UNIVERSITY
OF
JOHANNESBURG

FACULTY	: Education
DEPARTMENT	: CHILDHOOD EDUCATION
CAMPUS	: SWC
MODULE	: MATINB2
SEMESTER	: Second
EXAM	: NOVEMBER 2019

DATE	: November 2019	**SESSION**	1
ASSESSOR	: Mr E LIBUSHA		
MODERATOR	: Dr K Fonseca (University of Johannesburg)		
DURATION	: 2 HOURS	**MARKS**	: 100

INSTRUCTIONS

Read the following instructions carefully before answering the questions.

1. You are allowed to use a calculator.

2. Answer all questions correctly.

3. Write neat and legibly.

Question 1

1.1 Explain the difference between the values that are direct proportion and those that are indirect proportion and also give one example of each in a form of a table — 6

1.2 Tshifhiwa wins R80 000 on the lottery, he gives 25% to charity and shares the rest between himself, his wife and his children in the ratio 5 : 3 : 2. If he keeps the largest share, how much does he receive? — 4

1.3 The ratio of gay men to straight men in prison is 7:8. If there are total of 21 gay men, how many straight men are there? — 2

1.4 Write 8:7 in a form of fraction — 1

1.5 Explain what is the difference between procedural fluency and conceptual understanding. — 4

1.6 When the following problem is given to grade 6 learners to solve: Their solutions can either demonstrate the intertwining of both conceptual understanding and procedural fluency or only procedural fluency.

> **In a box, the ratio of red marbles to blue marbles is 7:4. What is the total number of blue marbles in the box if there are 20 red marbles?**

1.6.1 Illustrate how a learner with conceptual understanding would solve this problem, then — 3

1.6.2 Illustrate how a learner could solve this problem procedurally without really understanding the ratio concept. — 3

1.7 Define the use of is strategic competence in the mathematics classroom as defined by Kilpatrick et al(2009) — 2
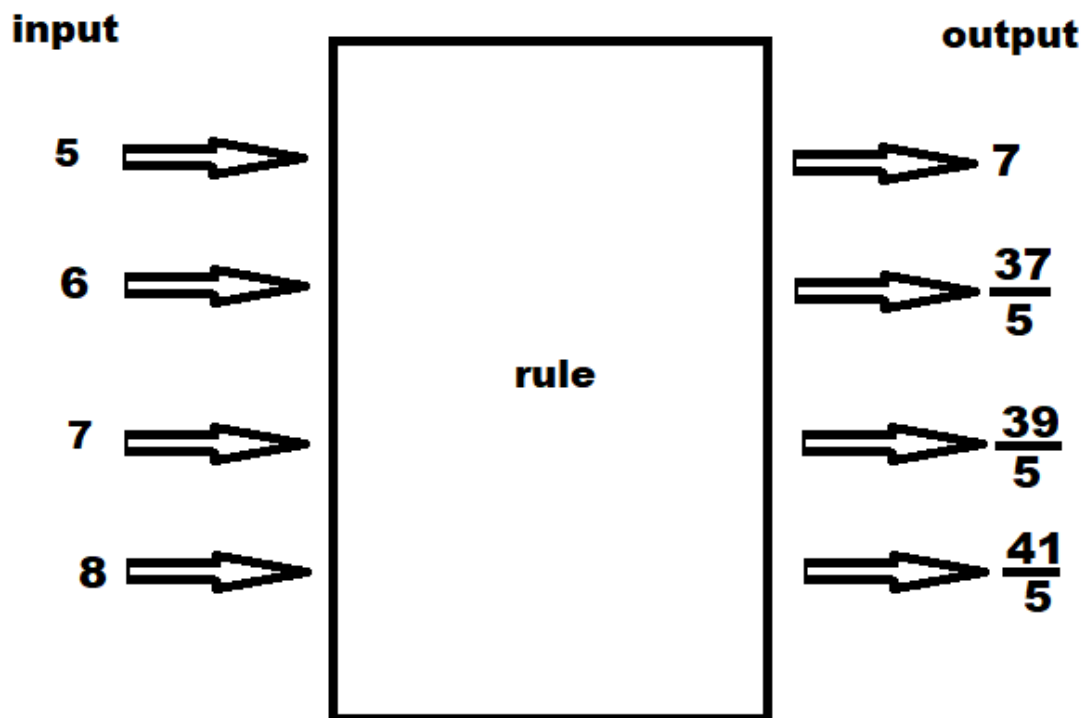
[25]

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Question 2

Simplify (show calculations)

