COMPETENCE BASED ASSESSMENT MATHEMATICS ITEMS WORK BOOK

SENIOR ONE TO SENIOR FOUR

BASED ON THE NEW LOWER SECONDARY CURRICULUM

By

NAME:_____ **CLASS:**_____

SCHOOL:_____ **YEAR:**_____

lwangawilliam11@gmail.com
+256750549201 / +256771803014

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Kawempe - Tula Road, Kampala

Near Kakungulu Police

Tel: +256771803014 (WHATSAPP) / +256750549201

E-mail: lwangawilliam11@gmail.com

You can also locate " Lwanga Books Ltd" easily using the " Google search" or " Google maps".

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Preface

This learner's topical items work book has been written in line with the revised mathematics syllabus for the new lower secondary curriculum.

This is a topical trial items book designed to tackle major topics in the current syllabus.

The items are graded in each topic and the main objective is to present the material in a manner for easy comprehension and understanding.

The book consists of **Some** Review sections in a number of topics which help a learner to recall several formulars where need be in order to bring out the meaning clearly.

The main reason for the designing of this book is to provide enough items for the students' practice in order to perfect in the subject and also provide confidence in the students after being exposed to a number of items in this book.

It is hoped that the book will be found useful for students' revision items at New Ordinary level ***and it will be more useful to a learner if he or she has the " Lwanga William Mathematics Learner's Research Book (detailed mathematics new curriculum notes)" by the same company.***

This learner's items book is one of the materials which are to be used to support the teaching and learning process of the new lower secondary curriculum.

Lwanga Books Ltd feels confident that this Book will be of immense value to both the learners and the teachers.

Any suggestions for improvement of this book are most welcomed, thanks.

"It is not what We do for you but what We will teach you to do for and by yourselves that will eventually make you successful beings in the society"

Acknowledgement

Lwanga Books Limited is deeply indebted to all those who participated in the development of **Lwanga William S1-S4 Competence Based Assessment Mathematics Items Work Book.**

Special thanks go to **Mr. Lwanga William**, the CEO Lwanga Books Ltd for his valuable insights and advice on all publishing matters.

We would like to express our sincere appreciation to all those who worked tirelessly towards the production of this learner's mathematics items book.

First and foremost, we would like to thank our families and friends for supporting all our initiatives both financially and spiritually, Lwanga William's parents; **Mr. William Lwanga** and **Mrs. Harriet Lwanga,** his brother; Mr. Nsubuga Grace.

The initiative and guidance of the publishing partners, Ministry of Education and Sports (MoES) and National Curriculum Development Centre (NCDC) in development and implementation of the New Lower Secondary Curriculum are highly appreciated.

We thank God for the wisdom He has given us to produce this volume of work.

May the Almighty God bless all the students that will use this book with knowledge to encounter all CBA Scenario Items incorporated in this Competence Based Assessment Mathematics Items Book…….**AMEN**.

We welcome any suggestions for improvement to continue making our service delivery better.

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NUMBER BASES, WORKING WITH INTEGERS, SEQUENCES AND PATTERNS

Items:

1. Muvule trees are to be planted in Busoga on both sides of the road at 30 *m* apart on one side of the road and 45 *m* apart on the other side. At one end of the road, two trees must be directly opposite to each other.

Task:

After what distance, measured from that end would a pair of trees be directly opposite each other? **[Ans: 90 *m*]**

2. Your friend has been elected as the new time keeper at your school. He has to ring the bell for changing lessons for O'level after 40 minutes while that for A'level after 60 minutes. Lessons for both 'O' and 'A' level have to begin at 7:20 *am* with the sounding of the bells together.

Task:

Help your friend to find the time when he has to ring the two bells together again.

[Ans: 9:20 *am*]

3. You visited a certain company and noticed that three bells ring at intervals of 20, 30, 40 seconds in a day as work is on-going. The Askari of the company has to begin by ringing them together for work to start and together for work to end of that day.

