e-Learning
Platform

`PRIMARY SEVEN MATHEMATICS LESSON NOTES

TOPIC: SETS I

REFERENCE: MK 2000 Math Bk 6
: MK 2000 Math BK 7
: Understanding Mathematics Bk 6
: Understanding Mathematics Bk 7

METHODS: Discussion
: Discovery
: Question and Answer
: Explanation
: Think pair share

ACTIVITIES: Grouping, Shading, Matching, etc….

1. What is a set?

A set is a collection of well-defined objects.

Examples of sets

A set of 5 books.
A set of 2 chairs.
A set of 3 cups.
A set of 6 girls.

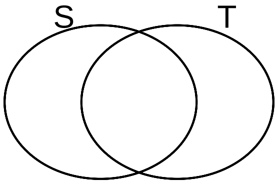
2. Types of sets

a) An empty set
b) Subset
c) Equivalent sets
d) Equal sets
e) Union sets
f) Intersection sets
g) Disjoint sets
h) Universal sets
i) Complement of sets
j) Non equivalent sets
k) Solution sets

3. Exercise.

a) Write a set of the first 4 even numbers.
b) Set P = { 2,3,5,7} Name the members of set P
c) Set S = {The first 7 letters of the alphabet}
List down members of set S
d) Set T = { vowel letters}
List down members of set T
c) Set S = {a, c,d,e,f,g} Set T = {a,e,i,o,u}
- Find SnT
- Find n (SUT)

- Draw the Venn diagram to show set S and T



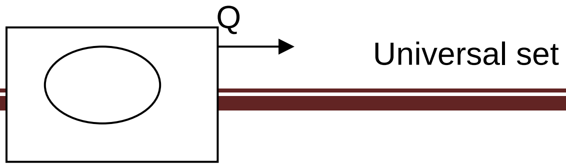
4. Set V = { whole numbers less than 12}
Set R = {Multiples of 3 between 0 and 15}
a) List down the members in sets V?
b) List down members of set R
c) Find n (V U R)
d) Find n (V n R)
e) Draw the Venn diagram to show sets T and R

Lesson

SUBTOPIC : UNIVERSAL SETS

1. What is a universal set?
   - ♦ A universal set is a set with 2 or more sets
   - ♦ It is a mother set
   - ♦ A universal set is the union of all the members of a given set
2. The symbol for universal set is
3. **EXAMPLES OF UNIVERSAL SETS**
   a) Domestic animals
   {Cats, goats, cows, dogs, sheep}
   b) Vegetables
   {Cabbage, letters, lettuce, Sukuma}
   Clothes
   {Skirt, trouser, short}

Given that Q = (all pupils in a class)
P = (all girls in a class)
Represent this information on a Venn diagram

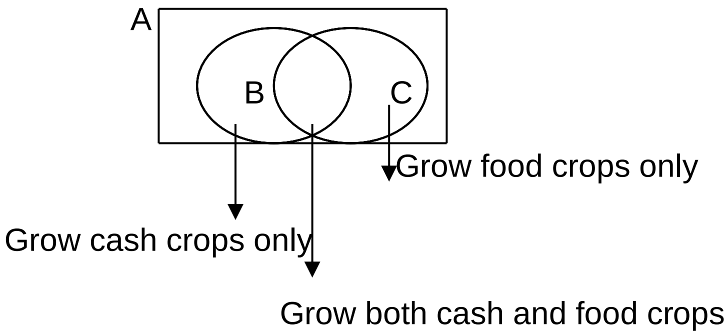


→ Set P

EXAMPLE 2

Given that A = [all farmers in ojwin village]
B = [farmers who grow cash crops]
C = [farmers who grow food crops]

Representing this on a Venn diagram



EXERCISE 1

Draw a Venn diagram for the following

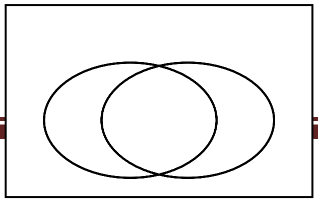
1. K = [all books in the library]
L = [all mathematics books]

