CREAMHILL SCHOOLS – MULAGO

PRIMARY FIVE

MATHS

Dear Parent/Guardian;
Below is part of the work that was left to complete term one's work. Encourage the child copy the notes into their class work books and later attempt the questions that follow.

MATHEMATICS LESSON NOTES FOR PRIMARY FIVE (TERM 1)

SETS

Definition

A set is a collection of well-defined elements / members.

Examples of sets

- A set of chairs
- A set of days of the week
- A set of the first 5 prime numbers.

1) Types of sets (Equal sets)

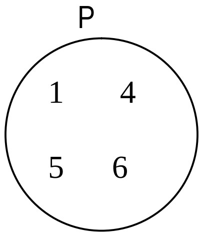
These are sets with the same number of members which are exactly the same.

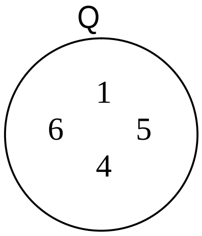
Example

i) A = {a, e, i, o, u} B = {a, i, o, u, e}

Set A = B

ii)





Set P = Set Q

2. Equivalent sets

These are sets with different elements but same numbers of members.

Example

Given that A = {x, y, z} V = {a, b, c}

Set H ⟷ V

A = {Melon, banana, apples, mango}

B = {Lion, tiger, cat, pig}

Set A ⟷ B

Note: The opposite

Equal set	Non equal set
=	≠
Equivalent	Non equivalent
⟷	↮

3. Empty set / Null set

These are sets without any member.

Examples

Names of pupils in P.5 who are 4years old.

A set of male teachers who are pregnant in Creamhill primary school.

The symbol for empty set is { } ∅

REF: Pr MTC Macmillan bk 5

Pg 1 – 3

UNION AND INTERSECTION OF SETS

1. Union of sets

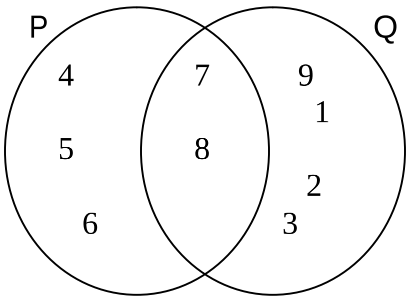
It refers to a combination of all elements in given sets

Given that A = {d, e, f, g}

B = {f, g, h, i, j}

$A \cup B$ = {d, e, g, f, g, h, i, j}

Given the sets P and Q on the diagram below;



a) Find $A \cup B$

$A \cup B$ = {1, 2, 3, 4, 5, 6, 7, 8, 9}

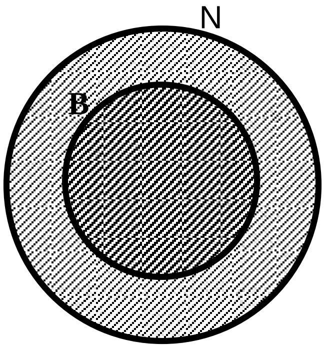
b) Find $n(P \cap Q)$

$P \cap Q$ = {7, 8}

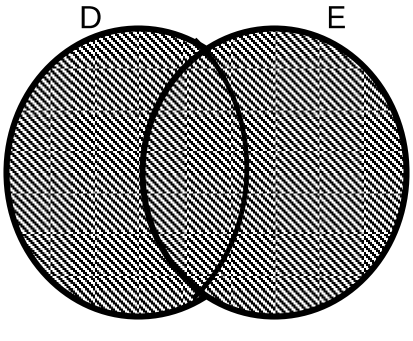
$\therefore n\ (P \cap Q)$ = 2 members

SHADING OF SETS.

Shade the union of the following sets



$N \cup B$



$D \cup E$

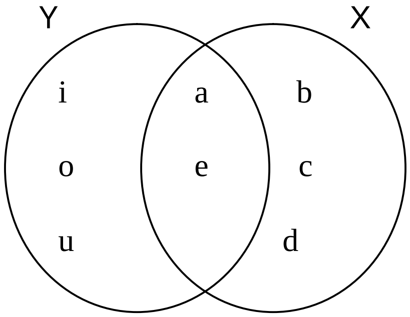
Intersection

This is a set of common elements in given sets

If set Y = {a, e, I, o, u}

X = {a, b, c, d, e}

a) Show the two sets on venn diagrams.

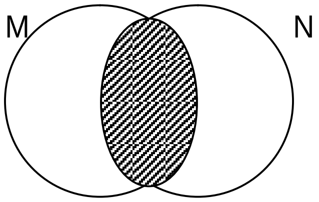


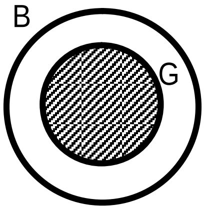
Find n(X⋂Y)

X⋂Y = {a, e}

n(X⋂Y) = 2 elements.

Shade the intersection of the figures.

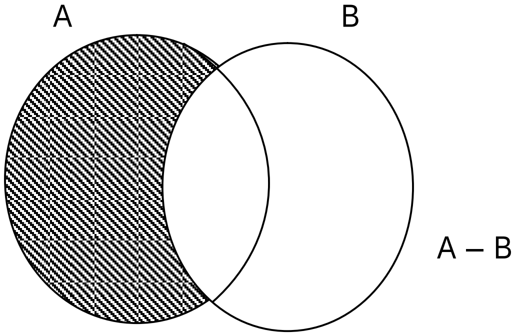




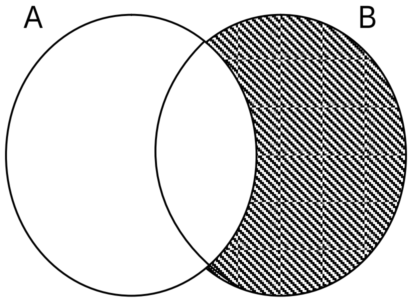
Difference in sets

This is a set showing members that belong to one set but are missing in another set.

a) Shade A - B



b) Shade B - A



B – A

Complement of sets

Complement of a set means a set of members not in the given set.

OR

Elements in the universal set but not in the given set.

Example

Given that; P = {4, 3, 6, 7, 9}

and

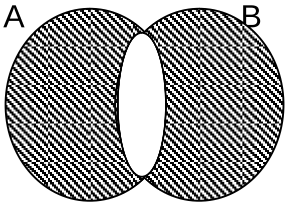
Q = {1, 2, 3, 5, 7}

Write down members in P’ (Complement of set P)

P’ = {1, 2, 3} * Find n(P⋂Q)

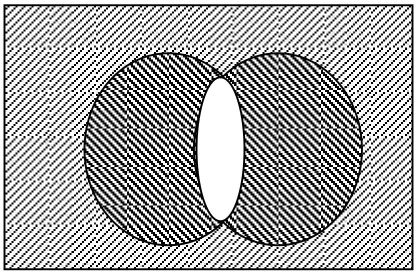
Note: The symbol for complement of a set (^{l})

Shading regions for complement of a set



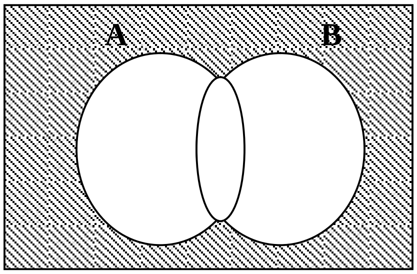
= (A⋂B)’

A⋂B the complement



= (AnB)’

Draw and shade (A⋃B)’



= (A⋃B)’

ACTIVITY

Mk Book 6 page 11 – 13 primary school Maths book 15 pg 7 – 8.

