



COWBELLPEDIA COMPENDIUM

VOL 1, JUNIOR CATEGORY, 2018

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A COMPILATION OF
PAST QUESTIONS AND ANSWERS
FROM THE SECONDARY SCHOOL

MATHEMATICS

TV QUIZ SHOW



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SECONDARY SCHOOL
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Created by Oladapo Ojo

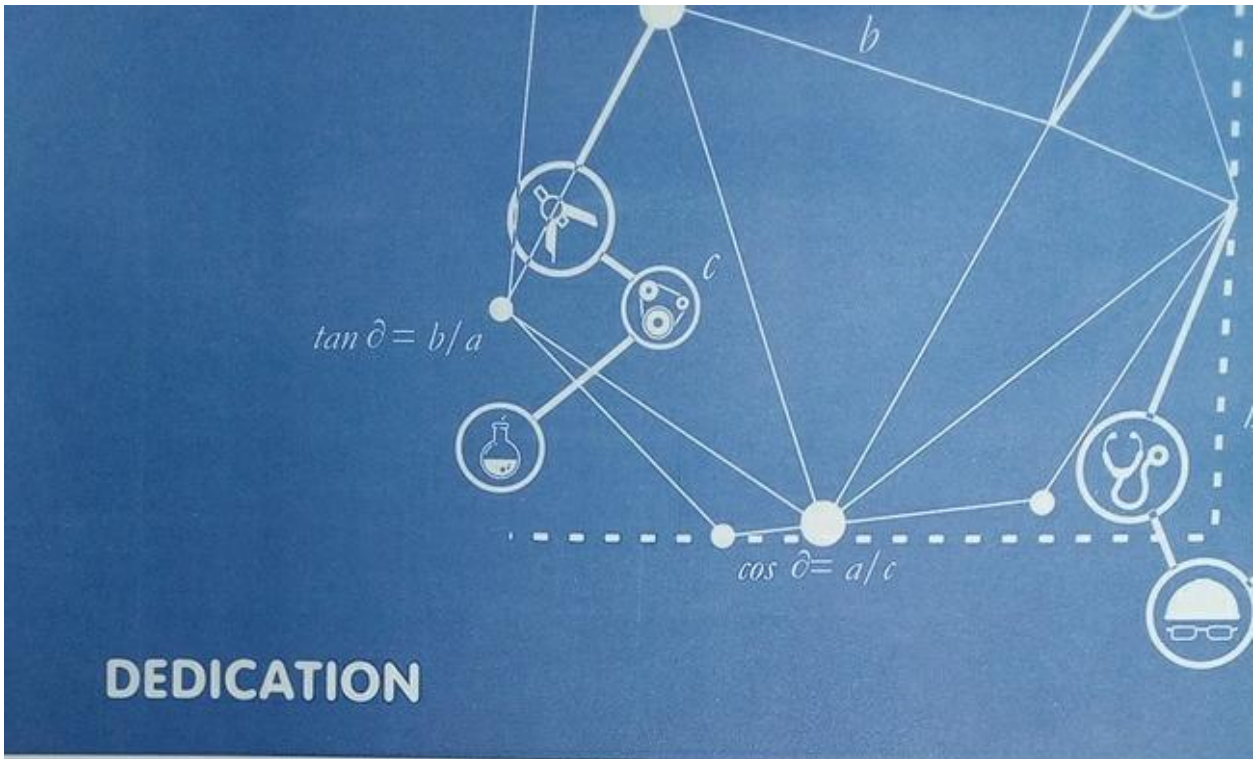
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DEDICATION

The CowbellPedia Compendium, a publication by Promasidor, makers of Cowbell - Our Milk, is dedicated to all teachers.

