



<u>FACULTY</u>	:	Education
<u>DEPARTMENT</u>	:	Childhood Education
<u>CAMPUS</u>	:	Soweto Campus
<u>MODULE</u>	:	Introduction to Mathematics 1B (MATINB1)
<u>SEMESTER</u>		Two
<u>EXAM</u>		December 2020

<u>ASSESSOR</u>	Dr K. Fonseca
<u>MODERATOR</u>	Mr E Libusha (University of Johannesburg)
<u>SUBMISSION DATE</u>	December 2020
<u>TOTAL</u>	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.
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FIRST NAME & SURNAME:

STUDENT NUMBER:

I DECLARE THAT:

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

SIGNATURE:

QUESTION 1:**[40 MARKS]**

Read the following case study and answer the following questions

One of the parent's in your neighborhood is very concerned about her child's level of understanding, fractions and measurement related concepts. She approached you, and kindly requested you to tutor her son. You eagerly agreed to assist him with his first homework activity but before you meet with him you first want to work through the mathematical problems on your own to identify the possible errors and misconceptions the boy might have. As part of your preparation answer the following questions.

1.1.1 The set shown is $\frac{3}{4}$ of a unit what is the unit? Draw the unit. (2)

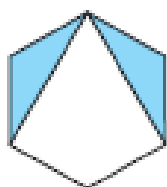


1.1.2 The set shown is $\frac{5}{3}$ of a unit. What is the unit? Draw the unit. (3)

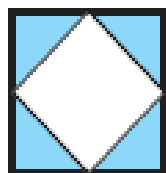


1.1.3 What fraction represents the part of the whole region that has been shaded?

Demonstrate how you obtained your answer (6)



(a)



(b)

1.1.4 Explain which fraction related concepts can be developed by solving problems

4/...

such as the problems in question 1.1.1 – 1.1.3. Then explain the importance of understanding these concepts for further fraction concept development. (5)

1.2 When asked to evaluate the sum of $\frac{1}{5} + \frac{5}{7}$, a learner claimed that the answer when simplified is $\frac{1}{2}$.

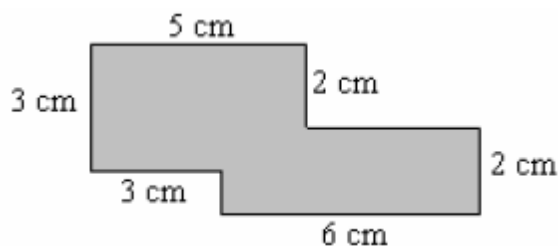
1.2.1 How do you suspect the learner arrived at this answer? (2)

1.2.2 Discuss what you might do to help this learner understanding the mathematical concepts without giving a step by step guide on how the problem can be solved.

Marking rubric	
Mathematical pre knowledge required	1
Mathematical concepts required on this problem	4
Models you intend to use and how you will use them	3

(8)

1.3 The figure is a combination of two rectangles with dimensions as shown. What is the area of the figure? (5)



1.4 Tom, Jerry and Scrooge are three stuffed animals. They are weighed two at a time. Here are the results.

$$T + J = 12\text{kg}$$

$$J + K = 14\text{kg}$$

$$K + T = 16\text{kg}$$

How much will all three weigh together? (5)

1.5 What are the most effective models to teach learners converting from millilitres, litres and kilolitres? Explain and give at least 2 examples. (4)

QUESTION 2

[25 MARKS]

2.1 Draw a concept-map on the knowledge of rational numbers gained in this course. In reflecting on the knowledge gained you need to use the concept-map on fractions you submitted in the beginning of the semester as a reference point. You therefore, need to copy and paste the concept-map you submitted as section A.

In section B, your concept-map should illustrate:

- The conceptual and procedural knowledge gained
- Key aspects of learning and teaching fractions
- Importance of representations and models

QUESTION 3

[35 MARKS]

3.1 Use the information in the photo to determine the height of the Mandela Statue. (7)



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

3.3 Do you think this is a suitable mathematical task to engage learners in measurement estimation? Explain, what is measurement estimation and how one can or cannot use this task to engage learners in measurement estimation.

(10)

3.4 Look at the table below, identify at least 5 and write out the mathematical processes involved in solving this problem and give an example.

(15)

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.	

Marking rubric	
For each mathematical process	
identify	1x5
Writing out of the mathematical processes involved	1x5
Example extracted from the question	1x5

Rubric for concept-map

	Exemplary 4	Exceeds Standard 3	Adequately Meets Standard 2	Below Standard 1	Student Score
Organization	<ul style="list-style-type: none"> Well organized Logical format Contains main concepts Contains an appropriate number of concepts Map is “treelike” and not stringy Follows standard map conventions 	<ul style="list-style-type: none"> Thoughtfully organized Easy to follow most of the time Contains most of the main concepts Contains an adequate number of concepts Follows the standard map conventions 	<ul style="list-style-type: none"> Somewhat organized Somewhat incoherent Contains only a few of the main concepts 	<ul style="list-style-type: none"> Choppy and confusing Contains a limited number of concepts 	
Content	<ul style="list-style-type: none"> Linking words demonstrate superior conceptual understanding Links are precisely labeled 	<ul style="list-style-type: none"> Linking words easy to follow but at times ideas unclear Links are not precisely labeled 	<ul style="list-style-type: none"> Linking words are clear but present a flawed rationale Links are not labeled 	<ul style="list-style-type: none"> Difficult to follow No links 	_____
Cooperation	<ul style="list-style-type: none"> Worked extremely well with each Respected and complemented each others ideas 	<ul style="list-style-type: none"> Worked very well with each other Worked to get everyone involved 	<ul style="list-style-type: none"> Attempted to work well with others At times “off task” and not everyone was actively involved 	<ul style="list-style-type: none"> Little or no teamwork 	_____