2. M = [all pupils in the class]
P = [pupils who like math]
Q = [pupils who like English]

3. X = [all football players]
Y = [Football players who use the right foot]
Z = [football players who use the left foot]

EXERCISE 2

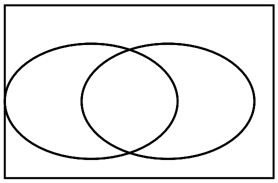
1. List all the elements of the sets shown on the Venn diagram



= { 8,7,1,2,5,3,4,6}

A = { 1,2,5,3} B = { 3,4,6}

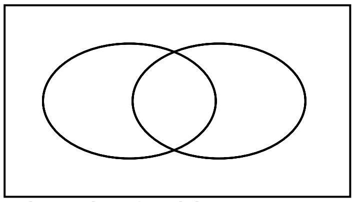
2.



= {6,3,0,2,4,8}

P = { 0,2} Q = { 2,4,8}

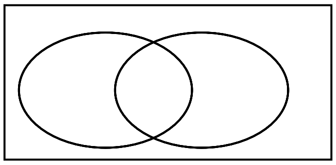
3.



= {a,b,c,d,e,f,g,h}

H = [a,,c,d, b] G = [e,f,g,d,c]

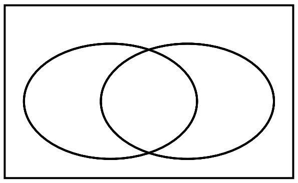
4.



= [t,p,s,q,r]

K = [p,s,q] L = [r,q]

5.



= {0,4,2,5,7,3,6}

N= { 0,4,2,5,7} Q = { 3,6,2,5,7}

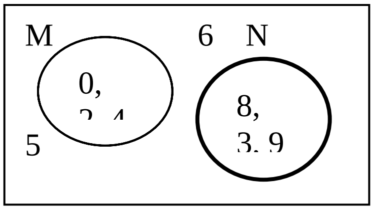
Lesson

SUBTOPIC : COMPLEMENTS OF SETS

Complement means elements or members that do not belong to the set.

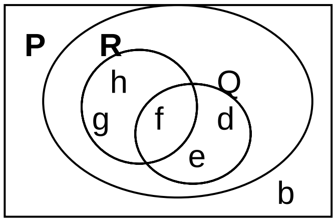
EXAMPLE

1.



a) List members of set M
M = { 2,0,4}
b) List members of set N
N = { 3,8,9]
c) What is the complement of set M?
M = { 3,8,9,5,6,7}
d) What is N complement
N = { 0,2,4,5,6,7}
e) What is MUN complement
(MnN) = { 7,5,6}
f) List members of the universal sets
= { 5,6,7,0,2,4,8,9,3}

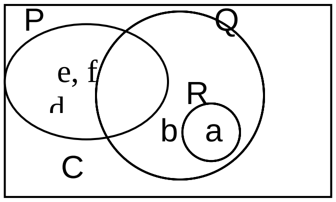
Trial



a) List the elements of set R
b) List members of set Q
c) List the elements for set P
d) What is a set R complement
e) What is set q complement
f) What is set P complement

g) What is set (Q n R) complement

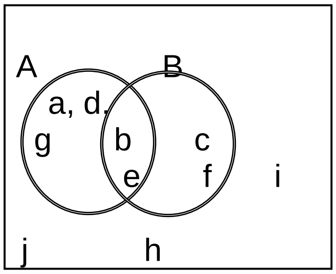
1.



a) List elements for set P
b) List the elements for set Q

c) List elements of set R
d) List all the members in the universal set
e) What is (P n Q)
f) What is (R n Q)
g) What is (R U Q) complement
h) What is (O n R) complement.

2.



a) List elements f set A
b) List elements of set B
c) What is the complement of set A
d) What is the complement of set B
e) List the elements of the universal set.

Lesson

SUBTOPIC : DIFFERENCES IN SETS

SUBTOPIC: SUBSETS

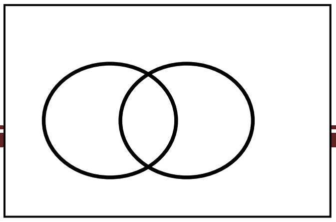
Revise the above topics as in level 2 work. Using the formula to find the subsets.

