# P.6 Lesson Notes for Mathematics

## Topical Breakdown for Term I

<table>
<thead>
<tr>
<th>Theme</th>
<th>Topic</th>
<th>Sub Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sets</td>
<td>Sets concepts</td>
<td>• Types of sets&lt;br&gt;- Disjoint sets&lt;br&gt;- Equivalent sets&lt;br&gt;- Non equivalent sets&lt;br&gt;- Equal sets&lt;br&gt;- Union sets&lt;br&gt;- Unequal sets&lt;br&gt;- Matching sets&lt;br&gt;- Intersection sets&lt;br&gt;- Joint sets&lt;br&gt;- Complement of sets&lt;br&gt;- Difference of sets&lt;br&gt;- Sub sets&lt;br&gt;- Listing proper sub sets and improper subsets&lt;br&gt;- Finding the number of sub sets&lt;br&gt;- Application of subsets (finding number of members in a set whose subsets are given)&lt;br&gt;- Representing elements on a Venn diagram&lt;br&gt;- Venn diagram&lt;br&gt;- Describing and shading regions of a Venn diagram&lt;br&gt;- Representing members on Venn diagram&lt;br&gt;- Venn diagrams showing number of members in the sets&lt;br&gt;- Application of the set concept&lt;br&gt;- Probability</td>
</tr>
<tr>
<td>Numeracy</td>
<td>Operation on whole numbers</td>
<td>• Writing numbers in words&lt;br&gt;• Writing numbers in figures&lt;br&gt;• Decimal fractions&lt;br&gt;• Place values&lt;br&gt;• Value&lt;br&gt;• Expanding decimal fractions&lt;br&gt;• Writing in words&lt;br&gt;• Writing in figures&lt;br&gt;• Rounding off decimals&lt;br&gt;• Roman numbers up to M&lt;br&gt;• Roman numerals to Hindu Arabic&lt;br&gt;• Application of Roman numbers.</td>
</tr>
<tr>
<td>Numeracy</td>
<td>Whole numbers</td>
<td>• Place values up to millions&lt;br&gt;• Values of digits up to millions&lt;br&gt;• Expanding numbers&lt;br&gt;- Place value form&lt;br&gt;- value form&lt;br&gt;- powers of ten (exponents)</td>
</tr>
</tbody>
</table>
| Pattern and sequences | Divisibility tests of 2,3,4,5,6,8,9,10<br>• Types of numbers<br>- Even and odd numbers<br>- Whole and natural numbers<br>- Counting numbers<br>- Triangular numbers<br>- Square numbers<br>- Prime numbers<br>- Composite numbers<br>• Number patterns
### TOPIC / UNIT ONE - SET CONCEPTS

#### LESSON 1

**Sub topic:** Types of sets

- Types of sets:
  - Equal sets e.g.
  - Equivalent sets

<table>
<thead>
<tr>
<th>Consecutive numbers</th>
<th>Counting</th>
<th>Even</th>
<th>Odd</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factors of a number</td>
<td>Common factors</td>
<td>Greatest / highest common factor</td>
<td>Prime factorization</td>
</tr>
<tr>
<td>Finding unknown prime number</td>
<td>Finding GCF and LCM using prime factors on venn diagrams</td>
<td>Application of GCF</td>
<td>Multiples of numbers</td>
</tr>
<tr>
<td>Common multiples and LCM</td>
<td>Application of LCM</td>
<td>Finding square of numbers</td>
<td>Finding square root of numbers</td>
</tr>
<tr>
<td>Application of square and square roots of numbers</td>
<td>Forming number patterns</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### LESSON 2

**Sub topic:** Types of sets

- Intersecting sets (\(\cap\)) / joint sets: A set of common members from two or more sets.
- Union sets (\(\cup\))

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**Examples**

1. **Equal sets**
   - A
     - 1
     - 2
     - 3
   - B
     - 2
     - 3

2. **Equivalent sets / matching sets**
   - X
     - 1, 2, 3, 4,
   - Y
     - a, b, c, d,

3. **Non equivalent sets**
   - P
     - a, e, i
   - Z
     - 1, 2, 3, 4

**ACTIVITY**

The pupils will attempt exercise 1:1 page 2 from A new MK primary MTC pupils’ BK 6. / Mk new edition pg 1-2 / understanding mtc pg 1-3/ fountain pf 1-8

**REMARKS**

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**Lesson 3**

**Sub Topic**: Types of Sets

**Content**:

(a) **Difference of sets**
   - shading of regions
   - describing regions

(b) **Complement of sets**
   - find complement of sets
   - shading regions with complement of sets

**Examples**:

- **a)**
  - $A = \{1, 2, 3, 4\}$
  - $B = \{p, q, r, s\}$

- **b)**
  - Complements
  - Given that $U = \{a, b, c, d, e, f, g, h\}$

**Activity**

Mk new edition pg 10

**Remarks**

_____________________________________________________________________

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**Lesson 4**

**Sub Topics**: Subsets ($\subseteq$)

**Content**:

(a) Listing / forming subsets

(b) Numbers of sub sets

(c) Number of proper subsets
LESSON 5
Subtopic: Finding number of elements in sets.
Content: (a) listing members of sets
(b) Number of elements in sets.
Examples: (i) Find members in set N
N = {prime numbers between 0 and 10}
N = {2, 3, 5, 7}
(ii) \( n(N) = 4 \)
(i) Use the venn diagram to answer questions

\[ \begin{align*}
X & \quad Y \\
b, d & \quad a, g, h, k, j \\
c, e & \quad p, q
\end{align*} \]

Activity
Mk old edition pg 20-22

Remarks

_____________________________________________________________________
_____________________________________________________________________

LESSON 6
Subtopic: Application of set concepts.
Content: (a) Representing information on a venn diagram
Given that set \( A = \{a, b, c, d, e, f, g\} \) \( B = \{a, e, i, o, u\} \)

\[ \begin{align*}
A & \quad B
\end{align*} \]

Activity
Mk new edition pg 6-7
Fountain mtc pg 8-10
Understanding mtc pg 4-6

Remarks
b a i
c d e 0
f u
g

n(A) = 7
n(B) = 5
n(A∪B) = 2
n(A∩B) = 3
n(A∪B) = 10

(b) Interpreting information given on a venn diagram

Examples:
(i) Given that n(A) = 7, n(B) = 5 and n(A∩B) = 2
(ii) Draw a venn diagram to represent the above information

Activity
Mk old edition pg 22-25

Remarks
_____________________________________________________________________
_____________________________________________________________________
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LESSON 7

SUBTOPIC : Application of sets:
Content: Interpreting word problems using the venn diagram (real life situations)

Examples: (a) In a class, 12 pupils like English (E), 15 pupils like Maths (M) and 5 pupils like both Eng and Maths. Draw a venn diagram to represent the information above.

n(E) = 12
n(M) = 15

\[(12 - 5)\]
\[7\]
\[(15 - 5)\]
\[10\]

(i) The class has \(7 + 5 + 10 = 22\) pupils
\(\therefore \varepsilon = 22\) pupils

(ii) How many like one subject only?
\(7 + 10 = 17\) pupils

(b) In a class of 30 pupils, 20 take Mirinda (M), 15 take Fanta (F) and some take both drinks while 2 take neither of the drinks.
(i) Show this information on a venn diagram

\[\begin{array}{c}
N(M) = 20 \\
n(F) = 15 \\
\end{array}\]

(ii) How many pupils take both drinks?
\[20 - y + y + 15 - y + 2 = 30\]
\[20 + 15 + 2 + y - y - y = 30\]
\[37 - y = 30\]
\[37 - 37 - y = 30 - 37\]
\[\therefore y = 7\]

Activity
(i) Understanding mtc pg 13-15
(ii) Fountain p g 10-13
(iii) Mk new edition pg 8-9

Remarks
_____________________________________________________________________
_____________________________________________________________________

LESSON 8

Sub topic: Probability
Content: (i) The idea of probability / chance
(ii) Formular
\[\text{Prob.} = \frac{n(\text{Expected outcome})}{n(\text{EE})} \]
\[\frac{n(\text{possible outcomes})}{n(\text{SS})}\]
Application

Example: If \( B = \) {counting numbers less than 10}\n\[ B = \{1, 2, 3, 4, 5, 6, 7, 8, 9\} \]

(a) Find the probability of picking an even number
Even numbers = \{2, 4, 6, 8\}
\[ n(\text{Expected outcomes}) = 4 \]
\[ n(\text{possible outcomes}) = 9 \]
\[ \text{Prob} = \frac{4}{9} \]

(b) In a class of 17 pupils, 11 like Eng (E) and 9 like Maths (M) if a pupil is picked at random from the class, what is the probability of picking a pupil who likes Maths only?
\[ \varepsilon = 17 \]
\[ n(E) = 11 \]
\[ n(M) = 9 \]
\[ (11 + 9) - 17 \]
\[ 20 - 17 \]
\[ \frac{3}{3} \]
\[ 9 - 3 \]
\[ (11 - 3) \]
\[ (9 - 3) \]
\[ \text{Prob} = \frac{8}{17} \]

Activity

Fountain pg 14-16
Mk new edition pg 10-12

Remarks

LESSON 9
Revision work on set concepts
1. Write equal, unequal or equivalent against each

\[
\begin{array}{ccc}
P & Q & R \\
1, 2, 3, 4, 5 & 1, 3, 9 & 8, 9, 11, 7, 2, 1, 3, 5, 1, 2, 4 \\
(i) & (ii) & (iii) \\
Q & R & S \\
\end{array}
\]

(ii) P and S
(iii) Q and R

2. If \( P = \) {even numbers less than ten}
(a) Find \( n(P) \)
(b) How many subsets has set \( P? \)

3. Study the venn diagram and use it to answer the questions about it.

4. Write down the elements for:

\[
\begin{array}{ccc}
K & M \\
a, b & i, g \\
d, e, f & h \\
\end{array}
\]

(iii) \( K \cap M \)
(iv) \( M \cup K \)
(v) \( K - M \)
(vi) \( K^1 \)

5. (a) List down all the subsets in \( A \) if \( A = \) {o, u, i, s}
(b) A set has five elements how many subsets has set \( A? \)
(c) Given that a set has 16 subsets. Find the numbers elements in this set.

6. Set \( P = \) {2, 3, 5, 7}, \( Q = \) {1, 2, 3, 4, 6, 7, 8}
(a) Complete the venn diagram

(b) Find \( n(P \cap Q) \)
(ii) \( n(P \cup Q) \)
(iii) \( n(Q - P) \)
(iv) \( n(P) \) only
(v) \( n(Q) \)
(vi) \( n(P)^1 \)

7. In a market 24 traders sell cloth (C), and 30 traders sell food (F). If 16 traders sell both items, draw a venn diagram and find out how many traders sell only one type of commodity.

8. In a class of 30 pupils, 18 eat meat, 10 eat beans and 5 do not eat any of the two types of food.
(i) Show this information on a venn diagram
(ii) How many pupils eat meat only?
(iii) Find those who eat beans only.
(iv) How many pupils eat only one type of food?
(v) Find the number of pupils who eat both types of food.
(vi) What is the probability of choosing a pupil at random who eats meat?

TOPIC/ UNIT TWO
THEME: NUMERACY

TOPIC: WHOLE NUMBERS

LESSON 1
Subtopic: Value values
Content: Value of digits in numerals
Examples:
(i) Find the place value
(ii) Find the value of each digit

<table>
<thead>
<tr>
<th>Number</th>
<th>Place value</th>
<th>value</th>
</tr>
</thead>
<tbody>
<tr>
<td>9 4 3 8 7 2 5</td>
<td>Ones</td>
<td>5 x 1 = 5</td>
</tr>
<tr>
<td></td>
<td>Tens</td>
<td>2 x 10 = 20</td>
</tr>
<tr>
<td></td>
<td>Hundreds</td>
<td>7 x 100 = 700</td>
</tr>
<tr>
<td></td>
<td>Thousands</td>
<td>8 x 1000 = 8000</td>
</tr>
<tr>
<td></td>
<td>Ten thousands</td>
<td>3 x 10000 = 30000</td>
</tr>
<tr>
<td></td>
<td>Hundred thousands</td>
<td>4 x 100000 = 40000</td>
</tr>
<tr>
<td></td>
<td>Million</td>
<td>9 x 1000000 = 9000000</td>
</tr>
</tbody>
</table>

ii) Using operations to find values of digits

Activity
Mk new edition pg 14-15
Fountain pg 20-23

Remarks

LESSON 2
Subtopic: Expanded form
Content
(i) Expand using values / place values
(ii) Expand using powers of ten
Examples:
(a) Expand 6845 using values

\[
6845 = (6 \times 1000) + (8 \times 100) + (4 \times 10) + (5 \times 1) = 6000 + 800 + 40 + 5
\]

(b) Using power exponents

\[
6^8 \cdot 4^5 \cdot 5^9 = (6 \times 10^8) + (4 \times 10^5) + (5 \times 10^9)
\]

Activity
Mk new edition pg 16-17
Understanding mtc pg 25
Fountain pg 23-24

Remarks

LESSON 3
Scientific /standard form
Content: expanding number using scientific notation

Example: Express 6845 in scientific form

\[
\begin{align*}
6845 &= 6.845 \times 10^3 \\
6845 &= 684.5 \div 10 \\
6845 &= 68.45 \div 10 \\
6845 &= 6.845 \times 10^3 \\
\end{align*}
\]

LESSON 4
SUBTOPIC: Expressing expanded numbers as single numeral.
Content:
(i) Expanded form of values
(ii) Expanded form of place values
(iii) Expanded form of exponents.
Examples:
(a) Write in short:

\[
\begin{align*}
4000 + 60 + 2 &= 4062 \\
80000 + 7000 + 500 + 90 + 3 &= 87593 \\
(6 \times 10^3) + (4 \times 10^2) + (2 \times 10^0) + (3 \times 10^0) &= 6425 \\
6.42 \times 10^9 &= 6.42 \times 100 = 642 \\
\end{align*}
\]

Activity
- Fountain pg 23-24
- Mk new edition pg 16-17

Remarks
LESSON 5
Subtopic: Reading and writing numbers in words
Content: Expressing numerals in words up to millions.

Examples A
9452
9000 – nine thousand
400 – four hundred
52 - fifty two
Therefore; 9452 = nine thousand four hundred fifty two

Examples:
(b) Write 1486019 in words
1000000 – One million
486000 - Four hundred eighty six
19 - Nineteen
∴ 1486019 = One million, four hundred eighty six thousand nineteen

Activity:
MK new edition pg 18-19
Fountain pg 25.

Remarks

LESSON 6
Subtopic: writing words in figures .
Content: Writing number words in figures to millions

Write in figures.
Examples A
Four hundred thousand, seven hundred sixteen

Solution:
Four hundred thousand 400000
Seven hundred sixteen + 716
400716

Activity
MK new edition pg 18-19
Fountain pg 25.

Remarks

LESSON 7
Subtopic: Rounding off whole numbers
Content: Round off to the nearest
(i) Tens
(ii) Hundreds
(iii) Thousands

Examples:
(i) Round 677 to the nearest tens

|   677 |
| + 10  |
|   687 |

(ii) Round 1677 to the nearest hundreds

|   1677 |
| + 100  |
|   1700 |

(iii) Round off 34567 to the nearest thousands

Activity
MK old edition pg 47-48

Remarks

LESSON 8
Subtopic: Decimal numbers
Content: Place values of decimal in words and figures.

Examples:
(a) \[ \frac{1}{10} \] One tenth

Place value of 1 in 0.1 is Tenths.

(b) \[ \frac{8}{100} \] Eight hundredths

(c) Find the value of each digit

\[ 4.6 \]

Tenths – 6 x 1/10 (6 x 0.1) = 0.6
Ones – 4 x 1 = 4

<table>
<thead>
<tr>
<th>Number</th>
<th>Place values</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.73</td>
<td>6 – ones</td>
<td>6x1 = 6</td>
</tr>
<tr>
<td></td>
<td>7 – tenths</td>
<td>7x1/10 = 0.7</td>
</tr>
<tr>
<td></td>
<td>3 = hundredths</td>
<td>3 x 1/100 = 0.03</td>
</tr>
</tbody>
</table>

Activity
MK old edition pg 42-44

Remarks

LESSON 9
Subtopic: Reading and writing decimals in words and the vice verse
Content:
(i) Writing decimals in words
(ii) Expressing decimals in figures from words

Examples:
(a) Write 0.125 in words

0.125 = One hundred twenty five thousandths
(b) 18.4
18  ——  Eighteen
0.14  ——  Fourteen hundredths
18.14  ——  Eighteen and fourteen hundredths

(c) Twenty six and four tenths
Twenty six  ——  26
Four tenths  ——  + 0.4
26.4

Activity
Mk old edition pg 45-46

Remarks

LESSON 10
Subtopic: Expanding decimal numerals
Content:
(i) Expand using place values
(ii) Expand using values
(iii) Expand using exponents
Examples:
(i) Expand 3.54

\[ 3 \text{ Ones} + 0.5 \text{ Tenths} + 0.04 \text{ Hundredths} = 3 + 0.5 + 0.04 \]
\[ = 3.54 \]

(ii) Expand 4.62 using exponents/
\[ 4.62 = (4 \times 10^0) + (6 \times 10^{-1}) + (2 \times 10^{-2}) \]

(iii) Write as a single numeral
(a) \[ 3 + 0.5 + 0.04 \]
\[ = 3 + 0.5 + 0.04 \]
\[ = 3.54 \]

(b) Express in the shortest form
\[ (4\times10^0) + (6\times10^{-1}) + (2\times10^{-2}) \]
\[ = 4 \times 1 + 0.6 + 0.02 \]
\[ = 4.62 \]

Activity
The pupils will do exercises 8:8 and 8:9 A New MK 2000 BK 6 pg 59 (old Edn)

Remarks

LESSON 11
Subtopic: Expressing decimal in scientific notation.
Content: Expand decimals of different place values in standard/Scientific notation.
   (a) Tenths
   (b) Hundredths
   (c) Thousandths
Examples:
(i) \[ 0.4 \text{ in standard form} \]
\[ 0.4 = 4.0 \times 10^{-1} \]

(ii) \[ 2.52 = 2.52 \times 10^{0} \]

(iii) \[ 23.63 = 2.363 \times 10^{1} \]

(iv) \[ 464.241 = 4.64241 \times 10^{2} \]

Activity
Express the following to standard form:
(a) 4.8
(b) 3.25
(c) 38.06
(d) 207.4
(e) 4819.2
(f) 23.63
(g) 49
(h) 29.7
(i) 0.006
(j) 120.0

Remarks

LESSON 12
Content: Finding expanded decimals
Example
a) What number has been expanded
i) \[ 3+0.5 + 0.04 \]
ii) \[ (4\times10) + (6\times1) + (7\times0.01) \]
iii) \[ (6\times10^2) + (4\times10^1) + (9\times10^{-2}) \]

Remarks
Ref: MK old edition pg 47-48

LESSON 13
Subtopic: Ordinary decimals
Content:
(a) Arrange in ascending and descending order
Example:
(i) Arrange the following in ascending and descending order
\[ 0.1, 2.0 \text{ and } 0.04 \]
1, 2, 4 (LCM = 100)

\[ \frac{1}{10} \times 100 = \frac{1}{10} \times 10 = 10 \quad (2^{nd}) \]
\[ \frac{2}{10} \times 100 = \frac{2}{1} = 200 \quad (3^{rd}) \]
\[ \frac{4}{100} \times 100 = \frac{4}{1} = 4 \quad (1^{st}) \]

Ascending order = 0.04, 0.1, 2.0

(ii) Arrange the following in descending order
3.5, 4.05, 0.45, 0.02

35, 405, 45, 2 (LCM = 100)

\[ 35 \times 100 = 3500 \]
\[ 45 \times 100 = 4500 \]
\[ 100 \]
\[ \therefore \quad \text{Descending order} = 4.05, 3.5, 0.45, 0.02 \]

Activity
The pupils will do exercises below:
(1) 1.5, 0.015, 0.015, 15.0 (Ascending order)
(2) 0.5, 5.5, 1.5, 5.1 (Ascending order)
(3) 0.33, 0.3, 3.3 (Ascending order)
(4) 0.2, 0.75, 0.5 (Descending order)
(5) 0.25, 0.5, 0.4, 0.6 (Ascending order)

Remarks
Ref: Trs collection

LESSON 14
Subtopic: Rounding off decimals
Content:
Round off to the nearest:
(a) Tenths / one place of decimal
(b) Hundredths / two places of decimals
(c) Thousandths / three places of decimal
(d) Ones / whole number

Example:
(i) Round off 4.25 to the nearest whole no.
\[ 4.25 \]
\[ + \quad 0.0 \]
\[ \therefore \quad 4.25 \triangleq 4 \]

(ii) 29.67 to nearest tenths
\[ 29.6 \]
\[ + \quad 0.0 \]
\[ \therefore \quad 29.67 \triangleq 29.7 \]

(iii) 39.95 to nearest tenths
\[ 39.9 \]
\[ + \quad 0.0 \]
\[ \therefore \quad 39.95 \triangleq 40.0 \]

Note: consider the answer upto the required place value
Ref
MK old edition pg 48
Understanding mtc pg 33-35

LESSON 15
Subtopic: Roman and Hindu Arabic Numerals
Content:
(i) Reading writing Roman numerals to 10,000
(ii) Expressing Hindu Arabic numerals in Roman system.

