UNIVERSITY OF JOHANNESBURG

FACULTY OF EDUCATION

JUNE EXAMINATION 2018

PROGRAMME: B Ed Intermediate phase programme

MODULE: Mathematics for the Intermediate Phase

CODE: MATINA2

TIME: 2 hours

MARKS: 100

EXAMINERS: Mrs K Fonseca

MODERATOR: Prof C Long

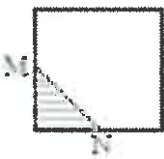(This paper consists of 7 pages)

INSTRUCTIONS:

Read the following instructions carefully before answering the questions.

1. This question paper consists of 5 questions.
2. Answer all the questions.
3. Number the questions correctly as in the question paper.
4. Read each question carefully before answering.
5. Show ALL working out.
6. You may **NOT** use a calculator.
7. Write NEATLY and LEGIBLY.

	Question 1: Multiple Choice	**11 marks**
1.1	Which of these numbers is the smallest number?	(1)
A.	0, 07	
B.	0, 2	
C.	0, 068	
D.	0, 2443	
1.2	At school A, a bell rings every half an hour and at school B a bell rings every 35 minutes. If the two bells ring together at 08:00 when will they ring together again?	(2)
A.	10:30	
B.	10:55	
C.	11:30	
D.	12:00	
1.3	The first odd number is 1, the second is 3 and the third one is 5. What is the hundredth odd number?	(2)
A.	99	
B.	201	
C.	199	
D.	101	
1.4	$2000 - 1999 + 1998 - 1997 + \cdots + \cdots + 2 - 1 =$	(2)
A.	2000	
B.	1	
C.	0	
D.	1999	

1.5	What is the Highest Common Factor (HCF) of 12, 16, 24, 40?	(2)
A.	3	
B.	4	
C.	8	
D.	12	
1.6	M and N are the midpoints of the sides of the square. What fraction is the triangle of the square?	(2)
A.	$\dfrac{1}{16}$	
B.	$\dfrac{1}{4}$	
C.	$\dfrac{1}{8}$	
D.	$\dfrac{1}{12}$	

Question 2		**20 marks**
2.1	State the Fundamental Theorem of Arithmetic.	(2)
2.2	Write 2 340 as a product of its prime factors.	(3)
2.3	Let $a = 2^3.3^1.7^2$	
2.3.1	Is $2^2.7^1 = 28$ a factor of a ? Why or why not?	(2) .
2.3.2	Is $2^1.3^2.7^1 = 126$ a factor of a ? Why or why not?	(2)
2.3.3	One factor of a is $b = 2^2.3^1$. What is the quotient when a is divided by b?	(3)

2.4	A learner claims that 157 163 is divisible by 3 since the last digit in the number is 3. Explain how you would correct the learner's thinking.	(3)
2.5	Find the HCF for 195 and 330	(2)
2.6	Ms Chauke's learners are working on the following problem: *Is 371 a prime number?* As she walks around the room looking at their books, she **sees** many different ways to solve this problem. Which solution method is correct? A. Check to see whether 371 is divisible by 2, 3, 4, 5, 6, 7, 8 0r 9 B. Break 371 into 3 and 71 they are both prime. C. Check to see whether 371 is divisible by any prime number less than 20. D. Break 371 into 37 and 1 they are both prime, so 371 must also be prime. Explain, why you say so.	(3)

Question 3		**32 marks**
3.1	Given the list of numbers: $$-7{,}7 \; ; \; 5 \; ; \; \sqrt{-6} \; ; \; 8 \; ; \; \sqrt{35} \; ; \; 36 \; ; \; \frac{71}{3}$$ Write down:	
3.1.1	A prime number	(1)
3.1.2	An irrational number	(1)
3.1.3	A factor of 32	(1)
3.1.4	A square number	(1)
3.1.5	An unreal number	(1)
3.2	Justify each step in the calculation by stating a property of the whole numbers: $18 \times 4 = (10 + 8) \times 4$ *expanded notation* $= 10 \times 4 + 8 \times 4$ **3.2.1**_____	(4)

	$= 10 \times 4 + 32$ *one − digit multiplication fact* $= 10 \times 4 + (3 \times 10 + 2)$ *expanded notation* $= 4 \times 10 + (3 \times 10 + 2)$ 3.2.2 _____ $= (4 \times 10 + 3 \times 10) + 2$ 3.2.3_____ $= (4 + 3) \times 10 + 2$ 3.2.4 _____ $= 7 \times 10 + 2$ *one − digit addition fact* $= 72$	
3.3	When asked to add 1 million to the following number; 29 368 400, two grade 5 learners gave the following responses: **Alex:** 39 368 400 **Siya:** 210 368 400	
3.3.1	What error did the learners make and why do you think they made these errors?	(4)
3.3.2	Explain what you would do to help the learners correct these errors.	(3)
3.4.1	Calculate 132×23 using the partial – products algorithm.	(3)
3.4.2	Lucy is struggling to multiply 3-digit numbers by 2-digit numbers. You decided that you would help her by drawing a rectangular-area-model for 132×23 to help her understand after you have shown her the partial - product algorithm. Illustrate 132×23 in a rectangular-area-model and explain why this model is useful when teaching multiplication of multi-digit numbers.	(5)
3.5.1	When two odd numbers are added will the result always be an even number? Use inductive reasoning to determine your answer.	(3)
3.5.2	Use representational reasoning to show your answer.	(3)
3.5.3	Explain what is a conjecture.	(2)
Question 4		**25 marks**
4.1	Find a rational number between the two given rational numbers.	

4.1.1	$\dfrac{2}{3}$ and $\dfrac{3}{4}$	(2)
4.1.2	$\dfrac{5}{12}$ and $\dfrac{3}{8}$	(2)
4.2	Calculate:	
4.2.1	$\dfrac{1}{2} + 2\dfrac{3}{4} - \dfrac{3}{8}$	(3)
4.2.2	James spends $\dfrac{1}{8}$ of his allowance on CD's and $\dfrac{2}{5}$ on movies and $\dfrac{1}{3}$ on take-aways. What fraction of his spending money is left?	(4)
4.3	Calculate $\dfrac{1}{4} + \dfrac{2}{3} = $; illustrate your working out with the aid of fraction strips.	(4)
4.4	Illustrate why $\dfrac{2}{3} \times \dfrac{4}{5} = \dfrac{8}{15}$; using a number line.	(3)
4.5	Calculate $\dfrac{3}{8} \div \dfrac{2}{5} = $; illustrate your working out with the Rectangular- Area-model.	(4)
4.6	When asked to evaluate the difference $\dfrac{9}{11} - \dfrac{3}{22}$, a student gave the answer $\dfrac{165}{242}$. What would you suggest to the learner?	(3)

Question 5		12 marks
5.1	Write the sequence of numbers in ascending order (from smallest to biggest); $0,017; 0,007; \ 0,0017; \ 0,027$	(2)
5.2	Convert the following decimal fractions into common fractions: (a) $2,255$ (b) $0,\dot{3}$	(4)
5.3	Calculate: $2,2 \times (5,6 - 1,\dot{6}) \div 8$	(3) •
5.4	When asked to perform the decimal computations $3,6 \times 0,2$ and $8,36 \div 0,4$, some learners submitted the answers shown below:	

	$\begin{array}{r} 3.6 \\ \times 0.2 \\ \hline 7.2 \end{array}$ $\qquad$ $0.4\overline{)8.36}$ with quotient 2.9		
5.4.1	Identify the errors made by each student.	(2)	
5.4.2	Explain how the learners can avoid making the same errors in future.	(3)	