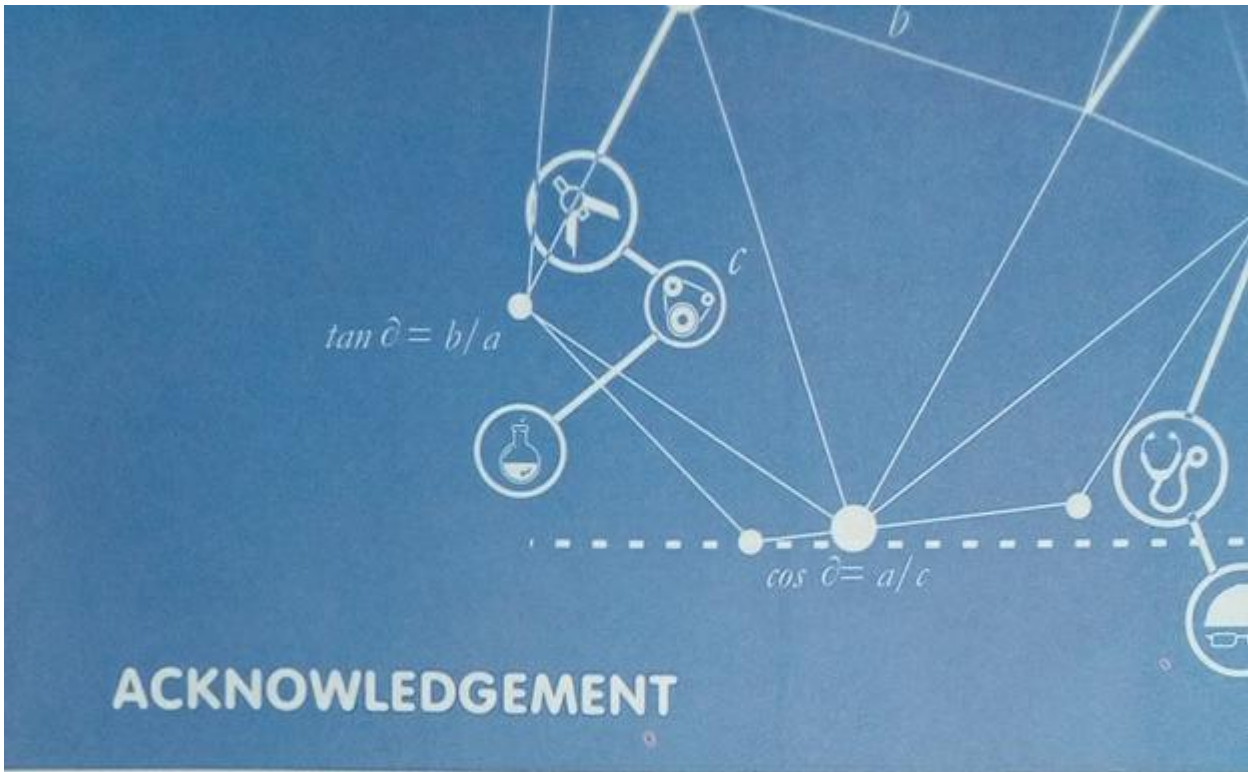
We see you as Nigeria's heroes, great men and women, driving the development of the Nation through science and technology and we are glad that you are partnering with us to make this a reality.

DISCLAIMER

The information provided in this book is designed primarily to give helpful explanations/insights to the user(s) about the topics treated in the book.

This book is not designed to be used strictly for the purpose of preparing for examinations. It is meant to help the user(s) to better understand different topics/theories/theorems in Mathematics and how to solve questions using this better understanding of the topics.

While best efforts have been made in putting together valid information in this book, the author or the publishers shall not be held liable for any incidental or consequential damage caused or alleged to have been caused directly or indirectly by the information contained in the book to any person(s) or entity.



ACKNOWLEDGEMENT

We will like to express our sincere gratitude to all the stakeholders especially our valuable partners; the Federal Ministry of Education, the National Examinations Council of Nigeria (NECO), the various State Ministries of Education, School principals and teachers for their support towards the Cowbell and Mathematics initiative in the last 20 years.

ABOUT THIS BOOK

Cowbellpedia Compendium is a collection of some of the past questions (now designed with answers) used on the Cowbellpedia Secondary Schools Mathematics TV Quiz Show from 2015 till date.

To mark the 20th anniversary of the relationship between Cowbell - Our Milk and Mathematics, these materials have been put together in a format that can serve both as a textbook and the revision notes based on the current school syllabus and subject areas. It is published and distributed free of charge to Secondary Schools students across Nigeria.

This publication will be produced in volumes and released yearly across the nation as hard copies and electronic copies.

NUMBERS AND NUMERATIONS

Numeration systems are methods for representing quantities. As a simple example, suppose you have a basket of oranges. You might want to keep track of the number of oranges in the basket.

Or you might want to sell the oranges to someone else. Or you might simply want to give the basket a numerical code that could be used to tell when and where the oranges came from. In order to perform any of these simple mathematical operations, you would have to begin with some kind of numeration system.