Example:
(i) Basic digits / numerals

<table>
<thead>
<tr>
<th>Hindu Arabic</th>
<th>1</th>
<th>5</th>
<th>10</th>
<th>50</th>
<th>100</th>
<th>500</th>
<th>1000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roman</td>
<td>L</td>
<td>V</td>
<td>X</td>
<td>C</td>
<td>D</td>
<td>M</td>
<td></td>
</tr>
</tbody>
</table>

(ii) 75 = 70 + 5
\[ \text{LXX} + V = \text{LXXV} \]

(iii) 555 = 500 + 50 + 5
\[ \text{D} + \text{L} + \text{V} = \text{DLV} \]

Activity
- Mk old edition pg 49-51
- Understanding pg 36-39
- Fountain pg 26-30

LESSON 15
Subtopic: Expressing Roman Numerals to Hindu Arabic numerals
Content: Convert from Roman numerals to Hindu Arabic numerals
LESSON 16
Subtopic: Operations on Roman Numerals
Content:
(a) Addition
(b) Subtraction
Examples:
(i) Write LXXV in Hindu Arabic system
LXXV
L = 50
XX = 20
V = 5

75
(ii) CCCXCIX
CCC = 300
XC = 90
IX = 9

399
(iii) CMLXIX
CM = 900
LX = 60
IX = 9

969

Activity
- Mk old edition pg 49-51
- Understanding mtc pg 36-39
- Fountain pg 26-30

LESSON 17
Subtopic: converting from base ten to base five
Content: (a) Change from base ten to base five
Examples:
(i) Change 23 to base five

2
3

14
3

\therefore 23 = 43_{five}

(b) Converting from base ten to binary base

19_{ten}

B
W
T
R
2
19
1
2
9
1
2
4
0
2
2
0

19_{ten} = 10011_{two}

Remarks


4 1 2 five = (4 \times 5^2) + (1 \times 5^1) + (2 \times 5^0)  
= (4 \times 5 \times 5) + (1 \times 5) + (2 \times 1)  
= 100 + 5 + 2  
= 107_{ten}

Examples:  
(ii) change 1011two to base ten  
1011two = (1 \times 2^3) + (1 \times 2^1) + (1 \times 2^0)  
= (1 \times 2 \times 2 \times 2) + (1 \times 2) + (1 \times 1)  
= 8 + 2 + 1  
= 11_{ten}

Activity  
Trs’ collection  
Remarks

LESSON 19  
Subtopic: Operations on bases  
Content: Addition of same non decimal base numerals  
Examples:  
(i) 2 3 five + 21 five  
\[\begin{align*}  
2 & \ 3 \ five \\
+ & \ 2 \ 1 \ five \\
\hline 4 & \ 4 \ five 
\end{align*}\]  
(ii) Add: 1101 + 11two  
\[\begin{align*}  
1101two \\
+ & \ 11 \ two \\
\hline 10000 \ two 
\end{align*}\]  

Activity  
Trs’ collection  
Remarks

LESSON 20  
Subtopic: Subtraction of bases  
Content: Subtraction in non decimal bases in the same base.  
Examples:  
(i) Subtract 34five – 13five  
\[\begin{align*}  
3 & \ 4 \ five \\
- & \ 1 \ 3 \ five \\
\hline 2 & \ 1 \ five 
\end{align*}\]  
(ii) Subtract 1011two - 111two  
\[\begin{align*}  
1011 \ two \\
- & \ 111 \ two \\
\hline 0100 \ two 
\end{align*}\]  

Activity  
Trs’ collection  
Remarks

LESSON 21  
Subtopic: Multiplication in Binary system  
Content: Multiply  
(i) 2 by 2  
(ii) 3 by 2  
(iii) to 4 b 3 digit numerals  
Examples:  
(i) 10two x 11two  
\[\begin{align*}  
10 & \ two \\
\times & \ 11 \ two \\
\hline 1 & 0 \\
\hline & + \ 100 \\
\hline \ 110 \ two 
\end{align*}\]  
(ii) 11two x 11two  
\[\begin{align*}  
11 & \ two \\
\times & \ 11 \ two \\
\hline & \ 11 \ two \\
\hline & + \ 111 \\
\hline & 10101 \ two 
\end{align*}\]  

Activity  
Trs’ collection  
Remarks

LESSON 22  
Subtopic: Operations on finites  
Content: Addition in finite/modular system  
Examples:  
(i) Add: 3 + 4 = - (finite 5)  
(a)  
(b) 3 + 4 = - (finite 5)  
3 + 4 = 7  
0
LESSON 23

SUBTOPIC: Multiplication in finite systems

Examples:

(i) Work out $3 \times 4 = x$ (finite 5)

$3 \times 4$ means
3 groups of 4
$\therefore 3 \times 4 = 2$ (finite 5)
So $x = 2$ (finite 5)

(ii) $3 \times 4 = x$ (finite 5)

$3 \times 4 = 12$
$12 \div 5 = 2$ (finite 5)
$\therefore x = 2$ (finite 5)

Activity
Ref: MK old edition pg 245-253
Remarks

LESSON 24

Subtopic: Subtraction in finite system.

Content:
(a) Using the dial
(b) By calculation method

Example:
(i) Subtract $3 - 4 = -$ (finite 5)

$\therefore 3 - 4 = 4$ (finite 5)

(ii) $3 - 4 = -$ (finite 5)

$(3 + 5) - 4$
$8 - 4$
$= 4$

$\therefore 3 - 4 = 4$ (finite 5)

Activity
Mk old edition pg 245-253
Remarks

LESSON 25

Subtopic: Algebra in finite system

Content: Solve equations in finite system

Examples:

(i) Solve: $p - 4 = 3$ (finite 6)

$P - 4 + 4 = 3 + 4$ (finite 6)
$P + 0 = 7$ (finite 6)
$P = 7 + 6 = 1$ (finite 6)
$P = 1$ (finite 6)

(ii) Find $x$ if $2x - 3 = 3$ (finite 4)

$2x - 3 = 3$ (finite 4)
$2x - 3 + 3 = 3 + 3$ (finite 4)
$2x + 0 = 6$ (finite 4)
$\frac{2x}{2} = \frac{6}{2}$

$X = 3$ (finite 4)

Activity
Trs’ collection
Remarks

LESSON 26

Subtopic: Application of finites.

Contents: Use ideas on finites to solve everyday life problems: (weeks, months)
Examples:
(a) If today is a Friday, what day of the week will it be after 23 days.
   Day + 23 = - (finite 7)
   5 + 23 = 28
   28 ÷ 7 = 4 r 0
   → The day will be Sunday.
(b) If today is Friday, what day of the week was 45 days ago?
   Day - 45 (finite 7)
   5 - 45
   6 r 3
   7
   5 – 3 (finite 7)
   2 (finite 7)
   → It was Tuesday.
(c) It is April now, which month will it be after 18 months
   Month – 18 (finite 12)
   4 – 18 1 r 6
   12
   4 – 6
   (4 + 12) – 6
   16 – 6 = 10 (finite 120)
   It will be October.

Activity
MK old edition 252-253

REVISION WORK ON WHOLE NUMBERS
1. Given digits 8, 4, 2
   (a) Write down all the numerals you can form using the digits.
   (b) Find the difference between the highest and the lowest numeral formed.
2. Find the place value and value of the underlined digits.
   (a) 4 6657 (b) 16785 (c) 16345
3. Expand 8739 using
   (a) values (b) place values (c) Powers
4. Write 7432 in standard/scientific form
5. Express the following in single form
   (a) 5000 + 70 + 3
   (b) (7 x 10000) + (8 x 1000) + (3 x 100) + (7 x 10) + (2 x 1)
   (c) (7 x 10³) + (4 x 10²) + (3 x 10¹) + 5 x 10⁰

(d) 8.56 x 10²
6. Write 2592028 in words
7. Write: six million, eight hundred thousand, nine hundred sixteen
8. (a) Round off 4867 to the nearest tens
   (b) Round off 79581 to the nearest hundreds.
   (c) Round off 79581 to the nearest thousands.
9. Write the place value and value of the underlined digits
   (a) 0.784 (b) 3.282 (c) 5.948
10. Write 0.328 in words
11. Write Twenty seven and six tenths in figures.
12. Expand 5.78 using
   (a) place values (b) values (c) exponents
13. Express 0.432 in standard form
14. Arrange 0.44, 0.4, 4.4 in ascending order.
15. Arrange 0.35, 0.5, 0.7, 0.33 in descending order.
16. Round off 39.96 to the nearest tenth.
17. Write 99 in Roman Numerals.
18. Write XLV in Hindu Arabic system.
19. Work out: XI = 1X
20. Change 26₆₆ to base six.
21. Write 346₇ in words.
22. Give the place value of each digit in 243₅.
23. Expand 462₇ using powers.
24. Change 341₆ to base ten
25. Change 12₄₅ to base six.
26. If 17X = 16₆ find value of x
27. Add 5₅₇ + 3₃₇ = ______ seven.
28. Subtract: 4₄₅ – 1₂₅
29. Multiply 10₂ x 1₁ₐ
30. Change 13 to finite 7.
31. Add: 4 + 4 = ______ finite 5
32. Multiply: 2 x 4 = ______ finite 5
33. Subtract: 2 – 4 = ______ finite 6
34. Divide 5 ÷ 3 = ______ finite 7
35. Solve: x – 4 = 3 finite 6
36. If today is Friday, what day of the week will it be after 22 days?
37. If today is Thursday, what day of the week was it 44 days ago?
38. It is 2.00 pm what time of the day will it be after 400 hours?

TOPIC / UNIT OPERATIONS ON WHOLE NUMBERS.
LESSON 1
Subtopic: Addition of whole numbers up to millions.
Content: Adding large whole numbers up to millions with and without carrying.

Examples:
(a) \[
\begin{array}{c}
7 & 8 & 6 & 4 & 7 & 6 & 2 \\
+ & 1 & 9 & 7 & 9 & 8 & 6 & 8 \\
\hline
9 & 8 & 4 & 4 & 6 & 3 & 0
\end{array}
\]

(b) Example: There were 246 240 books in a library and 167 645 more books were donated to the same library. How many books are these altogether?
\[
\begin{array}{c}
2 & 4 & 6 & 2 & 4 & 0 \\
+ & 1 & 6 & 7 & 6 & 4 & 5 \\
\hline
4 & 1 & 3 & 8 & 8 & 5 & \text{books}
\end{array}
\]

Example:
(b) A company has 850 workers who earn sh 5460 each a day. How much does the company spend on wages everyday?
\[
\begin{array}{c}
5 & 4 & 6 & 0 \\
x 8 & 5 & 0 \\
\hline
0 & 0 & 0 & 0 \\
2 & 7 & 3 & 0 & 0 \\
+ 4 & 3 & 6 & 8 & 0 \\
\hline
4 & 6 & 4 & 1 & 0 & 0 & 0
\end{array}
\]

= 4641000

LESSON 2
Subtopic: Subtraction of whole numbers up to millions.

Examples:
(a) \[
\begin{array}{c}
4 & 1 & 1 & 1 & 2 & 13 \\
- & 1 & 3 & 4 & 5 & 1 & 0 & 2 \\
\hline
3 & 8 & 8 & 8 & 0 & 8 & 4
\end{array}
\]

(b) Example: A dairy processed 6500 650 litres of milk and sold 565945 litres. How many litres were left?
\[
\begin{array}{c}
6 & 5 & 0 & 0 & 6 & 5 & 0 \\
- & 5 & 6 & 5 & 9 & 4 & 5 \text{litres}
\hline
8 & 4 & 9 & 7 & 0 & 5
\end{array}
\]

LESSON 3
Subtopic: Multiplication

Examples:
(i) \[
\begin{array}{c}
1 & 4 \times 3 \\
\hline
4 & 2 & 2 & 2 & 4 & 8
\end{array}
\]

(ii) \[
\begin{array}{c}
1 & 2 \times 3 \\
\hline
2 & 1 & 3 & 2 & 7 & 8
\end{array}
\]

Activity
Understanding mtc pg 40-42
Fountain pg 32-35
MK new edition pg 24-25

Remarks
_____________________________________________________________________

LESSON 4
Subtopic: Division

Examples:
(i) \[
\begin{array}{c}
1 & 5 \div 3 \\
\hline
1 & 7 & 6 & 7
\end{array}
\]

(ii) \[
\begin{array}{c}
1 & 2 \div 6 \\
\hline
1 & 6 & 6 & 6
\end{array}
\]

Activity
Fountain pg 34-36 / understanding mtc pg 46-49/ MK new edition pg 28

Remarks
_____________________________________________________________________

Activity
Understanding mtc pg 40-42
Fountain pg 32-35
MK new edition pg 24-25

Remarks
_____________________________________________________________________

Activity
Fountain pg 34-36 / understanding mtc pg 46-49/ MK new edition pg 28

Remarks
_____________________________________________________________________
LESSON 5
Subtopic: Division
Content: Word problems involving division of large numbers.
Example: A petrol station manager bought 2200 litres of motor oil. If she put equal amount of oil in 440 drums. How many litres of oil were in each drum?

\[
\begin{array}{rll}
440 & \div 2200 & = 440 \\
-2200 & & -2200 \\
0 & & 880 \\
-0 & & 1320 \\
0 & & 1760 \\
\end{array}
\]

Activity
Mk new edition pg 37-38
Fountain pg 37-38
Understanding MTCpg 49-53

LESSON 6
Subtopic: Combined operations on numbers
Content: Use of BO MAS
Examples: (i) Work out: \(9 - 15 + 6\)
\[
(9 + 6) - 15
\]
\[
15 - 15
\]
0

(ii) \(8 \div 4 \times 3\)

(iii) \(18 - (4 \times 3) \div 6\)

BO MAS
\[
(8 + 4) \times 2
\]
\[
2 \times 2
\]

4

iv) Kawoya got 32 mangoes in the morning and ate 28 of them. \(\frac{1}{2}\) of 32 was got in the evening. How many mangoes did he have at the end of the day?
2. Add: 231 048 + 524 628
3. There were 351 272 books in a library and 189 242 more books were donated to the same library. How many books are there altogether?
4. Subtract: 6 4 3 2 2 7 8
   - 2 3 2 1 1 0 1
5. Subtract 452 367 from 872 291
6. A dairy processed 5300 450 litres of milk and sold 3450833 litres. How many litres were left?
7. Multiply 145 by 19?
8. Multiply 1238 by 134
9. A bus carries 84 passengers each trip. How many people will it carry if it makes 18 trips?
10. Divide 5984 \( \div \) 68
11. A farmer has sh 688640 to pay to 32 workers. How much money does each worker get?
12. Work out 18 – ( 3 x 2) \( \div \) 6

**TOPIC / UNIT 4: PATTERNS AND SEQUENCES:**

**LESSON 1**

Subtopic: Divisibility tests
Content:
- Divisibility tests of 2, 5, 10
- Divisibility by 3, 6, 9
- Divisibility by 4 and 8

Example:
(a) By 3
A Number is divisible by 3 when the sum of its digits 15 a multiple of 3.
E. g 612

\[
6 + 1 + 2 = 9
\]
\[
9 \div 3 = 3
\]
\[\therefore 612 \text{ is divisible by } 3\]

(b) Divisibility by 8:
A number is divisible by 8 when the last three digits form a multiple of eight.
E. g 6248

\[
\text{last 3 are 248}
\]
\[\therefore 6248 \text{ is divisible by } 8\]

**Activity**
MK new edition pg 34-36
Fountain pg 41-42
Understanding pg 60-61

**Remarks**

**LESSON 2**

Subtopic: Developing number patterns
Content:
- Odd and even numbers
- Triangular numbers
- Rectangular numbers
- square numbers

Examples:
(i) Lists down the following:
(a) Counting / natural numbers less than 15.
(b) Whole numbers up to ten
(c) Even numbers between ten and 20.
(d) Odd numbers less than twenty
(ii) Triangular numbers E.g

\[
\begin{array}{cccc}
0 & 1 & 0 & 3 \\
0 & 0 & 0 & 0 \\
1 + 2 = 3 & 0 & 0 & 0 \\
1 + 2 + 3 = 6 &
\end{array}
\]

N.B Find triangular numbers by adding the consecutive natural numbers i. e (1, 3, 6, 10, 15, ----------)
(iii) Rectangular numbers

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2 x 1</td>
<td>2 x 3</td>
<td>2 x 5</td>
</tr>
<tr>
<td>2</td>
<td>6</td>
<td>10</td>
</tr>
</tbody>
</table>

(iv) Square numbers

<table>
<thead>
<tr>
<th>e.g</th>
<th>00</th>
<th>000</th>
<th>0000</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>00</td>
<td>000</td>
<td>0000</td>
</tr>
</tbody>
</table>

1 x 1 = 1 2 x 2 = 4 3 x 3 = 9 4 x 4 = 16

Activity

Fountain pg 43-48
MK new edition pg 37
Understanding pg 62-65

Remarks

LESSON 3
Subtopic: Prime and composite numbers.
Content: - List prime numbers
- Composite numbers
Examples: (i) What is the sum of the 3rd and the 7th prime numbers
Prime numbers are:
- 2, 3, 5, 7, 11, 13, 17, 19, 23
Sum = 5 + 17
= 22
(ii) Work out the sum of the first five composite numbers
Composite numbers are:
- 4, 6, 8, 9, 10, 12, 14, 15,
Sum is
- 4 + 6 + 8 + 9 + 10 = 37

Activity

Remarks

LESSON 4
Subtopic: Consecutive numbers / natural numbers / integers
Content: Find the consecutive counting numbers

Example: The sum of 3 consecutive whole numbers is 36. What are these numbers
Let the 1st number be n.
2nd number = n + 1
3rd number = n + 2
But:
- n + n + 1 + n + 2 = 36
- n + n + n + n + 1 + 2 = 36
- 3n + 3 = 36
- 3n + 3 - 3 = 36 - 3
- \( \frac{3n}{3} \) = 33
- n = 11

1st number = n 2nd number (n + 1) 3rd number is (n + 2)
and n = 11 11 + 1 = 12 11 + 2 13

Activity
Mk old edition pg 76-78

Remarks

LESSON 5
Subtopic: Consecutive numbers
Content: Find the consecutive EVEN and ODD numbers
Example: (i) The sum of three consecutive EVEN numbers is 24. list down the 3 numbers
Let the 1st number by (x)
2nd number be (x + 2)
3rd number be (x + 4)

\[
\begin{align*}
X + x + 2 + x + 4 &= 24 \\
X + x + x + 2 + 4 &= 24 \\
3x + 6 &= 24 \\
3x + 6 - 6 &= 24 - 6 \\
\frac{3x}{3} &= 18 \\
X &= 6
\end{align*}
\]

These EVEN Numbers are:
1st is 6, 2nd is , 3rd X + 2 x + 4
LESSON 6
Subtopic: Factors
Content: - Listing factors
- The common factors (CF)
- The HCF / GCF
- The LCF

Examples: (i) How many factors does 18 have?
F_{18} = \{1, 2, 3, 6, 9, 18\}
\therefore 18 has 6 factors

(ii) Work out the sum of all the F20
F_{20} = \{1, 2, 4, 5, 10, 20\}
Sum = 1 + 2 + 4 + 5 + 10 + 20
= 42

(iii) Work out the GCF of 12 and 18
F_{12} = \{1, 2, 3, 4, 6, 12\}
F_{18} = \{1, 2, 3, 6, 9, 18\}
CF = \{1, 2, 3, 6\}
GCF = 6

N.B (iv) The LCF is always 1

LESSON 7
Subtopic: Prime factorization
Content: - Using (a) Multiplication

(b) Subscript method
(c) Powers/ exponents

Examples: (i) Find number prime factorised.

(ii) Find the prime factors of 60.
(a) By ladder
(b) by factors tree

\[\begin{array}{c|c|c}
2 & 60 & 60 \\
2 & 30 & 30 \\
3 & 15 & \text{3} \\
5 & 5 & \text{5} \\
1 & \text{1} & \text{1}
\end{array}\]

Pf 60 are (a) \(2 \times 2 \times 3 \times 5\)
Or \(\{2, 3, 5\}\)
Or \(2^2 \times 3 \times 5^1\)

Activity
MK old edition pg 82
Remarks

LESSON 8
Content:
i) Finding prime factorized number
ii) Finding the missing prime factors

Examples
i) What number has been prime factorised
ii) Prime factories and find missing factors
The prime factorization of 30 is \(2 \times y \times 5\), find \(y\)

\[a = \{2,2,5\}\]
\[b = 2^2 \times 3 \times 5^1\]

(i) If \(2 \times 3 \times y = 30\) find \(y\)
\[2 \times 3 \times y = 30\]
\[6y = 30\]
\[\therefore y = 5\]

(ii) If \(144 = a^4 \times b^2\) find ‘a’ and ‘b’
\[2 \mid 144\]
\[\therefore 2^4 \times 3^2 = a^4 \times b^2\]
(iii) Given that \(2^2 \times 2 = 32\) find the value of \(x\).

(1st prime factorise 32)

\[ \begin{array}{c|c|c} \hline 2 & 16 & 32 \\ \hline 2 & 8 & 4 \\ \hline 2 & 4 & 2 \\ \hline \end{array} \]

\[ \begin{array}{c|c|c} \hline 2 & 3 & 18 \\ \hline 3 & 9 & 1 \\ \hline \end{array} \]

\[ \begin{array}{c|c|c} \hline 2 & 72 & 36 \\ \hline 3 & 36 & 9 \\ \hline \end{array} \]

\[ \begin{array}{c|c|c} \hline 2 & 24 & 36 \\ \hline 3 & 12 & 18 \\ \hline 2 & 6 & 9 \\ \hline 3 & 3 & 9 \\ \hline \end{array} \]

\[ \begin{array}{c|c} \hline 3 & 1 \\ \hline \end{array} \]

\[ \therefore a = 2 \text{ and } b = 3 \]

LESSON 9

Subtopic: Multiples of numbers

Content:
- Listing multiples.
- The common multiples
- The LCM

Examples:
(i) List the multiples of 4 between ten and 30.
\[ M_4 = \{4, 8/ 12, 16, 20, 24, 28/ \ldots \} \]
\[ M_4 \text{ between } 10 \text{ and } 30 \text{ are} \]
\[ \{12, 16, 20, 24, 28\} \]

(ii) Work out the LCM of 24 and 36
(a) Using multiples
(b) By prime factorization method.

\[ \begin{array}{c|c|c} \hline 2 & 24 & 36 \\ \hline 3 & 12 & 18 \\ \hline 2 & 9 & 6 \\ \hline 3 & 3 & 3 \\ \hline \end{array} \]

\[ \text{LCM} = 2 \times 2 \times 2 \times 3 \times 3 = \boxed{72} \]

Activity
Mk old edition pg 83

Remarks
_____________________________________________________________________

LESSON 10

Subtopic: Finding LCM and GCF by prime factorization using a venn diagram

Content:
- Representing prime factors on the venn diagram.
- Find the GCF/HCF and LCM from the venn diagram

Examples:
(i) Work out the prime factors of 30 and 36
\[ \begin{array}{c|c|c|c} \hline 2 & 15 & 30 \\ \hline 3 & 5 & 1 \quad \text{and} \quad 36 \\ \hline 2 & 3 & 2 \quad \text{F}_{30} = \{2, 3, 5, 1\} \quad \text{and} \quad 36 \\ \hline 3 & 2 & 3 \quad \text{F}_{36} = \{2, 3, 3, 1\} \quad \text{F}_{30} \cap \text{F}_{36} = \{2, 3\} \\ \hline \end{array} \]

(ii) Complete
\[ \begin{array}{c|c} \hline 30 \quad \text{F}_{30} & \text{F}_{36} \quad \text{F}_{36} \\ \hline 5 \quad 2 \quad 2 \quad \text{F}_{30} \cap \text{F}_{36} = \{2, 3\} \quad \text{F}_{30} \cup \text{F}_{36} = \{2, 3, 5, 1\} \\ \hline \end{array} \]

(iii) Use the venn diagram to find the:
(a) GCF of 30 and 36
\[ \text{GCF} = \text{F}_{30} \cap \text{F}_{36} = \{2, 3\} \]
\[ = \boxed{2 \times 3 = 6} \]

(b) LCM of 30 and 36
\[ \text{LCM} = \text{F}_{30} \cup \text{F}_{36} = \{2, 3, 5, 1\} \]
\[ = \boxed{2 \times 2 \times 3 \times 3 \times 5 = 180} \]

Activity
Mk old edition pg 86-87

Remarks
_____________________________________________________________________

LESSON 11

Subtopic: Unknown values/ factors

Content:
(i) Find the missing number
(ii) Find the unknown factors
(iii) Work out HCF and LCM

Example:
(i) Find \(x\) and \(y\) below
\[ \begin{array}{c|c|c} \hline 2 & 21 & 23 \quad \text{F}_{x} \quad \text{F}_{y} \quad \text{factors of } y \quad \text{are} \quad \{21, 22, 31, 32, 33\} \\ \hline \end{array} \]
\[ y = 2 \times 2 \times 3 \times 3 \times 3 \]
\[ y = 108 \]

Factors of \(x \quad \text{are} \quad \{21, 22, 31, 23\} \]
\[ 2 \times 2 \times 3 \times 2 \times 2 \]
\[ X = 24 \]

Remarks
_____________________________________________________________________

Activity
Mk old edition pg 86

Remarks
(ii) Find the unknowns

\[ F_{20} = \{x, 21, 51\} \]
\[ F_{30} = \{21, 51, y\} \]
\[ \text{GCF of 20 and 30} \]
\[ \frac{20}{10} = \frac{10x}{10} = \frac{10}{1} = \frac{2 x 5}{5} \]
\[ \frac{2}{1} = \frac{x}{2} \]
\[ \therefore x = 2 \]

\[ \frac{30}{10} = \frac{10y}{10} = \frac{10}{1} = \frac{2 x 5}{5} \]
\[ \frac{3}{1} = \frac{y}{3} \]
\[ \therefore y = 3 \]

\[ \text{LCM} = F_{20} \cup F_{30} \]
\[ = \{21, 22, 31, 51\} \]
\[ = 2 \times 2 \times 3 \times 5 \]
\[ \therefore \text{LCM} = 60 \]

**Activity**
Oxford primary MTC BK 6 pgs 34 – 41

**Remarks**

**LESSON 12**
Subtopic: Application of GCF/LCM
Content:
- Relationship between GCF and LCM
- Other problem related to HCF/GCF
Examples:
(i) The LCM of two numbers is 144 their GCF is 12 and one of these numbers is 48. Find the other number

Solution:
Let 2nd No be \( y \)
1st No \( \times \) 2nd No = LCM x GCF
\[
\begin{align*}
48 \times y &= 144 \times 42 \\
48 &= 48 \\
\therefore y &= 36
\end{align*}
\]

(ii) What is the largest possible divisor of 24 and 36. Largest possible divisor is GCF

\[ 2 \times 2 = 4 \]
\[ 2 \times 3 = 6 \]
\[ 2 \times 2 \times 3 = 12 \]

\[ \text{largest divisor} = 12 \]

\[ \begin{array}{c|c|c}
2 & 24 & 36 \\
\hline
\end{array} \]

**Activity**
Oxford primary MTC pupils BK 6 pgs 34 - 36

**Remarks**

**LESSON 14**
Subtopic: Working with powers of whole numbers.
Content:
- Find a number from powers
LESSON 15
Subtopic: Squares of numbers
Content: - Squares of
  (a) whole numbers
  (b) fractions
  (c) mixed fractions
  (d) decimal

Example: (i) What is the square of 12?
12² = 12 x 12 = 144

(ii) Work out the square of ¾
\[
\frac{3}{4} \times \frac{3}{4} = \frac{9}{16}
\]

(iii) Calculate the square of 1 ½
\[
1 \frac{1}{2} \times 1 \frac{1}{2} = \left( \frac{1 \times 2 + 1}{2} \right) \times \left( \frac{1 \times 2 + 1}{2} \right) = \frac{3 \times 3}{2 \times 2} = \frac{9}{4} = 2 \frac{1}{4}
\]

(iv) Find (0.15)²
\[
(0.15)^2 = \frac{15}{100} \times \frac{15}{100} = \frac{225}{10000} = 0.0225
\]

Activity
A New MK pupils’ BK 6 pgs 84 and 85.

