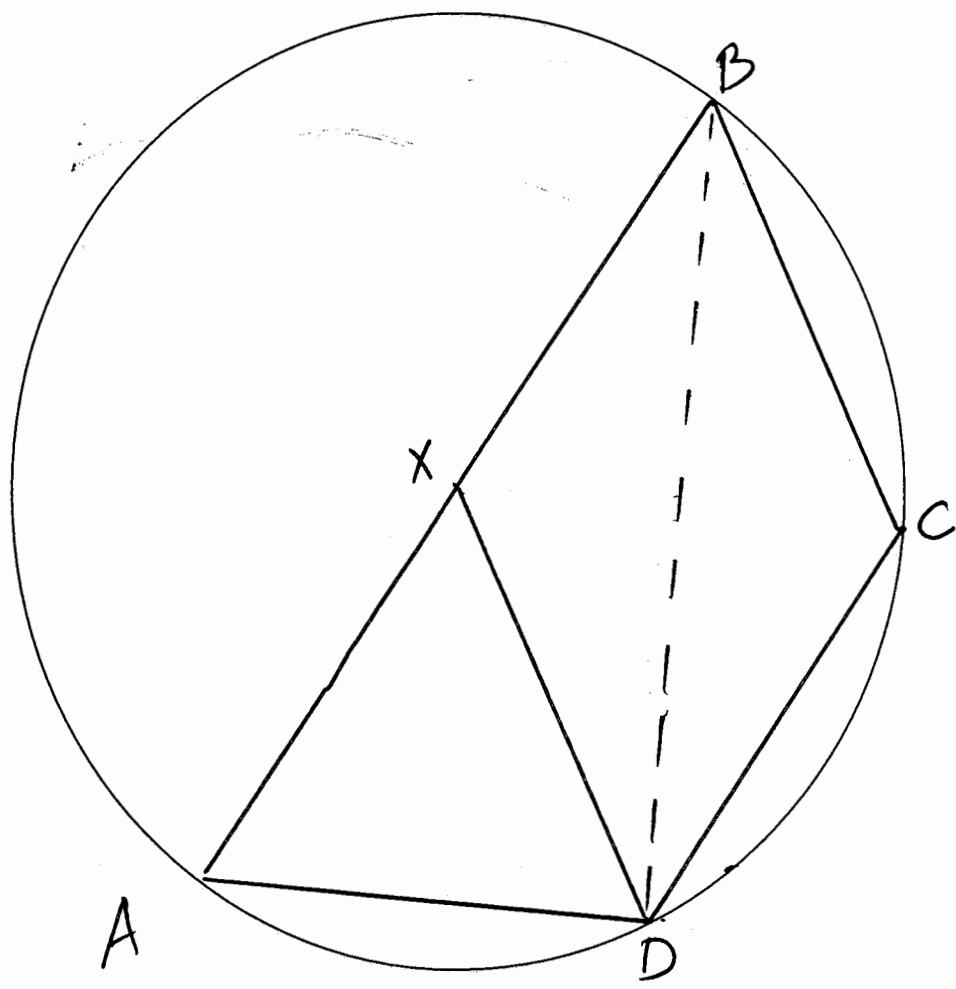
**Question 4**

4.1 Find the area between the straight line  $y = 12 - 3x$  and the curve  $y = 2x^2 - 3$ .

4.2 Given that  $y = x^2 - 4x + 7$ , calculate

- a) the gradient of the tangent to the curve of  $y$  at the point where  $x = -1$ .
- b) the value of  $x$  for which  $y$  has its minimum value.

4.3. In the figure below,  $x$  is the center of the circle drawn on  $AB$  as diameter,  $BC = CD$  and  $\angle XDA = 50^\circ$ , calculate the angles of the quadrilateral  $ABCD$ .



**Question 5**

5.1 Evaluate the following definite integral;

$$\int_1^2 (x^2 + 9x - 1) dx$$

5.2. The angle A is acute and  $5 \sin^2 A - 2 = \cos^2 A$ . Find the angle A.

5.3. To find the height of a tower a surveyor stands some distance from its base and finds the angle of elevation to the top of the tower is  $30^\circ$ . He moves 150 m nearer to the base and finds the angle of elevation is now  $60^\circ$ . If the ground is horizontal, then what will be the height of tower ?

**END OF PAPER**