CONTENTS

THE CONTEXTS

EXAM PAPERS & MEMORANDA

A separate book – **"Papers & Answers"** – contains four June exam papers & eight November exam papers !

WHAT IS MATHS LITERACY?

DEFINITION:

"Mathematical Literacy provides learners with an **awareness** and **understanding** of the role that mathematics plays in the modern world. It is a subject that is driven by **life-orientated applications of mathematics**. It enables learners to develop the ability and confidence to **think numerically** and **spatially** in order to **interpret** and **critically analyse** everyday situations and to **solve problems**."

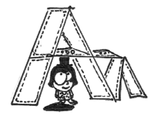
(DOE, National Curriculum Statement Gr 10 – 12 (General) – Mathematical Literacy, pg 9 & 10)

Maths Literacy is:

- Practical Mathematics
- Mathematics taught with links to real-life contexts and applications.
- Aimed at providing learners with skills and knowledge to be able to deal with the mathematical scenarios that they encounter in their daily lives and in the workplace.
- Aimed at developing learners who are able to apply their mathematical knowledge and skills to solve problems in life.

THE CURRICULUM

There are **FOUR LEARNING OUTCOMES** for Maths Literacy:



- **LO1: NUMBER AND OPERATIONS IN CONTEXT**
  Use knowledge of numbers and their relationships to investigate a range of different contexts.
- **LO2: FUNCTIONAL RELATIONSHIPS**
  Recognise, interpret, describe and represent various functional relationships to solve problems in real and simulated contexts.
- **LO3: SPACE, SHAPE AND MEASUREMENT**
  Measure, using appropriate instruments; estimate and calculate physical quantities, interpret, describe and represent properties of, and relationships between 2-D shapes and 3-D objects in a variety of orientations and positions.
- **LO4: DATA HANDLING**
  Collect, summarise, display and analyse data and apply knowledge of statistics and probability to communicate, justify, predict and critically interrogate findings and draw conclusions.

Context 1: DECIMALS AND PERCENTAGES

An OUTLINE . . .

■ 1.1 DECIMALS

➢ **ACTIVITY 1:** Calculating cell phone costs

❐ Introduction

Practice Exercise 1.1.1

➢ **ACTIVITY 2:** Itemised billing

❐ Definition

Practice Exercise 1.1.2

■ 1.2 PERCENTAGES

1.2.1 THEORY

A What is a percentage?

❐ Example

B Calculating a percentage of a value

❐ Example

C Working out what percentage one number is of another number

❐ Worked Example

Practice Exercise 1.2.1

1.2.2 PRACTICAL APPLICATIONS OF PERCENTAGES IN REAL-LIFE SCENARIOS

➢ **ACTIVITY 1:** Calculating Tax

❐ Introduction

PART A : Calculating VAT

❐ Worked Example

Practice Exercise 1.2.2 - 1A

PART B : Calculating Income Tax

❐ Worked Example

Practice Exercise 1.2.2 - 1B

➢ **ACTIVITY 2:** Percentages on a salary slip

❐ Introduction

Practice Exercise 1.2.2 - 2

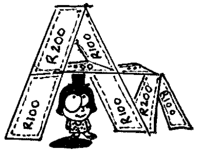
■ 1.3 CONSOLIDATION ACTIVITY

❐ Introduction

Practice Exercise 1.3

4.2 SUBSTITUTION AND SOLVING EQUATIONS

4.2.1 THEORY



What is an equation?

An equation is a mathematical expression showing a relationship between two (or more) variables and/or numbers.

A variable is a symbol or letter that is used to take the place of numbers in equations or expressions. Variables do not have a fixed value - their value can vary or change.

Every equation has an equal sign describing precisely how the variables and/or numbers are related to each other.

Dependent and Independent variables

When working with equations, it is important always to establish which variable is the *dependent variable* and which variable(s) is the *independent variable.*

- The **dependent variable** is a variable whose value is determined by the value of one or more other variables.
- The **independent variable(s)** is a variable whose value is not dependent on the value of any other variable.

For example . . . .
Consider the formula for the area of a rectangle:

area = length × breadth

*In this formula, area is the **dependent** variable and length and breadth are the **independent** variables, because the area of a rectangle is dependent on its length and breadth.*

- When drawing a graph to represent the relationship between two variables, the independent variable usually goes on the horizontal axis and the dependent variable on the vertical axis.

Substituting values into equations

To substitute a value into an equation means to replace the independent variable(s) with a specific value in order to determine the value of the dependent variable.

❒ Worked Example: Temperature conversions

Although in South Africa we measure temperature in degrees Celsius (°C), many countries indicate temperature in degrees Fahrenheit (°F).
If you are a South African travelling overseas, it can become very confusing to try to work out the temperature. Similarly, for an overseas tourist visiting South Africa, it can be equally confusing.

> The equation **°F = (1,8 × °C) + 32°** represents
> the relationship between degrees Fahrenheit (°F) and degrees Celsius (°C).
> We can use this equation to convert from °C to °F and vice versa.

How many °F is equal to 25 °C?

°F = (1,8 × ° C) + 32°

If °C = 25 then:

°F = (1,8 × 25°) + 32°
°F = 45° + 32°
°F = 77°
∴ 25°C = 77°F

How many °F is equal to 1 °C?