SUBTOPIC: SHOWING NUMBER OF MEMBERS

Example 1

Given that set A = [factors of 18]
B = [factors of 24]
A = [1,2,3,6,9,18]
B = [1,2,3,4,6,8,12,24]

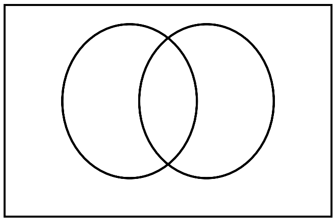
Fill in the venn diagram to show sets A and B



Example 2

Set A = [a,b,c,d]

Set B = [a,b,e,f,g]



EXERCISE.

Fill in the following sets in a venn diagram

1. G = [1,2,3,4,5,6]
   H = [0,2,4,7,9]

2. Set M = [a,e,I,o,u]
   Set N = [a,d,u,w,f]

3. Set L = [1,2,3,4,5,6]
   Set M = [2,4,9,11]

4. Set P = [a,e,I,o,u]
   Set Q = [a,b,c,d,e,f,g]

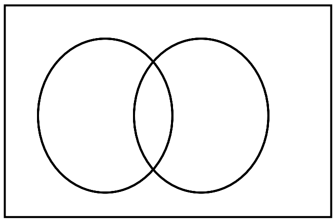
5. Set V = [jane,sarah,andrew,henry,marvin]
   Set D = [amos,josehp,deo,henry,andrew]

Lesson

SUBTOPIC: DRAWING AND REPRESENTING THE INFORMATION ON A VENN DIAGRAM

Example 1

Given that n(A) = 5, n(B) = 20 and n(An B) = 9
Draw the venn diagram and represent the information



i. Find n (A – B)
ii. Find n (B- A)
iii. Find n (A – B)

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TRIAL

The number of pupils who do maths (M) = 24 and the number of pupils who do English = 30 . If there are 16 pupils who do both.

i. Draw a venn diagram and find out how many pupils do one subject.
  ii. Find n(M – E)
  iii. Find n (E – M)
  iv. How many pupils like one subject?
  v. How many pupils are in the class?

EXERCISE

1. Draw the venn diagram for these sets n(P) = 16, n(Q) = 27 AND (Pn Q) = 8
   i. Find (P – Q)
   ii. n(Q – P)
   iii. n (P U Q)
2. Given that n(K) = 32, n(L) = 27 and n (Kn L) = 19
   i. Draw the venn diagram for these sets
   ii. Find n(K – L)
   iii. Find n (L – K)
   iv. Find n (L U K)
3. Given that n(Q) = 17, n(P) = 21 and n(PnQ) = 12
   i. Draw a venn diagram for these sets
   ii. Find N(Q – P)
   iii. Find n(R – Q)
   iv. Find n(PUQ)

4. Given that n(M) = 15, n(N) = 20 and n(M n N) = 8
   i. Draw a venn diagram to show the sets.
   ii. Find n(M – N)
   iii. Find n(N – M)
   iv. Find n(NUM)

Lesson

PROBABILITY

Definition: probability is a measure of the likelihood of an event. There are four broad ranges of things we expect i.e. certain, likely, unlikely and impossible

Using sample space and favourable chances to get probability

Example1

When a die is roled, what is the probability of getting an even number on top?

Solution

Probability space (T)={1,2,3,4,5,6}

$n(T)=6$

Expected outcome (E)={2,4,6}

$n(E)=3$

Therefore $P(E) = \frac{n(E)}{n(T)}$

$=3/6$

Activity

Exercise 10:23 page 189

Cartesian products and probability space

Example 1

If two coins are tossed at once what is the probability of two heads showing up?