Remarks

LESSON 16
Subtopic: Square roots.
Content: Square roots of whole numbers.

Example: Find the square roots of \( \sqrt{36} \)
\[
\begin{array}{c|c}
2 & 36 \\ \\
2 & 18 \\ \\
3 & 9 \\ \\
3 & 3 \\
\end{array}
\]
\( \therefore \sqrt{36} = 6 \)

(ii) Work out \( \sqrt{324} \)
\[
\begin{array}{c|c}
2 & 324 \\ \\
2 & 162 \\ \\
3 & 81 \\ \\
3 & 27 \\ \\
3 & 9 \\
\end{array}
\]
\( \therefore \sqrt{324} = 18 \)

Activity
A New MK pupils’ MTC BK 6 pg 38.

Remarks
Find the square root of 1.44

\[ 1.44 = \frac{144}{100} = \sqrt{\frac{144}{100}} = \sqrt{\frac{12 \times 12}{10 \times 10}} = \frac{12}{10} = 1.2 \]

Activity
New MK pupils BK 6 pages 39-40

Remarks

LESSON 18
Subtopic: Application of squares and square roots.
Content:
- Solve problems using square
- Solve problems involving use of square roots.
Examples:
1. A square garden has a length of 3 ½ m. What out its area.
   
   Area of sq = S x S
   
   \[ 3 \text{ ½ m} \times 3 \text{ ½ m} = \frac{7}{2} \times \frac{7}{2} = \frac{49}{4} = 12 \frac{1}{4} \text{ m}^2 \]
   
   ∴ Area = 12 ¼ m².

(ii)
If a square has an area of 576.

(a) Calculate its side
   
   Area = side x side
   
   \[ 576 = S \times S \]
   
   \[ \sqrt{576} = \sqrt{S^2} \]
   
   ∴ side = 24

(b) Find the perimeter of the square.
   
   P = 4 x side
   
   \[ 4 \times 24 \]

Activity
The Pupils will do exercise 4 : 41 and 4 : 43 pages 100 and 102.
A old MK pupils’ BK 6 pages 100 to 102.
New mk pg 39

Remarks

LESSON 19.
Subtopic: Cubes and cube roots
Content:
- Find the cubes
- Find the cube roots
Examples:
(i) What is the cube of: 5?
   
   \[ 5^3 = 5 \times 5 \times 5 = 125 \]

(ii) Find the volume of the cube below:
   
   Vol of cube = S x S x S
   
   \[ 6 \text{ cm} \times 6 \text{ cm} \times 6 \text{ cm} \]
   
   \[ V = 216 \text{ cm}^3 \]

(iii) Work out the cube root of

(a) \[ 64 = \sqrt[3]{64} = \sqrt[3]{2 \times 2 \times 2} \times \sqrt[3]{2 \times 2 \times 2} \]
   
   \[ = \frac{2 \times 2 \times 2}{2 \times 2 \times 2} = \frac{8}{8} = 2 \times 2 \]

(b) \[ = \sqrt[3]{8} = 2 \]

Activity
The Pupils will do exercise below
1. Work out 2³
2. Find the number of cubes in the figure:
   
   (a) \[ \text{ (b) } \]

3. Work out the volume of a cube of side.
   
   (i) side = 4 cm  (ii) side = 10 cm  (iii) side = 5

4. Work out the cube root of each of these numbers
   
   (a) 8  (b) 27  (c) 64  (d) 216

LESSON 20
Subtopic: Number patterns and sequences
Content: Complete series and sequences
Examples: Find the missing number:
(a) 2, 3, 5, 7, ___
11 is the next number
(prime numbers)
(b) 4, 9, 16, 25, ___
2 x 2   3 x 3   4 x 4   5 x 5   6 x 6
(square numbers)
(c) 1, 2, 4, 5, 7, 8, 10, 11
10 + 1 = 11
(d) 22, 16, 20, 14, 18, 12
-6, *4, -6, *4, -6
18 - 6 = 12
(e) ½, ¼, 1/₈, ___

Activity
A New Mk primary MTC BK 6 pages 90 – 91.
Fountain pg 49
Remarks

UNIT 5: TOPIC: FRACTIONS

LESSON 1
Sub topic: Operations on fractions
Basic operations
(i) Addition (+ )
(ii) Subtraction (-)
(iii) Multiplication (X)
(iv) Division (÷)
(v) Mixed operations (BODMAS)
Content:
(i) Addition of simple fractions with different denomination
(ii) Addition of mixed numbers
Examples:
(i) Add: \( \frac{2}{3} + \frac{1}{4} \) LCM 12
\( \frac{2 \times 4}{3 \times 4} + \frac{1 \times 3}{4 \times 3} \)
\( \frac{8}{12} + \frac{3}{12} \)
\( \frac{11}{12} \)

(ii) Find the sum of \( 2 \frac{2}{3} \) and \( 2 \frac{1}{4} \)
Solution: \( 2 \frac{2}{3} + 2 \frac{1}{4} = (2 + \frac{2}{3}) + \frac{1}{4} \) LCM 12
\( 4 + \frac{(2 \times 4)}{3 \times 4} \) \( \frac{(1 \times 3)}{4 \times 3} \)
\( 4 + \frac{8}{12} + \frac{3}{12} \)
\( 4 + \frac{11}{12} \)
\( \frac{44}{12} \)

Activity
- Fountain pg 56-57
- Understanding pg 85

LESSON 2
Sub-topic: Operation on fractions
Content: (i) Subtraction of simple fractions with different denominations
(ii) Subtraction of mixed numbers

Examples: (a) Subtract: \( \frac{3}{4} - \frac{3}{5} \) \( \text{LCM} = 20 \)

\[
\frac{15}{20} - \frac{12}{20} = \frac{3}{20}
\]

(b) Subtraction: \( 4 \frac{1}{3} - \frac{7}{8} \)

\[
\frac{13}{8} - \frac{15}{8} = \frac{104 - 45}{24} = \frac{59}{24}
\]

\[
2 \frac{11}{24}
\]

(b) One third of the children in a school are girls. One day a quarter of the girls in the class were absent. What fraction of the girls in the school were absent on that day?
Fraction girls = \( \frac{1}{3} \)
Fraction of girls absent = \( \frac{1}{4} \) of \( \frac{1}{3} \) = \( \frac{1}{4} \times \frac{1}{3} \) = \( \frac{1}{12} \) Ans

Activity
Trs’ collection
Remarks

LESSON 3
Sub-topic: Addition and subtraction of fractions involving word problems
Content: - Addition of fractions involving word problems
- Subtraction of fractions involving word problems
Examples: (a) A man used three quarters of his shamba to grow groundnuts, a half to grow potatoes and two thirds to grow water melons. Fin total fraction of the whole land used.
Solutions

\[
\frac{3}{4} + \frac{1}{2} + \frac{2}{3} \quad \text{LCM 12}
\]

\[
\frac{3 \times 3}{4 \times 3} + \frac{1 \times 6}{2 \times 6} + \frac{2 \times 4}{3 \times 4}
\]

\[
\frac{9}{12} + \frac{6}{12} + \frac{8}{12}
\]

\[
= \frac{23}{12} + \frac{12}{12} + \frac{11}{12}
\]

\[
= 2 \frac{11}{12}
\]

Activity
Understanding mtc pg 87
Fountain pg 58-60
Remarks

LESSON 4
Sub-topic: Addition and subtraction by use of BODMAS
Content: B O D M A S - subtraction
| Addition |
| Multiplication |
| Division |
| Of Brackets |

Example: Simplify: \( \frac{1}{2} - \frac{2}{3} + \frac{1}{5} \)

Solution

\[
\frac{1}{2} - \frac{2}{3} + \frac{1}{5} \quad \text{(BODMAS)}
\]

Rearrange
\[
\frac{1}{2} + \frac{1}{5} - \frac{2}{3} \quad \text{LCM} = 30
\]

\[\frac{(15 + 6) - 20}{30} = \frac{21 - 20}{30} = \frac{1}{30}\]

(b) Simplify: \[\frac{1}{3} + \frac{3}{4} - \frac{5}{6}\]

Solution:

\[
\frac{4}{3} + \frac{3}{4} - \frac{5}{6} = \frac{16 + 9}{12} - \frac{10}{12}
\]

\[= \frac{25}{12} - \frac{10}{12} = \frac{15}{12} = \frac{5}{4}\]

\[\frac{5}{4} + \frac{3}{4} - \frac{5}{6}\]

\[= \frac{12}{12} + \frac{3}{4} \cdot \frac{12}{4} = \frac{1}{4}\]

Activity
Fountain bk 6 pg 59.

Remarks

LESSON 5
Sub-topic: Multiplication of fractions
Content: - Multiplication of fractions
- Multiplication of simple fractions

Examples:
(i) \[\frac{1}{3} \times 12 = \frac{1}{3} \times 12\]

\[= \frac{12}{3} = 4\]

(ii) \[\text{Calculate } \frac{2}{3} \text{ of } 12\]

\[= \frac{2}{3} \times 12 = 8\]

(iii) \[\frac{3}{4} x \frac{3}{4} = \frac{1}{4} \times 4\]

\[= \frac{3}{4}\]

(iv) \[\frac{3}{4} \times \frac{3}{4} = \frac{9}{16}\]

\[= \frac{4}{3}\]

\[\text{t} = \frac{4}{3}\]

\[\Rightarrow \text{Reciprocal of } \frac{3}{4} \text{ is } \frac{4}{3}\]
What is the reciprocal of $2 \frac{1}{4}$?

Let the reciprocal of $2 \frac{1}{4}$ be $y$.

\[
2 \frac{1}{4} \times y = \frac{1}{1}
\]

\[
9 \times y = \frac{1}{4}
\]

\[
\frac{9y}{4} = \frac{1}{x}
\]

\[
y = \frac{4}{9}
\]

\[\therefore \text{Reciprocal of } 2 \frac{1}{4} \text{ is } \frac{4}{9}\]

\[
1 \div \frac{1}{2} = 1 \div \frac{1}{4}
\]

\[
= 1 \times \frac{4}{9}
\]

\[
= \frac{4}{9}
\]

**Activity**

Old edition MK pg 48

**Remarks**

---

**LESSON 6**

**Sub-topic:** Division of fractions

**Content:**
- Divide fractions using reciprocals
- Divide fractions using LCM

**Examples:**

(i) Divide $2 \div \frac{2}{3}$

\[
2 \div \frac{2}{3} = \frac{3}{2} \times \frac{1}{1} = \frac{2}{6} = \frac{1}{3}
\]

(b) Divide $2 \div \frac{2}{3}$

\[
\frac{2}{3} \div \frac{2}{1} = \frac{2}{3} \times \frac{1}{2} = \frac{2}{6} = \frac{1}{3}
\]

---

\[
2 \div 6.
\]

\[
\frac{2}{1} = \frac{1}{3}
\]

**Activity**

New MK BK 6.

**Remarks**

---

**Examples (ii)**

(a) Divide: $\frac{3}{4} \div \frac{1}{2}$

<table>
<thead>
<tr>
<th>LCM</th>
<th>Reciprocal</th>
</tr>
</thead>
<tbody>
<tr>
<td>$3 \div 1$ LCM $4$</td>
<td>$\frac{3}{4} \div \frac{1}{2}$</td>
</tr>
<tr>
<td>$4 \div 2$</td>
<td>reciprocal $\frac{2}{4}$</td>
</tr>
</tbody>
</table>

\[
\frac{\frac{3}{4} \times \frac{2}{1}}{\frac{4}{1} \times \frac{2}{1}} = \frac{3}{4} \times \frac{1}{2} = \frac{6}{3}
\]

(b) Divide $2 \frac{1}{2} \div 1 \frac{1}{4}$

<table>
<thead>
<tr>
<th>LCM</th>
<th>Reciprocal</th>
</tr>
</thead>
<tbody>
<tr>
<td>$2 \frac{1}{2} \div 1 \frac{1}{4}$</td>
<td>$2 \frac{1}{2} \div 1 \frac{1}{4}$</td>
</tr>
<tr>
<td>$\frac{5}{4} \div \frac{5}{2}$ LCM $4$</td>
<td>$\frac{5}{2} \div \frac{5}{4}$</td>
</tr>
</tbody>
</table>

\[
\frac{\frac{5}{4} \times \frac{2}{1}}{\frac{5}{2} \times \frac{4}{1}} = \frac{5}{4} \times \frac{1}{2} = \frac{10}{5} = \frac{2}{10}
\]

---

**LESSON 7**

**Sub-topic:** Operation on fractions

**Content:** Mixed operations with fractions
(i) Use of BODMAS
B - Brackets ( )
O - Of of
D - Division ÷
M - Multiplication X
A - Addition +
S - Subtraction -

Examples: 1. Simplify: \( \frac{5}{6} \div 1 \frac{1}{2} \)
   
   Rename 1 \( \frac{1}{2} \) to \( \frac{3}{2} \)
   
   \( \frac{5}{6} - \left( \frac{3}{4} + \frac{3}{2} \right) \)
   
   BODMAS
   
   \( \frac{5}{6} - \left( \frac{3}{4} \times \frac{3}{2} \right) \)
   
   \( \frac{5}{6} - \frac{1}{2} \) LCM = 12
   
   \( \frac{10}{12} - \frac{6}{12} = \frac{4}{12} \)
   
   = \( \frac{1}{3} \)

Activity
Fountain pg 64-66
New mk pg 51
Old mk pg 113

Remarks:
Emphasis should be on the order of BODMAS

Examples
(a)
(i) Add: 1.5 + 0.4 (ii) 7.04 + 1.6 (iii) Add 2.4 + 0.254
   
   \[ \begin{array}{ccc}
   1.5 & + & 0.4 \\
   7.04 & + & 1.6 \\
   2.4 & + & 0.254 \\
   \hline
   1.9 & + & 8.64 \\
   2.654 \\
   \end{array} \]

(b)
(i) Add: 1.5 + 1.6 (ii) Add 0.09 + 0.18 (iii) Add 0.067 + 0.057
   
   \[ \begin{array}{ccc}
   1.5 & + & 1.6 \\
   0.09 & + & 0.09 \\
   0.067 & + & 0.057 \\
   \hline
   3.1 & + & 0.27 \\
   0.124 \\
   \end{array} \]

Content:
- Subtraction of decimals up to ten thousandths without carrying.
- Subtraction of decimals up to ten thousandths with carrying.

Examples
(a)
(i) Subtract: 2.5 – 1.3 (ii) Subtract: 0.9 – 0.4 (iii) Subtraction 2.085 – 0.03
   
   \[ \begin{array}{ccc}
   2.5 & - & 1.3 \\
   0.9 & - & 0.4 \\
   2.085 & - & 0.03 \\
   \hline
   1.2 & - & 0.58 \\
   2.602 \\
   \end{array} \]

Example (b)
(i) Subtract 2.8 - 0.9 (ii) Subtract 1.45 – 0.6 (iii) Subtract 2.7 – 0.098
   
   \[ \begin{array}{ccc}
   2.8 & - & 0.9 \\
   1.45 & - & 0.6 \\
   2.7 & - & 0.098 \\
   \hline
   1.9 & - & 0.85 \\
   2.602 \\
   \end{array} \]

Activity
Understanding mtc pg 91-93
MK old Mk pg 114

LESSON 8
Sub-topic: Decimals
Content:
1. Addition of decimal up to ten thousandths with carrying
2. Addition of decimals up to ten thousandths with carrying.

LESSON 9
Subtopic: Decimals
Content: Addition and subtraction of decimals (consolidated)
Examples (a) \( 8 – 5.16 + 2.13 \)
Word problems involving addition and subtraction of decimals.

Example:

(d) Mariko bought 4.5 litres of milk. If 0.35 litres got spilled. How many litres were left?

4.50
- 0.35
---
4.15 litres were left.

(e) In a Ludo game, Okello scored 7.5 points in the first round and 3.8 points in the second round. How many points did he score altogether?

1st round 7.5
2nd round + 3.8
---
11.3
He scored 11.3 points altogether.
Example:

(a) Divide $8 \div 0.02$

\begin{align*}
\text{Method 1} & \quad \frac{8}{0.02} \times 100 \\
\text{Method 2} & \quad \frac{8}{2} \div 100
\end{align*}

\begin{align*}
&= \frac{800}{1} \\
&= \frac{400}{2}
\end{align*}

(b) Divide: $0.02 \div 8$

\begin{align*}
\text{Method 1} & \quad \frac{0.02}{8} \times 100 \\
\text{Method 2} & \quad \frac{0.02}{0.02} \div 8
\end{align*}

\begin{align*}
&= \frac{2}{1} \quad = \frac{1}{1} \\
&= \frac{800}{400} \quad \frac{400}{400}
\end{align*}

(c) Divide: $2.4 \div 0.03$

\begin{align*}
\text{Method 1} & \quad \frac{2.4}{0.03} \times 100 \\
\text{Method 2} & \quad 24 \div 3
\end{align*}

\begin{align*}
&= \frac{240}{1} \\
&= \frac{80}{8}
\end{align*}

(d) Divide: $0.072 \div 0.8$

\begin{align*}
\text{Method 1} & \quad \frac{0.072}{0.8} \times 1000 \\
\text{Method 2} & \quad 7.2 \div 8
\end{align*}

\begin{align*}
&= \frac{720}{8} \\
&= \frac{9}{1}
\end{align*}

Remarks

**LESSON 12**

Subtopic: Decimals

Content: Consolidation of all operation on decimals

Example: 1. Work out: $0.7 \times 0.6$

<table>
<thead>
<tr>
<th>Method 1</th>
<th>Method 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>$0.7 \times 0.6 \times 100$</td>
<td>$0.3 \div 10$</td>
</tr>
<tr>
<td>$70$</td>
<td>$1$</td>
</tr>
</tbody>
</table>

Activity

Old MK pg 121

Fountain pg 64-65

Understanding pg 73

Remarks

**LESSON 13**

Subtopic: Decimals

Content: Word problems involving multiplication and division of decimals.
Example: (a) The length of one side of a square is 8.75 cm. What is the perimeter of the square.

**Method 1**
Perimeter of square = 4S

\[\text{P} = 4 \times 8.75\]

\[= 35.00\]

The perimeter is 35 cm

(b) A parcel weighing 5.5 kg contains packets of salt. How many packets of salt are in the parcel if each packet weighs 0.25 kg.

**Method 1**
No of packets = \(\frac{\text{total weight}}{\text{Weight of one packet}}\)

\[= \frac{5.5}{0.25} = 22\]

Either \(\frac{5.5 \times 100}{0.25 \times 100} = 22\)

There are 22 packets

**Method 2**

\[P = 4S\]

\[= 4 \times 875\]

\[= 3500\]

OR \(\frac{55}{25} = \frac{11}{5}\)

Either \(\frac{55}{10} \times \frac{100}{25} = 22\)

There are 22 packets

Activity
New Mk pg 65
Old MK pg 118
Understanding mtc pg 98

Remarks

<table>
<thead>
<tr>
<th>Theme</th>
<th>Topic</th>
<th>Sub topic</th>
</tr>
</thead>
</table>
| Numeracy | Fractions | • Multiplication of fractions by fractions  
• Division of fractions  
• Mixed operation on fraction  
• Operation on decimals (x, +, -, ÷)  
• Mixed operation on decimals  
• Application of fractions  
• Ratios and proportion  
- Changing the fractions to ratios and ratios to fractions  
- Increasing in ratios  
- Finding the ratio of increase  
- Decrease quantity in ratios  
- Finding the ratio of increase  
- Sharing in ratios  
• Proportions  
- Consistent  
- Direct/simple proportionality  
- Indirect/inverse proportionality  
• Percentages  
- Changing fraction in percentages  
- Changing ratios to percentages and vice versa  
- Increasing and decreasing in percentages  
- Finding the percentages increase and decrease  
• Loss and profit  
• Percentage loss and profit  
• Simple interest  
• Solving word problems involving simple interest  |

Interpretation Data • Collection of data from different
<table>
<thead>
<tr>
<th>of groups and data handling</th>
<th>sources</th>
</tr>
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<tbody>
<tr>
<td>• Presentation of data;</td>
<td></td>
</tr>
<tr>
<td>- Tables</td>
<td></td>
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<tr>
<td>- Line graphs</td>
<td></td>
</tr>
<tr>
<td>- Bar graphs</td>
<td></td>
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<tr>
<td>- Pie charts</td>
<td></td>
</tr>
<tr>
<td>• Simple statistics</td>
<td></td>
</tr>
<tr>
<td>- Finding mode</td>
<td></td>
</tr>
<tr>
<td>- Finding mean</td>
<td></td>
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<tr>
<td>- Finding median</td>
<td></td>
</tr>
<tr>
<td>- Finding range</td>
<td></td>
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<tr>
<td>- Finding modal frequency</td>
<td></td>
</tr>
<tr>
<td>• Probability</td>
<td></td>
</tr>
<tr>
<td>• Application of probability</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Measurements</th>
<th>Money</th>
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</thead>
<tbody>
<tr>
<td>• Naming currency for different countries</td>
<td>• Finding number of notes in bundles</td>
</tr>
<tr>
<td>• Exchange rates</td>
<td>• Conversion of currency</td>
</tr>
<tr>
<td>• Conversion of currency</td>
<td>• Shopping</td>
</tr>
<tr>
<td>• Shopping</td>
<td>• Shopping bills</td>
</tr>
<tr>
<td>• Finding discounts</td>
<td>• Finding discounts</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Distance, time and speed</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Time</td>
<td>• Distance</td>
</tr>
<tr>
<td>• Duration</td>
<td>• Finding distance when speed and time are given</td>
</tr>
<tr>
<td>• Conversion of time (hours, minutes and seconds)</td>
<td>• Speed</td>
</tr>
<tr>
<td>• Changing from 12 hrs to 24 hrs</td>
<td>• Finding speed when given distance and time</td>
</tr>
<tr>
<td>• Finding time when given speed and distance.</td>
<td>• Changing km/hr to m/s and vice versa</td>
</tr>
<tr>
<td>• Distance</td>
<td>• Distance time graphs</td>
</tr>
<tr>
<td>• Finding distance when speed and time are given</td>
<td>• Interpretation of distance time graphs</td>
</tr>
</tbody>
</table>

### TOPIC: RATIOS AND PROPORTIONS

#### LESSON 14

**Subtopic:** Ratios

**Content:**

(i) Form rations

**Examples:**

Rations are away of comparing similar quantities.

