**UNIVERSITY OF JOHANNESBURG**
**FACULTY OF EDUCATION**
**NOVEMBER EXAMINATION 2014**

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| **PROGRAMME:** | B Ed |
| **MODULE:** | LEARNING AREA METHODOLOGY 3B: MATHEMATICS |
| **CODE:** | LMW3B20 |
| **TIME:** | 3 hours |
| **MARKS:** | 100 |
| **EXAMINER:** | Prof GJ Jacobs |
| | Mr FDM Kotze |
| **MODERATOR:** | Dr E Spangenberg |

(This paper consists of 9 pages, including **two (2 Annexures**)

**INSTRUCTIONS**

1. Answer **ALL** the questions.
2. Number your answers in accordance with the numbering system used in this question paper.
3. Annexures A and B should be returned with your answer book/sheets.
4. Questions may be answered in English or Afrikaans.

## QUESTION 1

1.1 Define the concept **assessment**. (7)

1.2 What, in your view, is the **overarching goal** of assessment? (1)

1.3 Outline **four steps** involved in any form of assessment. (4)

1.4 Name five school-based principles of **recording** and **reporting**. (5)

1.5 Distinguish between an assessment **method**, -**tool** and -**form** by firstly *defining* each of them and secondly by providing *four examples* of each of them, with specific reference to Mathematics. (15)

1.6 The main purpose of school-based assessment is to continuously fulfil five types of assessment, namely *baseline*, *informal*, *diagnostic*, *formal* and *systemic* assessment. Distinguish these five types of assessment from each

other and also describe the **desirable implementation** of each of them in the subject Mathematics. (15)

1.7 What is the **process** that ensures that assessment of learners is fair, valid and reliable, called? (1)

1.8 Three prominent requirements of a good examination paper are **validity**, **reliability** and **standard**. Explain in your own words what these three requirements mean. (6)

**(54)**

## QUESTION 2

2.1 Jayanthi, Gersten & Baker (2008), in their 2008-publication, "*Mathematics instruction to students with learning disabilities or difficulty learning. A guide for teachers*", differentiate between three areas of **mathematical ability**. Distinguish these three areas from each other. (6)

2.2 The three questions below appeared in a Gr 10 Algebra examination paper:

1. Simplify the following expression:

$$\frac{5.45^x}{9^x.5^{x+2}}$$

2. Solve the following equations, without the use of a calculator:

    2.1 $x^2 - 25 = 0$

    2.2 $2^x = 0.125$

3. For which value(s) of $x$ are the following expressions not defined in $R$?

    3.1 $\sqrt{x-7}$

    3.2 $\frac{5}{x-10}$

Draft an appropriate **memorandum** for these questions in your answer book. Clearly indicate the question numbers, the *marks* that you'll allocate per question, as well as *for what* each mark will be awarded in your memorandum. (12)

2.3 A Gr 10-learner attempted all the questions in 2.2 above. Mark the learner's answers in **Annexure A** (on p. 4). Clearly indicate *how many* marks you'll allocate to each answer, as well as *for what* each mark will be awarded. (8)

**(26)**

## QUESTION 3

In **Annexure B** (starting on p.5) you'll find a Grade 9 Mathematics examination paper. Carefully interrogate the paper and evaluate to what extent it meets the technical requirements of a **good paper** by identifying and listing deficiencies in respect of **(a)** its design, lay-out, consistency and **(b)** its content.

You are expected to number and to mark in colour (or highlight) each potential deficiency that you've identified in the attached paper and also to number and briefly describe (label) them in your answer book. You are required to identify **ten (10)** distinctive *technical* design, lay-out and consistency-related and **ten (10)** *content-related* deficiencies. **(20)**

**TOTAL: 100**

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# ANNEXURE A

**Initials & surname:** _____     **Student no:**_____

## Suggested answer to Question 1

$$\frac{5.45^x}{9^x.5^{x+2}}$$

$$= \frac{5.3^2.5^x}{3^{2x}.5^x.5^2}$$

$$= \frac{5.3^2}{3^{2x}.5^2}$$

$$= 5^{-1}.3^{2x-2}$$

$$= \frac{3^{2x}}{5^1.3^2}$$

$$= \frac{3^{2x}}{45}$$

## Suggested answer to Question 2.1

$$x^2 - 25 = 0$$

$$x^2 = 25$$

$$x = 5$$

## Suggested answer to Question 2.2

$$2^x = 0.125$$

$$x = -3$$

## Suggested answer to Question 3.1

$$\sqrt{x-7}$$

$$x = 0$$

## Suggested answer to Question 3.2

$$\frac{5}{x-10}$$

$$x = 10$$

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Make sure that you've inserted your surname, initials and student number above.