Solution

1st coin

		H	T
2nd	**H**	**HH**	**TH**
Coin	**T**	HT	**TT**

Probability space(T) ={HH,HT,TH,TT}

$N(T) =4$

Expected outcome (E)={HH}

$N(E)=1$

Therefore probability $P(E)=\frac{n(E)}{N(T)}$

$P(E) = \frac{1}{4}$

Lesson

SUBTOPIC: APPLICATION OF SETS

Example 1

In a class, 18 pupils eat posho (P) and 15 eat beans (B) if 8 pupils eat both posho and 15 pupils eat beans (B) . If 8 pupils eat both posho and beans.

i. Draw the venn diagram to show the sets.
ii. How many pupils eat posho only.
iii. How many pupils eat beans only.
iv. How many pupils eat only one type of food.

EXERCISE

1. 21 farmers grow beans and 17 grow groundnuts. If 9 farmers grow both beans and groundnuts
   i. Draw the venn diagram
   ii. How many farmers grow beans only?
   iii. How many Farmers grow groundnuts?
   iv. How many farmers grow only one type of food?

2. In the market there are 30 traders. 19 sell beans 11 sell both beans and cassava.
   i. Draw a venn diagram to show the information.
   ii. How many traders sell only beans?
   iii. How many traders sell only one type of food?

3. 30 pupils play tennis, 25 pupils play football and 13 pupils play both games.
   i. Put the information in the venn diagram.
   ii. How many pupils play only tennis?
   iii. How many pupils play only football?
   iv. How many pupils play only one game?

4 35 pupils passed Maths, 25 pupils passed English and 11 pupils passed both Maths and English.
   i. Show this information on a venn diagram.
   ii. How many pupils passed Maths only?
   iii. How many pupils passed only one subject?

5. 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. What is the number of pupils who eat beans only?
   iv. How many pupils eat only one type of food?
   v. Find the number of pupils who eat both foods.

Lesson

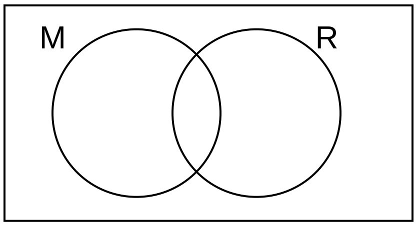
MORE APPLICATION OF SETS

1. It is given that in a class of 30 pupils 18 like Music (M), 21 like Art (A). If x pupils like both music and Art
   i. Draw the venn diagram and find the value of x

ii. How many pupils like music only?
iii. How many pupils like Art only?
iv. How many pupils like only one subject?
v. What is the probability of picking a pupil who likes only Art?
vi. What is the probability of picking a child who likes Art?

2. In a class of 60 pupils, 35 pupils like matooke (m), y like rice only, 8 like both matooke and rice while 5 like none these.

a) Complete the venn diagram below.



b) Find the value of y.
c) How many pupils like rice?
d) How many pupils like only one type of food?

3. There are 24 boys in the field. I 2 like football (F) 16 like hockey (H). x like both.
   i. Draw the venn diagram to show this information
   ii. How many boys like football only?
   iii. How many boys like only one game?
   iv. What is the probability of picking a boy who likes only one game?
   v. What is the probability of picking a boy who likes football only?

5. In a class of 42 pupils, 6 like Maths, 10 like English 24 like, x like all the three subjects and 12 like neither.
   a. Draw the venn diagram and show the information.
   b. How many pupils like all the three subjects?
   c. How many like English only.

Lesson

FINDING THE NUMBER OF SUBSETS

Example 1

Given that A=(p, q), find the number of subsets in set A.

i, By listing ;(p), (q),(p,q),( )

ii, By using number of elements.
set A has 2 elements.

no. of subsets=2^n
no. of subsets=2^2
=2x2
=4subsets

work to do

1. listthe subsets for each of the following sets.
   I, (a,b)

II, (x,y,z)

2. how many subsets are in a set of;
   I, 6elements

II, 4elements

proper subsets

universal set is excluded.