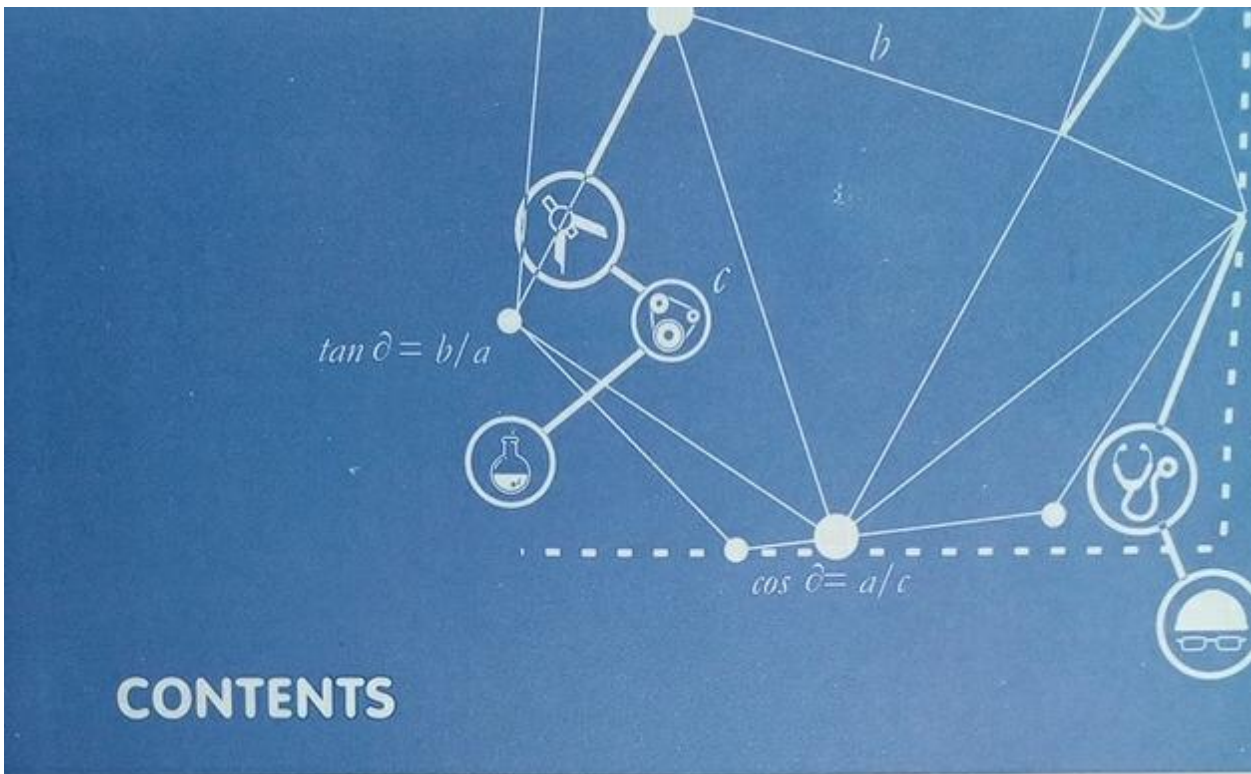
A number is a mathematical object used to count, measure, and label. The original examples are the natural numbers 1, 2, 3, 4 and so forth. A notational symbol that represents a number is called a numeral. In addition to their use in counting and measuring, numerals are often used for labels (as with telephone numbers), for ordering (as with serial numbers), and for codes (as with ISBNs).

Calculations with numbers are done with arithmetical operations, the most familiar being addition, subtraction, multiplication, division, and exponentiation. Their study or usage is called arithmetic. The same term may also refer to number theory, the study of the properties of numbers. Besides their practical uses, numbers have cultural significance throughout the world. For example, in Western society, the number 13 is regarded as unlucky, and "a million" may signify "a lot."

One of the most important inventions in western culture was the development of the Hindu-Arabic notation system (0, 1, 2, 3 ... 9). That system eventually became the international standard for numeration.

Numeration systems continue to be invented to this day, especially when companies develop systems of serial numbers to identify new products.

The binary (base-2), octal (base-8), and hexadecimal (base-16) numbering systems used in computers were developed in the late 1950s for processing electronic signals in computers.



