

**UNIVERSITY OF FORT HARE**

**MAT 304**

**SUPPLEMENTARY EXAMINATIONS**

**January 2019**

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**Time: 3 HOURS**

**Subject: History and Fundamental Concepts**

**Marks: 100**

**This paper consists of 3 pages including cover page**

**Internal Examiner**

**Dr S Ngcibi**

**External Examiner**

**Prof V Murali**

**Instructions**

**All questions may be answered**

**Write in full sentences**

**Sloppy work will be penalized**

### Question 1

1. What is the *aim* and *ambition* of a study of the History of Mathematics? [3]
2. (a) Differentiate between a *number* and a *numeral*. [2]  
(b) If  $N$  is a number to base 10, explain how  $N$  can be written to the arbitrary base  $b$ . [5]
3. (a) Write short notes on **Pythagoras** and the *Pythagorean Brotherhood*. [6]  
(b) Write notes on *Babylonian mathematics* [5]  
(c) Give **Pythagoras'** *dissection type of proof* of 'his' theorem. [5]

### Question 2

1. State four main differences between **Hindu** and **Greek** Mathematics. [4]
2. What is the history of the word *Algebra*? What are the meanings of the names of trigonometric expressions  $\tan \theta$ ,  $\sec \theta$ ,  $\sin \theta$ ? [7]
3. What were the four general steps in the development of *Calculus*? [4]
4. Discuss the so called 'Three important events' of the nineteenth century. [6]
5. What were the three vital and distinct lines of development during the first 300 years of Greek Mathematics, and what were 'the three famous problems'? [5]

### Question 3

1. Give a short history of **Euclid's Elements**, and list 2 'defects' in its logical structure. [5]
2. **Thales of Miletos** is possibly the first mathematician of whom we have a record. Who is Thales? State any two geometrical results he is credited for discovering. [5]
3. (a) What were the **Middle Ages**? [2]  
(b) Mention two mathematicians and their works during this time. [4]
4. (a) State accurately the famous three laws of planetary motion. [6]  
(b) What were the limitations of Greek mathematics? [3]

#### Question 4

1. State and explain *Fermat's Fundamental Principle* of Analytic Geometry. [4]
2. Identify and describe three stages in the historical development of algebraic notation. [5]
3. Name the three commentators of Greek mathematics. [3]
4. Discuss the lives and major mathematical works of the following:
  - (a) Gauss [5]
  - (b) Fibonacci [5]
  - (c) Kepler [5]

END OF EXAMINATION