



UNIVERSITY OF JOHANNESBURG
FACULTY OF EDUCATION
MAY / JUNE
EXAMINATION 2016

PROGRAMME: BEd (SENIOR PHASE)
MODULE: LEARNING AREA METHODOLOGY 4A - MATHEMATICS
CODE: LMW4A10
TIME: 2 hours
MARKS: 100
EXAMINER: Mrs K Ramatlapana
MODERATOR: Dr A Essien

(This paper consists of 4 pages)

INSTRUCTIONS

Read the following instructions carefully before answering the questions:

1. This question paper consists of six (6) questions.
2. Answer **ALL** the questions.
3. Number the answers correctly according to the numbering system used in this question paper.
4. Write legibly and present your work neatly.
5. Read the questions carefully before answering them.
6. Questions are to be answered in English.

QUESTION 1

1.1 The rapid developments of new technology-based tools have gained widespread acceptance and use in the teaching and learning discourses. Despite the diversity in technology-based learning environments questions have emerged on how technology can be integrated into mathematics teacher education.

1.1.1 What does integrating technology in teaching and learning mathematics mean?

(3)

1.1.2 Give two (2) advantages of using technology instead of pen and paper? (4)

1.2 GeoGebra is an open free source software developed in 2004 by Markus Hohenwarter to support teaching and learning mathematics. What are the attributes of GeoGebra in the mathematics teaching and learning environment? (8)
(15)

QUESTION 2

Duval (1995) proposed cognitive processes to identify the reasons for why and how geometry should be taught in school. Briefly describe the following processes:

- 2.1 Visualization process (2)
- 2.2 Construction process (2)
- 2.3 Reasoning process. (2)
(6)

QUESTION 3

3.1 A curriculum can be interpreted as 'that which is planned and guided'. What assumptions does mathematics SP CAPS curriculum make about the following:

- 3.1.1 Learning and the learner (3)
- 3.1.2 Teaching and the teacher (3)
- 3.1.3 Mathematics knowledge (3)
- 3.1.4 Society (3)
- 3.1.5 Resources for learning mathematics (3)

3.2 What are the basic content areas of mathematics SP CAPS curriculum? (5)
(20)

QUESTION 4

Study the word problem activity provided below.

Activity

Consider the following word problem:

I am thinking of three consecutive numbers. Double the sum of the first number and the last number is 9 bigger than the sum of the middle number and the last number

- 4.1 Answer the following questions:
- 4.1.1 Write down two (2) **equations** to express the relationships among the 3 numbers. (2)
- 4.1.2 Choose one (1) of the equations in (4.1.1) and provide an **algebraic** solution to the problem. (4)
- 4.2 You intend to incorporate this activity in your next lesson. Organise your thinking about this activity and unpack teaching ideas portrayed in the activity by focusing on the following aspects:
- 4.2.1 What do you intend the learners to know about the idea? (3)
- 4.2.2 The rationale for learning algebra? (3)
- 4.2.3 What else do you know about this idea (that you do not intend learners to know yet)? (3)
- 4.2.4 What are the difficulties/limitations connected with teaching this idea? (4)
- 4.2.5 The teaching procedures (and particular reasons for using these to engage with this idea). (3)
- 4.2.6 Give an explanation of the mathematical words/terms underlined in the activity? (4)
- 4.3 Discuss three (3) ways learners might think about patterns, sequences and series. Give examples. (9)
- (35)**

QUESTION 5

- 5.1 Identify five (5) roles of the teacher in a constructivist mathematics classroom. (5)
- 5.2 Briefly discuss how mathematics is viewed and perceived in society? (5)
- (10)**

QUESTION 6

Below you are given a part of a calendar which shows the days from Sunday to Saturday for the month of January 2009. Focus only on the part of the calendar that has been highlighted.

January 2009						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				1 New Year's Day	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19 Martin Luther King Jr Day	20	21	22	23	24
25	26	27	28	29	30	31

- 6.1 What do you notice about the structures in this highlighted part of the calendar? (4)
- 6.2 Why are the structures the way that you found in (6.1)? (3)
- 6.3 Express the structure as a rule that is independent from the numbers on the calendar square. (4)
- 6.4 Does this new rule always work? Explain. (3)
- (14)**

TOTAL: 100