Example

If p=(a,b,c),how many subsets does set p have?

method1
(a), (b), (c), (a,b),(a,c),(b,c), ( )
there are 7 proper subsets.

method II
no. of subsets =2^n-1

Exercise
1.how many proper subsets are there in the following sets?
I, p=(1,2,3)
II, m=(p, q, r, s)

2. find the number of proper subsets of a set which has;
   a) 2 elements
   b) 3 elements
   c) 5 elements

Lesson

FINDING NUMBER OF MEMBERS WHEN SUBSETS ARE GIVEN

Example1
Set A has 8 subsets. find the number of elements on set A.
2^n=8
2^n=2x2x2
2^n=2^3

n=3
Set A has 3 elements.

Example 2

Set p has 15 proper subsets.Find the number of elements of set up.

No. of subsets= 2^n-1

$15=2^n-1$

$15+1=2^n-1+1$

$16=2^n$

$2x2x2x2=2^n$

$2^4=2^n$

$4=n$

There4 n=4 elements.

Work to do.

1. find the number of members in a set with the following number of subsets
   a)4 subsets
   b) 64 subsets
   c)32 subsets
2. The number of proper subsets is 30. How many elements are in the set?

TOPIC : WHOLE NUMBERS

REFERENCE: MK Standard Mathsbk 6
: MK Standard Mathsbk 7
: Understanding Mathsbk 6
: Understanding Mathsbk 7
:
:
METHODS : Discussion
: Discovery
: Question and Answer
ACTIVITIES: Adding, Grouping, Spelling, Subtracting, Dividing,

Lesson

SUBTOPIC ;

Place values of numbers

i. Place value is the position of that particular digit.

Values of numbers

ii. Value is the measure of that particular digit.

Example 1

Find the place value of these digits

2 4 5 6

Ones

Tens

Hundreds

Thousands

Example 2

Values of each digit

3 2 4 5 6

ones = 6x1 = 6

tens = 5x10 = 50

hundreds = 4x100 = 400

thousands = 2x1000 = 2000

ten thousands = 3x10000 = 30000

Exercise

Find the value of the underlined figures

1. 46657
2. 16785
3. 20763
4. 14566
5. 19781
6. 204787
7. 16345
8. What is the sum of the values of 3 and 4 in the number 145636
9. What is the difference between the value of 6 and 4 in the number 24763
10. Find the product of the value of 5 and the value of 3 in 65213
11. Divide the value of 8 by the value of 2 in the number 18425

Lesson

SUBTOPIC : WRITING NUMBERS IN WORDS

Example 1

Write 1234 in words 1000 = one thousand
200 = two hundred
30 = thirty
4 = four

1234 = One thousand two hundred thirty four.

NOTE: The spellings e.g. four, forty, nineteen, ninety etc.…

EXERCISE:

1. 678
2. 5678
3. 123
4. 10987
5. 234523
6. 10267450
7. 67890
8. 30000009
9. 1200050

Lesson

SUBTOPIC: WRITING NUMBERS IN FIGURES

Example 1

Write "Twelve thousand six hundred ninety four" in figures.

Twelve thousand = 12000
Six hundred = 600
Ninety four = + 94
12694 Ans

Example 2

Nine million two hundred twenty two thousand six hundred five.

Nine million = 9000000
Two hundred
Twenty two
thousand = 222000
six hundred five = 605
9222605 Ans

EXERCISE

1. Eleven thousand six hundred eleven.
2. Seventeen thousand seven hundred seven.
3. One hundred thousand one
4. Eighteen thousand five hundred twenty six.
5. Nine million eight hundred twelve.
6. Six million nine hundred eight thousand four hundred twenty one.

Lesson

SUBTOPIC : EXPANDED FORM OF NUMBERS

Using powers of ten.

Example 1

456

456 = $(4x10^2)+(5x10^1)+(6x10^0)$

EXERCISE

1. 2678
2. 5295
3. 41277
4. 7697
5. 30956

LESSON

SUBTOPIC : EXPANDING USING VALUES

Example 1

575
ones
tens
hundreds
= (5x100) + (7x10) + (5x1)
= 500 + 70 + 5

EXERCIS

1. 457
2. 304
3. 587
4. 9984
5. 3045

SUBTOPIC : ROUNDING OFF

Rounding off whole numbers

1. Consider numbers 0 to 10 on a number line
2. Numbers 0,1,2,3,4 are nearer to zero than any other number.
3. Numbers 5,6,7,8,9 are nearer to ten than they are nearer to zero
4. If the figure on the right of the required place value is less than 5 i.e 0,1,2,3,4 leave the figure unchanged. But change all the figures on its right to zero.
5. If the figure on the right of the required place value is 5 or greater than 5 i.e 5,6,7,8,9 add 1 to the figure in the figure on the right change to zero.