Also make sure that you've marked and awarded marks to **all five** answers.

Put your completed Annexure A **into your answer book**.

## ANNEXURE B

**Initials & surname:** _____          **Student no:**_____

# Exam College

GRADE 9: MATHEMATICS

Time:        2 hours                                        100 marks

### READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1. This paper consists of 6 pages. Please check that your paper is complete.

2. Read the questions carefully.

3. Answer all the questions.

4. Number your answers as the questions are numbered.

5. All the necessary working details must be clearly shown.

6. Approved calculators may be used except where otherwise stated.

7. It is in your interest to write legibly and present your work neatly.

8. Diagrams are not drawn to scale.

### HAND YOUR QUESTION PAPERS IN TOGETHER WITH YOUR ANSWER SHEETS
## GOOD LUCK

**QUESTION 1**

a) Write down the elements of the following set:
   $-3 \leq x \leq 5; \ x \in N$                                              (2)

b) Solve the following inequality by drawing a number line:
   $\{3x - 1 \leq 2; x \in R\}$                                              (3)

c) Express the following set in interval notation:
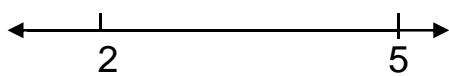


   2          5                                              (2)

**QUESTION 2**

Simplify the following:
(All answers must be left with positive exponents. No calculators may be used for this question.)

a)　　$3^x.3^2$　　　　　　　　　　　　　　　　　　　　　　　　　(1)

b)　　$296^0$　　　　　　　　　　　　　　　　　　　　　　　　　(3)

c)　　$\sqrt{16x^{16}}$　　　　　　　　　　　　　　　　　　　　　　(2)

d)　　$\dfrac{5^{n+4}}{5^{n+2}}$　　　　　　　　　　　　　　　　　　　　(2)

e)　　$\sqrt{6\dfrac{1}{4}}$　　　　　　　　　　　　　　　　　　　　　(2)

f)　　$\dfrac{3^3.5^{-1}.25^2.3^{-1}}{9.5^3}$　　　　　　　　　　　　　　　　(2)

**(14)**

**QUESTION 3**

Determine the value of S if $S = \dfrac{a(5-r^n)}{r}$ and a = 36, r = 2 and n = 3

**(5)**

**QUESTION 4**

a) For what value of x will the following expression be undefined?

$$x + \dfrac{3}{x-2} + 7$$　　　　　　　　　　　　　　　　　　(1)

b) Subtract $4x^3 - x + 2$ from $x^2 - 4x$ and add the answer to $x^3 - 4x^2$

**(1)**

**QUESTION 5**

Simplify:

a)　　$5 - 4(3-x) - x$　　　　　　　　　　　　　　　　　　　(2)

b)　　$(5x+1)(3x-2)$　　　　　　　　　　　　　　　　　　　(2)

c)　　$(2x-3)^2 - 7(x-2)(x-1)$　　　　　　　　　　　　　　(2)

d)　　$(x+7)(x-7)$　　　　　　　　　　　　　　　　　　　　(2)

e)　　$-3(2x-y)^2 - (x-y)^2$　　　　　　　　　　　　　　　(5)

**(13)**

**QUESTION 6**

Factorise fully:

a)     $p^4 - 16$                     (3)

b)     $x^2 + 14x + 45$              (2)

c)     $a(x+y) + b(y-x)$          (3)

d)     $m^2(a+b) - n^2(a+b)$       (3)

                                                      **(11)**

**QUESTION 7**

Simplify:

a)     $\dfrac{4x^2 y - 12xy}{8xy}$              (3)

b)     $\dfrac{x+1}{2} + \dfrac{2x}{3} + \dfrac{x-1}{6}$     (3)

c)     $\dfrac{3p+12}{p^2-16} \div \dfrac{3p^2 - 9p}{p^3 - 7p^2 + 12q}$     (6)

                                                      **(12)**

**QUESTION 8**

Solve for x:

a)     $x + 4 = 7$                    (1)

b)     $\dfrac{x}{2} = 6$                   (1)

c)     $2(3x-1) - 5(x-2) = 4x - 1$     (3)

e)     $\dfrac{x}{2} + \dfrac{x}{4} = 5 + \dfrac{x}{3}$       (3)

f)     $2x(x-4) + -2(x-3) = 2(x+2)^2$     (4)

