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University of Fort Hare

East London Campus

Course Code: 50046

Bachelor of Education in Intermediate Phase Teaching

MTH 121 E

Mathematics in Education 1

NOVEMBER 2019

Time: 3 hours
Subject: Mathematics Education 1
Marks: 100 Marks

This paper consists of 12 pages including this cover page

Internal Examiner

Dr Peter Shaw

Moderator

Dr Mwezeni Nela

Notes

- Sections 1 and 2 are answered in UFH Multiple Choice Answer Sheets
- Section 3 is answered in this exam script
- Fill in your details in the textbox above and below
- NO CALCULATORS MAY BE USED
- Colouring pencils and pens may be used

Section	Value	Internal	Moderator
1	20		
2	20		
3	60		
Total	100		

STUDENT'S DETAILS

Student Number:

Surname:

First Name:

Date of Examination:

EXAMINERS SIGNATURES

Dr Peter Shaw:

Dr Mwezeni Nela:

Result:

SECTION 1

(1 mark each)

On the Multiple Choice Answer Sheet, select A for a true answer or B for a false answer

1. The main focus of Advance Organisers is to examine our prior knowledge of a particular topic
2. TIMSS is an acronym for Trends in Mathematics and Science Studies
3. TIMSS research is conducted on a 6 year cycle
4. In teaching and learning, 'setting out' refers to the techniques we use to properly display our thinking on chalkboards and in our written work in note-books
5. Rote-learning means that we mainly learn facts, repeat information and rehearse processes
6. A spiral curriculum implies that we examine any big idea only ever one time
7. CAPS is based on a spiral curriculum.
8. In the calculation: $12 \times 32 + 16 \times 33$, the first step is to add 32 and 16 together.
9. The correct answer to: $3 + 5 \times 7 - 2$, is 40.
10. The numbers 31, 37, 41 and 43 are all examples of prime numbers.
11. The numbers 4, 25, and 81 are all examples of perfect squares.
12. The natural number factors of 28 are 1, 2, 4, 7, 14 and 28
13. All natural numbers are also whole numbers.
14. The number 24 622 105 is two-hundred-thousand more than 24 602 105
15. A $\frac{1}{4}$ of a $\frac{1}{4}$ is $\frac{1}{8}$
16. In CAPS, for progression from one grade to the next, we use Formative Assessment
17. 64 is an example of a perfect square and a perfect cube
18. In 123 456 789,51 the place-value of the 2 is twenty million
19. The concepts of "assimilation and accommodation" are linked to Bruner's theory of learning
20. "Equilibrium" is a state where new information has been assimilated and accommodated.

SECTION 2

(1 mark each)

On the Multiple Choice Answer Sheet, select one option: A, B, C, D or E for each question

21. Which one of the following is an example of an open question?
- A. What is: $8 - 3 \times 7$
 - B. What is the sum of -12 plus -4?
 - C. Continue this sequence: 1, 4, 16, 64, _____, _____, _____
 - D. What numbers can you make with 4, 5 and 6?
 - E. None of the above
22. Which one of the following sequences of numbers goes from bigger value fractions on the left to smaller fractions on the right.
- A. $\frac{1}{4}$ $\frac{1}{5}$ $\frac{1}{6}$ $\frac{1}{7}$
 - B. $\frac{3}{4}$ $\frac{6}{8}$ $\frac{9}{12}$ $\frac{12}{16}$
 - C. $\frac{3}{16}$ $\frac{1}{4}$ $\frac{2}{9}$ $\frac{2}{5}$
 - D. $\frac{1}{5}$ $\frac{1}{4}$ $\frac{1}{3}$ $\frac{1}{2}$
 - E. None of the above
23. The number sequence: 2, 4, 6, 8, 10, etc., is a list of:
- A. Odd numbers
 - B. Perfect Cubes
 - C. Skip jumping
 - D. Doubling
 - E. None of the above
24. The number sequence: 2, 4, 8, 16, 32, etc., is a list of:
- A. Powers of 2
 - B. Triangular numbers
 - C. Doubling
 - D. Perfect cubes
 - E. None of the above
25. Our ability to interpret figural information (IFI), explains how...
- A. we can imagine mathematical solutions in our brain
 - B. we use rulers and mathematical apparatus to work with shapes
 - C. we use clues on mathematical pictures to solve problems
 - D. we gather information from the internet to support mathematical thinking
 - E. None of the above