- Mass first quantity = 4 kg
- Mass second quantity = 5 kg

**Ration** = 4:5

(b) Express 40 cm to 2 m as a ratio.

(c) Write 1 to 1 as a ratio

**Remarks:**

- Activity

New MK pg 66

**Remarks:**

#### LESSON 15

**Subtopic:** Ratios

**Content:**

(i) Expressing rations as fractions

(ii) Expressing fractions as rations

(iii) Expressing quantities as ratios

**Examples:**

(a) Express 1 : 2 as a fraction

**Solution**

\[ 1 : 2 = \frac{1}{2} \text{ Ans} \]

(b) Express 1 as a ratio

\[ 1 = \frac{1}{3} \text{ Ans} \]
Henry has 12 books and John has 20 books. What is the ratio of Henry’s books to John’s books?

Solution

\[
\frac{12}{4} : \frac{20}{4} = \frac{3}{5}
\]

**NOTE:** Ratios must be simplified to its lowest terms

**Activity**
New MK pg 67
Fountain 77-78

**Remarks**

**LESSON 16**

**Subtopic:** Ratios
**Content:** Sharing in ratios

**Examples:**
(i) John and Mary share 27 sweets in the ratio 4 : 5. How many sweets does each get?

Ratios: John : Mary
4 : 5

John’s share: \( \frac{4}{9} \times 27 = 4 \times 3 \) sweets
\[ \frac{12}{12} \] sweets

(ii) A Man and his wife had 200 kg of coffee. They decided to share it in a ratio of 7 : 3 respectively.

(i) How many kg did the man get?

\[ \text{M} : \text{W} \]
\[ 7 : 3 \]

Total ratio = 7 + 3 = 10

Man’s share: \( \frac{7}{10} \times 200 \) kg
\[ = 140 \] kg

(ii) How many kg did the wife get?

\[ \frac{3}{10} \times 200 = 60 \] kg

Example: (iii) A sum of shs 30000 was shared by three brothers Amos, Andrew and Allan in a ratio of 1 : 2 : 3 respectively. How much did each get?

Total ratio = 1 + 2 + 3
\[ = 6 \]

Ratios by names: Amos : Andrew : Allan
Ratio 1 : 2 : 3

\[
\begin{align*}
\text{Amos} &= \frac{1}{6} \times 30000 \\
&= \text{Shs 5000} \\
\text{Andrew} &= \frac{2}{6} \times 30000 \\
&= \text{Shs 10000} \\
\text{Allan} &= \frac{3}{6} \times 30000 \\
&= \text{Shs 15000}
\end{align*}
\]

**Activity**
Fountain pg 80-81/old MK pg 133-135

**Remarks**

**LESSON 17**

**Subtopic:** Ratios
**Content:** Finding numbers when ratios are given

**Example:** The ratio of boys to girls in a class is 1 : 2. If there are 14 boys, how many pupils are in the class?

**Solution**
Expressing ratios in terms of \( t \).

<table>
<thead>
<tr>
<th>B</th>
<th>G</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>( t )</td>
<td>( 2t )</td>
<td>( 3t )</td>
</tr>
</tbody>
</table>

Total = 3t
\[ = 3 \times t \]
\[ = 3 \times 14 \]
\[ = 42 \]

\[ \therefore \text{There are 42 pupils in the class} \]

**Activity**
Old MK pg 135
LESSON 18

Subtopic: Ratios

Content: - Increasing in a given ratio
- Decreasing in a given ratio

Examples: (a) The prize of an article is increased from shs 1200 in a ratio 3 : 2. Find the new prize.
Solution,
\[ \frac{3}{2} \times 1200 = \frac{3600}{2} = 1800/\text{/=} \]
(b) The prize of an article costing shs 2500 was reduced in the ratio 5 : 8. Find the new prize.
Solution
\[ \frac{5}{8} \times 2500 = \frac{12500}{8} = \text{shs 1562.5} \]

Activity
Old MK pg 129-131
Fountain pg 79-80

LESSON 19

Subtopic: Ratios

Content: - Finding the ratio of increase
- Finding the ratio of decrease

Examples: (a) A man’s salary was shs 10000. It has been increased to shs 12000 in what ratio has it increased?
New salary = shs 12000
Old salary = shs 10000
Increased ratio = \[ \frac{12000}{10000} = \frac{12}{10} = 6 : 5 \]
Ratio increased = 6 : 5
(b) A bag had 40 sweets, 12 more sweets were added.
(i) How many sweets are in the bag now?
40 + 12 = 52 sweets
(ii) In what ratio have the sweets increased
Increase in ratio = \[ \frac{\text{New No}}{\text{Old No}} = \frac{52}{40} = \frac{13}{10} \]

Activity
Old MK pg 132

Remarks
Activity
Old MK pg 135
Remarks

LESSON 20
Subtopic: Proportions
Content:
(i) Direct proportions
(ii) Constant proportionality
Example (i) One pen costs 200/= What is the cost of 5 pens?

Method 1: New ratio : Old ratio
1 pen costs 200/= 5 : 1
\[ \therefore 5 \text{ pens cost } (200 \times 5)/= = 1000/= 1 \text{ part } = 200 \]
5 parts = (200 x 5)/= = 1000/= 1 part = 200 3 parts = (200 x 3)/= = 600=/=

Example (b) 4 pens cost 2000/= What is the cost of 7 pens?

1 pen costs 2000/= 500

Example (c) 1800/= can buy 2 kg of sugar. How many kg of sugar can one get with 3600/=?
1/= can buy \( \frac{2}{1800} \) kg

Example (d) In constant proportionality, one quantity increases in the same proportion as the other. E.g. With a moving body, or car in a given distance, it takes 2 hours to carry 30 people, and takes the same time to carry 10 people through the same distance;

Activity
Fountain pg 82-83
Old MK pg 136-137
Remarks

LESSON 21
Subtopic: Proportions
Content: Indirect/Inverse proportion
Example (a) 3 men can do a piece of work in 6 days. How long will 9 men take to do the same piece of work at the same rate?

<table>
<thead>
<tr>
<th>MEN</th>
<th>DAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 men</td>
<td>6 days</td>
</tr>
<tr>
<td>1 man</td>
<td>(6 x 3) days</td>
</tr>
<tr>
<td>9 men</td>
<td>( \frac{6^2 \times 3}{1} = 2 \text{ days} )</td>
</tr>
</tbody>
</table>

(b) 2 children can dig a garden in 8 days. How many children will dig the same garden in 4 days?

<table>
<thead>
<tr>
<th>DAYS</th>
<th>CHILDREN</th>
</tr>
</thead>
<tbody>
<tr>
<td>In 8 days it requires</td>
<td>2 children</td>
</tr>
<tr>
<td>In 1 day it requires</td>
<td>(2 x 8) children</td>
</tr>
<tr>
<td>In 4 days it requires</td>
<td>( \frac{2 \times 8 \times 2}{4} = 4 \text{ children} )</td>
</tr>
</tbody>
</table>

(c) A car moving at a speed of 80km/hr takes 3 hours to cover a certain journey. How long will the car take if it moves at a speed of 120km/hr for the same journey?

<table>
<thead>
<tr>
<th>SPEED</th>
<th>TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td>At 80km/hr the car takes</td>
<td>3 hours</td>
</tr>
<tr>
<td>At 1/km/hr the car takes</td>
<td>(3 x 80) hrs</td>
</tr>
<tr>
<td>( \therefore ) At 120km/hr the car take</td>
<td>( \frac{3^1 \times 80^2}{420} = 2 \text{ hrs} )</td>
</tr>
</tbody>
</table>

Activity
Fountain pg 82-83
New MK pg 71
Remarks

LESSON 22
Subtopic: Percentages
Content:
- Meaning of percentage
- percentage as fractions
- Fractions as percentages
Examples:

(i) Express as fractions
(a) 5% = \( \frac{5}{100} = \frac{1}{20} \)
(b) 15% = \( \frac{15}{100} = \frac{3}{20} \)

Remarks
LESSON 23
Subtopic: Decimals as percentages.
Content: - Express decimals as percentages
- Change percentages to decimal
Examples: (i) Convert 0.6 to percentage
\[
0.6 = \frac{6}{10} \times 100\% = 60\%
\]
(ii) What is 2.8 as a percentage?
\[
\left(\frac{28}{10}\right) x 100\% = 28\%
\]
(iii) Express 0.014 as percentage
\[
0.014 = \frac{14}{1000} \times 100\% = 1.4\%
\]
(iv) Change 2.5% to decimal
\[
2.5 = \frac{25}{100} \times 100\% = \frac{25}{100} \div \frac{100}{1} = \frac{25}{100} \times \frac{1}{100} = 0.0025
\]

LESSON 24
Subtopic: Ratios as percentages.
Content: - Express ratios as fraction
- Change ratios to percentages
- Percentages as ratios
Examples: (i) Express the following as percentages
(a) \(1 : 2\)
\[
1 : 2 = \frac{1}{2} \times 100\% = \frac{100}{2}\% = 50\%
\]
(b) \(3 : 8\)
\[
3 : 8 = 0.375 \times 100\% = 37\frac{1}{2}\%
\]
(ii) Percentage as ratios
E.g. Express 60% as a ratio
\[
60\% = \frac{60}{100} = \frac{6}{10} = \frac{3}{5}
\]

Activity
Understanding mtc pg 115-116
Old MK pg 145
New MK pg 75
The
Remarks

LESSON 25
Subtopic: Find parts of percentages
Content: Find part represented by a given percentage
Example: (a) If 80% of a class are boys
What percentage are girls
\[
\text{Boys} = 80\% \quad \text{Girls} = (100 - 80)\%
\]

Remarks
If a man covers 30% of the journey by car and 50% by bus.
What percentage of the journey is left?
Total journey = 100%
Covered = (30 + 50) % = 80%
Journey left = 100% - 80%
= 20%

Activity
Understanding mtc pg 117
Remarks

LESSON 26
Subtopic: Quantities as percentages
Content: expressing quantities as percentages.
Examples: A
(i) There are 40 goats on a farm and 15 are sold. Find the %age number of goats.
(a) sold = 15 out 40 = \( \frac{15}{40} \)
\[ \left( \frac{15 \times 100}{40} \right) \% = \frac{1500}{40} = 37 \frac{1}{2} \% \]
(b) not sold: = 40 - 15 = 25
\[ \left( \frac{25 \times 100}{40} \right) \% = \frac{2500}{40} = 62 \frac{1}{2} \% \]

Examples: B
(i) What is 20% of sh 2500/=
20 % of 2500 = \( \frac{20 \times 2500}{100} \)
= \( \frac{20 \times 25}{1} \)
= sh 500

Activity
Understanding mtc pg 117
Remarks

LESSON 27
Subtopic: Expressing a quantity as percentage of the other
Content: Find one quantity as percentage of another given quantity
Examples: (i) In a school of 400 pupils. Boys are 30% of the total
(a) Express the boys as a percentage of the school
\[ \frac{300}{400} \times 100 \% = 75\% \]
(b) Express 500g as a percentage of 1 kg
\[ \frac{500}{1000} \times 100 \% = 50\% \]

Activity
Understanding mtc pg 117
Remarks

LESSON 28
Subtopic: Sharing quantities using percentage
Content: Share quantities using given percentages.
Examples: (a) If a school has 400 pupils, 30% are boys.
How many boys are there in the school?
School = 400 pupils
Boys = 30% of total
Number of boys = 30% of 400
\[ \frac{30 \times 400}{100} = 120 \text{ boys} \]
(b) How many are girls?
\[ \frac{400 - 120}{280} = \text{No of girls} \]

Activity
Old MK pg 151
Remarks
LESSON 29
Subtopic: Algebra in percentages
Content: Forming and solving equations involving percentages
Examples: (i) If 10% of a number is 40, find its number
Let this number be x.
But 10% of x = 40
\[ \frac{10}{100} \times x = 40 \]
\[ \frac{10x}{100} = 40 \]
\[ \frac{10x}{100} = 100 \times 4 \]
\[ \frac{100}{100} \]
\[ x = 400 \]
(ii) If 20% of the school are girls, there are 35 girls in the school. How many pupils are there in the school.
Method 1
Let the total = y
20% of the number = 35
\[ \frac{20}{100} \times y = 35 \]
\[ \frac{2y}{100} = 35 \]
\[ \frac{2y}{100} \times 100 = 35 \times 100 \]
\[ \frac{2y}{10} = 350 \]
\[ \frac{2y}{2} = 350 \]
\[ y = 175 \text{ pupils} \]
Method II
1% of the number = 35
\[ \frac{1}{100} \times y = 35 \]
\[ \frac{y}{100} = 35 \]
\[ \frac{y}{100} \times 100 = 35 \times 100 \]
\[ \frac{y}{10} = 350 \]
\[ \frac{y}{2} = 350 \]
\[ y = 175 \text{ pupils} \]

Activity
Olf MK pg 152-153
Remarks

LESSON 29
Subtopic: Decrease in percentage
Content: Decrease in percentage
Examples: (i) Decrease 900 litres of water by 10%
(100% - 10% of original value)
\[ 90\% \text{ of } 900 = \frac{90}{100} \times 900 = 810 \text{ litres} \]
(ii) Byansi had 180 cows. He sold 15% of them. How many cows remained
(100% - 15% = 85%)
\[ 85\% \text{ of } 180 = \frac{85}{100} \times 180 = 153 \text{ cows} \]
\[ \therefore 153 \text{ cows remained} \]
(iii) A man’s salary is $800. How much will his salary be if it is cut by 12 ½% (100 – 15% = 85%)
Method
\[ 87\frac{1}{2}\% \text{ of } 800 = \left( \frac{175}{100} \times 1 \right) \times 800 \]
\[ = \frac{175}{2} \times 800 = 1400 \times 2 = 700 \]
\[ = $700 \]

Activity
Ne Mk pg 80
Old MK pg 133-136
LESSON 30
Subtopic: Percentage profit / loss
Content:
- Find the percentage profit.
- Find the percentage loss.
Example:
(i) A trader bought 1600/= and sold it at 2000/= 
(a) Find the profit he made
Profit = Sp – Cp
(2000 – 1600) = 400/=
\[ \therefore \text{profit} = 400/= \]
(b) Work out the percentage profit
\[ \% \text{age profit} = \frac{\text{profit} \times 100}{\text{C. price}} \]
\[ = \frac{400 \times 100}{1600} \]
\[ \therefore \text{profit} = 25\% \]
(ii) Mulema bought a goat at 35,000/= and sold it at sh 32,000= 
(a) Find the loss.
Loss = Cost price – selling price
35000 - 32000 = 700/= 
\[ \therefore \text{Loss} = 20\% \]
(b) Calculate the percentage loss
\[ \% \text{ loss} = \left( \frac{\text{loss} \times 100}{\text{c.p}} \right) = \frac{700 \times 100}{350} \]
\[ \therefore \text{Loss} = 20\% \]
Activity
Fountain pg 86-87
Understanding pg 126-127
Remarks

LESSON 31
Subtopic: Simple interest and amount
Content:
- Calculate the simple interest with emphasis on time in
  (i) years
  (ii) months
\[ S.I = \text{principal} \times \text{time} \times \text{rate} \]
\[ = \frac{\text{P} \times \text{T} \times \text{R}}{100} \]

S.I = 3,600/= 
(ii) Work out the simple interest offered to Tom who deposited 48000/= in a bank at an interest rate of 15% for 6 months.
\[ S.I = \frac{\text{P} \times \text{T} \times \text{R}}{100} \]
\[ = \frac{48000 \times \frac{6}{12} \times 15}{100} \]
\[ = \frac{240 \times 15}{100} \]
\[ S.I = 3600/= \]
(iii) Find the simple interest on 12000/= at a rate of 10% per year for 2 ½ years.
\[ S.I = \frac{\text{P} \times \text{T} \times \text{R}}{100} \]
\[ = \frac{600 \times \frac{5}{2} \times 1}{100} \]
\[ = \frac{12000 \times 2 \frac{1}{2} \times 10}{100} \]
\[ = \frac{600 \times 5}{2} \]
\[ = 3000/= \]
\[ \text{Amount} = S.I + P = 12000 + 3000 \]
\[ = 15,000 \]
Activity
Fountain pg 88
New Mk pg 83
Understanding pg 129-130
Remarks

Exercise 01
Revision questions on fractions
1. Change 5 to a mixed number.
2. What is 1 ½ as an improper fraction.
3. (a) Reduce 6 to its lowest terms.
(b) Reduce 48 to its lowest terms
4. Change (a) ¾ to a decimal fraction (b) 2 ¼ to a decimal fraction.
5. Convert (a) 0.25 to a common fraction
(b) 1.25 to a common fraction.
6. Change 2/3 to a decimal fractions
7. What is 0.333— as a common fractions
8. Change (a) 0.3636  (b) 0.2727 to common fractions.

9. Write (a) 0.122 ------   (b) 0.24555--- to common fractions

10. Arrange the following fractions in ascending order.
    (a) \( \frac{1}{6}, \frac{1}{2}, \frac{1}{2}, \frac{1}{6} \)  
    (b) \( \frac{3}{5}, \frac{2}{3}, \frac{1}{2}, \frac{1}{2} \)

11. Arrange the following fractions in descending order.
    (a) \( \frac{2}{5}, \frac{1}{5}, \frac{1}{5}, \frac{1}{6} \)  
    (b) \( \frac{3}{4}, \frac{1}{3}, \frac{1}{3}, \frac{1}{6} \)

12. Add:  (a) \( \frac{3}{8} + \frac{1}{4} \)  
    (b) \( 1 \frac{1}{2} + 2 \frac{1}{4} \)

13. (a) What is the sum of a quarter and a third? 
    Moses bought a half litre of milk and later bought three quarter litres of milk 
    because the milk was not enough. How much milk did he buy altogether?

Exercise 02  Revision Exercises on Fractions

1. Subtract:  (a) \( \frac{1}{2} - \frac{1}{4} \)  
    (b) \( 2 \frac{1}{2} - 1 \frac{3}{4} \)  
    (c) \( \frac{5}{6} - \frac{3}{8} \)  
    (d) \( 3 \frac{1}{4} - 1 \frac{3}{2} \)

2. (a) What is the difference between three – quarters and a half 
    (b) Subtract a quarter from \( \frac{1}{2} \)

3. A farmer uses a half of his shamba for tomatoes, \( \frac{2}{3} \) to grow onions 
   (a) How much land does he use for farming? 
   (b) How much land remained unused?

4. A quarter of the pupils in my class are girls. one day \( \frac{1}{5} \) of the girls number 
   didn’t attend lessons. What fraction of the girls was absent.

5. Simplify:  (a) \( \frac{1}{4} - \frac{1}{2} + \frac{2}{3} \)  
    (b) \( \frac{2}{5} + \frac{1}{3} - \frac{2}{5} \)  
    (c) \( \frac{1}{3} + \frac{1}{6} + \frac{4}{4} \)

6. Find the value of \( 2 \frac{1}{4} - \frac{2}{3} - \frac{5}{6} \)

7. Work out (a) \( 4 \div \frac{1}{3} \)  
    (b) \( 3 \frac{1}{8} + 6 \)

8. Simplify:  (a) \( \frac{3}{4} + \frac{3}{5} \)  
    (b) \( 3 \frac{1}{8} + 3 \frac{3}{4} \)

9. Work out \( 4 \frac{1}{3} \div (1 \frac{1}{6} + 2 \frac{1}{3}) \)

10. Simplify: \( (2 \frac{1}{2} + \frac{5}{6}) + 1 \frac{1}{3} \)

11. Find the value of \( 1 \frac{1}{2} - 2 \frac{1}{3} + 1 \frac{1}{4} \)

12. Work out  (a) \( \frac{1}{2} + \frac{1}{3} \)  
    (b) \( 2 \frac{1}{4} + \frac{1}{3} \)  
    (c) \( \frac{5}{6} - \frac{1}{3} \times \frac{1}{3} \)
    (d) \( \frac{2}{3} - \frac{1}{2} \)  
    (e) \( \frac{1}{3} + \frac{1}{2} \)  

13. A club spent a quarter of its earnings and saved the rest. What fraction was saved?

Exercise 03  Revision Exercise on Fractions

1. What is the reciprocal of  (a) \( 2 \)  
    (b) \( \frac{3}{5} \)  
    (c) \( y \)  
    (d) \( 1 \frac{1}{2} \)  
    (e) \( 0.5 \)

2. Use the reciprocal method and work out:
   (a) \( \frac{3}{4} \times \frac{1}{4} \)  
   (b) \( 1 \frac{1}{3} + 2 \frac{1}{3} \)

3. Use the LCM method and simplify:
   (a) \( 2 \frac{1}{2} + 1 \frac{1}{4} \)  
   (b) \( \frac{3}{5} + \frac{1}{10} \)

4. How many quarter litre bottles can be got from 5 litres?

5. A sixth of my salary is 50,000/= How much is my salary?

6. I spent 20,000/= out of my salary amounting to 40,000/= What fraction of my salary did I spend?

7. Add:  (a) \( 1.5 + 0.6 \)  
    (b) \( 8.03 + 2.1 \)  
    (c) \( 0.05 + 22.5 \)

8. Subtract:  (a) \( 12.5 - 1.2 \)  
    (b) \( 0.86 - 0.07 \)  
    (c) \( 4 - 0.9 \)

9. Add: \( 2.05 \) to 30.6

10. Subtract: \( 1.4 \) from 34

11. Work out  (a) \( 7 - 4.27 + 3.14 \)  
    (b) \( 6 - (0.43 + 1.62) \)  
    (c) \( 3.021 - 2.2 \) + 0.04
    (d) \( 5.23 + 4 - 6.02 \)

12. Maurice bought 6.4 litres of paraffin for some of his wall paint. He later 
bought 2.6 litres to mix all the remaining paint. How many litres of paraffin 
did he buy altogether?

