UNIVERSITY OF FORT HARE

DESCRIPTION OF MODULE

IPS 226 E

BACHELOR OF EDUCATION

November

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Time: 3 HOURS

Subject: MATHEMATICS

Marks: 100

This paper consists of 5 pages including the cover page

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INSTRUCTIONS

- **Answer all the questions**
- **Number your answers exactly as they are numbered in the question paper.**
- **Show all the calculations clearly.**

QUESTION 1 **[35]**

1.1 CAPS (2011) defines Mathematics as the language that uses symbols and notations to describe numerical, geometric and graphical relationships. Define the following mathematical concepts used in patterns:

1.1.1 conjecture (2)

1.1.2 geometric pattern (2)

1.1.3 inductive reasoning (2)

1.1.4 implication (2)

1.1.5 numeric patterns (1)

1.2 List and explain the three kinds of knowledge as discussed in class. (9)

1.3 For each kind of knowledge in 1.2, indicate the role(s) of the teacher. (3)

1.4 The content area Patterns, Functions and Algebra has topics such as Numeric Patterns and Geometric Patterns.

1.4.1 Design a classwork with clear instruction(s) for grade 6 learners where you want them to investigate and extend numeric patterns. In the classwork, use activities that involve

(i) A constant difference (2)

(ii) A constant ratio (2)

(iii) Without a constant difference or ratio (2)

1.5 All the statements below are false. Give the counter - example for each:

1.5.1 All triangles have angles less than 90^{o} (2)

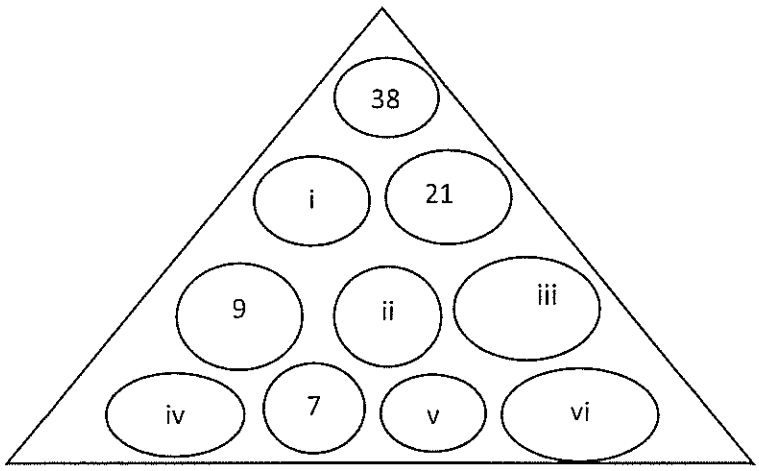
1.5.2 When you multiply a number by 2, the product is always a multiple of 4. (2)

1.5.3 All multiples of 3 are prime numbers. (2)

1.5.4 All odd numbers are composite numbers. (2)

QUESTION 2 **[25]**

2.1 Pyramids provide another constructive activity for developing number sense and pattern understanding. Below is an example of a pyramid with missing numbers.



2.1.1 Complete by filling in the missing numbers. (6)

2.1.2 Explain in your own words, to the grade 4 learners how did you find each missing numbers. (3)

2.2 Problem solving is one of the teaching methods that a teacher uses when dealing with number sentences. State the four steps of problem solving by Polya. (4)

2.3 The plumber charges R75 to visit my house and R50 per hour for his labour.

2.3.1 How much will I have to pay if he works for 1 hour, 3 hours, 5hours, 8 hours and 11 hours?. Show by means of a table. (5)