26. A farmer has 6 chickens. Each chicken has 4 chicks. Each chick eats 2 pips. Altogether, how many pips do all the chicks eat?
- A. 48
 B. 60
 C. 32
 D. 44
 E. None of the above
27. The solution to: $\frac{1}{4} + \frac{1}{5}$ is:
- A. $\frac{2}{9}$
 B. $\frac{11}{20}$
 C. $\frac{9}{20}$
 D. $1\frac{2}{9}$
 E. None of the above
28. The solution to: $2\frac{1}{2} - 1\frac{1}{4}$ is:
- A. 1
 B. $1\frac{1}{4}$
 C. $\frac{3}{4}$
 D. $1\frac{1}{2}$
 E. None of the above
29. The solution to: $\frac{2}{4} \times \frac{3}{5} \times \frac{20}{12}$ is:
- A. $\frac{1}{4}$
 B. 3
 C. $\frac{1}{2}$
 D. $1\frac{1}{3}$
 E. None of the above
30. The solution to: $\frac{3}{7} \div \frac{39}{42}$ is:
- A. $\frac{7}{9}$
 B. $\frac{6}{13}$
 C. $\frac{4}{7}$
 D. 1
 E. None of the above

31. The concept of ZPD – Zone of Proximal Development – comes from the work of:
- A. Piaget
 - B. Bruner
 - C. Erikson
 - D. Donaldson
 - E. None of the above
32. Multiple Intelligences theory comes to us from the work of:
- A. Piaget
 - B. Bruner
 - C. Erikson
 - D. Donaldson
 - E. None of the above
33. Which of the following is not one of the original Multiple Intelligences?
- A. Interpersonal intelligence
 - B. Visual-spatial intelligence
 - C. Musical intelligence
 - D. Mechanical intelligence
 - E. Intrapersonal intelligence
34. Which ONE of the following statements is not correct?
- A. $13,5 \div 0 = 13,5$
 - B. $0 \times 89 = 0$
 - C. $0 \div 0 = \text{indeterminate}$
 - D. $0 - 16,24 = 16,24$
 - E. None of the above
35. The sum of two numbers is 124. One number is three times bigger than the other number. The two numbers are:
- A. 30 and 94
 - B. 31 and 93
 - C. 32 and 92
 - D. 33 and 91
 - E. None of the above

36. 44 fence-poles are connected in a straight line with a distance of 3m between each pole. What is the distance between the first and last pole?
- A. 129m
 - B. 130m
 - C. 131m
 - D. 132m
 - E. None of the above
37. Rote learning is a learning strategy in which:
- A. Learners work in groups to deeply investigate possible solutions to big questions
 - B. Learners repeat words and methods and practice the same routines repeatedly
 - C. Learners are expected to take risks and try out different ideas to solve complex problems
 - D. Learners use intuition, life-experience, and insights to solve problems
 - E. None of the above
38. Which one of the following is an example of an open question?
- A. $84 - 52 + 26 = ?$
 - B. How might you estimate the square root of 98?
 - C. Is 4 x 3 bigger or smaller than 2 x 5?
 - D. Is 49 a prime number?
 - E. None of the above
39. Epistemology refers to:
- A. a theory of knowing, a view of what is 'knowledge'
 - B. the methods and practices of teaching in the classroom
 - C. a description of the methods used for teaching
 - D. a description of the activities undertaken in the classroom
 - E. None of the above
40. Compression, in mathematics, is a term we use to explain that:
- A. different types of mathematical operators are placed into separate categories
 - B. new ideas are quickly lost if they are not regularly practiced
 - C. brackets are put around e.g. (12×5) to remind us to first multiply before we add
 - D. previously learned ideas, concepts and skills have become automatic
 - E. None of the above

Now, carefully check your Multiple Choice Answer Sheet:

Make sure that you have correctly filled in your student number and have correctly shaded in the appropriate student number circles.

Once you have done this, set the sheet to one side and continue with the rest of your examination paper.

SECTION 3

Fill in the appropriate answer to each question in the space that is provided for the answer. Remember that the presentation – the setting-out – of your answers is also being evaluated and marks will be deducted for cases where poorly set-out or untidy work is presented.