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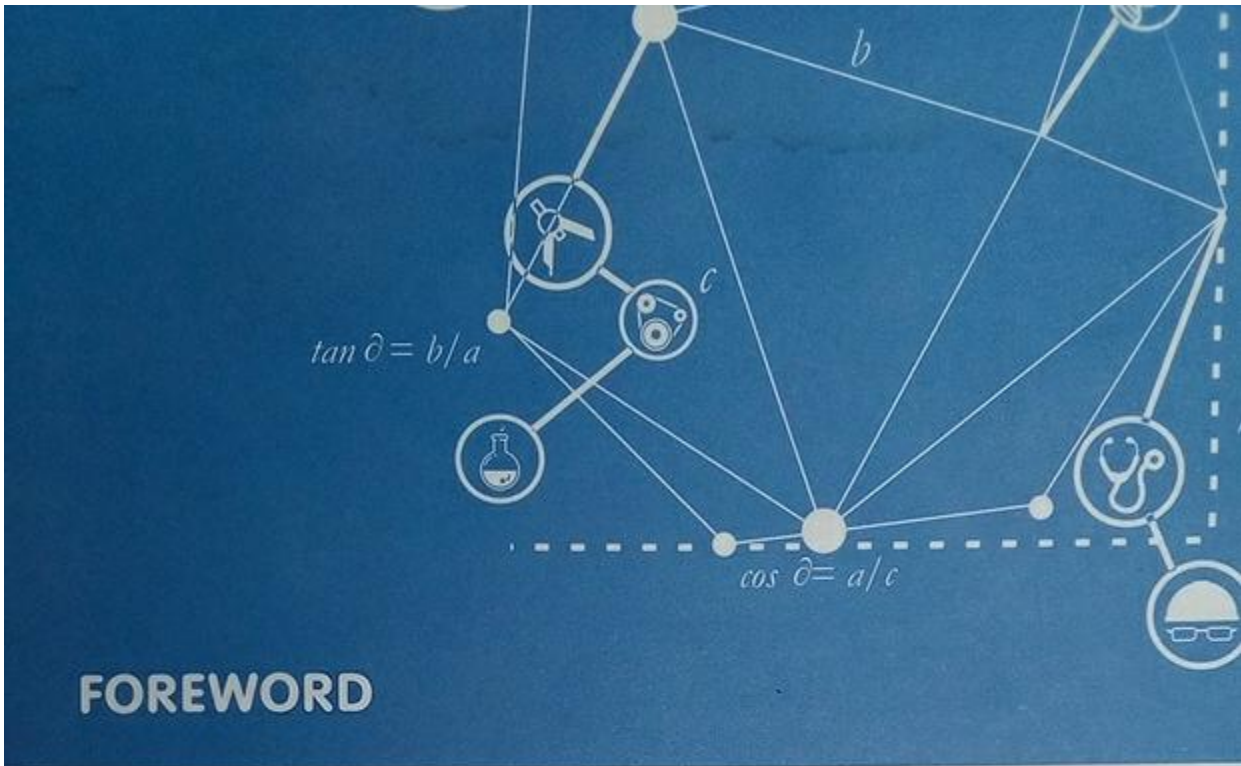
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FOREWORD

This collection of past questions used on the CowbellPedia Secondary Schools Mathematics TV Quiz Show with answers, is a laudable educational initiative by CowbellPedia for the support of the study of Mathematics in Secondary Schools in Nigeria. It is a Compendium designed primarily for the student(s) to use as a guide in understanding the different topics in Mathematics and the different steps to apply in solving questions under these topics.

