UNIVERSITY
OF
JOHANNESBURG

FACULTY	: Education
DEPARTMENT	: Childhood Education
CAMPUS	: Soweto Campus
MODULE	: Mathematics for the Intermediate Phase 2A (MATINA2)
SEMESTER	One
EXAM	July 2020

ASSESSOR	Dr K. Fonseca
MODERATOR	Dr S. McAuliffe (Cape Peninsula University of Technology)
SUBMISSION DATE	
MARKS	100 Marks

NUMBER OF PAGES: 8 PAGES

INSTRUCTIONS:

1. You must answer all questions.
2. **You may not collaborate with other students about this submission. Your work will be screened for plagiarism and any evidence of copying directly from other sources (including other students and your own earlier assignments) will result in you failing this assessment**.
3. Clearly number each question and submit in the correct order.
4. All text must be 12 Arial font size, 1.5 line spacing and justified text.

5. Hand written work should be neat and legibly.
6. Complete and sign the declaration.

FIRST NAME & SURNAME:

STUDENT NUMBER:

I DECLARE THAT:

- This is my own work
- I have not plagiarised form any source
- I have not sought help from any one
- I have numbered each question in accordance with the question paper

SIGNATURE:

QUESTION 1

- **Read the following Case Study.**

- *During the national COVID-19 lockdown we saw many mathematics teachers sending worksheets and activities via school communication systems (e.g. D6-communicator) and some teachers distributed worksheets while they delivered food to learners through the community's feeding scheme. There were also many who could not send any form of school work to their learners. It is evident, that during a national crisis like the COVID-19 lockdown schools are depending on parents to carry out educational activities in their homes. Activities, such as assisting children with completing worksheets and assisting them in understanding the content. However, we are all aware of the social inequalities, as not all homes have parents or guardians who are literate and are mathematical proficient to assist children with mathematics. Furthermore, not all homes have access to network connections, and mathematical learning materials. The onus therefore, lies with the teacher to provide the necessary support to the parents by providing them with mathematics content guidelines and solutions for the worksheets/activities.*

- *One of the teachers gave her grade 7 learners a worksheet (see worksheet in Addenda) on fractions and measurement to complete at home under the guidance of their parents/guardians. But the teacher did not provide the necessary support for the parents so that they are equipped to provide their children with the needed support. As a 2nd year student teacher you have been tasked to provide the parents with a 'Teachers Guide'.*

The guide should include the following:

1.1   Write out a memorandum with worked out solutions for each question in the worksheet.   (50)

1.2   Create a concept map illustrating all the concepts and prior knowledge needed to solve each question in the fraction section of the worksheet.   (20)

2.   Identify the typically misconceptions/errors related to this worksheet. Link misconceptions and question.   (10)

3. Explain what the most suitable models/representations and concrete materials are, parents can use to address the fraction and measurement related misconceptions. Name forms of models/representations for fractions and forms of models/concrete apparatus for measurement related concepts.   (10)

4. Read the two extracts from the articles by Pizzaro et al., (2015) and Hoth et al., (2019) on measurement estimation. Then write a one -page long paragraph in which you discuss:

- In your own words what measurement estimation is and the strategies used for measurement estimation.
- Pose (write) your own mathematical problem suitable for a grade 6 class and explain how you will use this problem to promote the strategies involved in measurement estimation.   (10)

TOTAL: 100

ADDENDA

APPENDIX A: GRADE 6 MATHEMATICS WORKSHEET

Section A: Fractions

1. Write an appropriate word problem to illustrate $1\frac{1}{2} \div \frac{1}{4}$. (4)

2. Mr Dlamini has 7 cans of coke. He uses ¾ of a can to fill a glass with coke. (5)

   How many glasses can he fill from 7 cans?
   Solve the problem using diagrams and algorithm representation.

3. Jacob was given the following problem to solve: (5)

   Kim travelled from the Soweto Campus to Pretoria. In the first half an hour she covered 1/7 of it. In the second half an hour she covered a 1/3 of the reamining journey. Finally she took another half an hour to finish the journey at a speed of 72km/h. Find the average speed for the whole journey.

   Jacob solved the problem using an algebraic method (using variables) and got the answer of 42km/h. Jacob is one of a very few grade 6 learners that can solve the problem using algebraic equations.

3.1 Write out a solution for Jacob's problem using an arithmetic strategy (fraction-notation) and suitable model/representation. (5)

4.1 Mary has been driving for $3\frac{5}{6}$ hours. If it takes $6\frac{1}{3}$ hours to get to her destination, how much longer must she still drive. (6)

Solve the problem using diagram and algorithm representations

Section B: Measurement
Show all working out

1. All 28 sides of the polygon are equal in length with adjacent sides (5) perpendicular. If the perimeter of the polygon is 56 cm, what is the area of the polygon?
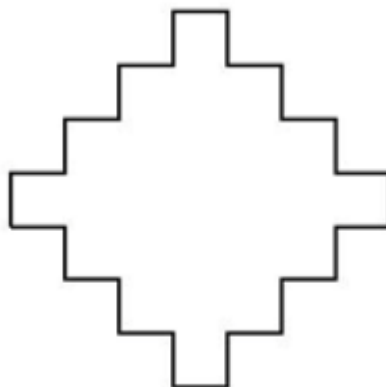
2. Complete the following investigation, when given the following problem:

You have 28m of fencing to make a rectangular garden.[1]

2.1 Solve the problem by answering the following: (10)

- What different size rectangular gardens could you make with this fencing?
- What gardens could you not make?
- What is the largest size garden you could make?

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[1] This task is one of the tasks created for the PrimTEd-Mathematical Thinking group by Dr Erna Lampen.

2.2   What mathematical content did you use to solve this problem? Explain.   (3)

2.3   Look at the table below, identify and write out the mathematical   (12)
       processes involved in solving this problem and give an example.

1. Playful engagement to develop, or search for, mathematical insight		
a) Act	Use action and perception to develop mathematical insight	
b) Explore	Explore relationships in patterns and processes (contextual and mathematical) to generate mathematical structure.	
c) Connect	Identify, construct and formulate connections between mathematical patterns and/or representations.	
d) Clarify	Pose and investigate questions to clarify understanding.	
2. Represent and use mathematics		
a) Model	Make sense of real-life situations using mathematical models (contextual problem solving)	
b) Identify properties	Identify properties that can be counted, measured or form geometrical invariants.	
c) Attend to precision	Decide upon and generate precision appropriate to the task.	
d) Represent	Form and manipulate mathematical representations (including names, diagrams, figures, symbol systems, and functions / relations).	

e)	Describe and define	Describe and define in mathematical ways.	
3.	**Develop mathematical productions**		
a)	Specialise	Consider special cases to generate mathematical insight.	
b)	Generalise	Generalize patterns, relationships and attributes	
c)	Conjecture	Generate and test conjectures (educated guess).	
d)	Classify	Distinguish and organize mathematical objects to create systems.	
4.	**Reason and reflect**		
a)	Justify	Provide supporting reasons for claims.	
b)	Prove	Validate conjectures (guess).	
c)	Refute	Construct counterexamples (example to disprove conjecture).	
d)	Critique	Compare mathematical productions for efficiency, effectiveness and elegance.	
e)	Regulate	Reflect to regulate task process.	