SUBSETS

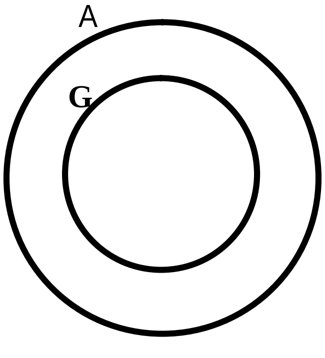
A subset is a small set got from a big set.

The bigger set from which a subset is got is called a Universal set or Super set.

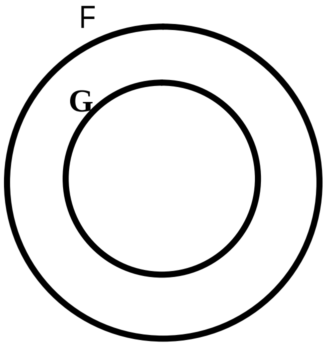
The symbol for subset is C.

The symbol for not a subset is ⊄. The symbol for Universal set is ξ.

1. Draw a Venn diagram to show that all goats (G) are Animals (A)



2. Draw a Venn diagram to show that girls are a subset of females



3. Given that set Q = {a, b, c}. List down all the subsets in set Q.

{a}, {b}, {c}

{a, b}, {a, c}, {b, c}

{}, {a, b, c} $\Longrightarrow$ Subsets $\Longrightarrow$ 8 in number.

N.B The empty set and the set itself (universal) are subsets of every set.

4. <u>By calculating,</u> find the number of subsets in set Z if Z = {7, 5, 3}

No. of subsets = 2^n where n represents the number of elements in the given set.

$\therefore$ set Z has 3 elements

$\therefore$ $n(c) = 2^n$

$= 2^3$

$= 2 \times 2 \times 2$

$= 4 \times 2$

<u>= 8 subsets</u>

PROPER SUBSETS

These are all subsets of a given set excluding the given set itself. (Universal set)

Set P = {1, 2, 3}. Find by listing all the proper subsets of set P.

These are :-

{ }, {1}, {2}, {3}

{1, 2}, {1, 3}, {2, 3}

$\Longrightarrow$ 7 proper subsets.

ii) By calculation

Number of proper subsets

$= 2^n - 1$

$= 2^3 - 1$

= (2 x 2 x 2) – 1

= 8 – 1

= 7

REF: Mk bk 7 pg

APPLICATION OF SETS

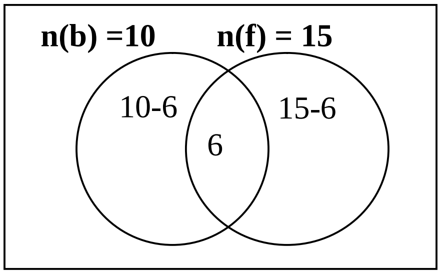
In a group f swimmers,15 do free style (f) 10 do backstroke (b) and 6 do both

n(f) = 15

n(b) = 10

$n(f \cap B) = 6$

a) Represent the above information on a venn diagram.



b) How many swimmers swim only back stroke?

10 - 6

4 swimmers

c) How many do only free style?

15 – 6

9 swimmers

d) How many swimmers are in that group?

(10 + 6) + 6 + (15 – 6)

4 + 6 + 9

10 + 9

= 19 swimmers

e) How many swim only one style?

Backstroke only + free style

(10 – 6) + 15 – 6

4 + 9

= 13 swimmers

2. Given that n(A) = 15 n(B) = 25 $n(A \cap B) = 5$

a) Represent the above information on a venn diagram

REF: Prim school MTC Mk book 6 pg 29 – 30

PROBABILITY

Probability is a measure of chance.

It's written as fraction i.e

$$\frac{\text{No of possible chances}}{\text{No of total chances available.}}$$

Chances possible $\Longrightarrow$ desired chance (D.C)

Total chances $\Longrightarrow$ T.C

$\therefore$ Probability = $\frac{n(D.C)}{n(T.C)}$

1) TOSSING A COIN

A coin has 2 faces i.e Head and Tail. Musa tossed a coin. What is the probability that a tail shows up?

T.C = {Head}

P (Tail) = $\frac{n(D.C)}{n(T.C)}$

= $\frac{1}{2}$

2. Tossing a die

A die has 6 possible chances T.C = {1, 2, 3, 4, 5, 6}

If Richard tossed a die, what is the probability that a prime number shows up.

T.C = {1, ②, ③, 4, ⑤, 6}

P (prime) $= \frac{n(D.C)}{n(T.C)}$

$= \frac{3}{6}$

$= \frac{1}{2}$

b) What is the probability that a 5 shows up.

T.C = {1, 2, 3, 4, ⑤, 6}

P($_5$) $= \frac{n(D.C)}{n(T.C)}$

$= \frac{1}{6}$

More about probability

If it's to run next week, what is the probability that it rain on a day of the week starting with letter T?

T.C = {M, Ⓣ, W, Ⓣ, f, S, S}

P(T) $= \frac{n(D.C)}{n(T.C)} = \frac{2}{7}$

John has a basket with cards on which he has written all the months of the year. What is the probability of picking a card with a months starting with letter J?

T.C = {J, f, m, A, M, J, J, A, S, O, N, D}

P(J) $= \frac{n(D.C)}{n(T.C)}$

$= \frac{3}{12}$

$= \frac{1}{4}$

What is the probability of picking letter E from the name (T U S H E M E R E I R W E) at random.

$$P(E) = \frac{n(D.C)}{n(T.C)}$$

$$= \frac{4}{13}$$

REFERENCE : Mk Prim Maths pg
Macmillan bk 5 pg 10 – 11

NUMERATION SYSTEMS AND PLACE VALUES

Forming numerals from digits

Example

Using the digit 6, 7, 9 and 4, write the biggest number or numerals.

N.B:

i) When forming the largest numerals we write the digits in descending order.

ii) In forming these numerals, we leave out the commas, i.e from 6, 7, 9 and 4.

Biggest No. = 9764

Example

When forming the smallest number from a given set of digit, we start from the smallest.

I.e. smallest number from 4, 7, 2, 9

⇒ 2479

* Find the difference between the largest numeral and smallest numeral formed by the digits 2, 3, 7.

Largest = 732

Smallest = 237

Difference:
$$\begin{array}{r} 732 \\ \underline{235} \\ \underline{497} \end{array}$$

Activity

Mk Bk 5 pg 25

Understanding MTC

Book 5 page 16

PLACE VALUES AND VALUES OF WHOLES

Reviewing place values up to millions.

6 1 4 2 0 8 7

Ones

Tens

Hundreds

Thousands

Ten thousands

Hundred thousands

Millions

Give the value of each digit in 4123456.

M	Hth	TTH	TH	H	T	O
4	1	2	3	4	5	6

6 X 1 = 6

5 X 10 = 50

4 X 100 = 400

3 X 1000 = 3000

2 X 10,000 = 20,000

1 X100,000 = 100,000

4 X 1,000,000 = 4,000,000

NUMBER	DIGIT	PLACE VALUE	VALUE
6,142,572	6	MILLIONS	6 X 1,000,000 = 6,000,000
	1	HUNDRED THOUSANDS	1 X 100,000 = 100,000
	4	TEN THOUSANDS	4 X 10,000 = 40,000
	2	THOUSANDS	2 X 1000 = 2000
	5	HUNDREDS	5 X 100 = 500
	7	TENS	7 X 10 = 70
	2	ONES	2 X 1 = 2

REF: MK Bk 5 page 26 – 27

Understanding MTC bk 5 pg 16 – 17

Mk bk 6 pg 34

Writing figure in words

When writing in words, we group the number into its major groups:

Example

4,156,036

Millions	Thousands	Units
4	156	036

4 156 036 ⟶ Four millions one hundred fity six thousands thirty six.

