



<u>FACULTY</u>	: Education
<u>DEPARTMENT</u>	: Childhood Education
<u>CAMPUS</u>	: SWC
<u>MODULE</u>	: MPMATB3 :Teaching Methodology and Practicum for Mathematics
<u>SEMESTER</u>	:Second
<u>EXAM</u>	:Supplementary 2019

<u>DATE</u>	:	<u>SESSION</u>
	Prof C Long & Dr K	
<u>ASSESSOR(S)</u>	: Fonseca	
<u>MODERATOR</u>	:Dr K. Fonseca	
<u>DURATION</u>	: 2 HOURS	<u>MARKS</u> : 100

NUMBER OF PAGES: 4 PAGES

INSTRUCTIONS:

1. Answer ALL THE QUESTIONS.
2. Number your answers clearly.
3. Each question should take approximately 20 minutes.

QUESTION 1: Reform Mathematics Education

1.1 According to the theory of conceptual fields, mathematical proficiency is developed through **encountering situations or problems that are carefully designed for the purpose of learning**. These constructed situations serve two purposes, the first is to illustrate a concept by providing a context, at the cognitive level of the child, and the second is to expand the existing conceptual structures of the child through extending the complexity of the mathematical situation beyond the child's current level of mastery (Long, 2011)

1.1.1 Rewrite this statement in your own words. [6]

1.1.2 Explain the two purposes with reference to "The Dice Game." [6]

2.1 The *reality principle in Realistic Mathematics Education* aims at enabling students to apply mathematics. However, this application of mathematical knowledge is not only something that takes place at the end of a learning process, but also at the beginning. Rather than **starting with procedures, formulae or definitions to be applied later (Scenario 1), one must start with rich contexts that require mathematical organisation (Scenario 2)** or, contexts that can be mathematised.

2.1.1 Give an example that illustrates each scenario. (6)

2.1.2 Describe the advantages, or disadvantages, of each scenario. (6)

[24]

QUESTION 2: From number to variable

2.1 "Adding an odd number and an even number always results in an odd number". Explain the truth of this statement using

a) words (2)

b) a picture or a diagram, and (2)

c) symbols (4)

2.2 Prove that multiplying two even numbers always results in an even number (3)

- 2.3 Transition from number (arithmetic) to algebra is challenging for many children, as it requires them to make many adjustments. Kieran (2004) proposed five adjustments children need to make to transition from arithmetic to algebra. Name the five adjustments. (5)

[16]

QUESTION 3: Fractions, decimals and percentages

- 3.1 The symbol $\frac{3}{4}$ has at least 3 different meanings. Explain the three different meanings to a Grade 6 child. Give examples. (9)
- 3.2 Fractions, decimals and percentages:
- 3.2.1 Write five-hundredths in fraction, decimal and percentage form. (3)
- 3.2.2 Compare decimal fractions and percentages. What have they in common and what is different? (4)
- 3.3 Children have numerous misconceptions about fractions. For instance, they mistakenly use the operation “rule” for whole numbers to calculate with fractions for example $\frac{1}{2} + \frac{1}{2} = \frac{2}{4}$.
- 3.3.1 Discuss how you would confront and address this misconception. (3)
- 3.4 A Grade 6 class solved the problem: $2\frac{3}{5} - \frac{3}{4}$.

Two learners solved the problem differently.

Carol $2\frac{3}{5} - \frac{3}{4}$ $= 2\frac{12}{20} - \frac{15}{20}$ $= 1\frac{17}{20}$	Sipho $2\frac{3}{5} - \frac{3}{4}$ $= 2.60 - 0.75$ $= 1.85$
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Explain two methods of testing whether the answers are equivalent. (4)

- 3.5 Discuss the main concepts needed to understand multiplication of decimals (3)

[26]

QUESTION 4: Measurement

The formulae for the area and perimeter of a rectangle are given below:

Perimeter of a rectangle: $P = 2(l + w)$ Area of a rectangle: $A = l \times w$

- 4.1 Explain to a learner the concept of surface area of a box. (4)
- 4.2 Explain to a learner a) the concept of circumference and b) how to calculate the circumference of a circle with radius, 10 centimetres. (4)
- 4.3 Explain two advantages of the metric system of measurement. (4)
- 4.5 Rob was given the following problem to solve: A performing arts show starts at 10:15 and finishes at 12:55. How long is the show? Rob gave the following answer: 3 hours 40 minutes.
- 4.5.1 Correct Rob's answer by giving the correct answer. (2)
- 4.5.2 Explain what the main concepts and skills are learners in the intermediate phase need to solve time related problems or activities. (6)

[20]

QUESTION 5: Data handling and probability

5.1. The rainfall recorded in Johannesburg from September to March was September; 50 mm, October; 60 mm, November; 70 mm, December; 100 mm, January; 100 mm, February; 80 mm, March; 30 mm.

- 5.1.1 Calculate the median rainfall over seven months. (1)
- 5.1.2 Calculate the mean rainfall over seven months. (1)
- 5.1.3 Name four skills related to data handling needed to be developed in the intermediate phase (4)
- 5.3 Discuss the key issues of teaching probability. (4)
- 5.2. Explain the difference between theoretical probability and relative frequency, using examples. (4)

[14]

Total [100]