°F = (1,8 × ° C) + 32°

If °C = 1 then:

°F = (1,8 × 1°) + 32°
°F = 1,8° + 32°
°F = 33,8°
∴ 1°C = 33,8°F

Practice Exercise 4.2.1- A: Substitution

1. The equation **d = 110 × t** represents the *distance* (in kilometres) that a car travels over *time* (in hours).

   1.1.1 How far will the car travel in 2 hours?
   1.1.2 How far will the car travel in 1 hour 40 minutes?

   1.2 If the speed of a car is measured in the number of km travelled in 1 hour, what is the average speed (in km/h) of this car?

2. When you take out a loan from a bank, you will have to pay back the loan with interest. This means that you will end up paying more than the original value of the loan back to the bank at the end of the loan.

NOV PAPER B

QUESTION 1

1.1 120 marks in 120 minutes
$\therefore$ 1 mark per minute

1.2 12 minutes

1.3 Question 2.3

> Convert hours to minutes, remember there are 60 minutes in an hour.

QUESTION 2

2.1.1 Area $= 20 \times 40$
$= 800\ m^2$ for 1 penalty area
$\therefore$ Total Blue grass $= 800 \times 2$
$= 1\ 600\ m^2$

2.1.2 Area $= \pi r^2$
$= \pi(10)^2$
$= 314{,}16 m^2$

> Always use radius for area of a circle, therefore divide diameter by 2 to find radius.

2.1.3 Area of field (including Penalty areas) $= 144 \times 60$
$= 8\ 640\ m^2$
Green Grass only $= 8\ 640 - 1\ 600$
$= 7\ 040\ m^2$

2.1.4 Green + Yellow Grass $= 150 \times 66$
$= 9\ 900\ m^2$
Yellow Grass only $= 9\ 900 - 8\ 640$
$= 1\ 260\ m^2$

> When working out area of a border add twice the width of the border to the length as well as to the breadth and then calculate the entire area. Subtract the inner area from your answer to find the border area.

2.2.1 straight lines $= 144 + 144 + 60 + 60 + 20 + 20 + 20 + 20 + 40 + 40 + 60$
$= 628$ m
circle markings $= \pi d$
$= \pi\ (20)$
$= 62{,}83$ m
$\therefore$ Total length of markings $= 628 + 62{,}83$
$= 690{,}83$ m
$\therefore$ To the nearest meter : 691 m

2.2.2 691×250
$= 172\ 750\ m\ell$
$= 172{,}75\ \ell$

> To convert from mℓ to litres, divide by 1 000.

2.2.3 $\dfrac{172{,}75}{2{,}5}$
$= 69{,}1$
$\therefore$ Need 70 tins

2.3 Cost of paint $= 70 \times 180$
$=$ R12 600

Cost of Grass: Blue $= 1\ 600 \times 100$
$=$ R160 000
Red $= 314{,}16 \times 100$
$=$ R31 416
Green $= 7\ 040 \times 80$
$=$ R563 200
Yellow $= 1\ 260 \times 120$
$=$ R151 200
$\therefore$ Total cost $= 12\ 600 + 160\ 000 + 31\ 416 + 563\ 200 + 151\ 200$
$=$ R918 416

2.4 Area of entire field $= 150 \times 66$
$= 9\ 900\ m^2$

> Remember to always show all your calculations

Volume of soil A $= 9\ 900 \times 0{,}8$
$= 7\ 920\ m^3$
Cost of soil A $= 7\ 920 \times 200$
$=$ R1 584 000

> Volume = area $\times$ depth

Volume of soil B $= 9\ 900 \times 1{,}3$
$= 12\ 870\ m^3$
Cost of soil B $= 12\ 870 \times 130$
$=$ R1 673 100

$\therefore$ Soil A is more cost effective

2.5.1 $\dfrac{50}{5} = 10$
$\therefore$ length $= 10 \times 12$
$= 120$ m

2.5.2 $\dfrac{160}{12} = 13{,}33$
$\therefore$ breadth $= 13{,}33 \times 5$
$= 66{,}67$
$\therefore$ breadth $= 67$ m

2.5.3 $\dfrac{55}{5} = 11$ m
$\therefore$ length $= 11 \times 12$
$= 132$ m
$\therefore$ largest possible field: 132 m long by 55 m

QUESTION 3

3.1 Interest $= 2\ 500 \times \dfrac{10}{100} \times 3$
$= 750$
$\therefore$ In three years Thando will have:
$2\ 500 + 750$
$= 3\ 250$
This is R150 short of what he needs

> Remember the simple interest formula only works out the interest not the total amount.

3.2 $\mathbf{A} = \mathbf{P}\left(\mathbf{1} + \dfrac{\mathbf{r}}{\mathbf{100}}\right)^{\mathbf{n}}$
$= 2\ 500\left(1 + \dfrac{9{,}5}{100}\right)^3$
$=$ R3 282,33

This is not enough money

3.3 $r = \dfrac{9}{4} = 2{,}25\%$
$n = 3 \times 4 = 12$
$\therefore \mathbf{A} = \mathbf{P}\left(\mathbf{1} + \dfrac{\mathbf{r}}{\mathbf{100}}\right)^{\mathbf{n}}$
$= 2\ 500\left(1 + \dfrac{2{,}25}{100}\right)^{12}$
$=$ R3 265,12

No, he would be better off with Bank B.