REF: Understanding MTC bk 5 pg 13, bk 6 pg 23

Prim MTC, Macmillan bk 5 pg 18 – 19

Writing words in figures

Write six hundred two thousand, four hundred sixty four in figures.

Solution: breakdown the number in its groups.

Six hundred two thousand = 602,000

Four hundred sixty four = + 464

602,464

Example II

Write two million, seven hundred sixty five thousand four hundred thirty two.

Two million → 2,000,000

Seven hundred sixty five thousand → 765,000

Four hundred thirty two → 432

2,765,432

REF: Mk bk 6 pg 38 -39.

EXPANDING WHOLE NUMBERS

Expanding using values

1) Expand 349

$349 = (3 \times 100) + (4 \times 10) + (9 \times 1)$

$300 + 40 + 9$

2) Expand 48914

$48914 = (4 \times 10{,}000) + (8 \times 1000) + (9 \times 100) + (1 \times 10) + (4 \times 1)$

$40{,}000 + 8000 + 900 + 10 + 4$

Expanding using powers / exponents

$$148 = \begin{array}{c|c|c} 1 & 4 & 8 \\ \hline 10^2 & 10^1 & 10^0 \end{array}$$

$(1 \times 10^2) + (4 \times 10^1) + (8 \times 10^0)$

$$7\,9\,6\,2 = \begin{array}{c|c|c|c} 7 & 9 & 6 & 2 \\ \hline 10^3 & 10^2 & 10^1 & 10^0 \end{array}$$

$(7 \times 10^3) + (9 \times 10^2) + (6 \times 10^1) + (2 \times 10^0)$

Writing expanded numbers as single numbers / short form.

What number has been expanded to give;

$(2 \times 10^3) + (4 \times 10^2) + (3 \times 10^1) + (7 \times 10^0)$

REFERENCE: Mk bk 5, pg 31 – 32

Understanding Math bk 5, pg 21.

ROMAN NUMERALS

HINDU	1	5	10	50	100	500	1000
ROMAN	I	V	X	L	C	D	M

A) Repeated Roman numerals

Numbers with 2 and 3.

2 = I+ I = II

3 = I + I + I = III

20 = 10 + 10 = XX

30 = 10 + 10 + 10 = XXX

200 = 100 + 100 = CC

300 = 100 + 100 + 100 = CCC

B) Subtraction Roman Numerals

(number with 4 and 9)

4 = (5 – 1) = IV

9 = (10 – 1) = IX

400 = (500 – 100) = CD

40 = (50 – 10) = XL

90 = (100 – 10) = XC

900 = (1000 – 100) = CM

C) Addition Roman numerals

Numbers with (6, 7 and 8)

6 = (5+1) = VI

7 = (5+2) = VII

8 = (5+3) = VIII

60 = 50 + 10 = LX

70 = (50+20) = LXX

80 = (50 + 30) = LXXX

600 = 500 + 100 = DC

700 = 500 + 200 = DCC

800 = 500 + 300 = DCCC

Examples

Write the following as Roman numerals.

i) 75 = 70 + 5
=LXX + V
= LXXV

445 = 400 + 40 + 5
= CD + XL + V
= CDXLV

Changing roman numerals to Hindu – Arabic

Express LXXVI in hindu – Arabic numerals

= LXX + VI
= 70 + 6
= 76

Mzee Yokana was born in the year MCMXLII. Express this year in Hindu – Arabic.

MCMXLII = M + CM + XL + II
1000 + 900 + 40 + 2
1942

REFERENCE: Mk bk 6 pg 50, Mk bk 5 pg 5 – 6
Learning MTC standard 5, pg 11

ROUNDING OFF WHOLE NUMBERS

Rounding off means taking a given place value to another level.

When rounding off, we consider that if the digit on the right of the required place value is less than 5 we add to it 0 and replace all digits on it’s right with 0’s.

If the figure on the right of the place value is 5 or more add one to it.

Example

Round off 214 to the nearest tens.

$$\begin{array}{ccc} H & T & O \\ 2 & 1 & 4 \\ + & 0 & \leftarrow\!\lrcorner \\ \hline 2 & 1 & 4 \end{array} \quad = \quad \underline{\underline{210}}$$

Example II

Round off 7591 to the nearest thousands.

	Th	H	T	O
	7	5	9	1
+1	←	┘	↓	↓
	8	0	0	0

$\therefore 7591 \approx \underline{\underline{8000}}$

REFERENCE: Mk bk 6 pg 47
Mk bk 5 pg 20
Macmillan bk 5 pg 22 – 24.

Round down Round up

OPERATION ON NUMBERS

Addition

Terms commonly used:

Sum, increase, total, altogether.

Examples

1) Increase 345 boys by 44

$$\begin{array}{r} 345 \\ \underline{+\ 44} \\ \underline{\underline{389}} \text{ boys} \end{array}$$

2) There are 41 pupils in P5Y, 39 in P5B and 38 in P5P. How many pupils are in the 3 streams altogether.

$$\begin{array}{r} 39 \\ 38 \\ \underline{+\ \ 41} \\ \underline{\underline{118}} \text{ pupils} \end{array}$$

REFERENCE: Understanding MTC bk 5 pg 32 – 36
Macmillan bk 5 pg 27 - 28

SUBTRACTION

Terms used:

Difference
Minus
Decrease
Reduce
Less

Example

1) Subtract 109 from 458.

$$\begin{array}{r} 458 \\ -\ \underline{109} \\ \underline{348} \end{array}$$

2) Mr. Kakembo had 194 cows, he sold 89 during Christmas season. How many cows remained?

$$\begin{array}{r} 194 \\ \underline{-\ \ 89} \\ \underline{\underline{105}} \end{array}$$

REFERENCE: Understanding MTC book 5 pg 28.

MULTIPLICATION

Terms used: product

Example

1) Find the product of 28 and 23.

$$\begin{array}{r} 28 \\ \underline{\times\ \ 23} \end{array}$$

28 x 20 = 560

28 X 3 = $\underline{+\ \ 84}$

$\underline{644}$

23 = 20 + 3

2) In Moses' house there are 13 rooms and each room has 24 chairs. How many chairs are there altogether?

$$\begin{array}{r} 13 \\ \underline{\times \quad 24} \end{array} \qquad\qquad 24 = 20 + 4$$

$13 \times 4 = 52$

$13 \times 20 = \underline{+\ 260}$

$\underline{312}$ chairs

<u>REFERENCE:</u> Understanding MTC bk 5 pg 42 – 45

Macmillan MTC bk 5 pg 31 – 32

<u>DIVISION</u>

Terms used: share.

Quotient.

Share 288 book s equally among 12 classes.

$$\begin{array}{rr} & 024 \\ & 12\sqrt{288} \\ 0 \times 2 = & \underline{0\quad} \\ & 28 \\ 2 \times 12 = & \underline{24\ } \\ & 4\ 8 \\ 4 \times 12 = & \underline{48} \end{array}$$

1	12
2	24
3	36
4	48
5	60
6	72
7	84
8	96
9	108

Each class gets 24 books

REFERENCE: Understanding MTC bk 5 pg 62 – 66
Macmilan Pr MTC pg 32 – 36.