Task:

After what length of time will they ring together again in a a day? **[Ans: 120 seconds]**

4. Makanga, Zahara and Jjingo are running a 10,000 metres race. Makanga completes his first lap after 120 seconds, Zahara completes her first lap after 130 seconds while Jjingo completes his after 142 seconds.

Task:

When will they next be all at the starting point together? **[Ans: 110760 seconds]**

5. A family of Mr and Mrs.Kirya, and their daughter was promised some money from their family friend. The family friend wants the child, mother and father to get shs 7500, shs 9000 and shs12000 respectively.

Task:

Find the smallest sum of money which can be given to a family by the friend.**[Ans: 180,000]**

6. A certain number of oranges was divided into equal trips each containing 10, 15 or 25 oranges by your father.

Task:

Find the smallest number of oranges for which this is possible. **[Ans: 150]**

7. Square tiles are to be used to cover an area measuring 16.5 *m* by 12.75 *m* by your father. He needs the tiles to be all alike and only whole ones to be used.

Task:

What is the greatest size they can be? How many have to be bought by him?

[Ans: 0.5625 m^2, 374 litres]

8. Equal squares, as large as possible, have to be ruled off on a rectangular board 54 by 78 *cm*.

Task:

(i) Find the size of each square. **[Ans: 6 × 6 *cm* or 36 cm^2]**

(ii) How many squares are there? **[Ans: 117]**

9. A company is planning to distribute a set of electronic devices to its employees. The company wants to ensure that the devices are distributed in a fair and efficient manner. The devices come in different quantities, with one type available in sets of 24 and another type available in sets of 36.

Task:

Determine the largest number of employees for which the company can distribute the devices in equal numbers, ensuring no devices are left over.

10. During the mathematics contest organised at your school, the following question was left unsolved by all groups that were competing, "the product of two numbers is 1260 and their HCF is 6, find their LCM".

Task:

As an intelligent mathematician, help and solve. **[Ans: 210]**

11. The shortest piece of string can be cut into equal lengths, each of either 28 *cm*, 35 *cm* or 42 *cm*.

Task:

Find the length of that string?

12. You are planning a road trip across different states and want to ensure that you visit specific locations along the way. Each location has a different fequency of visitation, such as every 12 days, 15 days, and 20 days.

Task:

Optimize your travel plans such that you can visit all the locations at the same time during your road trip.

13. A school is organising a sports day and needs to arrange equipment for different activities. Each activity requires a specific number of items, such as balls, cones, and hurdles. The school wants to ensure that they have enough equipment for all activities without any shortages or excess items. The sports coordinator has noticed that one activity requires 12 balls, another requires 15 cones, and another requires 20 hurdles.

Task:

Help the sports coordinator to determine the total amount of each type of equipment needed for all the activities.

14. At your school, the Head master has decided to renovate the DOS's office which is a rectangular piece of room measuring 10 *m* long by 8 *m* wide with square tiles of equal side each.

Task:

(a) Find the value length of each square tile in metres **[Ans: 2 *m*]**

(b) Find how many tiles are needed if only whole ones are used? **[Ans: 20 tiles]**

15. The sitting room of your uncle's house measures 1440 *cm* by 1640 *cm*. It's floor is to be tiled using square tiles which are as large as possible.

Task:

(a) Find the size of these square tiles. **[Ans: 40 × 40 or 1600 cm^2]**

(b) How many square tiles are required for this purpose? **[Ans: 1476 tiles]**

16. Three pieces of timber of length 164 *m*, 286 *m* and 358 are to be cut into smaller pieces of the same length.

Task:

Find the greatest possible length which can be cut without leaving any remainder. **[Ans: 2 *cm*]**

17. Your grand father is a retired mathematics teacher but as he was going through a certain news paper, he landed on the following equation $11_n + 21_{3n} = 20_{4n}$

Task:

With a reason, determine wheather the equation is true or false. **[Ans: n = 2]**

18. Your friend is un employed and is looking for a job. He applied in a company organising parties and the only empty slot available in that company was the slot of organising the seating arrangements for the guests. He was given an a paper interview having "463x is divisible by 3, Find the possible values of x". After the interview, he wanted to know why he was given such a question.