2.1 $$\frac{3^{4n} \times (27^n \times 9^n)^2}{81^{n+1} \cdot 27^{2n-1} \cdot 9^{2n-1}}$$ — 6

2.2 $-(-8 - 6) - \{8 - |-9 + 4| - 8(3^3 \div 3) \div 6\}$ — 3

2.3 Determine the rule in the following flow diagram   4

input   **rule**   **output**

5 ⟹   ⟹ 7

6 ⟹   ⟹ $\dfrac{37}{5}$

7 ⟹   ⟹ $\dfrac{39}{5}$

8 ⟹   ⟹ $\dfrac{41}{5}$

2.4 Solve for x:

$-8x+12 = -7(x+3)$ 3
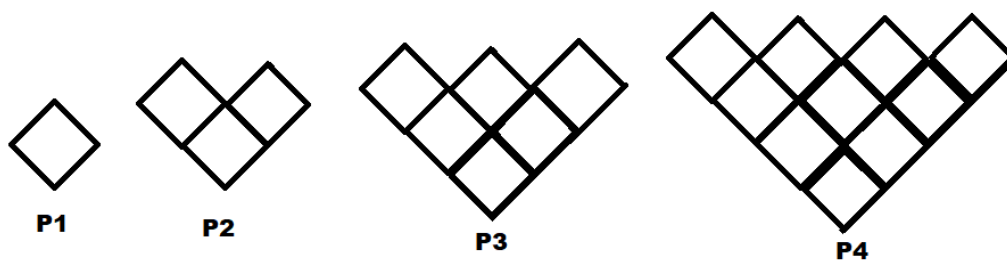
2.5 Solve the following:

4

A father is 30 years older than his son. Six years ago, the father was three times as old as his son. How old is the father and the son now?

[20]

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Question 3

3.1 Study the pattern and answer the following questions

P1   P2   P3   P4

3.1.1   Draw the fifth (P5) pattern   2

3.1.2   Write the general rule for the pattern   5

3.1.3   Determine how many blocks will be in P10. (use the general rule from   2
         above)

3.2   Write the general rule (in the form of Tn =…) for the following pattern: 5; 9;   2
       13…

3.3   Study the following pattern and answer the question below.
              …4; 8; 12; 20;32; …

3.3.1   Describe the rule for the following number patterns in your own words.   2

3.3.2   Write down the value of the first term and the 7th term   2

3.4   Give an example of a geometric pattern. (write down 4 consecutive numbers)   2

                                                                                   [17]
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Question 4

4.1   Sketch the graph for the following functions on the same set of axis using dual   6
       intercept method on the diagram sheet provide at the end of this question
       paper:

       $4x - 2y = 8 \ \ and \ \ 3y = -x - 6$

4.2   Determine whether the following two lines are parallel, perpendicular or neither   4
       of the two:

       $\frac{1}{2}y = -1x + 4 \ and \ 4y + 8x = 12$

       Give a reason for your answer.

4.3   Determine the equation of the graph that is perpendicular to the graph with the   3
       equation $y = -\frac{1}{2}x - 8$. The graph also passes through point P(0;10)

4.4   If the gradient of the straight line graph is undefined, how does it affect the   2
       graph?

4.5   What is the product of the gradients of the two straight line graph that are   2
       perpendicular?

4.6   If two graphs have the same gradient, what would be the relationship between   2
       the two graphs?

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Question 5

5.1 Read, the following case study and answer the questions below:

While you were on Work Integrated Learning (WIL), the grade 5 mathematics teacher asked you to mark one of the class tests, the learners wrote. The purpose of the test was to assess learners' knowledge and skills about whole numbers. With specific reference to subtraction of whole numbers. As you were busy marking you noticed that the learners represented their work in various ways. Some learners represented their answers in the following way:

I II III

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   4  12          4   15           6 9 8 15
  5̶0̶2̶           3̶5̶0̶0̶5̶           7̶0̶0̶5̶
 –   6          –      6          –      7
 ――――          ――――――          ――――――
  406           34009            6988
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5.1.1 Differentiate between a mathematical slip, an error and misconception. 9
Give an example of each, other than the example in the case study.

5.1.2 Critically analyse the three students' solution methods by:

Provide a detailed explanation about the errors each student made to 6
solve the subtraction of whole numbers task

6.1.3 Give a detailed description of the mathematical concepts needed to be 4
understood to solve subtraction of whole number tasks

[19]

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Total: 100

Name_____   student no:_____

Diagram sheet 1