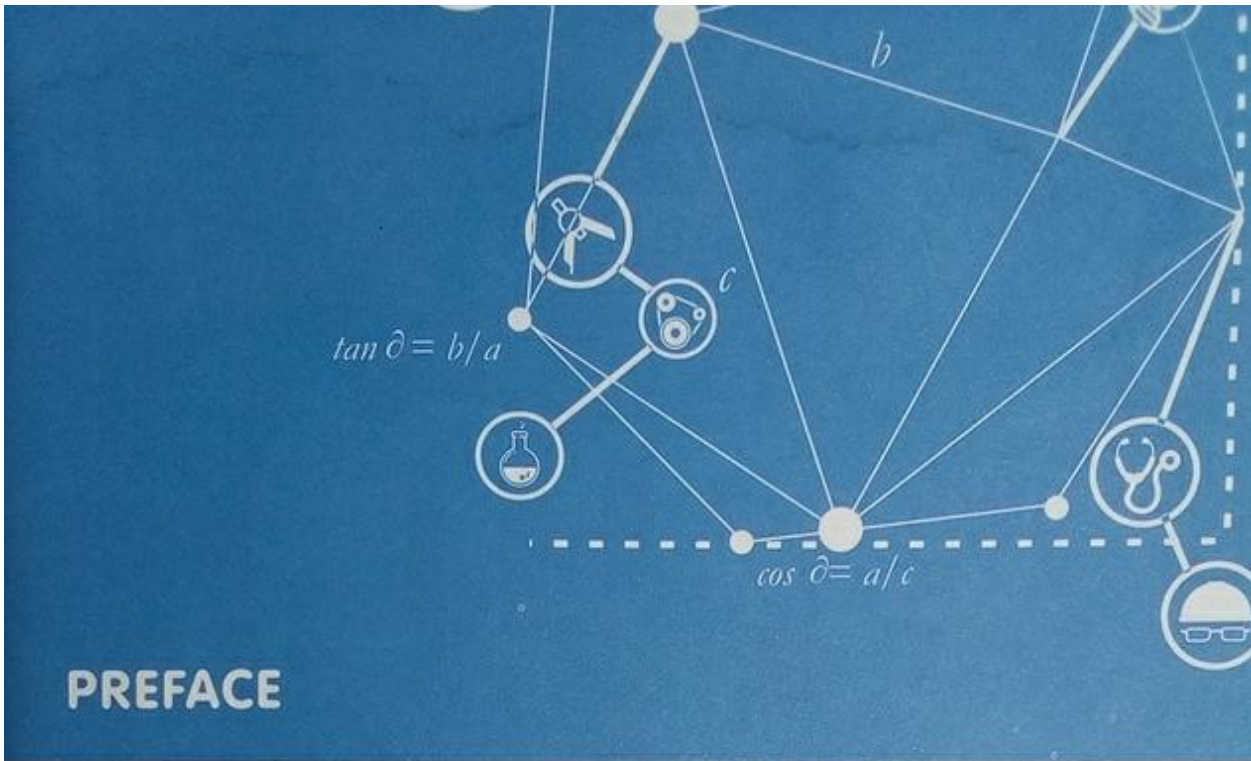
NECO recognizes the effort of Promasidor, the makers of Cowbell - Our Milk, the brand that has and is still supporting the development of Mathematics in Nigeria and JustMedia the producers of CowbellPedia in putting together this Compendium which is being supplied FREE to Secondary School students who desire to excel in mathematics.

NECO as an examining body is always in support of any initiative that will help improve the knowledge and skills of students in answering examination questions especially in the area of Mathematics which students say is one of the most difficult subjects that they face in any examination. The CowbellPedia compendium is a one stop compendium of knowledge aimed at explaining and solving various questions culled from the CowbellPedia Secondary Schools Mathematics TV Quiz Show

I hope this Compendium will achieve the desired impact and enhance students' understanding of the subject.

Professor Charles B.U. Uwakwe
*Registrar/Chief Executive
National Examinations Council (NECO)*





PREFACE

Economic development in the developed world has occurred at the speed and intensity it has due to a strong foundation of Science, Technology, Engineering and Mathematics (STEM) education.

STEM courses are pivotal to a nation's technological advancement and Mathematics, which has historically been seen by students, as an unattractive subject is a key component of STEM education. This becomes very important at this stage that Nigeria requires to broaden its economic base from a primary commodity-driven to a services oriented economy like that of the developed world. STEM education will galvanize the economy in such a direction.

Cowbell saw this strong need 20 years ago and started a relationship with schools and students, this has metamorphosed into what is now known as CowbellPedia.

To mark the 20th anniversary of the relationship between Cowbell and mathematics, the CowbellPedia Compendium has been compiled for Secondary School students across Nigeria, with the sole aim of stirring up and sustaining the interest of students in the subject area – Mathematics.

Cowbellpedia Compendium Volume One is divided into seven chapters for both Junior and Senior secondary schools, well written in an understandable language with elaborate explanation of topics delivered in a form that is easy to comprehend with numerous illustrations and exercise questions from the past CowbellPedia Secondary School Mathematics TV Quiz Show.