- 1 Use the **table (columns) method** to find the difference: $33\,646 - 14\,742$ (3 marks)

- 2 Use **long division (columns)** to find the quotient: $2\,160 \div 16$ (4 marks)

- 3 Construct a number-line to provide a visual representation of **multiplication as repeated addition** to find the product of 4×6 . (3 marks)

4 In the space below, rewrite 231 729 in **expanded notation**. (1 mark)

5 Below, label the **appropriate names** for the three parts of the mathematical operation. (3 marks)

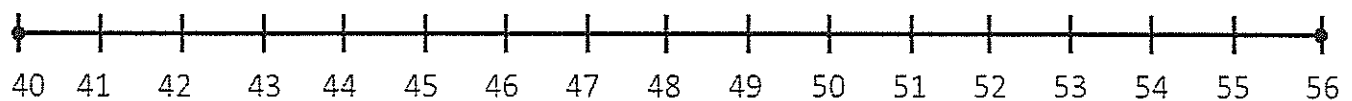
$\rightarrow 42 \div 8 = 5 \leftarrow$

6 Find the **prime factors** of 48 and list your answer in **exponent form**. (2 marks)

Answer: $48 =$ _____

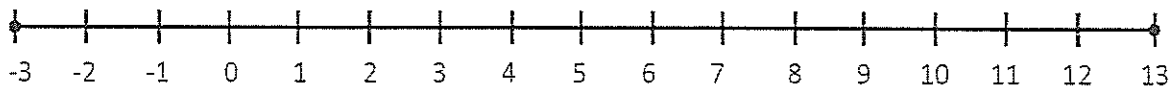
7 What does the term **instrumental knowledge** mean? (2 marks)

8 **Circle all the composite numbers** on the number line below (2 marks)



9 In bullet form, discuss the steps taken by teacher & pupils in find-my-rule activities (3 marks)

10 Numbers have both an ordinal value and a cardinal value. Below, on the number-line, neatly demonstrate the ordinal and cardinal values of 10. (2 marks)



11 Below, neatly construct a formal number line to demonstrate directed numbers to find the solution for $2 + 9 - 5 + 4$ (4 marks)

14 Use expanded notation and an empty number line to show the addition of $344 + 227$ (3 marks)

15.1 Explain how, *without the use of a calculator*, we can approximately determine the length of the side of a square which has an area of 41m^2 . (2 marks)

15.2 Approximately, **what is the length** of the side of a square with area 41m^2 ? (1 mark)

16 List, **one fact per line**, all of the mathematical things that you know about 13. (4 marks)

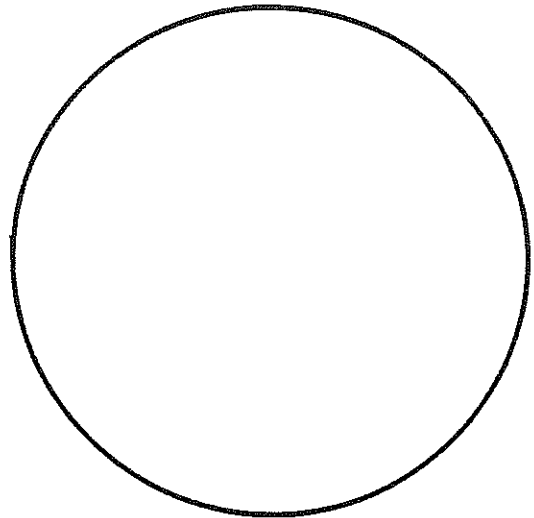
17 Historical evidence suggests two explanations for there being 360° in a circle. Give a brief summary of each of these origins for 360°. (4 marks)

EXPLANATION 1 _____

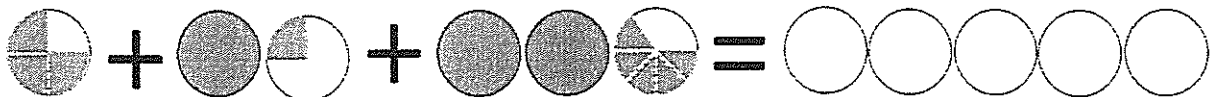
EXPLANATION 2 _____

18 On the provided circle, please neatly insert and label the following: (3 marks)

- A tangent to the circle
- A sector
- A chord



19 Below each fraction circle, neatly write the common fraction or mixed number. Then on the right side of the equals sign, shade in the correct answer and below that, write the appropriate answer. (4 marks)



End of Examination 😊