                                                      **(12)**

**QUESTION 9**

Cattle are ruminants (as are sheep, goats, deer, and giraffes), which gives them a unique digestive system that allows the digestion of otherwise unusable foods by regurgitating and rechewing them as cud. Mr Nkuna bought 25 wide-horned, Texas-bred oxen. Cattle are considered to have been one of the first animals domesticated by man for agricultural purposes. They were tamed to provide milk, meat and hides and for draft purposes. For some of them he paid R400 each and for the others he paid R700 each. The world cattle population is estimated to be about 1.3 billion head, with about 30 percent in Asia, 20 percent in South America, 15 percent in Africa, 14 percent in North and Central America, and 10 percent in Europe. The 10 states in the US with the largest cattle populations are Texas, Missouri, Oklahoma, Nebraska, South Dakota, Montana, Kansas, Iowa, Kentucky, and Florida. Altogether he paid R14,200. How many of each did he buy?

**(7)**

**QUESTION 10**

Find the equations for the following lines:

a)     The line parallel to $2y = x + 5$ cutting the $y-$axis at $-4$.

(2)

b)
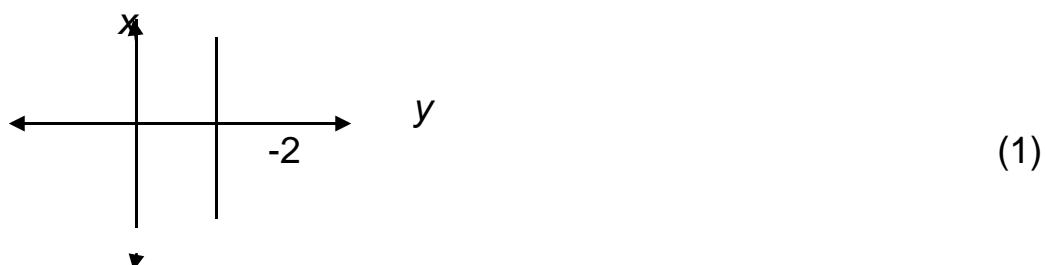


(1)

c)     The line perpendicular to $2y - 5x + 7 = 0$, cutting the y-axis at $-4$.

(3)

**(6)**

**QUESTION 11**

I.   Sketch the graph $2y = -4 + x$ using the dual-intercept method.

(2)

II.  On the same system of axis draw the line $x = 2$ (1)

III. Write down the co-ordinates where the two graphs meet. (2)

**(5)**

**QUESTION 12**

Use the graph to answer the questions that follow:
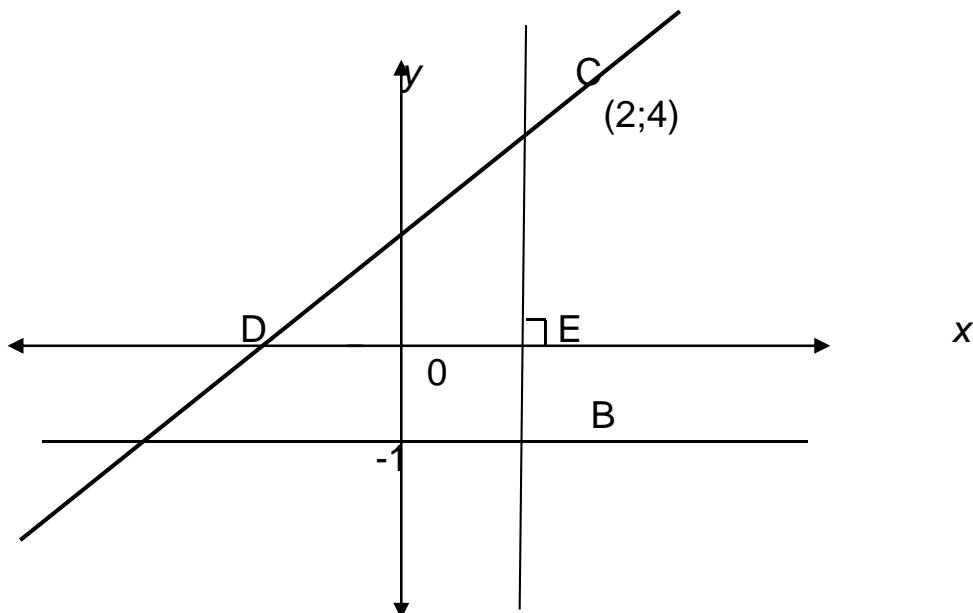


a)   Determine the equations of the lines:

1) BC (1)

2) AC (2)

b)   Write down the co-ordinates of B. (1)

c)   Find the length of OB. (2)

**(6)**

Make sure that you've inserted your surname, initials and student number on page 5.

Put your completed Annexure B **into your answer book**.

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