Task:

Help him to see whether he passed the intervidew or not. Explain why he was given such a number. **[Ans: 2, 5 and 8 : Applications of divisibilty tests]**

19. Your uncle plans to buy one bigger container that can be filled by five small containers of capacity 16, 72, 12, 24 and 56 litres but he does not know the actual capacity of the bigger container.

Task:

What is the capacity of the bigger container which can be filled by each of the above containers exactly without remainder when used separately? **[Ans: 8,064 litres]**

20. Musa, John and David start at the same time, position and direction to run round a circular field. Musa takes 180 seconds, John takes 480 seconds and David takes 720 seconds to complete one circuit. They start running at 3:00 pm.

Task:

At what time will they all be at the same position? **[Ans: 3:24 pm]**

21. Your friend's room measures 540cm by 420cm, he wants to tile it.

Task:

Find the length of the largest square tiles that can be used to cover the floor without requiring any cutting. **[Ans: 60 cm]**

22. Traffic lights at three different junctions show green light at intervals of 10 seconds, 12 seconds and 15 seconds. They all show green at 1:00 pm.

Task:

At what time will they all again show green together? **[Ans: 1:01 pm]**

23. In a large school, it is possible to divide the pupils into groups of equal numbers of 24, 30 or 32 and have no pupils left over.

Task:

Find the least number of pupils in the school that makes this possible. **[Ans: 960 pupils]**

24. A string is to be cut into exactly equal length of 4 cm or 7 cm or 18 cm.

Task:

Find the shortest length possible. **[Ans: 252 cm]**

25. In a certain school, two bells are sounded at intervals of 30minutes and 45 minutes. The bells were last heard at 10:15am.

Task:

Find at what time, they will be heard again together.

26. A two digit pin number is such that the sum of the ones and the tens digit is ten. Once the digits are reversed, the new pin number formed exceeds the original by 54.

Task:

Find the pin number.

27. The sum of two numbers exceeds their product by one. Their difference is equal to their product less five.

Task:

Find the two numbers.

28. The area covered by Mabira forest in Uganda is 40,000 km^2 at present. The human encroachment rate is estimated to be 2 % every 10 years.

Task:

Calculate the area of the forest encroached in 30 years.

29. A self-help group intended to purchase a dry cleaning machine worth shs.720,000. The members were required to contribute equal amounts to pay for the machine. The group recruited 20 more members consequently, each member paid shs.3000 less that what he would have contributed.

Task:

(a) find the original number of members

(b) find the amount required from each member to contribute after the recruitment

30. An aeroplane flew East for 640km then turned and flew on a bearing of 050^o. After 2.5hrs flying at 324km/hr, it was necessary to fly to the original point because of technical hitch.

Task:

How much shorter is it going to cover flying straight to the starting point than retracing its former route?

FRACTIONS, PERCENTAGES AND DECIMALS

RECALL

- A fraction is referred to as part of a whole quantity. It represented as $\frac{numerator}{denominator}$
- **Proper fraction** is a fraction whose numerator is less than the denominator
- **Improper fraction** is a fraction whose numerator is greater than the denominator
- **Mixed fraction** is a fraction containing a whole number and a proper fraction.
- **Operations on fractions**; This involves addition, subtraction, division and multiplication. But with addition and subtraction, if the denominators are different, we calculate their **LCM** and then proceed normally. On the other hand, if the denominators are the same, we add the numerators directly.
- When dividing two fractions, we find the reciprocal of the second fraction and then multiply them
- When multiplying two or more fractions, we multiply the numerators together and multiply the denominators also together.
- Compound operations on fraction; here we consider cases of simplifying fractions in which brackets and other arithmetic operations are involved. This process is governed by law called BODMAS
- Converting recurring decimals to fractions eg 0.66666666… to fractions

Items:

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