MIXED OPERATION (BODMAS)

Brackets

Of

Division

Multiplication

Addition

Subtraction

1) Workout: $240 \div (5 \times 8)$

$240 \div 40$

$$\frac{240}{40} = \underline{6}$$

2) Simplify: $8 - 12 + 4$

$8 + 4 - 12$

$12 - 12$

$\underline{\underline{0}}$

REFERENCE: Understanding MTC bk 6 62 – 66
Macmillan bk 5 pg 37 – 38

COMPARING VALUES USING <, > OR =

<Less than

>Greater than

= Equal to

Use >, < or = correctly

a) 2 + 2 + 2 ≤ 2 x 2 x 2
4 + 2 4 x 2
= 6 8

b) $\frac{3}{4} > \frac{3}{5}$ L.C.M = 20

$\frac{3}{\cancel{4}} \times \cancel{20}$ $\frac{3}{\cancel{5}} \times \cancel{20}$
15 12

c) 150 min < 3hrs
60 x 3
= 180min

REFERENCE: Mk bk 5 pg 66

GRAPHS / STATISTICS

Statistical terms

1) Model / model mark
The value that appears most.

2) Modal frequency
The number of times that the mode is appearing.

3) Median
The middle value after arranging in either ascending or descending order.

4) Mean / Average
This refers to an equal share. Got after dividing the sum of items by the number of items.

5) Range
The difference between the highest value and the lowest.

Qn. A pupils scored the following points in a series of games 1, 2, 3, 4, 4, 2, 4, 0
Work out the

a) Mode

b) modal frequency

c) Range

d) Medium

e) Mean

REFERENCE: Understanding MTC bk 6 pg 164 – 166

Mk bk 5 pg 64 – 65

BASES

Introduction
- Names of bases
- The digit used in each base.
- Place values

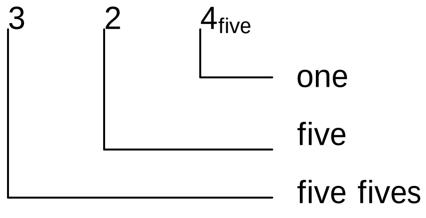
Bases: are systems of counting or grouping numbers.

Below are some of the systems their names and digits used in each.

Base	Name of base	Digits used
Base Two	Binary	0, 1
Base Three	Ternary	0, 1, 2
Base Four	Quaternary	0, 1, 2, 3
Base Five	Quinary	0, 1, 2, 3, 4
Base Six	Senary	0, 1, 2, 3, 4, 5
Base Seven	Septenary	0, 1, 2, 3, 4, 5, 6
Base Eight	Octal	0, 1, 2, 3, 4, 5, 6, 7
Base nine	Nonary	0, 1, 2, 3, 4, 5, 6, 7, 8
Base Ten	Deciaml (denary)	0, 1, 2, 3, 4, 5, 6, 7, 8, 9

Place values in base five

Give the place value of each of the digits in 324_{five}



Example II 124_{five}

1 2 4_{five}

One

Fives

Five fives

In base two the place values are:

1 0 1_{two}

ones

two

two twos

Writing bases in words

A part form base ten (decimal base), when writing other bases in words we name their individual digits.

Example

i) 43_{five} in words is written as

Four, three, base five.

ii) 213_{five} = Two, one, three, base five.

REFERENCE: MK Bks pg 70 – 71

EXPANDING BASES

Example

Expand 13_{five}

1 3

ones

fives

= (1 group of fives) (3ones)

= (1 x fives) + (3xones)

= (1 x 5) + (3 x 1)

OR

Using powers

1	3
5^1	5^0

= $\underline{(1 \times 5^1) + (3 \times 5^0)}$

Expand 213_{five}

Place values 2 1 3

Ones

Fives

Five fives

= $\underline{(2 \times 5 \times 5) + (1 \times 5) + (3 \times 1)}$

Example III

Expand $1\ 0\ 1_{two}$

1 0 1

ones

two

two twos

$\underline{(1 \times 2 \times 2) + (0 \times 2) + (1 \times 1)}$

CHANGING FROM BASE FIVE TO BASE TEN

Example I

Change 14_{five} to base ten

14_{five}

ones

fives

= $(1 \times 5) + (4 \times 1)$

5 + 4

= 9_{ten}

Example II

Change 213_{five} to base ten

place values 2 1 3

ones

fives

five fives

$= (2 \times 5 \times 5) + (1 \times 5) + (3 \times 1)$

$50 + 5 + 3$

$= 58_{ten}$

Example III

Change $2\ 1\ 3_{four}$ to base five.

2 1 3

ones

fours

four fours

$(2 \times 4 \times 4) + (1 \times 4) + (3 \times 1)$

$(8 \times 4) + 4 + 3$

$= 39_{ten}$

REFERENCE: MK bk 5 pg 71

CHANGING FROM BASE TEN TO OTHER BASES

Change 9_{ten} to base five

	No.	Rem
5	9	4
	1	

$= 14_{five}$

Change 58_{ten} to base five.

	No.	Rem
5	58	3
5	11	1
	2	

$\therefore 58_{ten}$

$= 2\ 1\ 3_{five}$

Express 33_{ten} to base three

	No.	Rem
3	33	0
3	11	2
3	3	0
	1	

$33_{ten} = 1020_{three}$

REFERENCE: MK BK 5 72

MACMILLAN BK 5 PG 6

ADDITION OF BASES

Workout: $24_{five} + 33_{five}$

24_{five} $\quad 4 + 3 = 7 \div 5 = 1^{r2}$

$\underline{33_{five}}$ $\quad 1 + 2 + 3 = 6 \div 5 = 1^{r2}$

$\underline{112}_{five}$

In addition if the answer is bigger than the base we divide, write the remainder and regroup the answer.

Example I

$10011_{two} + 1100_{two}$

10011_{two}

$\underline{\ \ 1100_{two}}$

$\underline{11111_{two}}$

ACTIVITY: Understanding MTC bk 6 pg 46 – 47

SUBTRACTION OF BASES

Example: $101_{two} - 11_{two}$

$$\begin{array}{l} 101_{two} \\ \underline{-\ 11_{two}} \\ \underline{010\quad} \end{array} \Rightarrow \underline{10_{two}}$$

REFERENCE: Mk bk 7 pg 40 – 41

Subtract:

$$\begin{array}{rl} & 40_{five} \\ - & \underline{22_{five}} \\ & \underline{\underline{13_{five}}} \end{array}$$

MULTIPLICATION OF BASES

$2_{five} \times 3$

$$\begin{array}{r} 2_{five} \\ \underline{\times\ 3} \\ \underline{11_{five}} \end{array}$$

$$= 6 \div 5 = 1^{r1}$$

$$\begin{array}{l} 421_{five} \\ \underline{x\ \ 3} \\ \underline{2313_{five}} \end{array}$$

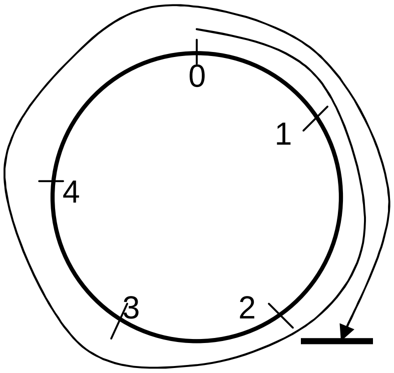
FINITE SYSTEMS

This is a system of grouping where we consider only the remainders.

It can also be called modular (mod) or clock Arithmetic.