13. Morgan was given 3.5 grammes of juice powder but 2.6 grammes got spoilt. 
How many grammes remained?

14. Multiply: (a) \( 0.9 \) by \( 0.2 \)  
    (b) \( 1.23 \) by \( 3.2 \)  
    (c) \( 2 \times 0.75 \)

15. Divide: (a) \( 6 \) by \( 0.04 \)  
    (b) \( 0.02 \) by \( 2 \)

Exercise 04  Revision Exercise on Fractions

1. Divide:  (a) \( 1.2 \) by \( 0.03 \)  
    (b) \( 0.064 \div 0.06 \)

2. Work out:  (a) \( 0.8 \times 0.4 \)  
    (b) \( 0.04 \times 2 \)
3. The length of one side of a square is 4.5 metres.
   (a) What is the perimeter of the square?
   (b) What is its area
4. A rectangular garden measures 2.8 cm by 1.2 cm. Find its
   (a) perimeter (b) Area
5. A parcel weighting 8.5 kg contains packets of salt each weighting 0.25 kg. How many packets of salt are in the parcel?
6. There are 20 boys and 30 girls in a class. What is the ratio of
   (a) Boys to girls (b) girls to boys
7. Express the following rates as fractions
   (a) 1 : 6 (b) 2 : 4 (c) ½ : ¼ (b) 0.2 : 0.4
8. Change the following fractions to ratios
   (a) 3 4 (b) 1 ½ (c) 8 4
9. Peter and Sseku shared 32 sweets in the ratio 3 : 5. How many sweets did each get?
10. A man and his wife shared an amount of money in the ratio 2 : 3 respectively if his wife got 9,000/=.
    (a) How much money did they share?
    (b) How much money did the man get?
11. 120 oranges were shared by Amos, John and Mary in the ratio 1 : 2 : 3 respectively. How many oranges did each get?
12. The ratio of sharing 24 goats by A, B and C is 2 : 3 : 7. If B got 6 goats how many goats did each of the rest get?

**Exercise 05 Revision Exercise on Fractions**
1. The ratio of boys to girls in a class is 2 : 5. If there are 14 boys, how many pupils are in the class?
2. Increase 320 in the ratio (a) 4 : 2 (b) 3 : 2
3. Decrease 480 in the ratio (a) 2 : 4 (b) 1 : 2
4. The price of an article was reduced from 18,000/= in the ratio 2 : 3. Find the new price.
5. The cost of an item was increased to 4000/= in the ratio 4 : 3. What was its original cost?
6. The price of a plastic basin was reduced to 12,000/= in the ratio 2 : 3. Calculate its original price.
7. The number of pupils in Kasanke Primary School rose from 400 to 480 pupils. What is the ratio of increase?
8. In what ratio did the enrolment of school C fall from 60 pupils to 25 pupils in the previous year?
9. If one exercise book costs shs 300/=, what is the cost of 4 similar exercise books?
10. Three pencils cost 2400/=, what is the cost of 2 pencils of a similar kind?
11. Shs 3600/= can buy 2 pairs of socks.
12. 2 men can do a piece of work in 4 days. How many days will 6 men take to do the same piece of work at the same rate?
13. 5 women can dig a garden in 15 days. How many women can dig the same garden in 5 days at the same working rates?
14. A bus moving at a speed of 60 km/hr takes 2 hours to cover a certain distance. How long will the car take to cover the same journey at 120 km/hr?

**Exercise 06 Revision Exercise on Fractions**
1. Express (a) 4% as a fraction. (b) 12 ¼ % as a fraction
2. Change the following fractions to percentages.
   (a) 2 (b) 3 (c) 1 5 4
3. Change the following as decimal fractions
   (a) 0.5 (b) 1.25 (c) 0.075 (d) 0.014
4. Change the ratios below to percentages.
   (a) 1 : 4 (b) 3 : 8 (c) 2 : 3
5. Convert the following percentages to ratios
   (a) 25 % (b) 75% (c) 125%
6. If 25% of a choir are female, what percentage are the male?
7. There are 50 children in our poultry house. We sold 15 of them yesterday.
   (a) What percentage of chicken was sold?
   (b) Calculate the percentage of chicken that remained
9. What is 20% of 1800/=?
10. Find 15% of an hour.
11. Find 12 ½ of 800/=
12. A school enrolled 600 pupils of which 250 are boys.
   (a) How many are the girls?
   (b) What percentage are the (i) boys (ii) girls
13. (a) Express 500g as a percentage of 1 kg
    (b) Express 30 minutes as a percentage of 2 hours
    (c) Express 15 goats as a percentage of 90 goats
    (d) What percentage are 125 g of a kg?
4. The number of children in a school last year was 360. This year the number increased by 25%. What is the number of the pupils in the school this year?

5. Decrease 280 by 14%.

6. An officer’s salary is shs 80,000/= per month. How much will his salary be
(a) If its decreased by 20% (b) If its increased by 25%

7. (a) Maizi bought a book at 450/= and sold it at 480/=, What was his profit?
(b) Find his percentage profit.

8. Mugerwa bought a radio at shs 9450/- and sold it at 9000/=. What was his loss?

9. What is the percentage loss of buying an item at 800/= and selling it at 600/=.

10. The marked price of an article is 4000/=. If a trader allows a discount of 2%
(a) The discount allowed
(b) The actual price after the discount

11. Mukasa bought a book at 400/=, a pen at 500/= and a set mathematical instruments at 600/= and was offered a discount of 5%. How much did he pay altogether?

Exercise 08  Revision Exercise on Fractions

1. Calculate the simple interest on 20,000/= at a rate of 5% per annum for 2 years.

2. Find the simple interest on 12,000/= at a rate of 4% per year for 2 ½ years.

3. Find the amount of money a trader will withdraw at a principle of 50,000/= at a rate of 2% per annum for 5 years.

4. Calculate the time taken for 15,500/= to yield 15000/= at a rate of 5% per year.

5. Find time taken on

<table>
<thead>
<tr>
<th>Principal</th>
<th>Rate</th>
<th>S.I</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>15,000/=</td>
<td>2%</td>
<td>6000/=</td>
<td></td>
</tr>
<tr>
<td>120,000/=</td>
<td>10%</td>
<td>24,000/=</td>
<td></td>
</tr>
<tr>
<td>400,000/=</td>
<td>5%</td>
<td>1000/=</td>
<td></td>
</tr>
<tr>
<td>700,000/=</td>
<td>20%</td>
<td>28,000/=</td>
<td></td>
</tr>
</tbody>
</table>

6. Find the rate at which 40,000/= will yield 3,600/= after 2 years.

7. What principal will give an interest of 2,800/= at 10% interest for 2 years?
The information in the table above can be put on the graph as shown below.

<table>
<thead>
<tr>
<th>Number of plant</th>
<th>Posho</th>
<th>rice</th>
<th>millet</th>
<th>yams</th>
<th>beans</th>
<th>peas</th>
<th>Ugali</th>
</tr>
</thead>
<tbody>
<tr>
<td>Types of food.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Questions
1. Which type of food is liked by most pupils?  
   Rice is liked by most pupils
2. Which food is least liked?  
   "Beans" is least liked
3. Which two types of food are liked by the same number of pupils?  
   etc. millet and peas are liked by the same number of pupils.

Activity
New Mk pg 85 – 86
Understanding mtc pg 132-133
Fountain pg 92

Remarks

LESSON 2
Sub-topic: Line graphs
Content: Interpretation of a ready reckoner
Examples: (a) Study the graph and answer questions that follow

![Graph showing cost in shillings vs. number of kg](image)

(a) What is the cost of 1 kg of sugar?  
   100/=  
(b) What is the cost of 4 kg of sugar?  
   4000/=  
(c) How many kg of sugar can one buy with 2000/=?  
   2 kg  
(d) What is the cost of 2 ½ kg of sugar?  
   2500/=  

Cost in shillings

![Graph showing distance in metres vs. time](image)

Questions
(a) What is the scale on the vertical axis? (1 square represents 5 km)  
(b) What is the scale on the horizontal axis? (1 square represents 15 minutes)  
(c) How far was Tom at 9.30 a.m.? (15 km)  
(d) At what time was Tom 25 km away? (At 10:30 am)
LESSON 3
Subtopic: Interpretation of information
Content: Finding the mode, median, mean and range
Examples: (a) Find the mode and the modal frequency of the following numbers.
8, 2, 6, 4, 5, 6, 9, 6, 2

<table>
<thead>
<tr>
<th>No</th>
<th>Tally</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>//</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>/</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>/</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>///</td>
<td>3</td>
</tr>
<tr>
<td>8</td>
<td>/</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>/</td>
<td>1</td>
</tr>
</tbody>
</table>

The mode is 6
The modal frequency is 3.

Example (b) Find the median of the following numbers
4, 2, 6, 7, 3, 9, 8

2 3 4 6 7 8 9

Example: (c) Find the mean (average) of the following numbers.
2, 4, 5, 6, 3, 8, 7
Average = \( \frac{\text{sum of all items}}{\text{Number of items}} \)
\[
= \frac{2 + 4 + 5 + 6 + 3 + 8 + 7}{7} = \frac{35}{7} = 5
\]

LESSON 4
Subtopic: Interpretation grouped data
Content: mode, median, range and mean
Example: The table below show the scores of marks got by pupils in a Mathematics test

<table>
<thead>
<tr>
<th>Marks</th>
<th>60</th>
<th>80</th>
<th>90</th>
<th>45</th>
</tr>
</thead>
<tbody>
<tr>
<td>No of pupils</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

Find the (i) mode (ii) median (iii) range (iv) mean

(i) From the table the mode is 45.

(ii) 45, 45, 45, 45, 60, 60, 80, 90, 90, 90

Median = \( \frac{60 + 60}{2} = \frac{120}{2} = 60 \)

(iii) Range = \( H - L \)
= \( 90 - 45 \)
= 45

(iv) Mean = \( \frac{(60 \times 2) + 80 + (90 \times 3) + (45 \times 4)}{10} \)
= \( \frac{120 + 80 + 270 + 180}{10} \)
= \( \frac{650}{10} \)
= 65

Activity
Trs’ collection
Remarks
**LESSON 5**
Subtopic: Interpretation of information
Content: Inverse problems on average
Example (a) The mean of 2, 4, 5, 6, and q is 5. Find q.
\[ \frac{q + 2 + 4 + 5 + 6}{5} = 5 \]
\[ q + 17 = 25 \]
\[ q + 17 - 17 = 25 - 17 \]
\[ q = 8 \]

**Activity**
Trs’ collection
Pupils work out the following exercise
1. The mean of the following numbers are given, find the unknown.
   (a) 8, 4, 7, 2, 6, x, x + 1. the mean is 10
   (b) 7, 9, a + 3, 68, 5, 3, the mean is 6.
2. The average of 3, 0, 7 and x is 4. What is the value of x?
3. The average of 7, x, 9, 8 and 10 is 8. Find the value of x.
4. If the average of x, 3x, 7x, 4x, and 0 is 6. find x.

**LESSON 6**
Subtopic: Interpreting information
Content: Inverse problems on average (cont)
Example: (a) The average of 3 numbers is 12. What is the sum of the 3 numbers?
Average = \( \frac{\text{sum of all items}}{\text{Number of items}} \)
\[ 12 = \frac{\text{sum}}{3} \]
\[ 12 \times 3 = \frac{\text{sum} \times 3}{3} \]
\[ \text{Sum} = 36 \]
Example (b) The average mark of 4 pupils is 6, and the average mark of 4 other pupils is 8. what is the average mark of all the 8 pupils.
The total mark of 4 pupils = 4 x 6 = 24
The total mark of 4 other pupils = 4 x 8 = 32

**Remarks**

**Activity**
MK old edition pg 172-173

**LESSON 7**
Subtopic: Pie chart
Content: Interpreting pie chart involving fractions
Example: The pie chart shows how a man spends sh 300,000

(i) What fraction of his money did he spend on food?
(ii) How much does he spend on rent?
(iii) How much more does he spend on food than others

<table>
<thead>
<tr>
<th>Rent</th>
<th>Food</th>
<th>Saving</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>4/10</td>
<td>X</td>
<td>2/10</td>
<td>1/10</td>
</tr>
</tbody>
</table>

(i) Let the fraction be x
\[ \frac{x + 4}{10} + \frac{2}{10} + \frac{1}{10} = 1 \]
\[ 10x + 4 + 2 + 1 = 10 \]
\[ X + 7 = \frac{10}{10} = 1 \]
\[ X + 7 - 7 = 1 = \frac{10 - 10}{10} \]
\[ X = \frac{10}{10} - \frac{7}{10} \]
\[ X = \frac{3}{10} \]

(ii) Expand on rent
\[ \frac{4}{10} \times 300,000 = \frac{120,000}{10} \]
\[ = 12,000/= \]

(iii) OR Food
\[ \frac{3}{10} \times 300,000 = \frac{90,000}{10} \]
\[ = 90,000/= \]

Other
\[ \frac{1}{10} \times 30,000 = \frac{30,000}{10} \]
\[ = 30,000/= \]

The fraction is \( \frac{3}{10} \)
The total mark of 8 pupils = 24 + 32 = 56
The average mark of 8 pupils = \( \frac{56}{8} = 7 \)
Example (b) The pie chart shows how a man spends sh 360,000

(i) Find the value of x

(ii) How much does he spend on Food?

(iii) How much more does he spend on rent than on food?

(i) \[ x + 60^\circ + 110^\circ + 90^\circ = 360^\circ \]
\[ x + 260 = 360 \]
\[ x = 100^\circ \]

(ii) \[ \frac{90 \times 360000}{360} = 90,000/= \]

OR

(iii) \[ 110 \times 360000 = 110000 \]

Either:

(iii) \[ 1100 = 600 = 500 \]
\[ \frac{1100}{1000} = \frac{500}{500} \]
\[ \frac{50 \times 360000}{360} = 50,000 \]
\[ 110,000 - 60,000 = 50,000 \]

Activity

New MK pg 94-97
Fountain pg 93-97

Remarks

LESSON 8
Subtopic: Pie charts
Content: Interpreting pie chart involving percentages

Example: The pie chart shows how a man spends 180,000/= 

(i) Find the value of x 

(ii) How much does he spend on Food?

(iii) How much more does he spend on rent than on food?

(i) \[ x + 30^\circ + 50^\circ = 100^\circ \]
\[ x + 80 = 100 \]
\[ x + 80 = 100 \]
\[ x + 80 - 80 = 100 - 80 \]
\[ x = 20^\circ \]

(ii) \[ \frac{30 \times 180000}{100} = 54,000 \]

(iii) \[ 50\% - 20\% = 30\% \]
\[ \frac{30 \times 180000}{100} = 54,000 \]

Example: (b) The pie chart represents the number of pupils taking Maths, history and Science. If there are 320 pupils in the school.

(i) Find the value of x

(ii) How many pupils do History?

(iii) How many pupils do Science than history?

(i) \[ x + 2x + 5x = 320 \]
\[ x + 8x = 320 \]
\[ 9x = 320 \]
\[ x = 40 \]

(ii) \[ \frac{8 \times 40}{8} = 40 \]

(iii) \[ 5x - 2x = 3x \]
\[ \frac{5x - 2x}{2} = \frac{3x}{2} \]
\[ \frac{3x \times 40}{2} = 120 \]

OR

\[ 5x - 2x \]
\[ \frac{5x - 2x}{2} = \frac{3x}{2} \]
\[ \frac{3x \times 40}{2} = 120 \]

LESSON 9
Subtopic: Pie chart
Content : Interpreting pie chart involving fractions

Example The pie chart below shows how a man spends his salary. If he spends 60,000/= on food, how much does he earn?

Let his salary be y/= 

\[ \frac{3 \times y}{10} = 60,000 \]
\[ \frac{30 \times y}{10} = 600,000 \]
\[ \frac{3 \times y}{3} = 200,000 \]

Let his salary be y/= 

\[ \frac{3 \times y}{10} = 60,000 \]
\[ \frac{30 \times y}{10} = 600,000 \]
\[ \frac{3 \times y}{3} = 200,000 \]
10 pts rep 20,000 x 10

= 200,000/= 

Examples: (c) The pie chart below shows how a man spends his salary. If he spends 60,000/= on food, 

Rent 120°

food 70°

Others 80°

saving

(i) let his salary be x/=  

90 of x = 60,000/= 

\[
\frac{90}{360} \times x = 60,000
\]

\[
4 \times \frac{x}{4} = 60,000 \times 4
\]

\[
= X = 240,000/= 
\]

(ii) \[
\frac{90}{360} \times 100\%
\]

\[
\frac{25}{4}
\]

\[
\frac{1}{4} \times 100
\]

Ref: trs’ collection

LESSON 10
Subtopic: Pie chart.
Content: Constructing pie chart
Example: In a village 25% of the farmers grow bananas, 20% grow maize 15%, grow beans 10% grow cotton and 30% grow coffee. Use the above information and draw a pie chart.

Sector for bananas = \[
\frac{25}{100} \times 360 = \frac{5 \times 18}{4} = 90°
\]

Sector for beans = \[
\frac{15}{100} \times 360 = \frac{3 \times 18}{4} = 54°
\]

Sector for maize = \[
\frac{20}{100} \times 360 = \frac{2 \times 36}{4} = 72°
\]

Sector for cotton = \[
\frac{10}{100} \times 360 = \frac{1 \times 36}{4} = 36°
\]

Sector for coffee = \[
\frac{30}{100} \times 360 = \frac{3 \times 36}{4} = 108°
\]

Activity
New MK pg 99-
Old MK pg 184-188
Fountain pg 98-99
Remarks
LESSON 11
Subtopic: Pie charts
Content: Constructing pie charts.
Example: In a pupil’s school bag there are 4 English books, 3 SST books, 5 Maths books and 6 Science books. Use the information and draw an accurate pie chart.
Solution

The total number of books = 6 + 5 + 3 + 4 = 18 books

Sector for English books = \(\frac{4}{18} \times 360 = \frac{4 \times 20}{18} = 80^\circ\)

Sector for SST books = \(\frac{3}{18} \times 360 = \frac{3 \times 20}{18} = 60^\circ\)

Sector for English books = \(\frac{5}{18} \times 360 = \frac{5 \times 20}{18} = 100^\circ\)

Sector for English books = \(\frac{4}{18} \times 360 = \frac{6 \times 20}{18} = 120^\circ\)

Activity:
1. New MK pg 99
2. Old MK pg 184-188
3. A woman spends her income as follows 1000/= on transport, 2000/= on drinks, 3500/= on food and 2500/= on other things. Draw a pie chart to show the information.

Remarks

LESSON 12
Subtopic: Co-ordinate graphs
Content
(i) Naming axes
(ii) Reading plotted co-ordinate points from the graph
(iii) Plotting points on the graph.
Example
(a) Horizontal Axis is the X – axis
(b) Vertical axis is the Y – axis.
(c) Points co-ordinate
(x, y)
A (-6, +5)
B (-2, -4)
C (+6, -4)
D (+3, +5)
E (0,0)

(d) Plot the points F (0, 6) G (5, 0) H (-2, -2) and I (0, -6) on the coordinate graph given.

N.B 1\textsuperscript{st} digit is found along the x – axis to form the coordinates of a 2\textsuperscript{nd} digit is found along the y – axis a point.
LESSON 13
Subtopic: Area and perimeter of shapes on the grid.
Content: (i) Finding area of shapes on the grid.
(ii) Finding perimeter of shapes on the grid.
Example: (a) Plot the following points on the co-ordinate graph below:
A (2, 2)  B (2, 8)  C (-3, 8)  D (-3, 2)
(b) Join the points (done)
(c) Name the shape formed. (Rectangle)
(d) Calculate / find its area.
(e) What is its perimeter?

Area of figure = length x width
= AB x CD
= 6 units x 5 units
= 30 sq units

Perimeter = 2 (L + W)
= 2 (6 + 5) units
= 2 x 11
= 22 units

Activity
Trs’ collection
Revision questions on graphs and interpretation of information

Exercise one
1. What is the mode of 4, 5, 2, 3, 9, 4 and 4
2. Find the median of 13, 11, 12, 8, 0 and 9.
3. Find the mean of 8, 6, 10 and 5.
4. The table below shows the results of a mathematics examination done by some pupils. Study it and answer the questions that follow:

<table>
<thead>
<tr>
<th>Mark</th>
<th>70</th>
<th>55</th>
<th>10</th>
<th>45</th>
<th>90</th>
</tr>
</thead>
<tbody>
<tr>
<td>No of pupils</td>
<td>3</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

(a) How many pupils did the test
(b) Find the modal mark
(c) Find the modal frequency
(d) What is the average mark

5. The average of 3 numbers is 20. Find the sum of the numbers.
6. The mean age of 6 boys is 10 years and that of 4 boys is 15 years. Find the mean age of the ten boys.
7. The mean of 3y, 2y, 5 and 2 is 5. Find the value of y.
8. The mean of p, (p +1), (p + 2), (p + 3), 5 and 7 is 5. Find the value of p.

Exercise Two
1. The graph below shows Roberts score in various subjects

(a) How many marks did he score in Maths?
(b) In which subject did he perform best?
(c) Calculate Roberts average mark

Exercise Three - PIE CHARTS
1. The pie chart below shows how Agudo spends her 24 hours in a day. Use it to answer questions which follow

(a) How many hours does Agudo spend sleeping?
(b) How many more hours does she spend at school than doing housework?
(c) If she reads 2 books in one hour, how many books does she read in a day?
2. The pie chart below shows how Nakubuya spends his monthly salary of 126,000

(a) Find the value of X.
(b) How much does he spend on rent?
(c) What percentage of his income is used for food?

3. The pie chart below shows Awori’s monthly expenditure use it to answer questions that follow

(a) Find the value of X.
(b) If h spends 90,000/= on rent, find this total expenditure?
(c) How much more does he spend on food than transport?

4. The pie chart below shows the number of candidates who passed PLE in four districts. Use it to answer questions.

(a) If 600 candidates passed in Moroto. How many candidates sat for the examination?
(b) How many more candidates sat in Bushenyi than Arua

5. A man shored his salary as follows:
Musobya 36,000/=, Akugizibwe 38,000/=, Opari 40,000/=, Laker 10,000/=. If the man had 108,000/= draw an accurate pie chart to show the above information.

6. At kigulu Primary School, 45% of the books in the library are for English, 15% Science, 20% Mathematics, 10% SST and X% are other subjects. In a circle of radius 3 cm, draw an accurate pie chart to show the above information

EXERCISE FOUR – LINE GRAPH

1. Study the line graph below and answer questions that follow

(a) What is the cost of maize per kg?
(b) What is the cost of meat per kg?
(c) What is the cost of beans per kg.
(d) How much will I pay if I buy 2 kg of meat, 3 kg of beans and 4 kg of maize.
2. The graph below shows the exchange rate of Uganda shilling against one US dollar, use it to answer questions that follow.

(a) How many Uganda shillings are equivalent to US $ 4.5?
(b) Convert 2500 Uganda shillings to dollars.
(c) Kasim bought a shirt at 3.5 dollar. Find the price in Uganda shillings.
(d) How many Uganda shillings are equivalent to 1 US $?