2.3.2 Show this by means of a flow chart. (4)

2.3.3 Write down the number sentence for the problem (3)

QUESTION 3 **[40]**

3.1 An investigation is one of the teaching methods used to teach the content area Patterns, Functions and Algebra.

3.1.1 Give 3 roles of learners when the above method is used in a Mathematics class. (3)

3.2 A Mathematics investigation was given to Grade 6 learners:

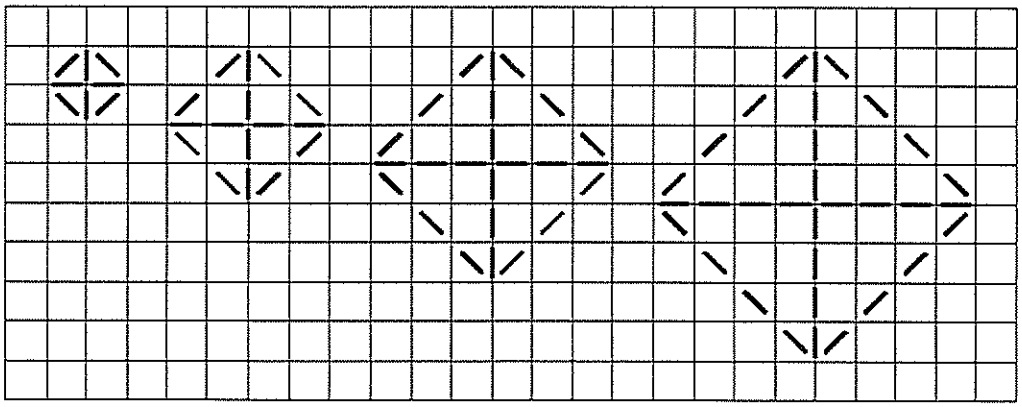
"Suppose you fold a piece of paper in half. When you unfold it, the paper is divided into 2 rectangles. As you increase the number of folds, you increase the number of rectangles ".

3.2.1 Draw a table to indicate the number of rectangles you get each time a paper is folded. The paper must be folded 8 times. (8)

3.2.2 How many rectangles would you get if you folded a piece of paper in half eight times? (2)

3.2.3 Find the nth term of the above pattern. (2)

3.3 Look at the figure below:



3.3.1 Using algebra, investigate by showing all the steps to be taken if you want to find the number of match- sticks in the *n*th shape? (8)

3.4 The following sequence **1, 2, 4, ...** was given to the learners. Learners were asked to find the third term of the sequence. Below is the responses from the learners:

Peters' response: 6

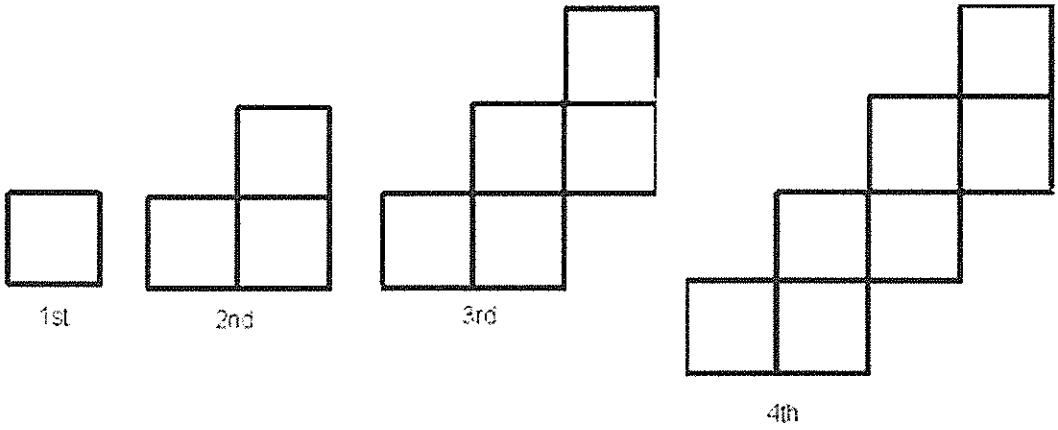
Bels' response: 8

Pauls' response: 7

3.4.1 What conjecture is each learner making? (6)

3.4.2 Is there enough information to say who is correct, if No, as a teacher what would you suggest to make the pattern clear? (3)

3.5 Look at the figures below and answer the questions that follow:



3.5.1 Draw a table to represent the number squares versus the matchsticks of the above pattern. (4)

3.5.2 There are 118 matchsticks, how many squares will you have? (2)

3.5.3 Give a rule for the pattern given. (2)