Grouping in finite systems

Finite 5.



7 = 2 (finite 5)

By calculation

7 = $7 \div 5$

= 1^{r2}

7 = 2 (finite 5)

Express 10 in finites

10 = $10 \div 5$

= 2^{r0}

10 = 0 (finite 5)

Write 6 in finite 7

Since 6 is less than 7

It remains as 6

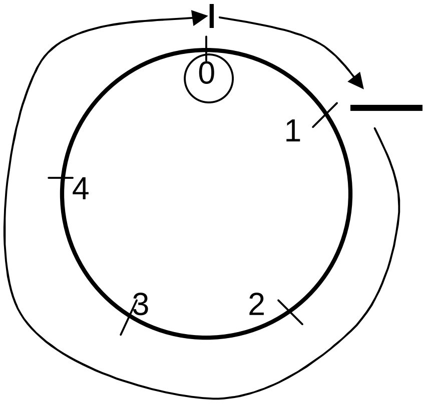
6 = 6 (finite 7)

REFERENCE: MK bk 5 pg 206

Addition in finite systems

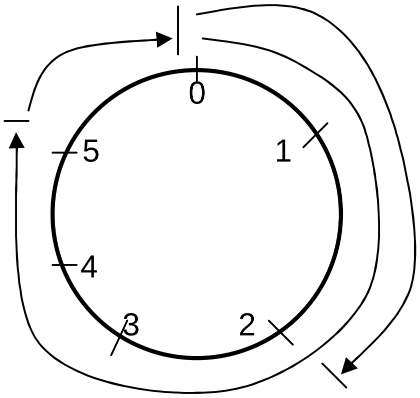
Using a dial

Add: 1 + 4 (finite 5)



1 + 4 = 0 (finite 5)

ii) 4 + 2 + 3 (finite 7)



4 + 2 + 3 + 2 (finite 7)

1 + 4 + (finite 5)

NUMBER PATTERNS AND SEQUENCES

Types of numbers.

1) Whole numbers ⇒ 0, 1, 2, 3, 4, 5, …………

2) Counting numbers/ Natural numbers ⇒ 1, 2, 3, 4, 5, …………

3) Odd numbers: These are numbers that give a remainder when divided by 2

⇒ {1, 3, 5, 7, ………………}

4) Even numbers: These are ones that are exactly disable by two

⇒ {0, 2, 4, 6, 8, 10, ………………}

5) <u>Prime numbers:</u> These are numbers with only two factors.

$\Rightarrow$ {2, 3, 5, 7, 11, 13, ...}

6) <u>Composition numbers:</u> These are numbers with more than 2 factors

$\Rightarrow$ {4, 6, 8, 9, 10, 12, ...}

7) <u>Square numbers:</u> These are numbers got by multiplying a number by its self.

$\Rightarrow$ {1, 4, 9, 16, 25, ...}

8) <u>Cubic numbers:</u> These are got by multiplying the same number three times.

{1, 8, 27, 64, ...}

9) <u>Triangular numbers:</u> These are got by adding consecutive counting numbers.

{1, 3, 6, 10, 15, 21, ...}

$^{+}2 \quad ^{+}3 \quad ^{+}4 \quad ^{+}5 \quad ^{+}6$

REFERENCE: Understanding MTC bk 6 pg 81 – 84

Mk Bk 5 Pg 80 – 89

<u>MULTIPLES AND L.C.M</u>

Take note of the limits

*Less than

*From to

*between .... And ....

*The first...................

<u>Examples</u>

i) List down the multiples of 6 between 20 and 40.

<u>{24, 30, 36}</u>

ii) List down the first 5 multiples of 12.

M_{12} = <u>{12, 24, 36, 48, 60}</u>

<u>Finding lowest common multiple by listing down multiples</u>

<u>Example</u>

i) Find the L.C.m of 6 and 8

M_6 = {6, 12, 18, ㉔, 30, 36, ...}

M_8 = {8, 16, ㉔, 32, ...}

<u>L.C.M = 24</u>

ii) Find the L.C.M of 6 and 9

M_6 = {6, 12, ⑱, 24, 30, ㊱, ...}

M_9 = {9, ⑱, 27, ㊱, 45, 54,..........}

C.M = {18, 36}

<u>L.C.M = 18</u>

REFERENCE: Understanding MTC Bk 5 pg 77.
MK Bk 5 pg 80.

<u>DIVISIBILITY TESTS</u>

These show which number is exactly divisible by another given number.

<u>Divisibility test for 2.</u>

A number is divisible by 2 if the last digit is an even number

i,e 0, 2, 4, 6, 8, ...

<u>Divisibility test for 3.</u>

A number is divisible by 3 if the <u>sum</u> of its <u>digits</u> is divisible by 3.

<u>Example</u>

State whether 144 is divisible by 3.

Sum of the digits 1 + 4 + 4
= 9

9 is divisible by 3

$\therefore$ 144 is divisible by 3.

<u>Divisibility test for 4</u>

A number is divisible by 4 if its last two digits are zero or divisible by 4.

<u>Divisibility test for 5</u>

A number is divisible by 5 if its last digit is either 0 or 5.

Divisibility test for 10

A number is divisible by 10 if its last digit is 0.

REFERENCE: MK BK 6 pg 65 – 67.

FACTORS OF NUMBERS

- These are numbers multiplied to give you a certain number.
- They can also be called the divisors of a number.

Example

Find all the factors of 18.

1 x 18 = 18

2 x 9 = 18

3 x 6 = 18

$\therefore F_{18} = \{1, 2, 3, 6, 9, 18\}$

Example 2

List down all the factors of 24.

F_{24}

1 x 24 = 24

2 x 12 = 24

3 x 8 = 24

4 x 6 = 24

$\therefore F_{24} = \{1, 2, 3, 4, 6, 8, 12, 24\}$

REFERENCE: MK Bk 5 pg 81.
Und. MTC Bk 5 Pg 70 – 71.

Greatest common factor (by listing)

Find the G.C.F of 12 and 17.

F_{12}	F_{18}
1 x 12	1 x 18
2 x 6	2 x 9
3 x 4	3 x 6

F_{12} = { ①, ②, ③, 4, ⑥, 12}

F_{18} = { ①, ②, ③, ⑥, 9, 18}

C.F = {1, 2, 3, 6}

∴ G.C.F = 6

Example II

Fins the G.C.F of 15 and 20.

F_{15}	F_{20}
1 x 15 = 15	1 x 20 = 20
3 x 5 = 15	2 x 10 = 20
	4 x 5 = 20

F_{15} = { ①, 3, ⑤, 15}

F_{20} = { ①, 2, 4, ⑤, 10, 20}

C.F = {1, 5}

∴ G.C.F = 5

REFERENCE: MK BK 5 PG 82.

PRIME FACTORISATION OF NUMBERS

Prime factorizing means dividing a number by its prime factors.

We use prime factors when prime factorizing e.g = {2, 3, 5, 7, 11, 13, …………}

Example I

Prime factorise 18.

We can either use a ladder or a factor tree.

i.e

2	18
3	9
3	3
	1

We can represent the prime factors as follows.

Set notation / subscript form

$18 = \underline{\{2_1, 3_1, 3_2\}}$

Multiplication form

$18 = \underline{2 \times 3 \times 3}$

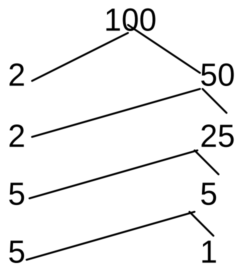
power form (expanded form)

$18 = \underline{2^1 \times 3^2}$

Example II

Prime factorise 100.