EXERCISE FIVE - COORDINATE GRAPH

Below is a coordinate graph.

Write the coordinates of the points plotted in the graph.
A ( ) B ( ) C ( ) D ( ) E ( )
F ( ) G ( ) H ( ) I ( ) J ( )
K ( ) L ( ) M ( )
Plot the following points on the graph
A (5, 2)  b (-2, 2)  C (-4, -1)  D (3, -1)

(b) Join A to B, B to C, C to D, D to A
(c) What name is given to the polygon formed?
(d) Calculate the area of polygon formed in square units.

EXERCISE SIX (TRAVEL GRAPHS)

The graph shows Emojong's journey from Pakwach to Kumi. Use it to answer questions that follow.

(a) At what time did Emojong arrive at town X?
(b) For how long did he rest at town Y?
(c) What distance had he covered by 6.20 am?

EXERCISE SEVEN – (TRAVEL GRAPHS)

1. Study the graph below and answer the questions which follow

(a) How far is town Q from town P?
(b) How long did the motorist take to travel from town P to Q?
(c) What was the average speed of the motorist 35 km from P to Q?
(d) At what time was the motorist 35 km from P?
(e) Calculate his average speed for the whole journey.

2. A gate way bus leaves Soroti at 8:00 am and travels at 60 km/hr for 2 hours. The driver rests for half an hour. He then continues for another 1 ½ hours at 40 km/hr until he reached his final destination.

(a) Draw a travel graph for the above information
(b) What was his average speed for the whole journey?

EXERCISE SEVEN – (TRAVEL GRAPHS)
UNIT 8 MEASURES
UNIT / TOPIC: MEASURES

LESSON 1
Subtopic: MONEY
Content: Currencies.
Finding the number of notes/ denominations amount and its application in real life situation
Examples
Bank notes are numbered from A 003782 to A 003881.

How many notes are there?
First note A 003782
Last Note A 003881

№ of notes = A 003881
- A 003782
99 without last note
Total № of Notes = 99 + 1
= 100 notes.

If denominations was worth shs 1000 per note then amount
= 1 note = 1000
100 notes = 1000 x 100 /=
= 100,000/=.

Activity
Pupils will do exercise 10 : 3 page 218 in MK BK 6.

Remarks:

LESSON 2
Subtopic: MONEY
Content: Uganda and other currencies
Example: Country currency

<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>CURRENCY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uganda</td>
<td>Uganda shillings (U.shs.)</td>
</tr>
<tr>
<td>Kenya</td>
<td>Kenya shilling (K.shs)</td>
</tr>
<tr>
<td>Rwanda</td>
<td>RF</td>
</tr>
<tr>
<td>South Africa</td>
<td>ZAB</td>
</tr>
<tr>
<td>Zambia</td>
<td>Kwacha (Kch)</td>
</tr>
<tr>
<td>USA</td>
<td>US dollar</td>
</tr>
<tr>
<td>Currencies</td>
<td>Buying</td>
</tr>
<tr>
<td>----------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>1 pound sterling (£)</td>
<td>Ug shs 2500</td>
</tr>
<tr>
<td>1 US dollar (US $)</td>
<td>Ug shs 1700</td>
</tr>
<tr>
<td>1 Kenya shillings (K shs)</td>
<td>Ug shs 19</td>
</tr>
<tr>
<td>1 Rwanda Franc (R.F)</td>
<td>Ug shs 1.9</td>
</tr>
<tr>
<td>1 Euro (Euro)</td>
<td>Ug shs 1520</td>
</tr>
<tr>
<td>1 Tanzania shillings (TZ shs)</td>
<td>Ug shs 1.6</td>
</tr>
</tbody>
</table>

Example: A tourist arrived in Uganda with £ 7650. The exchange rate is £ 1 = Ug shs 2500, How much money in Uganda shillings did he have? **Solution** Bureau will buy from him. £ 1 = Ug shs 2500 £ 7650 = Ug shs 2500 x 7650 Ug shs 19,125,000

Tamu has Euros equivalent to Ug shs 12480,000. Find the amount in Euros Tamu will get. **Solution** Bureau is selling Euros to Tamu 1 Euro = Ug shs 1560 Ug shs 1560 = 1 Euro Ug shs 1 = 1560 Ug shs 12480000 = 12480000, Euro 1560 = 8000 Euros

**Activity**
Fountain pg 117
Understanding pg 180-181.

**LESSON 1**

**Subtopic:** TIME

**Content:**
- Conversion of 24 hour clock to 12 hour clock
- Conversion of 12 hour clock to 24 hour clock

**Examples:**
**Time table**

<table>
<thead>
<tr>
<th>Time</th>
<th>24 hr clock</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 hr</td>
<td>0000 hrs / 24 hours</td>
</tr>
<tr>
<td>11.00 pm</td>
<td>2300 hrs</td>
</tr>
<tr>
<td>10.00 pm</td>
<td>2200 hrs</td>
</tr>
<tr>
<td>9.00 pm</td>
<td>2100 hrs</td>
</tr>
<tr>
<td>8.00 pm</td>
<td>2000 hrs</td>
</tr>
<tr>
<td>7.00 pm</td>
<td>1900 hrs</td>
</tr>
<tr>
<td>6.00 p.m</td>
<td>1800 hrs</td>
</tr>
<tr>
<td>5.00 p.m</td>
<td>1700 hrs</td>
</tr>
<tr>
<td>4.00 pm</td>
<td>1600 hrs</td>
</tr>
<tr>
<td>3.00 pm</td>
<td>1500 hrs</td>
</tr>
<tr>
<td>2.00 pm</td>
<td>1400 hrs</td>
</tr>
<tr>
<td>1.00 pm</td>
<td>1300 hrs</td>
</tr>
<tr>
<td>12.00 Noon</td>
<td>1200 hrs</td>
</tr>
<tr>
<td>11.00 am</td>
<td>1100 hrs</td>
</tr>
<tr>
<td>10.00 a.m</td>
<td>1000 hrs</td>
</tr>
<tr>
<td>9.00 am</td>
<td>0900 hrs</td>
</tr>
<tr>
<td>8.00 am</td>
<td>0800 hrs</td>
</tr>
<tr>
<td>7.00 am</td>
<td>0700 hrs</td>
</tr>
<tr>
<td>6.00 am</td>
<td>0600 hrs</td>
</tr>
<tr>
<td>5.00 am</td>
<td>0500 hrs</td>
</tr>
<tr>
<td>4.00 am</td>
<td>0400 hrs</td>
</tr>
<tr>
<td>3.00 am</td>
<td>0300 hrs</td>
</tr>
<tr>
<td>2.00 am</td>
<td>0200 hrs</td>
</tr>
<tr>
<td>1.00 am</td>
<td>0100 hrs</td>
</tr>
</tbody>
</table>

1. Write 12.45 pm in 24 hrs clock
2. Express 11 : 45 pm to 24 hrs clock

**Example:**

1. Express 04 00 hours as 12 hour clock
2. Express 04 00 hours as 12 hour clock

**Remarks:**

**Activity**
Pupils will do exercise 9 a and 9b page 217 and 218 respectively MK BK 5.
Express 1330 hours as am or pm
13 30 hrs
- 12 00
1. 30 pm

Activity
Pupils will do exercise 9c page 218 MK BK 5.
Pupils will do exercise 24:4 page 23, MK BK 6 (old)
Tr’s collection

Remarks:

LESSON 2
Subtopic: Time
Content: Finding duration
Examples.
(i) How many hours are there between 11 00 hours and 1830 hours
18 30 hrs
- 11 00 hours
7. 30 = 7 hours 30 minutes

(ii) An exam started at 1359 hours and ended at 1610 hours. How long was the exam?
16 10 hours
- 13 59 hours
2. 11 = 2 hours 11 minutes

Activity
Pupils will do exercises 24 : 6 in MK BK 6 (Old) pg 224-225

Remarks:

LESSON 3
Subtopic: Distance, Speed, Time
Content: Distance

1. Find the distance travelled by a car in 3 hours at 60 km/hr
Speed = 60 km/hr
Time = 3 hours
Distance = speed x time
= 60 km/hr x 3 hours
= 60 x 3 km x hr⁻¹
= 180 km.

Activity
Pupils will do exercise 10 : 16 page 235 MK BK 6
New MK 114

LESSON 4
Subtopic: Distance, Speed, Time
Content: Speed

Example:
A car travels for 3 hours to cover a distance of 210 km. At what speed does the car travel.
Time = 3 hours
Distance = 210 km
Speed = distance travelled
Time taken

= 70
= \frac{210 \text{ km}}{3 \text{ hrs}}

Speed = 70 km/hr

Activity
Pupils will do exercise 10 : 16 page 235 MK BK 6
New MK 114
LESSON 5
Subtopic: Distance, Time, Speed
Content: Expressing km/hr as m/sec
Example: Express 72 km/hr as m/sec
Means: distance = 72 km   Time = 1 hr
Distance   Time
1 km = 1000 m   1 hr = 3600 sec

70 km = 72 x 1000 m = 72000 m
Speed = \frac{distance}{Time} = \frac{72000 m}{3600 sec} = 20 m/sec

Activity
New MK 113

LESSON 6
Subtopic: Distance, Time, Speed
Content: Expressing m/sec as km/hr
Example: Express 100 m/sec as km/hr
Meaning: 100 m in 1 sec

Distance = speed x time
100 m = 1 km
1 sec = \frac{1}{3600} hr
1 m = \frac{1}{100}
100 m = 1000

= \frac{1}{10} km

= 0.1 km

Speed = \frac{distance}{Time} = \frac{1 km}{1 hr} = \frac{1}{3600} km/hr

Activity
New Mk pg 116
Old Mk pg 236
Remarks:

LESSON 7
SUBTOPIC: Distance, Time, Speed
Content: Finding average speed.
Examples:
A car takes 2 hours to cover a certain distance at 60 km/hr but it returns in 3 hrs. Calculate the average speed of the car for the whole journey.

To journey
Time = 2 hrs
Speed = 60 km/hr
Distance = speed x time = 60 km/hr x 2 hrs
To journey
Distance = 120 km

Fro journey
Time = 3 hrs
Speed = 60 km/hr
Distance = speed x time = 60 km/hr x 3 hrs
Fro journey
Distance = 180 km

Average speed = \frac{total distance travelled}{Total time taken} = \frac{120 + 180 km}{2 + 3 hrs} = \frac{300 km}{5 hr} = 60 km/hr

Activity
New Mk 115
Old Mk 235
Remarks:
LESSON 9
Subtopic: Distance, speed, Time
Content: Travel Graph
Example: In reference to graph on page 239 MK BK 6.
Teacher will guide the pupils through the questions that follow the graph.

Sample question
(a) What is the distance between A and B? = 160 km.
(b) What happened at B? (resting)

Activity
New Mk 115-120
Understanding pg 192-193

Remarks:

LESSON 10
Subtopic: Travel graphs
Content: Interpreting return journeys on travel graphs
Examples: Oseke left his mother’s house 30km away, use the graph to answer questions that follow.

(a) What is the scale on the vertical axis? (1 square represents 5 km)
(b) What is the scale on the horizontal axis? (1 square represents 20 minutes)
(c) Calculate Oseke’s average speed before he rested?
\[
\text{Distance} = 15 \text{ km/h}
\]
(d) How far from home was Oseke at 4:20 p.m? (5 km away)
(e) At what time did he arrive at his home? (At 4:40 p.m)

Activity
Pupils will do exercise 108 on page 176 No 5, 6, and 8 of Revision Maths for upper primary.

Remarks:

LESSON 11
Subtopic: Travel graphs
Content: Drawing travel graphs
Examples: Nduga started from town P at 7 a.m and covered 60km in 2 hours, then he rested for 30 minutes. Then covered the remaining 30 km to town R in 30 minutes.
(a) Show Nduga’s journey on a travel graph.
(b) At what time did he start his rest?
(c) Where was Nduga after the first hour?
(d) Calculate Nduga’s average speed for the whole journey.
Answers
(b) At 7 am  (c) 30 km away  (d) A.V speed $= \frac{90\text{km}}{3\text{hr}} = 30\text{km/ hr}$

Activity

Remarks
## P.6 MTC TERM III

### TOPICAL BREAKDOWN FOR TERM III

<table>
<thead>
<tr>
<th>Theme</th>
<th>Topic</th>
<th>Sub topic</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Measurements</strong></td>
<td>Length, mass and capacity</td>
<td>• Circumference</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Measuring the length of a straight spring</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Relationship between diameter and circumference ((\pi)) pie of circle.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Finding circumference of a circle</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Finding the radius and diameter when given circumference.</td>
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<tr>
<td></td>
<td>Area</td>
<td>• Finding area of;</td>
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<tr>
<td></td>
<td></td>
<td>- Triangles</td>
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<tr>
<td></td>
<td></td>
<td>- Rectangle</td>
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<tr>
<td></td>
<td></td>
<td>- Trapezium</td>
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<tr>
<td></td>
<td></td>
<td>- Parallelogram</td>
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<td></td>
<td></td>
<td>- Circle</td>
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<td></td>
<td></td>
<td>- Kite</td>
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<tr>
<td></td>
<td>Volume</td>
<td>• Finding value of;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Cube</td>
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<tr>
<td></td>
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<td>- Cuboid</td>
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<td>- Cylinder</td>
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<tr>
<td></td>
<td></td>
<td>- Triangular prism</td>
</tr>
<tr>
<td></td>
<td>Capacity</td>
<td>• Calculating capacity in litres and millilitres</td>
</tr>
<tr>
<td></td>
<td>Litres, half litres and quarter litres</td>
<td>• Calculating capacity in litres and millilitres</td>
</tr>
</tbody>
</table>

### Geometry

#### Lines, angles, and geometrical figures

- **Parallel lines**
- **Construction of parallel lines**
- **Using a set square**
- **Construction of parallel lines**
- **Using a compass**
- **Perpendicular lines**
- **Constructing perpendicular lines, perpendicular bisector**
- **Dropping a perpendicular line from point**
- **Skew lines**

**Angles**

- **Naming common arms and adjacent angles, supplementary angles, vertically opposite angles, and complementary angles.**
- **Construction of angles of** \(90^\circ, 60^\circ, 120^\circ\)
- **Bisecting angles**
- **Construction of angles of** \(30^\circ, 45^\circ, 135^\circ, 15^\circ, and 75^\circ\) etc
- **Properties of triangles (types of triangles)**
- **Pythagoras theorem**
- **Constructing a right angled triangle**

**Geometric figures**

- **Quadrilateral and their properties**
- **Application of properties of quadrilaterals**
- **Calculating angle of a rhombus and parallelogram**
- **Construction of squares**
- **Construction of a regular hexagon in a circle**
- **Construction of a pentagon when given sides**
- **Simple properties of prisms**
- **Nets of simple prisms**
NUMERACY

Integers
- Integers on a number line
- Addition of integers
- Subtraction of integers
- Writing mathematical statements
- Addition and subtraction of integers without using a number line
- Application of integers

Algebra
- Algebra (forming algebraic equations)
- Collecting like terms
- Substitution
- Simple equations (solving equations)
- By addition
- By subtraction
- By multiplication
- By division
- Equations involving brackets
- Forming and solving equations formed from polygons.

TOPIC LENGTH, MASS AND CAPACITY

LESSON 1
Subtopic: Length
Content: Measuring
Example: Learners will participate in measuring and recording length of different objects
i.e Book (length)
book (width)
book (thickness)
Geometry set (length, width, thickness)
pencil (length)
door (length, width)
window (length, width)
table (length, width, thickness)

Activity
Teacher will organize different objects to be measured by the pupils.
Old Mk 313-315

Remarks:

LESSON 2
Subtopic: Length
Content: Changing from small to large units
- metres to kilometres
- centimetres to metres
Examples: Change 2500 metres to kilometres
1000m = 1 km
1 m = \( \frac{1}{1000} \) km
2500m = \( \frac{1}{1000} \times 2500 \) km
\( \frac{25}{10} \) km
= 2.5 km
(ii) Change 300 cm to m
100 cm = 1 metre (m)
1 cm = \( \frac{1}{100} \) metre
300 cm = \( \frac{1}{100} \times 300 \) m
= 3 m
Activity
Old Mk 315-316
Remarks:

LESSON 3
Subtopic: Length
Content: Perimeter of geometrical figures
Example: 1. Find the perimeter of the figure below

```
10 cm
5 cm
13 cm
15 cm
```

Perimeter is the total distance around the figure.
∴ Perimeter = \( S_1 + S_2 + S_3 + S_4 \)
= \( 15 \text{ cm} + 5 \text{ cm} + 10 \text{ cm} + 13 \text{ cm} \)
= \( 43 \text{ cm} \)

(2) Find the perimeter

```
3 cm
2 cm
X cm
5 cm
3 cm
8 cm
```

Side \( X = 2 + 3 \)
\( X = 5 \text{ cm} \)
Perimeter = \( S_1 + S_2 + S_3 + S_4 + S_5 + S_6 \)
= \( 8 \text{ cm} + 3 \text{ cm} + 2 \text{ cm} + 5 \text{ cm} + 3 \text{ cm} + 5 \text{ cm} \)
= \( 26 \text{ cm} \)

Activity
New MK 125
Remarks:

LESSON 5
Subtopic: Area
Content: Area of shapes
Example: Find the area of a square whose side is 6cm

```
6 cm
```

Area \( = \text{ side} \times \text{ side} \)
\( = 6 \text{ cm} \times 6 \text{ cm} \)
\( = 36 \text{ cm}^2 \)

Find the area of a square whose side is \( p \text{ cm} \)

```
p cm
```

Area \( = \text{ side} \times \text{ side} \)
\( = p \text{ cm} \times p \text{ cm} \)
\( = p^2 \text{ cm}^2 \)

Content: Find one side of the square.
Example: The area of a square is 64cm\(^2\). Find the length of each side of the square.

Let one side be \( p \text{ cm} \)

```
p cm
```

\( S \times S = \text{Area} \)
\( P \times P = 64 \)
\( \sqrt{P^2} = \sqrt{64} \)
\( P = (2 \times 2) \times (2 \times 2) \times (2 \times 2) \)
\( P = 2 \times 2 \times 2 \)
\( P = 8 \)
Each length \( = 8 \text{ cm} \)

Activity
Pupils will do exercise 13:19 page 329 MK BK 6
New MK 122-123.
LESSON 6

Subtopic: Area
Content: Finding the side of a rectangle when area is given
Example: The area of a rectangle is 56cm². The length is 8cm. Find the width of the rectangle.

Area = 56cm²

L x W = Area
8cm x w = 56cm²

\[
\frac{8cm \times w}{8cm} = \frac{56 cm^2}{8 cm} = \frac{7 cm}{1}
\]

W = 7 cm

Width = 7 cm

11. A rectangular piece of paper is 4800mm². Its width is 60 mm. Find its length

Area = 4800mm²

Length x width = Area
L x W = Area
L x 60 mm = 4800mm²

\[
\frac{L \times 600mm}{60mm} = \frac{4800mm^2}{60mm} = \frac{80mm}{1}
\]

L = 80 mm

Activity
New MK pg123-125

LESSON 7

Subtopic: Area
Content: Finding sides, Area and perimeter
Example: ABCD is a rectangle.

\[
(2x - 5) cm \quad (x - 1) cm
\]

(x + 3) cm

(i) Find the value of x
(ii) Find width and length
(iii) Find the area of the figure

(i) Find the unknown

2x - 5 = x + 5
2x - x = 3 + 5
\[X = 8\]

(ii) Length \cdot x + 3

\[8 + 3 = 11 cm\]

Width: \[x - 1\]

\[8 - 1 = 7 cm\]
(iii) Area = \( L \times W \)
\[ = 11 \text{ cm} \times 7 \text{ cm} \]
\[ = 77 \text{ cm}^2 \]

(iv) Perimeter = \( 2(L + W) \)
\[ = 2 \times (11 \text{ cm} + 7 \text{ cm}) \]
\[ = 2 \times 18 \text{ cm} \]
Perimeter = 36 cm

**Activity**
Tr’s collection

**Remarks:**

---

**LESSON 8**

Subtopic: Area
Content: Finding area of shaded part.
Examples: Study the figure below carefully.

Find the area of the shaded part.

<table>
<thead>
<tr>
<th>6cm</th>
<th>9cm</th>
</tr>
</thead>
<tbody>
<tr>
<td>4cm</td>
<td>3cm</td>
</tr>
</tbody>
</table>

Length of outer rectangle = 8cm + 2 + 2cm
Width of outer rectangle = 12cm
Area outer rectangle = \( L \times W \)
\[ = 12 \text{ cm} \times 9 \text{ cm} \]
\[ = 108 \text{ cm}^2 \]

Area of shaded part = 108cm\(^2\) - 40cm\(^2\)
\[ = 68\text{cm}^2 \]

---

**Activity**
Understanding pg 262-263

**Remarks:** Use a variety of units

---

**LESSON 9**

Subtopic: Area
Content: Finding area of a triangle
Examples:

Area is \( \frac{1}{2} \times b \times h \)

Find the base of a triangle whose area is 60cm\(^2\) and height is 12cm

Diagrammatic representation

\[ \frac{1}{2} \times b \times 10 \text{ cm} = 60 \text{ cm}^2 \]
\[ b \times 6 \text{ cm} = 60 \text{ cm}^2 \]
\[ b = 10 \text{ cm} \]
LESSON 10
Subtopic: Area
Content: Finding Base or Height by comparing area
Example:

ABC is a triangle AC and BE are heights of the same triangle.
BD = 12 cm, AC = 10 cm BE = 8 cm
Find the length of AD

Area triangle ABD with height AC = ½ bh
Area Triangle ABD with height BE = ½ bh

same triangle with different heights
has the same area.

½ bh = ½ bh
\[
\frac{1}{2} \times 8\text{cm} = \frac{1}{2} \times 12\text{cm} \times 10\text{cm}
\]
AD x 4 cm = 60 cm
\[
\frac{1}{2} \times 15\text{cm} = \frac{1}{2} \times 60\text{cm}
\]
\[
AD = 15\text{cm}
\]

Activity
Remarks:

LESSON 11
Subtopic: Area
Content: Finding area of combined shapes
Examples: Find the area of the whole figure.

