UNIVERSITY
OF
JOHANNESBURG

FACULTY	:	Education
DEPARTMENT	:	Childhood Education
CAMPUS	:	SWC
MODULE	:	Mathematics for the Intermediate Phase
		MATINA2
SEMESTER	:	First
EXAM	:	July 2021

ASSESSOR(S)	:	Dr K. Fonseca
MODERATOR	:	Professor K. Luneta (University of Johannesburg)
DURATION	:	48 HOURS **MARKS** : 100

NUMBER OF PAGES: 4 PAGES

INSTRUCTIONS:

1. Answer ALL THE QUESTIONS.
2. Number your answers clearly.
3. You need to read the Case Study first before you can answer the questions.

QUESTION 1

Read the Case Study (see document attached). Then complete the activities/questions based on the case study.

1.1
- Solve the selected problems and,
- Give a detailed explanation of how you solved the problem, explaining the concepts, skills and mathematical thinking processes required to find a solution.

1.1.1 Can you fill in the matrix (table square) below?

The numbers 2 to 12 were used to generate it with, again, just one number used twice.

NB! You need to select numbers from 2-12 and place them in the grey blocks, the two factors that gives the products in red and complete the rest of the empty blocks.

X						
	32			40		
					49	
			22			
		15				27
			24			
					42	

(11)

Mark allocation: 6 marks for completing matrix

5 marks for concepts, skills and thinking processes

1.1.2 Given:

$$2^2 - 1^2 = 3$$

$$3^2 - 2^2 = 5$$

$$4^2 - 3^2 = 7$$

(10)

a. Complete the following two lines.

      b. Make a conjecture about this pattern. Write your conjecture in words.

      c. Generalise your conjecture for this pattern.

      d. Prove that your conjecture is true.

Mark allocation:6 marks for correctly answering a-d

: 5 marks for concepts, skills and thinking processes.

1.1.3   Mike made a journey from city P to city Q. In the first hour, he covered $\frac{1}{3}$ of it. In the second hour, he covered $\frac{1}{5}$ of the whole journey. Finally, he took 2 h to finish the remaining journey at a speed of 42 km/h.

Find his average speed for the whole journey.

Mark allocation: 7 marks for algorithm and diagrammatic representation

7 marks for concepts, skills and thinking processes   **(14)**

1.2   Now that you have solved the problems and explained how you solved them. You are going to discuss how each task can be used to develop either one of the main components of mathematical proficiency or it can develop all three.   **(20)**

1.3   To conclude your first submission, you are going to explain what is meant by number sense, in five sentences. Remember to explain in your own words.   **(5)**

[60]

QUESTION 2

2.1   For your second submission (**refer to case study**), you decided that your discussion will focus on the progression of rational number learning. To lay a foundation for your discussion you decided that you will first illustrate how to solve the following problems and then draw on these problems to discuss how rational number concepts develop in the intermediate phase.

2.1.1   Solve the following problem: **(5)**

Pam and Sam both have some face masks. They have blue masks, black masks, brown masks, and denim masks. They both counted how many of each colour they have.

Sam's masks are 50% blue, 35% black, 10% brown and 5% denim.

Pam's masks are 40% blue, 32% black, 20% brown and 8% denim.

They both have as few masks as possible with those percentages.

Who has the most masks?

Who has the most black masks?

Who has the most blue masks?

How many denim masks do they have between them?

2.1.2   Suppose you know that Pam and Sam have 10 denim masks between them how many flags do they have altogether? **(5)**

2.1.3   I'm thinking of a number. My number is a multiple of 4,5, and 6.

What could my number be?

What else could it be?

What is the smallest number it could be? **(3)**

2.2   As part of building your discussion, you decide to explain what multiplicative thinking is, by drawing on how you solved the problem in 2.1.3. **(7)**

2.3   You then proceed, to explain the learning progression of rational number in the intermediate phase by drawing on the two problems solved in 2.1.1-2.1.3.

In your discussion you need to explain and illustrate the representations/models needed when teaching rational number. **(20)**

[40]

TOTAL: 100