* Take note of factors of 100 that are prime numbers.



Subscript form ÷

$100 = \underline{\{2_1, 2_2, 5_1, 5_2\}}$

Multiplication form

$100 = \underline{2 \times 2 \times 5 \times 5}$

Power form

$100 = \underline{2^2 \times 5^2}$

Finding L.C.M by prime factorizing

Example

Find the L.C.M of 4 and 12 by prime factorization.

2	4	12
2	2	6
3	1	3
	1	1

L.C.M $= 2 \times 2 \times 3$

$= 4 \times 3$

$= \underline{12}$

Example II

Find the L.C.M of 12 and 20.

2	12	20
2	6	10
3	3	5
5	1	5
	1	1

L.C.M = 2 x 2 x 3 x 5
= 4 x 15
= 60

REFERENCE: MK MTC Bk 5 pg 86.

Finding G.C.F by prime factorizing

Example:

Find the G.C.F of 6 and 8

2	6	8
	3	4

G.C.F = 2

Example II

Find the G.C.F of 24 and 36.

2	24	36
2	12	18
3	6	9
	2	3

G.C.F = 2 x 2 x 3
= 4 x 3
= 12

Representing rime factors on Venn diagrams

Example I

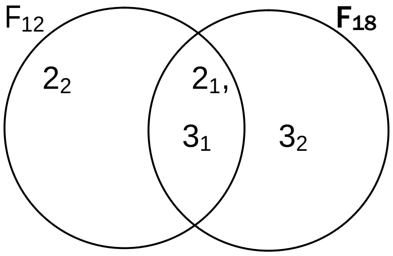
Represent the prime factors of 12 and 18 on a Venn diagram.

2	12
2	6
3	3
	1

2	18
3	9
3	3
	1

$F_{12} = \{\enclose{circle}{2_1}, \; 2_2, \; \enclose{circle}{3_1}\}$

$\mathbf{F_{18}} = \{ \enclose{circle}{2_1}, \; \enclose{circle}{3_1}, \; 3_2 \}$



a) Find the G>C>F of 12 and 18.

G.C.F product of the intersection

$F_{12} \cap F_{18} = \{2_1, 3_1\}$

$\therefore$ G.C.F = 2 x 3

<u>6</u>

L.C.M = product of the union.

$F_{12} \cup F_{18} = \{2_1, 2_2, 3_1, 3_2\}$

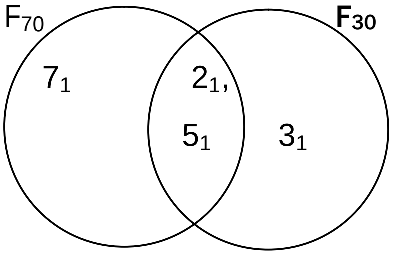
= 2 x 2 x 3 x 3

= 4 x 9

= <u>36</u>

<u>Example 2</u>

Below is a venn diagram showing factors.



a) Find the G.C.f of 70 and 30.

G.C.F = product of the intersection

$F_{70} \cap F_{30} = \{2_1, 5_1\}$

G.C.F = 2 x 5

= <u>10</u>

b) Find the L.C.M of 20 and 70.

L.C.M = product of the union

$F_{70} \cup F_{30}$ = {2_1, 3_1 , 5_1, 7_1}

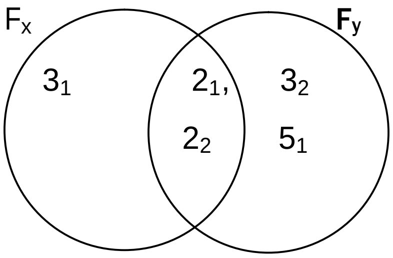
L.C.m = 2_1 x 3_1 x 5_1 x 7_1

= 6 x 35

L.C.M = <u>210.</u>

Activity: Understanding MTC Bk 6 Pg 79 – 81

<u>Finding the unknown number given prime factors on a venn diagram</u>



a) Find the value of x.

F_x = {2_1, 2_2 , 3_1}

X = 2_1 x 2_2 x 3_1

X = 4 x 3

= <u>12</u>

b) Find the value of y.

F_y = {2_1, 2_2 , 3_2, 5_1}

X = 2_1 x 2_2 x 3_2 x 5_1

X = 2 x 2 x 3 x 5

= 4 x 15

= <u>60</u>

REFERENCE: MK BK 6 Pg 88 – 89

<u>SQUARE ROOTS OF NUMBERS</u>

Review of square numbers.

i.e {1, 4, 9, 16, 25, 36, 49, 64, 81, ………………}

<u>A square number</u> is got by multiplying a number by it's self.

<u>A square root</u> is a number that is multiplied by its self to give a square number.

The symbol for square root is $\sqrt{}$

<u>Example</u>

Find the square root of 36.

2	36
2	18
3	9
3	3
	1

$$\sqrt{36} = \sqrt{(2x\cancel{2})x(2x\cancel{3})}$$

$$\sqrt{36} = 2 \text{ x } 3$$

$$= \underline{6}$$

<u>Example:</u>

Find the square root of 100.

2	100
2	50
5	25
5	5
	1

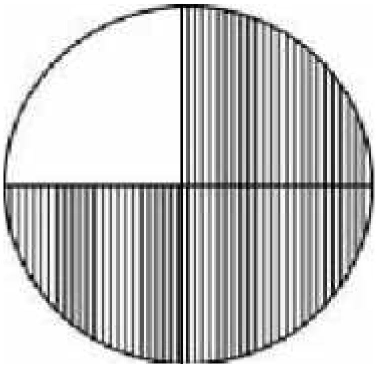
$$\sqrt{100} = \sqrt{(\cancel{2}x2)x(5x\cancel{5})}$$

$$= 2 \text{ x } 5$$

$$= \underline{10}$$

<u>FRACTIONS</u>

A fraction is a part of a whole.



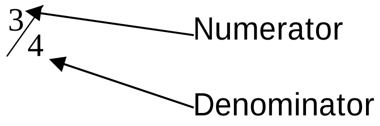
Shaded fraction ⟹ $^3/_4$

Unshaded fractions ⟹ $^1/_4$

Parts of fractions

The top number is called the Numerator.

The bottom number is called the Denominator.



Types of fractions

1) Proper fractions: In these the numerator is smaller than the denominator e.g

$^{1}/_{2}$, $^{1}/_{10}$, $^{3}/_{7}$

2) Improper fraction: Here the numerator is bigger than the denominator.