Name the identified figures in above.
A and B

Area A = \frac{1}{2} b \times h
Area B = \frac{1}{2} b \times h

Area of whole figure
\[
\frac{1}{2} x 8\text{cm} \times 6\text{cm}
\]
\[
\frac{1}{2} x 10 \times 4\text{cm}
\]
\[
24\text{cm}^2
\]
\[
= 5\text{cm} \times 4\text{cm}
\]
\[
= 20\text{cm}^2
\]
\[
AA + AB
\]
\[
= 24\text{cm}^2 + 20\text{cm}^2
\]
\[
= 44\text{cm}^2
\]

Activity
Pupils will do exercise 13:29 page 343 MK BK 6.
Understanding mtc pg 258
Remarks:

LESSON 12
Subtopic: Area
Content: Area of a trapezium
Examples: Trapezium are of two types.

right angled trapezium
Find the area of the trapezium below
Area = \frac{1}{2} h (a + b)
Find the area of the trapezium below

\[ \text{Area} = \frac{1}{2} h (a + b) \]

\[ = \frac{1}{2} \times 7 \text{cm} (8 + 10\text{cm}) \]

\[ = \frac{1}{2} \times 7 \times 18 \text{cm}^2 \]

\[ = 63\text{cm}^2 \]

Content: Finding one side of a trapezium
Examples: The area of a trapezium is 60\(\text{cm}^2\), the height is 4\text{cm} and one of the parallel sides is 10\text{cm}. find the length of the second parallel side.

\[ \frac{1}{2} h (a + b) = \text{Area} \]

\[ \frac{1}{2} \times 4 \text{ cm} (a + 10) = 60\text{cm}^2 \]

\[ 2\text{cm} (a + 10) = 60 \text{ cm}^2 \]

\[ 2\text{acm} + 20\text{cm} = 60\text{cm}^2 \]

\[ 2\text{acm} + 20 - 20 = 60 - 20 \]

\[ 2a = 40 \]

\[ a = 20 \text{ cm} \]

Second parallel side is 20 cm

Activity
New MK pg 128

Remarks

LESSON 13
Subtopic: Area
Content: Area of parallograms
Examples

\[ \text{AREA OF PARALLOGRAM} = \text{BASE x HEIGHT} \]

Find the area of the figure below

\[ \text{area} = \text{BASE x HEIGHT} \]

\[ = 10 \text{ cm} \times 6 \text{ cm} \]

\[ \text{Area} = \text{60cm}^2 \]

Activity
New Mk 129

Remarks

LESSON 14
Content: Area of rhombus and kite
Example 1.
Find the area of the rhombus below

\[ \text{Area} = \frac{1}{2} d_1 \times d_2 \]

\[ \frac{1}{2} \times 8\text{cm} \times 6\text{cm} \]

\[ 4\text{cm} \times 6\text{cm} \]

\[ 24\text{cm}^2 \]
Example II
Find the area of the kite

\[
\text{Area} = \frac{1}{2} d_1 \cdot d_2
\]

\[
\frac{1}{2} \times 8\text{cm} \times 12\text{cm}
\]

\[
4\text{cm} \times 12\text{cm}
\]

\[
48\text{cm}^2
\]

Ref: New Mk pg 130

LESSON 15
Subtopic: length
Content: Circumference - Diameter
Radius

Examples:
\textbf{Circumference:} is distance around a circular object.
\textbf{Diameter:} The longest distance through the centre of a circle object to the covered line.
\textbf{Radius:} Half the diameter distance

(i) Find the radius of a circle whose diameter is 40 cm.
Radius = \frac{\text{diameter}}{2}

(ii) Find the diameter of circle whose radius is 3 \frac{1}{2} cm
Diameter = 2 \times r
= 2 \times 3 \frac{1}{2} cm
= 2 \times \frac{7}{2}
\]

\[
\text{Diameter} = 7\text{cm}
\]

Content: Calculating circumference of a circle
Examples:
(i) Find the circumference of a circle whose diameter is 10 cm. (Use \( \pi = 3.14 \))
Diameter = 10 cm
Circumference = \pi \times D
\[
= 314 \times 10 \text{cm}
\]

\[
= 31.4 \text{ cm}
\]

Ref: understanding mtc pg 254-257
New MK pg 132

LESSON 16
Content: perimeter of sectors of a circle
Example 1
Find the perimeter of these shapes ( \( \pi = \frac{22}{7} \) or 3.14)

\[
180^0
\]

\[
7\text{cm}
\]

\[
2.1\text{m}
\]

\[
36^0
\]

\[
10\text{cm}
\]

Ref: Mk new Mk pg 133
LESSON 17
Content: finding the area of a circle
Example 1
Find the area of the circle

\[ A = \pi r^2 \]
\[ = 22 \times 7 \times 7 \]
\[ = 22 \times 7 \]
\[ = 154 \text{cm}^2 \]

Example 2
Calculate the area of the circle below (take \( \pi \))

\[ A = \pi r^2 \]
\[ = 3.14 \times 10 \times 10 \]
\[ = 314 \text{cm}^2 \]

Ref: new MK 134

LESSON 18
Subtopic: Area
Content: Finding total surface Area
Examples: Cuboid

A rectangular box has 6 faces
2 faces of length and width
2 faces of width and height
2 faces and length and height
2 (length x width) + 2 (width x height) + 2 (length x height)
TSA = 2 (L x w) + 2 (w x h) + 2 (l x h)

Example 1

\[ \text{TSA} = 2 (4 \times 6) + 2 (6 \times 5) + 2 (5 \times 4) \text{cm}^2 \]
\[ = 14 \times 4 + 12 \times 5 + 20 \times 3 \text{cm}^2 \]
\[ = 56 + 60 + 48 \text{cm}^2 \]
\[ = 164 \text{cm}^2 \]

Content: Total Surface Area of a Cube
Examples: Cube

- Cube has all edges equal
- Cube has all its faces equal
- Each face is a square

It has 6 equal faces
Area of one face = \( S \times S \)
\[ = S^2 \text{ where } S \text{ is side} \]
\[ \therefore 6 \text{ faces will have area } 6 \times S^2 \]
\[ \therefore \text{TSA of cube} = 6S^2 \]
Find the total surface area of a cube whose side is 4cm

\[ \text{TSA} = 6 \times S^2 \]

\[ \text{TSA} = 6 \times 4^2 \]

\[ \text{TSA} = 6 \times 4 \times 4 \text{ cm}^2 \]

\[ \text{TSA} = 96\text{cm}^2 \]

**Activity**


**Remarks**

LESSON 19

**Subtopic:** Area

**Content:** Finding sides of a cube

**Examples:** The total surface area of a cube is 384cm\(^2\). Find the length of each side of a square.

\[ \text{TSA} = 384\text{cm}^2. \]

But \(6S^2 = \text{TSA}\)

\[ 6S^2 = \frac{384}{6} \]

\[ S^2 = 64 \]

\[ \sqrt{S^2} = \sqrt{64} \]

\[ S = 8\text{cm} \]

**Activity**


**Remarks**

LESSON 20

**Subtopic:** Capacity

**Content:** Volume (3 dimensional figures.)

**Example:** A rectangular tank is 30cm by 60 cm by 90 cm. Find its capacity litres.

Sketch

Volume of the tank = \(L \times w \times h\)

= \(30 \times 60 \times 90\) cm\(^3\)

= 100 cm\(^3\)

No of litres in the tank

= \(\frac{30 \times 60 \times 90}{1000}\)

= 162 litres

**Activity**

Pupils will do exercise 35.8, Nos 1 – 10 on page 373 of a New MK pupils BK 6. (Old ed)

New Mk 139-141

**Remarks**

LESSON 21

**Subtopic:** Capacity

**Content:** application of volume and capacity

**Example:** The rectangular tank below holds 72 litres of water. Calculate the volume of h.

Solution:

I litre = 1000cm\(^3\)

The volume of water in the tank is \((72 \times 1000)\) cm\(^3\).

Therefore \(80 \times 60 \times h = 72 \times 1000\)
Activity
1. The tank below holds 72 litres of water. find h.
   \[ h = \frac{72 \times 1000}{60 \times 60} \]
   \[ h = 15 \text{ cm} \]

2. The tank below holds 280 litres of water find h.

3. The tank below is \( \frac{1}{3} \) full of water. How many litres of water are in the tank?

Ref: old Mk pg 359-360
Understanding pg 266-268
Remarks

LESSON 23
Subtopic: Capacity
Content: Conversion of \( \text{cm}^3 \) to litres
Examples
(a) Change 2000 \( \text{cm}^3 \) to litres
Solution:
\[ 1 \text{ cm}^3 = \left( \frac{1}{1000} \right) \text{ litres} \]
\[ 2000 \text{ cm}^3 = \frac{1 \times 2000}{1000} = 2 \text{ litres} \]
(b) Change 3700 \( \text{cm}^3 \) to litres
\[ 1000 \text{ cm}^3 = 1 \text{ litres} \]

1 \( \text{cm}^3 \) = \( \left( \frac{1}{1000} \right) \) litres

\[ 3700 \text{ cm}^3 = \frac{1 \times 3700}{1000} = \frac{37}{10} = 3.7 \text{ litres} \]

Activity
Pupils will do exercise 13.44, No 1 – 10 on page 364 of A New MK pupils BK 6 (New edn)
Remarks

LESSON 24
Subtopic: Capacity
Content: Conversion of ml to litres
Example:
(a) Change 3500 ml to litres
Solution
\[ 1000 \text{ml} = 1 \text{ litre} \]
\[ 1 \text{ml} = \left( \frac{1}{1000} \right) \text{ litres} \]
\[ 3500 \text{ml} = \frac{1}{1000} \times 3500 \text{ litres} \]
\[ = \frac{35}{10} = 3.5 \text{ litres} \]
(b) Express 900 ml as litres.
\[ 1000 \text{ml} = 1 \text{ litre} \]
\[ 1 \text{ ml} = \left( \frac{1}{1000} \right) \text{ litres} \]
\[ 900 \text{ ml} = \frac{1}{1000} \times 900 \text{ litres} \]
\[ = \frac{9}{10} = 0.9 \text{ litres} \]

Content: Conversion of litres of ml
Example:
(a) Change 5 litres to ml.
\[ 1 \text{ litre} = 1000 \text{ ml} \]
\[ 5 \text{ litres} = (1000 \times 5) \text{ ml} \]
\[ = 5000 \text{ ml} \]
(b) Change 0.25 litres to ml
\[ 1 \text{ litre} = 1000 \text{ ml} \]
\[ 0.25 \text{ litres} = (0.25 \times 1000) \text{ ml} \]
\[ = 25 \times 1000 \]
(c) Change 3 ½ litres to ml

1 litre = 1000ml
3 ½ litres = 1000 x 3 ½

\[
\begin{align*}
7 & \times 4000 \\
2 & \\
\end{align*}
\]

\[
= 7 \times 500 \\
= 3500ml
\]

Activity
Pupils do exercise 13.42 No 1 – 16 on page 362 of a New MK pupils Bk 6 (New ed)

Remarks

LESSON 25
SUBTOPIC: PACKING
Content: volume
Examples
Containers A are to be packed in a big container B

A

B

10cm

10cm

10cm

60cm

40cm

50cm

a) Find the number of small containers that can be packed in B.
b) How many containers A of water can fill container B?

MEASURES QUESTIONS
Set I
1. What is the cost of 250g of sugar at shs 2000 per kg?
2. A man watched a television for 900 seconds. For how many hours did he watch the television?
3. How many hours are between 3.30am and 2.30pm?
4. A victory party started at 8.40 am and ended at 11.15pm. How long did it take?
5. If the exchange rate is US $ 1 to Ushs 1750. How many dollars can I get from U hs 85,500?
6. A businessman bought a radio at shs 450,000 and sold at shs 500,000. calculate his profit.
7. If I sell an article at shs 120,000 making a profit of shs 5000. how much did I pay for the article?
8. Calculate the loss made by a trader buying an article at shs 10000 and selling it at shs 9050.
9. A man had shs 5000 and bought the following items:
   - 2kg of sugar at shs 1200 per kg
   - 500gm of salt at shs 400 per kg
   - 3 bars of soap at shs 2100.
   Calculate his total expenditure and balance.

Set 2
1. Find how many notes are in a bundle of notes numbered from AP 627400 to AP 27499.
2. How many 100 shilling coins are equivalent to twenty thousand shillings note?
3. A bus covered a distance of 60 km in 45 minutes. What was its speed?
4. Jinja is 148 km from Mbale through Iganga. The distance from Jinja to Iganga is 39km. How far is Mbale from Iganga?
5. A car travels at 96km/hr for 20 minutes. Calculate the distance travelled?
6. Two towns A and B are 420km apart. A driver travels from A to B at 7 kph and returns at 105 kph. Calculate his average speed for the whole journey.
7. Mwanani covers a distance of 180km in 3 hours. Calculate the speed in m/sec.
8. Katoke traveled to Kenya with K shs 25000 and then to German with Euros 2000. Find the total amount of money in Uganda shillings that he travelled with if K shs 1 = U shs 22 and Euro 1 = Ug shs 1520.
9. How much money is contained in a 5000 shilling note bundle numbered from VU 28504 and VU 285140?

Set 3
1. How many seconds are in 35 minutes?
2. Express 3.30 p.m to 24 hour clock.
3. Change 18000 seconds to hours.
4. Mugisha reached school at 8.15am and left the school at 5:30 pm, how long did she stay at school?

5. What distance will be covered at a speed of 20 m/sec for 5 minutes?

6. How long will a car take to cover a distance of 180km at a speed of 60 km/hr?

7. Change 40m/sec to km/hr

8. Lira is 124km from Kitgum. A bus takes 1 ½ hrs from Kitgum to Lira and 2 ½ hrs going back. Find its average speed.

9. A parent bought the following articles for the children at beginning of the term.
   - a dress at shs 5500
   - a shirt at shs 3000
   - 2 pairs of shorts at shs 3500 each.
   - Two pairs of shoes at shs 8000 each

If the parent had shs 50000, calculate his total expenditure and balance.

**Set 4**

1. Express 6km as metres.

2. One side of a regular hexagon is 8 cm. What is the total distance round it?

3. A triangular field has a base of 15m and its height 12m. What is the area of the field?

4. Calculate the circumference of a round table top whose diameter is 1.4m?

5. Calculate the area of the figure below.

6. A barrel of oil has a radius of 0.5m. Calculate its diameter in centimetres.

7. The diagram below is a rectangle ABCD.

   (3x - 2) cm
   \[ \frac{X}{2} \text{ cm} \]
   (2x + 6) cm

   (i) Find the value of x.
   (ii) Find the area of the rectangle
   (iii) Find its perimeter

8. ,

   (i) Find the length of AD
   (ii) Find the perimeter of the Triangle ABC

**Set 5**

1. Express 2 ½ litres as millilitres.

2. Write 15000 cm³ as litres.

3. Find the volume of the figure below.

4. A field is 40m². What is the area in cm³?

5. A road is 8 km long. What is this distance in metres?

6. ,

   (i) Find the width of the inner rectangle
   (ii) Find the area of the shaded part

7. Find the area of the shaded part in the diagram below
8. Change 6.045kg to grams.
9. A square room is 3.6 m long. What is its area?
10. Find the height of triangle whose area is 30cm² and its base is 12cm.

### THEME: Geometry

**Topic: LINES, ANGLES AND GEOMETRIC FIGURES**

**UNIT 9**

**LESSON 1**

**Subtopic:** Shapes

**Content:**

(i) Types of lines
   - line, line segment, ray, curves
   - perpendicular lines
   - parallel lines
   - Drawing line
   - Skew lines

**Examples:**

(a) Draw a line segment of 4.8 cm

(b) Draw a perpendicular line to AB at Y

(c) Drawing parallel lines

Activity:

Draw the following:

(a) line segment of length
LESSON 2
SUBTOPIC: Angles
Content: - Formation and naming angles
- Measuring and drawing angles using a protractor
Example: (a) Study the figure below
\[ \angle a \text{ is } MTR \text{ or } RTM \]
\[ \angle b \text{ is } RTW \text{ or } WTR \]
(b) Measure each angle in degrees:
\[ \angle "a" = 102^\circ \]
\[ \angle "b" = 78^\circ \]
(c) Measure and draw an angle of 45°.

Activity
(i) Draw the following angles using a protector
20° 30° 80° 120° 100° 65° 35° 45° 72°

LESSON 3
SUBTOPIC: Bisecting line segments and angles
Content:
- Bisect lines at a point.
- Drop bisector from a point
- Bisect given angles.
Example: (a) Bisect the line XY from point P

Activity
(i) Construct angles using a pair of compasses only
\[ (a) \ 60^\circ \]
\[ (b) \ 150^\circ \]
(ii) (a) 45° (b) 30°
(iii) Construct an angle of 120° at point T
Activity
Pupils will do exercise 6 on page 144 from Oxford primary MTC pupils BK 6.
Fountain pg 147

Remarks

LESSON 5

Subtopic: Construction of polygons
Content: - Types of triangles
- Construction of triangles (SSB) using a pair of compasses
And a protractor
Examples: Construct triangle XYZ where the side XY = 8 cm. YZ = 9cm and
XZ = 4cm

Sketch

Y

Z

Accurate

N.B (Emphasize a sharp pencil and accuracy)

Activity:
A old MK BK 6 pages 288 – 291.

Remarks

LESSON 6

Subtopic: Construction of triangles
Content: Construct triangle (AAS)
Example: Construct triangle PQR where angle PQR = 30°, angle PRQ = 60°
and side QR = 5.8cm

(a) Measure PQ and PR
(ii) Measure angle P

Sketch

P

Q

R

Accurate

Activity
LESSON 7
SUBTOPIC: Construction of polygons
Content:
- Construction of quadrilaterals
  (a) square
  (b) Rectangle
  (c) Determine the diagonals
- Their properties
Example: (i) Construct a square of side 6cm’
          (b) Give the length its diagonals
Example: (ii) Construct a rectangle PQRS such that PR = 8cm and RS = 4cm
          Measure its diagonal
Example: (iii) construct a square in a circle

Activity
The pupils will do exercise on construction of squares and rectangles:
Tr’s collection
Remarks

LESSON 8
SUBTOPIC: construction of polygons
Content: A regular Hexagon in a circle
N.B Accuracy in measuring radii
Example: (i) Construction of a circle of r = 2.2 cm

(ii) Construct a regular hexagon of side 4cm
     Find its perimeter
          P = 6 x side
          = 6 x 4 cm
          P = 24 cm

Activity
Fountain pg 155-156
New mk 165
Remarks

LESSON 9
EMPHASIZE ACCURACY
Subtopic: Properties of triangles and quadrilaterals.

Content:
(a) Triangles (Equilaterals, scalene, isosceles and right angled triangle)
(b) square
(c) Rectangle

Examples:
(a) Properties of triangles
(i) Equilateral
- 3 equal side
AB = AC = BC
Each int $\angle = 60^\circ$
Has 3 lines of folding symmetry

(ii) Isosceles triangle
- 2 equal sides (AB = AC)
- one line of folding symmetry
- 2 base $\angle$ s are equal

(iii) Right angled triangle
- one int $\angle = 90^\circ$ (right angle)
- longest side is Hypotenuse
- int $\angle$ sum = 180$^\circ$

(iv) Scalene triangle
- Has all 3 sides not equal
- No line of symmetry
- int $\angle$ s add to 180$^\circ$

(b) Properties of quadrilaterals

(i) Square
- All 4 sides equal
- Each int $\angle = 90^\circ$
- Int $\angle$ sum = 360$^\circ$
- Has 4 line of symmetry

(ii) Rectangle
- 2 opposite sides are equal i.e (L1 = L2)
(W1 = W2)
Each int $\angle = 90^\circ$
Has 2 lines of symmetry

Activity
Pupils make the sketch of the following showing properties
(a) Equilateral triangle
(b) Isosceles triangle
(c) scalen triangle
(d) Right angled triangle
(e) square
(f) rectangle

LESSON 10
Subtopic: Pythagoras theorem
Content: Use the Pythagoras theorem to find
(a) Hypotenus
(b) Height
(c) Base

Examples

(i) Find X
(ii) Find AB
LESSON 11

Subtopic: Application of Pythagoras theorem

Content: Solve problems using Pythagoras theorem

Example: (i) The flower bed measures 12m by 9cm
Work out the length of its diagonal

\[ 12m^2 + 9m^2 = H^2 \]
\[ H = \sqrt{225m^2} = 15m \]
\[ \therefore \text{Diagonal} = 15m \]

(ii) The triangle below is Isosceles: \( PQ = 13cm \)
(b) Find QS

\( (2x + 1) = 13cm \)
\[ 2x = 12cm \]
\[ x = 6cm \]

\( RS^2 + RP^2 = PS^2 \)
\[ RS^2 + 144 = 169 \]
\[ RS = 5 \]
\( \therefore QS = 5 \times 2 = 10cm \)

(c) Find area of PQS

\[ A = \frac{1}{2} \times b \times h \]
\[ (\frac{1}{2} \times 10 \times 12) \text{ cm}^2 \]
\[ \frac{1}{2} \times 5 \times 12 \text{ cm}^2 \]
\[ \text{Area} = 60 \text{ cm}^2 \]

Activity

Pupils will do exercise 12:34 page 300 MK pupils BK 6 pages 299 – 300

Remarks

LESSON 12

Subtopic: Angle properties

Content: - Acute, obtuse, reflex, straight, right and centre angles
- Complementary

Example: (i) Describe the angles below
<table>
<thead>
<tr>
<th>Angle</th>
<th>Description</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>50°</td>
<td>Acute angle</td>
<td>It is $&lt; 90°$ $&gt; 0$</td>
</tr>
<tr>
<td>124°</td>
<td>Obtuse angle</td>
<td>It is $&gt; 90°$ $&lt; 180°$</td>
</tr>
<tr>
<td>180°</td>
<td>Straight angle</td>
<td>It is a straight line</td>
</tr>
<tr>
<td>280°</td>
<td>Reflex angle</td>
<td>$&gt; 180°$ but $&lt; 360°$</td>
</tr>
<tr>
<td>360°</td>
<td>Centre angle</td>
<td>Forms full circle</td>
</tr>
</tbody>
</table>

(a) Find the value of $x$

\[
3x + 10° + 50° = 90° \\
(\text{complementary } \angle s) \\
3x + 20° + 2x + 10 = 90° \\
\]

\[
x + 20 + 2x + 10 = 90° \\
x = 10° \\
\]

(b) If $2y$, $40°$, and $30°$ are complementary angles, find $y$.

\[
2y + 30° + 40° = 90° \\
2y = 20° \\
y = 10° \\
\]

Find complement of $(y - 30°)$
Ref: fountain 146
MK new edition pg 144
Remarks

**LESSON 13**

Subtopic: Supplementary angles
Content:
- Angles on a straight line
- Angles on a triangle

Examples:

- $4f / 60°$  
  What is $f$
  
  $4f + 60 = 180$
  (angles on a straight line add up to $180°$)
  $4f = 120$
  $f = 30°$

(ii) If $2y + 20°$, $y + 80°$ and $2y$ are supplementary $\angle s$

  Find $y$

  \[
  2y + 20 + y + 80 + 2y = 180° \\
  5y + 100 = 180° \\
  5y = 80 \\
  y = 16° \\
  \]

(iii) Interior angles of a triangle add up to $180°$

Find the unknown

(a) $50°$

\[
2x + 50° + 90° = 180° \\
(\text{Int } \angle s \text{ add up to } 180°) \\
2x = 40 \\
2 = 2 \\
X = 20° \\
\]

(b) $30°$

\[
4p + 30 = 180 \\
5p = 150 \\
P = 30° \\
\]

**Activity**
LEsson 14
Subtopic: Angles formed by the transverse
Content: The co-interior angles and co-exterior angles
Examples: Find the unknown angles

Exercise 13:12 from page 224 of MK BK 7. page 224. page 287 from MK BK
Exercise 28:18
New Mk 156
Fountain pg 147
Remarks

LESSON 15
Subtopic: Alternate interior angles
Content: Alternate interior angles
- Alternate exterior angles
(ARE EQUAL ANGLES)
Examples: Work out the unknown

Activity: Exercise 29:4 and 29:5 of pages 308/9 MK BK 6 pages 308 and 309.
Remarks
Ref: Mk old edition pg 267-273
Subtopic: Equal angles
Content:
- Base angles of Isosceles triangle
- 2 interior angle = 1 exterior angle