Anders Einarsson
Managing Director
Promasidor Nigeria Limited





Since 1998, Cowbell has been involved in the sponsorship of Mathematics competition in Secondary Schools in Nigeria. Our objectives have remained the same over these years, as we believe in the total development of the Nigerian Child.

The objectives include:

- ◆ To awaken the consciousness and interest in Mathematics among Junior and Senior secondary school students in Nigeria.
- ◆ To improve students' performance in Mathematics Pan Nigeria.
- ◆ To create a credible platform for identifying outstanding students and encouraging excellence in Mathematics.
- ◆ To provide a credible platform that will reward excellence in the subject area of Mathematics

Over the years, this sponsored platform for both Junior and Senior Secondary categories has evolved from the humble beginning of Lagos state only examination to a nationwide examination that has received the support of the Federal Ministry of Education.

From 2016, we took a strategic decision to bring all Mathematics intervention activities by your favourite brand, Cowbell - Our Milk under one umbrella, COWBELLPEDIA.

This comprises of CowbellPedia Secondary Schools Mathematics TV Quiz Show, CowbellPedia Radio (a Mathematics class on radio) and CowbellPedia Mobile App (Mathematics Q&A mobile application).

All these are geared towards nourishing the dreams of Nigerian children by providing a platform that recognizes and rewards excellence in Mathematics in addition to the quality nutrition that is provided by the Cowbell brand.

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New
Creamier tasting
Cowbell Milk

