



UNIVERSITY OF JOHANNESBURG
FACULTY OF EDUCATION
JULY EXAMINATION 2017

PROGRAMME: B Ed Intermediate phase programme

MODULE: Mathematics for the Intermediate Phase

CODE: MATINA2

TIME: 2 Hours & 30 minutes

MARKS: 100 marks

EXAMINERS: Mrs K. Fonseca

MODERATOR: Professor C. Long & Mr E. Libusha

(This paper consists of **9 pages**)

INSTRUCTIONS:

1. Read each question carefully before answering.
2. Questions may be answered in any sequence.
3. Number all answers clearly.
4. You may **NOT** use a calculator.

Question 1: Only write the number and appropriate letter (E.g. 1.1 A)

[16]

1.1 Which of these is the BEST estimate of $\frac{4.21 \times 8.86}{12.09}$? (1)

A. $\frac{4 \times 8}{12}$

B. $\frac{5 \times 8}{12}$

C. $\frac{4 \times 9}{12}$

D. $\frac{42 \times 88}{121}$

E. $\frac{4 \times 89}{12}$

1.2 Which of these show how 48 can be expressed as a product of prime factors? (1)

A. $1 \times 4 \times 12$

B. $2 \times 2 \times 2 \times 2 \times 3$

C. $4 \times 4 \times 3$

D. $1 \times 6 \times 8$

E. $2 \times 4 \times 2 \times 3$

1.3 Which of these number sentences is true? (2)

A. $\frac{3}{10}$ of 50 = 50% of 3

B. 3% of 50 = 6% of 100

C. $50 \div 30 = 30 \div 50$

D. $\frac{3}{10} \times 50 = \frac{5}{10} \times 30$

E. $0.03 \times 50 = 0.05 \times 30$

1.4 The ratio of boys to girls in Grade 6 is 4 : 5. If there are 270 Learners in Grade 6, how many girls are there in Grade 6? (2)

A. 65.5

B. 54

C. 150

D. 50

E. 40

1.5 97 is a prime number. When its digits are reversed, the new number is also prime, i.e. 97 and 79 are both prime. How many two-digit prime numbers, less than 50, have this property? (2)

A. 2

B. 3

C. 4

D. 5

E. 6

1.6 Which statement is NOT true? (1)

A. $1 + 1 - 1 \times 1 = 1$

B. $1 - 1 \times 1 + 1 = 1$

C. $2 - 2 \div 2 + 2 = 2$

D. $3 - 3 + 3 \times 3 = 9$

E. $4 - 4 \div 4 \times 4 = 0$

1.7 What fraction is exactly halfway between $\frac{1}{4}$ and $\frac{1}{12}$? (2)

A. $\frac{1}{8}$

B. $\frac{3}{12}$

C. $\frac{1}{6}$

D. 0.6

E. $\frac{1}{2}$

1.8 Which of the following numbers is not a multiple of 4? (1)

A. 604

B. 240

C. 300

D. 280

E. 230

1.9 Penny had a bag of marbles. She gave one-third of them to Rebecca, and then one-fourth of remaining marbles to John. Penny then had 24 marbles left in the bag. How many marbles were in the bag to start with? (2)

A. 36

B. 48

C. 60

D. 90

E. 110

1.10 Which expression is equivalent to $(25^{-2})^4$? (2)

A. -50^6

B. $\frac{1}{5^{16}}$

C. $\frac{1}{1}$

D. 25^2

E. 5^6

Question 2

[20]

- 2.1 Place the following five decimals in order from smallest to largest. (4)

$$0.61; \frac{6}{10}; 0.006; 0.0059; \frac{6}{100}; 0.0601; 0.0519; 0.0612$$

- 2.2 A person wants to round 86.23498 to the nearest hundredth. He first rounds 86.23498 **TO** 86.2350. He then rounds it to 86.235. Finally; he rounds it **TO** 86.24. Is this process of mathematical reasoning correct or incorrect. Explain. (3)

- 2.3 Write as an equivalent decimal, $\frac{2}{7}$ (2)

- 2.4 Calculate the following: (4)

$$12 \div 0.03 - 50 \times (0.5 + 1.5)^3$$

- 2.5 The diameter of an atom is:
 $0.000000027m$

- 2.5.1 Write this number in scientific notation. (2)