Example:
(i) \[2x = 60^\circ\]
(2 base \( \angle \) s of Isosceles \( \triangle \) are \( \) )
\[2x = 60^\circ\]
\[x = 30^\circ\]

(ii) \[x + 70 + 70 = 180^\circ\]
\[x + 140^\circ = 180^\circ\]
\[x = 40^\circ\]

80 + 70 = w
(2 \( \angle \)s = 1 ext + opp \( \angle \))
\[150^\circ = w\]
\[W = 150^\circ\]

Activity
Old Mk pg 167-273
Remarks

\[\begin{array}{|c|c|}
\hline
X & 120^\circ \\
\hline
\end{array}\]
_____
5 sides

\[\begin{array}{|c|c|}
\hline
72^\circ & \text{______} \\
\hline
\end{array}\]
5 sides

\[\begin{array}{|c|c|}
\hline
140^\circ & \text{______} \\
\hline
\end{array}\]
9 sides

(b) A regular polygon has 12 sides find its
(i) exterior angles
(ii) interior angles

Remarks
Tr’s collection

\[\begin{array}{|c|c|c|}
\hline
\text{LESSON 16} & \text{Exterior and Interior angles} \\
\hline
\text{Content:} & \text{Find the exterior angles of regular polygon} \\
& \text{Interior angles of regular polygon} \\
\hline
\text{Example:} & \text{Find the exterior \( \angle \) is } 150^\circ \\
(a) & \text{Ext } \angle + \text{ Int } \angle = 180^\circ \\
& \text{Let ext } \angle \text{ be } y \\
& \text{Y + 150}^\circ = 180^\circ \\
& \text{Y + 150 – 150 = 180 – 150} \\
& \text{Y = 30}^\circ \\
(b) & \text{Work out the exterior angle of a regular decagon} \\
& \text{Decagon = 10 sides} \\
& \text{Ext } \angle = \frac{360^\circ}{10} = 36^\circ \\
& \text{\therefore Ext } \angle = 36^\circ \\
\hline
\text{Activity} & \text{Exterior} & \text{Interior} & \text{Number of sides} \\
\hline
\end{array}\]

\[\begin{array}{|c|c|}
\hline
120^\circ & \text{______} \\
\hline
\end{array}\]

\[\begin{array}{|c|c|}
\hline
72^\circ & \text{______} \\
\hline
\end{array}\]

\[\begin{array}{|c|c|}
\hline
140^\circ & \text{______} \\
\hline
\end{array}\]

\[\begin{array}{|c|c|}
\hline
\text{LESSON 17} & \text{Interior angle sum} \\
\hline
\text{Content:} & \text{Find interior angle sum of regular polygon} \\
& \text{problems involving interior angle sum} \\
\hline
\text{Examples:} & \text{Find the interior angle sum of a regular hexagon} \\
& \text{Int angle sum } = (n – 2) \times 180 \\
& = (6 – 2) \times 180^\circ \\
& = 4 \times 180 \\
& \text{Int angle sum } = 720^\circ \\
& \text{(ii) The interior angle of a regular polygon } is \text{ five times the} \\
& \text{Exterior angle} \\
& \text{Find the ext } \angle \\
(a) & \text{Let ext } \angle = x \\
& \text{Ext int } \angle = 5x \\
& \text{X } \text{ ext } \angle = \text{5x} \\
& \text{X = 300} \\
& \text{6 x = 180}^\circ \\
& 5 \times 30 = \text{150}^\circ \\
& \text{X = 30}^\circ \\
\hline
\text{Activity} & \text{If the interior angle is thrice the exterior angle of a regular polygon.} \\
(a) & \text{Find the exterior angle}
(b) How many sides has it
(c) Find its Int angle sum

Remarks
Ref: tr's collection

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**SYMMETRY**

**LESSON 1**

**Subtopic:** Symmetry

**Content:** Lines of folding symmetry of plane shapes

**Examples:**

(i) How many lines of symmetry has

- (a) 4 lines
- (b) 1 line
- (c) 1 line
- (d) 3 lines
- (e) 2 lines

(ii) Identify the line of folding symmetry

- (a) Infinite
- (b) 1 line
- (c) 1 line
- (d) 1 line
- (e) 2 lines

**Activity**

Pupils will draw and count the lines of folding symmetry of shapes given by the teacher.

**Remarks**

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**LESSON 2**

**Subtopic:** Drawing nets of solids

**Content:**
- Nets of solid objects
- Modes of solids

**Example:** Name the solid whose net is drawn

- Cylinder
- Cone
- Square-based prism
- Cuboid

**Activity**

The pupils will draw sketch nets of

- (a) cylinders
- (b) cones
- (c) triangular prism
- (d) square-based prism
- (e) pyramid
- (f) cube
- (g) cuboid

**Remarks**

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**LESSON 3**

**Subtopic:** Properties of space objects and their nets

**Content:**
- Naming solid figures
- Drawing solid shapes.
- The edges, vertices, faces
  \[ \text{i.e edges} + 2 = \text{vertices} + \text{faces} \]

**Examples:** Name the shapes

- (a) Rectangular prism
- (b) Triangle
- (c) Pyramid
REVISION QUESTIONS ON GEOMETRY

1. Name the following shapes
   (i) 
   (ii) 
   (iii) 
   (iv) 

2. Find the unknown angles below
   (a) 
   (b) 
   (c) 

3. Find the (a) complement of 15° (b) Supplement of 70°
   (c) If 48° is the complement of P. Find P.
   (d) Given that x, 40° and 2(x + 5) are supplementary angles. Find the value of x.

4. What is the value of the unknown?
   (a) 
   (b) 
   (c) 

5. Use a pair of compasses, ruler and pencil to:

Activity
Pupils will do exercise from Mk Bk 6.

Remarks ____________________________________________

(a) construct 45°  (b) 120°  (c) Bisect the angle
(d) Bisect line AB at point Y

6. Find the missing angles.

7. The exterior angle of a regular polygon is 40°.
   (a) How many sides does it have?
   (b) Work out its interior angle.
   (c) What is its interior angle sum?

8. How many lines of symmetry does each of these have.
   N.B Draw and show them
   (a) square   (b) isosceles triangle
   (c) Equilateral triangle   (d) kite

9. Copy and construct the figure accurately. Drop the perpendicular line to meet AV at N from point T.
   Sketch
   Accurate figure

83
10. The interior angle of a regular polygon is thrice its exterior angle. Find its interior angle sum.

11. (i) Don faces NE and makes a clockwise turn to face SW. What is the measure of his turn?
   (ii) Draw the shapes: cylinder (b) cube (c) triangular prism
   (iii) Draw a net for each solid in (ii) above.

12. Construct triangle XYZ with a pair of compasses such that \( XY = 7 \text{ cm}, \angle XYZ = 60^\circ \) and \( ZXY = 45^\circ \)
   (b) Measure XZ (c) \( \angle XZY \)

13. Without using a pair of compasses construct angle \( 50^\circ \)

14. What acute angle is between the hour and minute arm of a clock at 6:15 pm

15. Use a pair of compasses to construct the following.
   (a) Rectangle TOPE where \( TP = 8\text{ cm}, PO = 6\text{ cm} \) and measure its diagonal.
   (b) Regular hexagon of side 4.3 cm

16. Calculate the length of a rectangle whose width is 7 cm and a diagonal of 25 cm.
   (b) Find its (i) area (ii) perimeter

17. Use the triangle ABC to answer questions below
   (a) Find the value of \( y \).
   (b) What is the length of each side
   (c) Find the value of \( h \)
   (d) Calculate the area of \( \triangle ABC \)
   (e) Find her perimeter

18. The interior angle of a regular polygon is 120 more than its exterior angle.
   (a) Calculate its exterior angle
   (b) Find its interior sun
   (c) How many sides has the polygon and name it.

19. Name the parts
   (i) Line TP
   (ii) line AB
   (iii) Line XY

(iv) curve C
(v) shaded part
UNIT 7  INTEGERS
UNIT / TOPIC
LESSON 1
Subtopic: Integers on a number line
Content:
(i) Positive
(ii) Zero (neutral integer)
(iii) Negative
(iv) Opposites/inverses of integers
(v) Inverse property
Example: (i) Write down the inverse of:
(a) -4
   Inverse is +4
(b) What is the additive inverse of +5
   Let inverse be x
   But x + +5 = 0
   X + 5 – 5 = 0 – 5
   X = 0
   Inverse = -5

(c) Work out: (Use inverse property)
   + 6 - 6
   N.B An integer plus its opposite gives zero.
   i.e +6 – 6 = 0
   (b) -3t + 3t
      Answer is 0

Subtopic: Represent Integers using arrow.
Content:
- Name arrows on number lines
- Draw arrows to represent integers
Examples: (a) Which integers is represented by each arrow?

(b) Draw a number line showing each of:
(i) +6
(ii) +3
(iii) +2
(iv) -4

85
Activity
The pupils will do exercise 9:4 on page 196 from A New MK BK 6 page 196.

Remarks

LESSON 2
Subtopic: Ordering integers
Content:
- Compare integers
- Arrange in ascending order
- Arrange in descending order

Examples:
(i) Use >, < or = to compare
   (a) 2 ------ -2
       2 > -2
   (b) 20 ------ 11
       20 < *11
   (c) 0 ------ -4
       0 > 4
   (d) 100 ------ 0
       100 < 0
   (e) -y ---- +y
       <
   (f) 12 ------ *12
       =

(ii) Arrange {2, 3, 4} in ascending order
     1 2 3 4
     Order: {2, 3, 4}

(iii) Put {12, 20, 34, 0, 6} in descending order
     3rd 4th 5th 2nd 1st
     Order is {6, 0, -12, 20, 34}

N.B Integers on the right are greater and all those on the left one less.

Activity
The pupils will do exercise 9:7 from page 197 from A New MK pupils’ BK 6 page 197.

Remarks

LESSON 3
Subtopic: Operation on integers
Content:
Addition of
(i) Positive integers

(ii) Positive and negative integers
(iii) Negative and negative integers

On a number line
- Write sentences of addition on number lines.

Examples:
(a) Add +3 + 2
   +3
   +2
   +5

(b) +3 + 2 = +5
   -3 + 8 =
   +3
   +8
   +5

(iii) Operation on integers
Addition of integers

Examples:
(i) Add: +6 + 6 (inverse)
     +6 + 6 = 0
(c) +8 + 4
     +8 + 4 = +4

(b) +5 + 2
     = +7
(d) -12 + -16
     = -28

(ii) -2y + + 2y
     Means
     2y + 2y
     = 0

Activity
The pupils will do exercise 9:8, 9:9, 9:10 on page 198. A New primary MTC BK 6 pages 198.
New Mark 168-170

Remarks
**LESSON 4**

Subtopic: Operations on integers
Content: Subtraction on number line
Example: (i) Write the subtraction sentences gives

\[ -3 - 8 = ? \]
\[ -3 - 7 = ? \]
\[ -3 - 6 = ? \]
\[ -3 - 5 = ? \]
\[ -3 - 4 = ? \]
\[ -3 - 3 = ? \]
\[ -3 - 2 = ? \]
\[ -3 - 1 = ? \]
\[ -3 - 0 = ? \]
\[ -3 + 1 = ? \]
\[ -3 + 2 = ? \]
\[ -3 + 3 = ? \]
\[ -3 + 4 = ? \]
\[ -3 + 5 = ? \]
\[ -3 + 6 = ? \]

Sentence: \[ -3 - 8 = 3 \]
Sentence: \[ -3 + 1 - 4 = 2 \]

**SUBTOPIC:** Operations on integers

Content: Subtraction of integers:

Examples: (i) Work out: (Use the inverse of 2nd integer in qn (ii)
(a) \[ 7 - 5 \] means
(b) \[ +7 - *5 \] means
(c) \[ 7 - *5 \] means
(c) \[ 7 - 5 \] means
(d) \[ +7 - 5 \] means
(e) \[ -7 - 5 \] means
(f) \[ -7 - 5 \] means
(ii) Evaluate
(a) \[ 4 - *2 \] means
(b) \[ +7 - *3 \] means
(c) \[ 8 - *10 \] means
\[ \text{Set} Y = \{ -1, 0, *1, *2, *3, *4, *5, *6, \ldots \} \]

Activity
Pupils will do exercise 12:14 page 112 from A New Mk 2000 BK 6 page 112.
Tr's collection
Old mk 205

Remarks

**LESSON 5**

Subtopic: Operations on integers
Content: Multiplying integers on a number line

Example: (i) Show: \[ +3 \times -2 \] below (3 groups of 2)

\[ -2 - 2 - 2 - 2 \]

\[ \therefore +3 \times -2 = +6 \]

Activity
Pupils will do exercise 9:12, 9:13 without using a number line.
A New MK Bk 6 pages 171-175
Old mk 201

Remarks
Subtopic: Find the solution sets.

Content: Give the solution sets using a number line.

Examples:
(i) If $X > 2$ find possible values of $X$

\[ X = \{3, 4, 5, 6, \ldots\} \]

(ii) If $X \geq 2$ find the solution set for $X$.

\[ X = \{2, 3, 4, 5, 6, 7, \ldots\} \]

Activity

The pupils will do exercises 13:3 and 13:4 page 115.
A new MK BK 6 (Old Edn)
Old mk 207

Remarks

LESSON 7
Subtopic: Inequalities

Content: - Solve inequalities
- Find solution sets.

Example:
(a) Solve $2x > 8$

Solution:
\[ \frac{2x}{2} > \frac{8}{2} \]
\[ x > 4 \]

(b) Solve and give the solution set:
\[ 3x + 2 < 8 \]
\[ 3x + 2 - 2 < 8 - 2 \]
\[ 3x < 6 \]
\[ \frac{3x}{3} < \frac{6}{3} \]
\[ x < 2 \]

Solution set \[ \{\ldots, -4, -3, 2, 1, 0, 1, 2\} \]

REVISE WORK ON INTEGERS

1. Evaluate
   (a) $8 - 3$
   (b) $-9 - 6$
   (c) Decrease $7$ by $7$

2. Work out:
   (a) $3 \times 0$
   (b) $0.8 \times (-4)$

3. Use a number line to add:
   (a) $6 + 4$
   (b) $4 - 7$
   (c) Find the additive inverse of $6$.
   (d) Add: $6 + 6$
   (e) $14 - 14$

4. Work out:
   (a) $8 - 8$
   (b) $10 - 15$
   (c) $9 + 3$
   (d) $6 \times 2$
   (e) $12 \div 3$

5. The temperature of ice fell from $-30\,^\circ C$ by $5\,^\circ C$. Find the temperature of ice.
   (b) Umeme men are to plant an electric pole $650\,cm$. If $80\,cm$ goes below the ground level. What is the height of the pole seen?

6. Write the expression shown on the number line
   (a)
   (b)
(c) Give the sentence shown

\[ a = \ldots b = \ldots c = \ldots \]

sentence: ____________________

(ii) 

\[ \ldots \times \ldots = \ldots \]

7. Solve: \( 2y > 4 \) and give the solution set.
   (b) Give a set of integers for which: \( 2x + 3 \geq 5 \)
   (c) Find the set T shown below

\[ \ldots \]

8. (d) Represent \( W = \{ -3, -2, -1, 0, 1, +2, +3, +4 \} \) on a number line
   (a) Solve for \( X \) in \( 3x + 5 < 8 \)
   (b) Find the sum of \( -2 \) and 12.
   (c) Temperature on top of a mountain is \( 30^\circ \) at noon. It drops by \(-10^\circ\)C. What is the new temperature?
   (d) Find \( r \) if \( (2) + r = 0 \)

9. (a) If \( X = \) \{even numbers between 10 and 20\}.
   Find the solution set of \( 10 < x < 20 \).
   (b) Jie walked 4 metres. He remembered he had left some money behind and made 7 steps back to pick the money. Show it on a number line.
   (c) I think of a number, multiply it by 3 and subtract 4 from it, the answer is greater than 14. Find the number.

10. Simplify: \( 2 \times 6 \) (b) \( 2 (y + 1) \)

UNIT 10
ALGEBRA
LESSON 1
Sub-topic: Algebraic Expressions
Content: Writing phrases for Algebraic expressions by
(i) adding (ii) subtracting
(iii) multiplying (iv) dividing
Examples: (1) Add \( b \) to \( a = a + b \)
(2) Add 5 to \( n = n + 5 \)
(3) Subtract \( b \) from \( a = a - b \)
(4) Subtract 5 from \( n = n - 5 \)
(5) Multiply \( b \) by \( a = ab \)
(6) Multiply \( n \) by \( 5 = 5n \)
(7) Divide \( b \) by \( a = b \)
(8) Divide \( n \) by \( 5 = \frac{n}{5} \)

Activity
Pupils will do the following exercises from A New Mk Book 6 pages 374 and 375 14:1, 14:2, 14:3, 14:4 and 14:5
Fountain pg 187
LESSON 2

Subtopic: Substitution

Content:
1. Expanding Algebraic terms
2. Substitution

Examples:
(a) Expand the following
1. \(2p = 2 \times p\)
2. \(3p q = 3 \times p \times q\)
3. \(4q^2 = 4 \times q \times q\)
4. \((4q)^2 = 4q \times 4q\)

(b) Substitute and find the value of the given expressions below.
(i) Given \(b = 6\)
Find: \(b + 8\)
(ii) \(p = 8, q = 6, a = 2\)
Find: \(pqa = p \times q \times a\)

Activity:
Pupils do exercises 14:6 and 14:7 from A New MK Book 6 on page 376.
Activity:

Pupils will do the following exercises 14:12, 14:13, 14:14, 14:15, 14:16 and 14:17 from MK MTC BK 6 pages 380, 387 and 382.

Remarks:

LESSON 5

Subtopic: Forming equations
Content: Forming and solving equations involving addition.
Examples: 1. \( p + 4 = 12 \)
\[
P + 4 - 4 = 12 - 4
\]
\[
P = 8
\]
2. Amanda had some pineapples. She bought 6 more pineapples altogether. How many pineapples had she before?

Let the pineapples be \( p \)

<table>
<thead>
<tr>
<th>Before</th>
<th>more</th>
<th>total</th>
</tr>
</thead>
<tbody>
<tr>
<td>( p )</td>
<td>6</td>
<td>11</td>
</tr>
</tbody>
</table>

\( p + 6 = 11 \)

She had 5 pineapples

\( p + 6 - 6 = 11 - 6 \)

\( p = 5 \).

Finding the unknown.
Forming and solving equations involving subtraction.
Examples: 1. Find the value of:
\[
b - 3 = 8
\]
\[
b - 3 + 3 = 8 + 3
\]
\[
\therefore b = 11
\]

Activity:
Pupils will do the following exercises: 14:23 and 14:24 on page 386 from A New Mk MTC book 6
New Mk 184-185

Remarks.

LESSON 6

Subtopic: Finding the unknown.
Content: Forming and solving equations involving multiplication
Examples: 1. Solve: \( 2x = 8 \)
\[
\frac{2x}{2} = \frac{8}{2}
\]
\[
x = 4
\]
2. 4 buses carried \( y \) passengers each. Altogether they carried 320 passengers. How many passengers did each bus carry?

Passengers in 4 buses = (4 buses \( \times y \) passengers)
\[
4y = 320
\]
\[
\therefore y = 80
\]
Each bus carried 80 passengers.

Activity:
Pupils will do the following exercises 14: 27 and 14: 28 on page 388 from A New Mk book 6.
MK new edition 186

LESSON 7

Subtopic: forming equations
Musa is twice as old as Anna. Their total age is 18 years.

How old is Anna?
Let Anna’s age be \( x \).

<table>
<thead>
<tr>
<th>Anna</th>
<th>Musa</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>( x ) years</td>
<td>2( x ) years</td>
<td>18 years</td>
</tr>
</tbody>
</table>
X + 2x = 18
\[ \frac{2x}{3} = \frac{18}{3} \]
\[ x = 6 \]

Activity:
Pupils will do the following exercises 14: 27 and 14: 28 on page 390 from A New Mk book 6.

MK new edition 186

Remarks.

LESSON 8
Subtopic: Finding the unknown.
Content: Equations involving fractions
Examples:
(i) \[ \frac{a}{3} = 4 \]
\[ \frac{a}{3} = \frac{4}{1} \]
\[ \frac{a}{3} \times \frac{3}{1} = \frac{4 \times 3}{1} \]
\[ a = 12 \]

2. Find the number of oranges that can be divided among 5 boys, so that each gets 6 oranges.
Let the number of oranges be \( p \)
So \( \frac{p}{5} = 6 \)
\[ \frac{a}{5} \times \frac{5}{1} = \frac{6 \times 5}{1} \]
\[ P = 30 \] oranges

3. Solve:
\[ 5p + 2 = 12 \]
\[ \frac{5p}{4} + \frac{2}{4} = \frac{12}{4} \]
\[ 4 \times \frac{5p}{4} = 10 x 4 \]
\[ \frac{5p}{5} = \frac{40}{5} \]
\[ P = 8 \]

Activity:
Pupils will do exercises 14: 29 and 14:30 on page 389 from A New Mk MTC book 6.
Activity:
Pupils will do exercises 14:33 and 14:34 on pages 392 and 393 from A New Mk Bk 6.
Remarks.

LESSON 11
Subtopic: Application of Algebra
Content: Forming equations and finding the unknown.

Examples:
1. \[
\begin{align*}
\text{(x+1) cm} & \quad \text{2x - 1 = x + 3} \\
\text{(x) cm} & \quad \text{2x - 1 + 1 = x + 3 + 1} \\
\text{(x+3) cm} & \quad \text{2x = x + 4} \\
\text{X = 4 cm}
\end{align*}
\]

2. \[
\begin{align*}
2t & = 8 \\
\frac{2t}{2} & = \frac{8}{2} \\
t & = 4 \text{ cm}
\end{align*}
\]

Activity:
Pupils will do exercise 14:37 on page 394 from A New Mk book 6.
New Mk 190-191
Remarks.

REVISI0N WORK ON ALGEBRA
1. (i) Add: m to 6 (ii) subtract 4 from b (iii) multiply 2 by t (iv) Divide x by 7
2. If \(p = 8\), \(r = 4\), \(q = 6\), \(c = 3\). Find the value of
   (a) \(\frac{p + r}{qc}\) (b) \(\frac{pq}{rc}\)
3. Simplify: (a) \(3x + 6y - x - 2y\) (b) \(2x^3 \times 2x^3\)
4. Remove the brackets

(a) \(4 (1 - 3b)\) (b) \(+3x (y - 1)\)
(c) \(4(x + 3) + 2(x + 3)\)

5. Odoi made some stools, he was given 5 more stools and got 13 stools altogether. Find the number of stools Odoi made.
6. Akiiki harvested some sacks of potatoes, she sold 15 of them and kept 2 for her family. Find the number of sacks she harvested.
7. (a) Solve for \(m: 13m = 260\)
    (b) I think of a number, multiply it by 9. If the result is 108. What number did I think of?
8. A father is 3 times as old as his daughter. Their total age is 48 years. How old is the daughter?
9. The perimeter of the square of side \(p\) cm is 28 cm, Find \(P\).
10. Solve: \(\frac{5p}{4} = 12\)
11. Solve: (a) \(5(y + 1) - 3(y - 1) = 14\) (b) \(5x + 1 = 4x + 4\)
12. Find \(X\)

13. Figure ABCD is a rectangle.

(i) Find the value of \(X\).
(ii) Find the actual width and length
(iii) Find the perimeter and area of the rectangle.

SYMMETRY

Remarks ________________________________