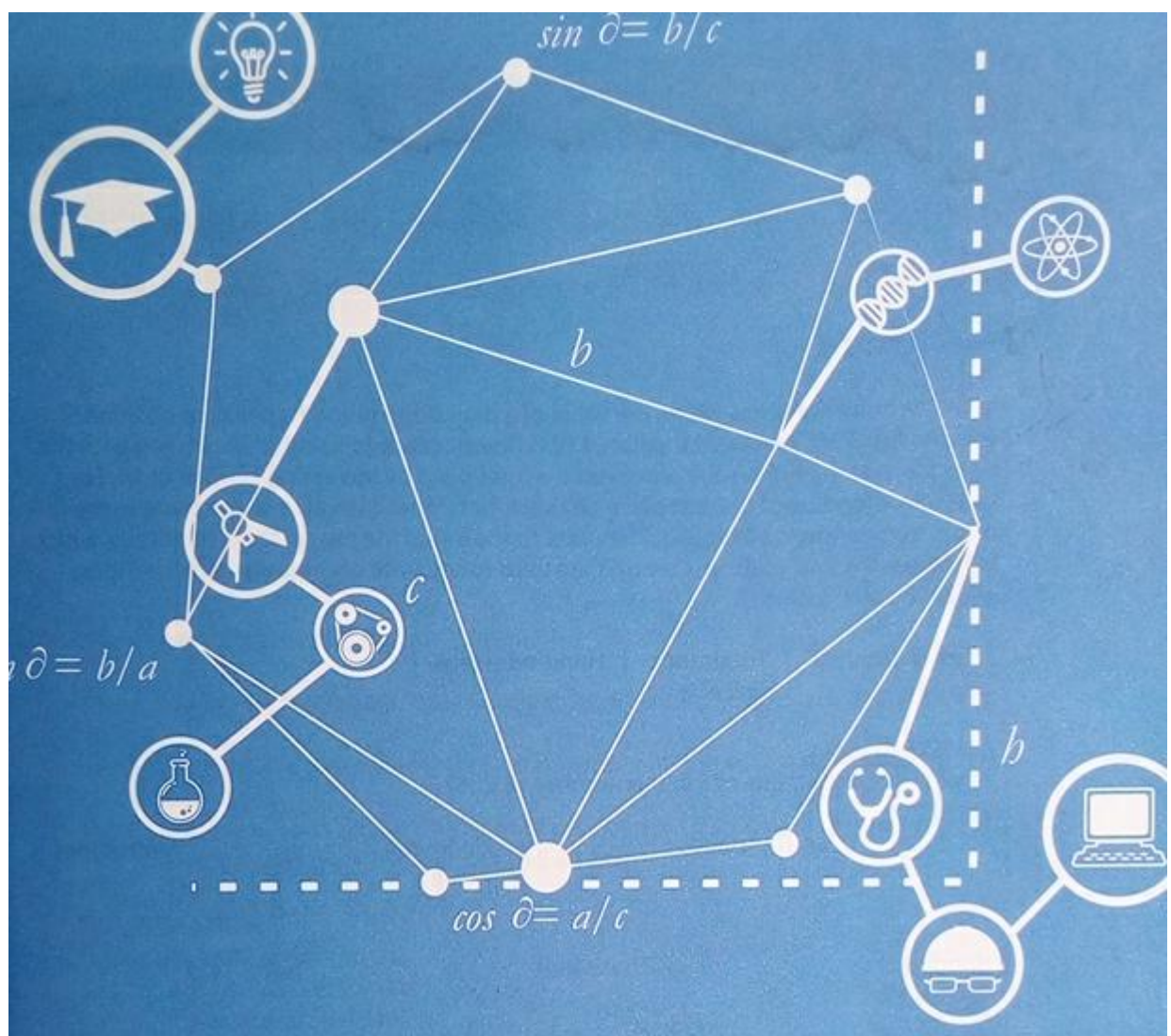


For Strong Body &
Sharp Brain





The 2017 finalists (6 Junior 6 Seniors) with the Managing Director of Promoside Nigeria, Mr. Anders Einarsson and the Commercial Director, Mr. Fatai Tefoy at the recording of the 2017 Combellpedia Secondary Schools Achievement TV Quiz Show



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CHAPTER ONE | NUMBERS

CHAPTER ONE

NUMBERS

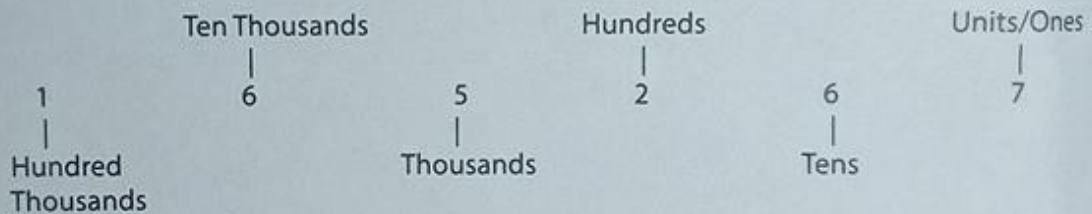
1.1 PLACE VALUE

In the decimal number system, the value of a digit depends on its place, or position, in the number. Each place has a value of 10 times the place to its right. Beginning with the ones place at the right, each place value is multiplied by increasing powers of 10. For example, the value of the first place on the right is "one", the value of the place to the left of it is "ten," which is 10 times 1. The place to the left of the tens place is hundreds, which is 10 times 10, and so forth. Commas are used to separate each group of three digits, which is called a period.

Ten thousands	Thousands	Hundreds	tens	
Place Value				

ILLUSTRATION 1

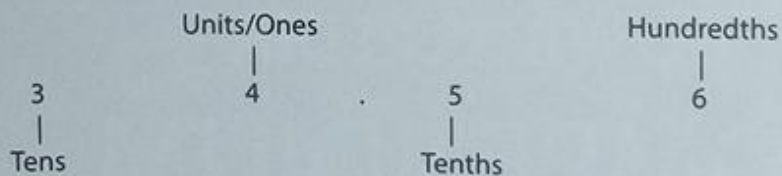
What is the place value of 5 in this number 165,267?



Solution: The place value of 5 is thousands.

ILLUSTRATION 2

What is the place value of 6 in this number, 34.567?



Solution: In the number 34.567, the place value of '6' is hundredths?

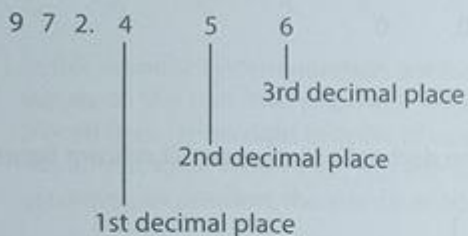
ILLUSTRATION 3

What is the Place value of 7 in 6,090.721?

Solution: The place value of '7' in the number is tenth.

1.2. DECIMAL PLACES AND SIGNIFICANT FIGURES

To find the number of decimal places simply count the number of figures after the decimal point.



The above number has 3 decimal places.

The following are required to take a decimal number to a given number of decimal places:

- Know the required decimal place you are rounding to.
- Check the next digit to the right of the point, if this digit is 5 or more then add 1 to the previous digit; if it is less than 5 add nothing.