2.5.2 Write in **standard notation**: (2)
 2.341×10^{14}

2.6 Multiple the following: (3)
 $(1.8 \times 10^9 g)(3.6 \times 10^2 g)$

Question 3

- [26]
- 3.1 Determine whether the following statements are **TRUE** or **FALSE**
- 3.1.1 0.125 is a rational number and a real number. (1)
- 3.1.2 All irrational numbers are non-real numbers. (1)
- 3.1.3 All irrational numbers can be written as a ratio and a fraction. (1)
- 3.1.4 Subtraction of whole numbers is commutative. (1)
- 3.1.5 An even number multiplied by an odd number equals an even number. (1)
- 3.1.6 The product of any common fraction and its multiplicative inverse is 1. (1)
- 3.2 What is the additive inverse of -121 ? (1)

3.3 Use any example to show how division of whole numbers is not associative. (3)

3.4 Teaching procedural fluency without conceptual understanding can lead to many misconceptions and errors in mathematics. Procedural errors are especially evident when learners have to perform four basic operations with 2 and 3- digit whole numbers. (5)

The following are three learners' solution to the multiplication of two-digit numbers. **Explain** what errors are made in each algorithm.

$ \begin{array}{r} 49 \\ \times 25 \\ \hline 405 \\ 108 \\ \hline 1245 \end{array} $	$ \begin{array}{r} 49 \\ \times 25 \\ \hline 225 \\ 100 \\ \hline 325 \end{array} $	$ \begin{array}{r} 49 \\ \times 25 \\ \hline 1250 \\ 25 \\ \hline 1275 \end{array} $
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3.5 Simplify: (4)

$$\sqrt{20}(\sqrt{125} - \sqrt{64 + 16})$$

3.6 A clock chimes every 12 seconds; a second clock chimes every 18 seconds and a third clock every 30 seconds. If all of the clocks chime together, after how many seconds will they chime simultaneously again? (4)

3.7 $A = 2 \times 3^2 \times 5$, $B = 2^3 \times 3 \times 5^2$ and $C = 3 \times 5^3$, (3)

Determine: $\frac{B \times A}{C}$

Question 4

[21]

- 4.1 Determine THREE rational numbers between $\frac{1}{16}$ and $\frac{3}{16}$. (3)
- 4.2.1 Write two equivalent fractions for $\frac{9}{27}$ (2)
- 4.2.2 Represent your equivalent fractions in 4.2.1, on a number line and diagrammatically. (4)
- 4.3.1 Simplify: (3)
- $$\frac{1\frac{1}{2}}{\frac{1}{4}}$$
- 4.3.2 Then write a word/story problem, which models this computation, that is, for which this computation provides the answer. (3)
- 4.3.3 When teaching division of fractions (such as the example in question 4.4.1) teachers teach the rule 'tip and times', meaning the divisor should be inversed and the division operation changes to multiplication. (3)
- Give a mathematically correct explanation for the 'tip and times' rule.

- 4.4 At the Primary schools Athletic Challenge $\frac{1}{3}$ of the spectators are male, $\frac{3}{7}$ females and the remainder children. What fraction of the spectators is children? (3)

Question 5

[17]

- 5.1 Write each of the decimals as percentages: (3)
- (a) 0.6 (b) 0.008
- 5.2 Write each of the fractions as percentages; (2)
- (a) $\frac{2}{6}$ (b) $\frac{14}{25}$
- 5.3 Calculate 25% of 1244 (2)
- 5.4 Rori buys T-Shirts at R78.50 each and sells them for R149.99 each. Her other expenses amount to R35.70 per T-Shirt.
- 5.4.1 Calculate the amount profit/loss that she makes on each T-Shirt. (2)
- 5.4.2 What is the percentage profit/loss she makes? (3)
- 5.5 Mike makes a journey from Johannesburg to Durban. In the first half hour, he covered $\frac{1}{7}$ of it. In the second half hour, he covered a $\frac{1}{3}$ of the remaining journey. Finally he took another half an hour to finish the journey at a speed of 72km/h .
- 5.5.1 Calculate the average speed for the whole journey. (5)

QUESTION 3 (MS Excel)

Open the MS Excel spreadsheet (<your studentno Q3>) from its saved location in your folder and execute the provided instructions. Follow the provided instructions

All instructions are on the file

Sub-total [100/2 = 50]

QUESTION 4 (MS PowerPoint)

Open the MS PowerPoint presentation < your studentno Q4> that contains a set of slides with graphics. Follow the provided instructions in each slide:

Sub-total [45]

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ANNEXURE – QUESTION 2

	Fruits	Vegetables
Orange		
Strawberry		
Pineapple		
Grapes		
Apple		
Potato		
Cabbage		
Beans		
Peas		
Tomato		
Carrots		
Cauliflower		

TOTAL: 100 MARKS