$^{3}/_{2}$, $^{14}/_{10}$, $^{14}/_{4}$

3) Mixed fractions: These have both the whole number and a fractional part e.g

$3\frac{1}{2}$, $1\frac{1}{2}$, $4\frac{1}{5}$

Note: For a mixed fraction e.g

$5\frac{2}{3}$

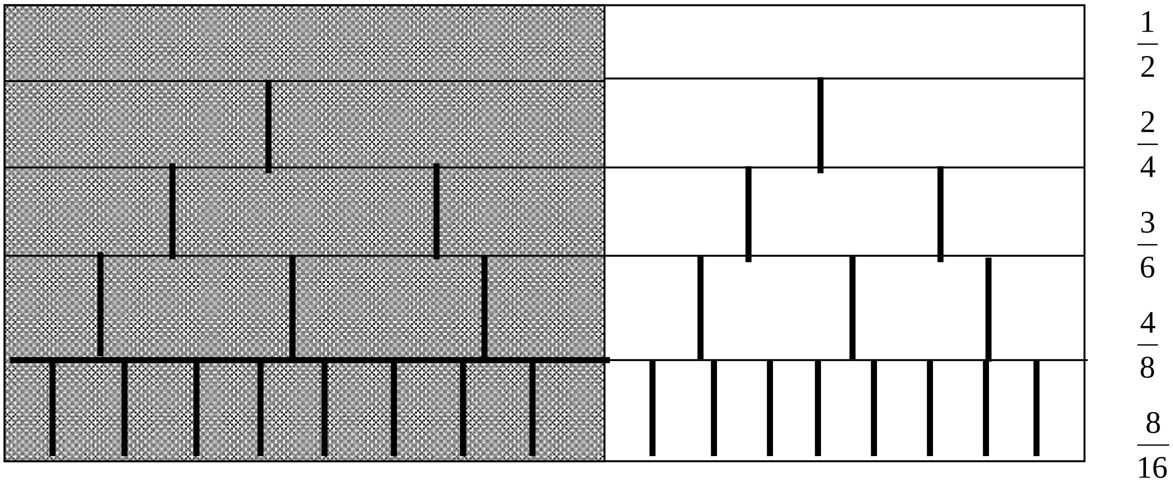
5 is a whole number.

2 is a numerator.

3 is a denominator.

Equivalent fraction

These are fractions with the same value but having different numerators and denominator.



$$\frac{1}{2} = \frac{2}{4} = \frac{3}{6} = \frac{4}{8} = \frac{8}{16}$$

Write the next 3 equivalent fractions for each of the following fractions.

$$\frac{2}{7} = \frac{2x2}{7x2} = \frac{2x3}{7x3} = \frac{2x4}{7x4}$$

$$\frac{2}{7} = \frac{4}{14} = \frac{6}{21} = \frac{8}{28}$$

REFERENCE: MK Bk 5 Pg 117.

Reducing fractions

Reduce $\frac{12}{18}$ to its simplest form.

2	12
2	6
3	3
	1

2	18
3	9
3	3
	1

$$\frac{12}{18} = \frac{\cancel{2}x2x\cancel{3}}{\cancel{2}x3x\cancel{3}}$$

$$= \frac{2}{3}$$

REFERENCE: Learning MTC pg 12 – 23
MK Bk 5 pg 118.

Ordering fractions

This involves arranging in either ascending or descending order.

Ascending order

Means from lowest to highest.

Descending Order

Means from highest to lowest.

Example

Arrange $\frac{1}{3}, \frac{1}{2}, \frac{1}{4}$ in ascending order.

L.C.M method;

$M_3 = \{ 3, 6, 9, \textcircled{12,} 15, \ldots\ldots\ldots\ldots\ldots\}$

$\mathbf{M_2} = \{ 2, 4, 6, 8, 10, \textcircled{12,} 14, \ldots\ldots\ldots\}$

$\mathbf{M_4} = \{ 4, 8, \textcircled{12,} 16, \ldots\ldots\ldots\}$

L.C.M = 12

$\frac{1}{\cancel{3}} \times \cancel{12} \Rightarrow 1 \times 4 = 4$

$\frac{1}{\cancel{2}} \times \cancel{12} \Rightarrow 1 \times 6 = 6$

$\frac{1}{\cancel{4}} \times \cancel{12} \Rightarrow 1 \times 3 = 3$

In ascending order

$= \frac{1}{4}, \frac{1}{3}, \frac{1}{2}$

Method II

Arrange $\frac{5}{8}, \frac{3}{4}, \frac{4}{6}$ in descending order.

Renaming (equivalent fractions)

$\frac{5}{8} = \frac{10}{16} = \boxed{\frac{15}{24}} = \frac{20}{32} = \frac{25}{40} = \frac{30}{48}$

$\frac{3}{4} = \frac{6}{8} = \frac{9}{12} = \frac{12}{16} = \frac{15}{20} = \boxed{\frac{20}{24}}$

$\frac{4}{6} = \frac{8}{12} = \frac{12}{18} = \boxed{\frac{16}{24}} = \frac{20}{30} = \frac{24}{36}$

In descending order = $\frac{3}{4}, \frac{4}{6}, \frac{5}{8}$

REFERENCE: MK Bk pg 119

Comparing fractions using <, > or =

Example

Use >, < or =

$\frac{1}{3} > \frac{1}{4}$ $M_3 = 3, 6, 9, 12$

$\frac{1}{\cancel{3}} \times \cancel{12}$ $M_4 = 4, 8, 12, 16$

$= \underline{4}$ $\frac{1}{\cancel{4}} \times \cancel{12} = \underline{3}$

ii) Which is smaller $\frac{5}{6}$ or $\frac{1}{2}$

L.C.M of 2 and 6.

= 6

$\frac{5}{\cancel{6}} \times \cancel{6} = \underline{5}$ $\frac{1}{\cancel{2}} \times \cancel{6} = 3$

$\frac{1}{2} < \frac{5}{6}$

REFERENCE: MK Bk 5 pg 120.

ADDITION OF FRACTIONS

Example I

$\frac{1}{4} + \frac{1}{2}$ $\frac{1}{4} + \frac{1}{2} = \frac{1+2}{4}$

$\frac{1}{4} = \frac{2}{8} = \frac{3}{12}$ $\frac{3}{4}$

$\frac{1}{2} = \frac{2}{4} = \frac{3}{6}$

Example 2

John filled $\frac{1}{2}$ of a tank in the morning and $\frac{2}{5}$ in the afternoon, what fraction did he fill altogether?

$\frac{1}{2} + \frac{2}{5}$ M_2 = { 2, 4, 6, 8, 10, 12, ……………..}

M_2 = { 5, 10, 15, 20, ………………..}

$\frac{1}{2} + \frac{2}{5} = \frac{5+4}{10}$

$= \frac{9}{10}$

REFERENCE: MK BK 5 Pg 121 -125.

SUBTRACTION OF FRACTIONS

Example I

Subtract; $\frac{4}{5} - \frac{1}{5}$

$\underset{=}{\Longrightarrow} \frac{4-1}{5}$ $\frac{3}{5}$

Example I I

A baby was given $\frac{5}{6}$ of a glass of water. If it drunk $\frac{7}{12}$, What fraction remained?

$\frac{5}{6} - \frac{7}{12}$

$M_2 = \{ 6, ⑫, 18, 24\}$

$M_{12} = \{$ ⑫, 24, 36}

L.C.M = <u>12.</u>

$$\frac{10-7}{12} = \frac{3}{12} \Longrightarrow \frac{1}{4}$$

Activity: Mk bk 5 Pg 126 – 127.

2) Isaac had $\frac{3}{4}$ of sugarcane. If he gave $\frac{3}{5}$ of it to Peter. What fraction did he remain with.

$$\frac{3}{4} - \frac{3}{5} = \frac{15-12}{20}$$

$$= \underline{\frac{3}{20}}$$

REFERENCE: Understanding MTC Std 5 pg 19 – 22.

MK BK 5 Pg 126 – 127.

Multiplication of fractions

1) i) $\frac{1}{3} X \frac{2}{5} = \frac{1X2}{3X5} = \frac{2}{15}$

ii) $\frac{1}{2} X \frac{1}{2} = \frac{nxn}{dxd}$

$\frac{1x1}{2x2} = \frac{1}{4}$

2) What is $\frac{2}{5}$ of 20 books?

$\frac{2}{\cancel{5}} \text{ x } \cancel{20}$

2 x 4 = <u>8 books</u>

3) What is $2\frac{1}{2}$ of 2 dozens.