ILLUSTRATION 1

Write 871.7542 correct to the

- Nearest whole number
- 1 Decimal place (d.p)
- 2 Decimal places (d.p)

Solution:

871.7542 = 872 to the nearest whole number

871.7542 = 871.8 correct to 1 d.p

871.7542 = 871.75 correct to 2 d.p

1.3 DECIMAL FRACTIONS

We can think of a decimal number as a Whole Number plus a Decimal Fraction.

So "2.3" looks like: 2 plus $\frac{3}{10}$

Examples:

And "13.76" looks like: 13 plus $\frac{76}{100}$

1.4 SIGNIFICANT FIGURES (S.F)

The first significant figure is always the first non-zero figure as you read the number from the left.

9	4	0	0	8.	0	0
1s.f	2s.f	3s.f	4s.f	5s.f.		

Note that the two zeros immediately after the decimal point are not significant figures.

0.	0	0	8	0	1
			1s.f	2s.f	3s.f

Note that the two zeros immediately after the decimal point are not significant figures.

To correct a number to a specific number of significant figures:

- (a) Know the required significant figure, then look at the next significant figure to the right.
- (b) If the next significant figure is 5 or more, then add 1 to the previous figure, if it is less than 5, add nothing.

ILLUSTRATIONS

Give 0.000 760 5 to; a) 1 s.f b) 2 s.f c) 3 s.f

Solution

- a) 0.000 7605 = 0.000 8 correct to 1 s.f
- b) 0.000 7605 = 0.000 76 correct to 2 s.f
- c) 0.000 7605 = 0.000 761 correct to 3 s.f

1.5. ROMAN NUMERALS

The numeric system represented by **Roman numerals** originated in ancient Rome. Numbers in this system are represented by combinations of letters from the Latin alphabet. Roman numerals, as used today, are based on seven symbols:

Symbol	I	V	X	L	C	D	M
Value	1	5	10	50	100	500	1,000

The numbers 1 to 10 are usually expressed in Roman numerals as follows:

I,	II,	III,	IV,	V,	VI,	VII,	VIII,	IX,	X.
1,	2,	3,	4,	5,	6,	7,	8,	9,	10.

In this numeric system numbers are formed by combining symbols and adding the values, so 'II' is two (two ones) and XIII is thirteen (a ten and three ones). Symbols are placed from left to right in order of value, starting with the largest. Because each numeral has a fixed value rather than representing multiples of ten, one hundred and so on, according to position, there is no need for "place keeping" zeros.

ILLUSTRATION 1

Write 207 and 1066 in Roman numerals

Solution:

(a) 207 = CCVII

Analysis

Two hundred = Two 'C's, = CC

A five and two ones = A 'V' and two 'I's = VII

(b) 1066 = MLXVI

Analysis

A thousand = M

A fifty = L

A ten = X

A five = V

A one = I

In a few specific cases, to avoid confusing and hard to read numbers with four characters repeated in succession (such as IIII or XXXX), subtractive notation is used as in this table:

Number	4	9	40	90	400	900
Notation	IV	IX	XL	XC	CD	CM

- When 'I' is placed before V or X, it indicates one less, so four is IV (one less than five) and nine is IX (one less than ten).
- When X is placed before L or C, it indicates ten less, so forty is XL (ten less than fifty) and ninety is XC (ten less than a hundred).

- When C is placed before D or M, it indicates a hundred less, so four hundred is CD (a hundred less than five hundred) and nine hundred is CM (a hundred less than a thousand)

ILLUSTRATION 2

Write 1904 in roman numerals

One thousand nine hundred and four = MCMIV

Analysis

One thousand = M

Nine hundred = CM (a hundred less than a thousand)

Four = IV (one less than five)

ILLUSTRATION 3

Write 1954 in Roman numeral

1954 = MCMLIV

1.6. TYPES OF NUMBERS

INTEGERS - Any of the positive and negative whole numbers... -3, -2, -1, 0, +1, +2, +3...
The positive integers, 1, 2, 3..., are called the natural numbers or counting numbers. The set of all integers is usually denoted by Z or Z^+

DIGITS - The 10 symbols 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9, used to create numbers in the base 10 decimal number system.

To Get the Remaining 78 Pages of the COWBELLPEDIA Compendium for Junior Category which Contains the Questions and Answers Call MR CHINEKS on 08107431933.

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