1 doz = 12books

2 dozens = 12 x 2

= 24 books

$2\frac{1}{2}$x24

$\frac{5}{\cancel{2}} \times \cancel{24} = \underline{60 \text{ books}}$

REFERENCE: Mk Books 5 page 129 – 137

Learning MTC Std 5 pg 26 – 28

RECIPROCALS OF FRACTIONS

Reciprocal of $\frac{3}{5}$ is $\frac{5}{3}$

A reciprocal is a number multiplied by a given fraction to give 1.

The Reciprocal of $\frac{2}{3}$ is $\frac{3}{2}$

Check: $\frac{2}{3} \times \frac{3}{2} = \frac{\cancel{6}}{\cancel{6}}$

$\underline{= 1}$

Any fraction multiplied by its reciprocal always gives 1.

Example:

Find the reciprocal of $\frac{3}{4}$

Let the reciprocal be m

$\frac{3}{4}$ x m = 1

$\cancel{4} \times \frac{3}{\cancel{4}} m = 1 \times 4$

3m = 4

$\frac{\cancel{3}m}{\cancel{3}} = \frac{4}{3}$

m = $\frac{4}{3}$

Consider the reciprocal of

a) 7

b) 0.7

c) $1\frac{1}{3}$

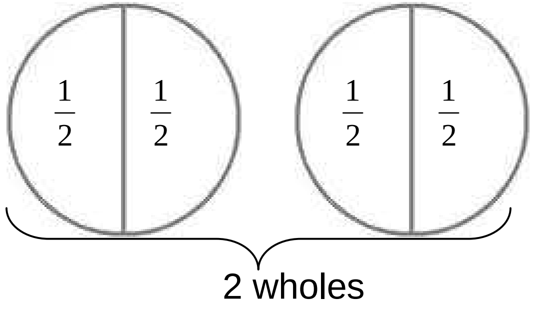
d) 2.5

REFERENCE: Mk Bk 5 pg 133.

Division of fractions

Wholes by fractions

1) $2 \div \frac{1}{2}$ (Use of diagrams)



$\therefore 2 \div \frac{1}{2} = \underline{4}$

Example 2

$3 \div \frac{1}{4} = \frac{3}{1} \times \frac{4}{1}$

$= \frac{12}{1} \Longrightarrow 12$

Example 3

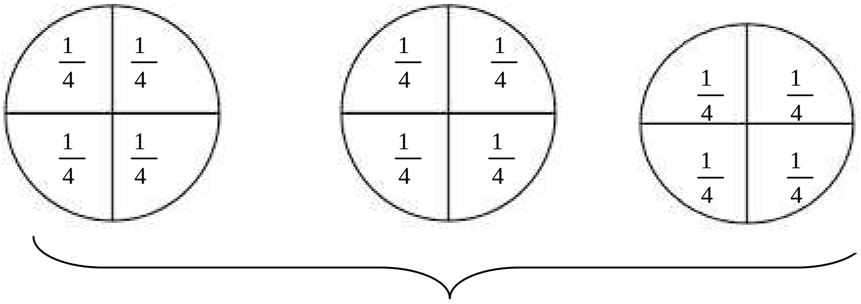
How many half litre cups are in a 3 litre jerry can?

$3 \div \frac{1}{2}$

$3 \times \frac{2}{1}$ = 6 cups

Example 4

How many $\frac{1}{4}$ kg packets of sugar can be packed from 3kg?



3kg

12 packets can be packed.

Division of fractions by fractions

Example I

$$\frac{2}{3} \div \frac{4}{5} \Longrightarrow \frac{2}{3} \text{ x } \frac{5}{4}$$

$$= \frac{\cancel{10}}{\cancel{12}} = \frac{5}{6}$$

Example 2

$$\frac{3}{4} \div \frac{1}{3}$$

$$\frac{3}{4} \text{ x } \frac{3}{1} = \frac{9}{4}$$

$$2\frac{1}{4}$$

REFERENCE: MK Bk 5 pg 134 – 136

MIXED OPERATIONS WITH FRACTIONS (BODMAS)

i) $\frac{1}{2} + \frac{1}{3} - \frac{1}{4}$

$$(\frac{3+2}{6}) - \frac{1}{4}$$

$$\frac{5}{6} - \frac{1}{4}$$

$$\frac{10-3}{12} = \frac{7}{12}$$

ii) $\frac{5}{6} - \frac{5}{9} + \frac{7}{18}$ Arrange according to BODMAS

$(\frac{5}{6} + \frac{7}{18}) - \frac{5}{9}$

$\frac{15+7}{18} - \frac{5}{9}$

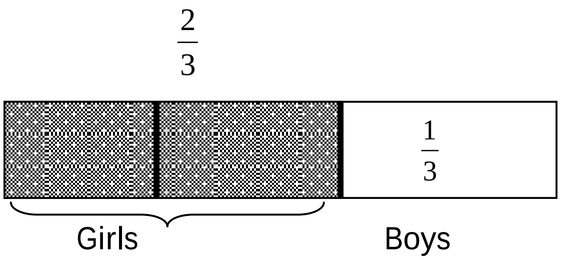
$\frac{22}{18} - \frac{5}{9}$

$\frac{22-10}{18} = \frac{\cancel{12}}{\cancel{18}}\ \frac{2}{3}$

REFERENCE: Mk Book 5 pg 128.

Application of fractions

In a class of 60 pupils $\frac{2}{3}$ are girls and the rest are boys.



Find the fraction of the boys.

$1 - \frac{2}{3}$ $\frac{3}{3} - \frac{2}{3} = \frac{3-2}{3} = \frac{1}{3}$

ii) How many boys are there?

$\frac{1}{\cancel{3}} \times \cancel{60}$

1 x 20

= 20 boys

c) How many girls are there?

$\frac{2}{3} \times \cancel{60}$

2 x 20

40 girls

d) How many more girls are there than the boys?

$$\begin{array}{r} 40 \\ -\ \underline{20} \\ \underline{\underline{20}} \end{array}$$ more girls

REFERENCE: Mk Bk 5 pg 132.

DECIMALS

* Converting decimals to common fractions

i) $0.5 = \frac{5}{10} = \frac{1}{2}$

The No. of decimal places determine the n^o of zeroe's in the denominator.

ii) $0.05 = \frac{5}{100} = \frac{1}{20}$

iii) $0.25 = \frac{25}{100} = \frac{5}{20} = \frac{1}{4}$

iv) $6.9 = 6\frac{9}{10}$

REFERENCE: Mk Bk 5 pg 143.
Learning MTC Bk 5 pg 31.

Comparing decimals

Use <, > or =

$0.11 \underline{<} \underline{0.2}$

$\frac{11}{\cancel{100}} \times \cancel{100} = 11$

$\frac{2}{10} \times \cancel{100}$

$\underline{= 20}$

Ordering decimals

Arrange 0.4, 0.44, 4.4 in ascending order.

As common fractions $\Longrightarrow \frac{4}{10}, \frac{44}{100}, \frac{44}{10}$

LCD = 100 (biggest denominator)

Multiply each by the biggest denominator.

$\frac{4}{1\cancel{0}} \text{ x } 10\cancel{0}$

= 40

$\frac{44}{\cancel{100}} \text{ x } 1\cancel{00}$

= 44

$\frac{44}{1\cancel{0}} \text{ x } 10\cancel{0}$

In ascending order,

= 440

0.4, 0.44, 4.4

REFERENCE: Learning MTC Std 5 pg 31 – 32

Mk bk 5 pg 145 – 146.