Example 1

Round off 67 to the nearest tens

NOTE: The digit in tens is 6. The next digit is 7 and 7 is more than 5 and therefore we add one to tens

Method 1

  67
+ 1
   70
67   70

Method 2

  67
        ones
       tens
67   70

TRIAL

1. Round off 143 to the nearest hundreds
2. Round off 13 to the nearest tens

EXERCISE

A Round off to the nearest tens

1. 81
2. 337
3. 4807
4. 5689

B Round off to the nearest hundreds

1. 263
2. 952
3. 2539
4. 1265

C Round off to the nearest thousands

1. 3723
2. 8275
3. 7945
4. 57389

LESSON

SUBTOPIC: ROMAN NUMERALS.

1. **NOTE**

Roman	Hindu Arabic
I	1
V	5
X	10
L	50
C	100
D	500
M	1000

2. A letter cannot be repeated four times e.g 4000 using MMMM is wrong.
3. When a bar is put above a group of Roman numerals, it means multiplying a group of Roman numerals by 1000 e.g X = 10000
   V = 5000
4. A Roman numeral can be used only three times in the same number.
5. A smaller numeral put before a bigger numeral means subtraction
   e.g IV = 5-1 = 4
6. A smaller numeral put after a bigger numerals means addition e.g
   VI = 5 + 1 = 6
   DC = 500 + 100 = 600

Lesson

SUBTOPIC : CHANGING/ EXPRESSING IN ROMAN NUMERALS.

Example 1

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

Example 2

1765 = 1000 + 700 + 60 + 5
= M + DCC + LX + V
= MDCCLXV Ans

EXERCISE

1. 468
2. 572
3. 641
4. 728
5. 489
6. 144
7. 1392
8. 168
9. 1772
10. 20576

LESSON

SUBTOPIC : EXPRESSING IN HINDU ARABIC

Example 1

CXCIX = C+XC+IX.
= 100 + 90 + 9
= 199 Ans

EXERCISE

1. CCLXIV
2. CDXLVI
3. DCIX
4. DCCX
5. MMLXXXVI
6. A building was built in MCCLXIV. Which year is this in Hindu Arabic?
7. Ahmed moved LX kilometers and he furthur moved XCVkm. What distance did he travel in Hindu Arabic altogether?
8. A man was born in MDCCCLXXII and he died in MCMXXV
   a) Express this years in Hindu Arabic
   b) How old was he when he died.

Lesson

SUBTOPIC : BASES

0 Counting in groups is referred to as bases.

1 There are two ways of grouping

i) Decimal system. This is counting in groups of ten

ii) Non decimal system. This is counting in other groups other than ten.

2 Special names for different bases

Base Two - binary
Base Three – Ternary
Base four - quarternary
Base five - quinary
Base six - Senary
Base seven - septenary
Base eight – Octal
Base nine – nonary
Base ten – decimal
Base eleven - Nuo decimal
Base twelve – Duo decimal

3 Special letters used in bases

" t' = ten
" e" = eleven
Those letters are in base twelve to avoid confusion

4 Numerals used in each base.

Base two= 0,1
Base three = 0,1,2
Base four = 0,1,2,3
Base five = 0,1,2,3,4
Base six = 0,1,2,3,4,5

Base seven = 0,1,2,3,4,5,6
Base eight = 0,1,2,3,4,5,6,7
Base nine = 0,1,2,3,4,5,6,7,8
Base ten = 0,1,2,3,4,5,6,7,8,9
Base eleven = 0,1,2,3,4,5,6,7,8,9,t
Base twelve = 0,1,2,3,4,5,6,7,8,9,t,e

5 Each number base has a different place value.

Example 1

432 five = 4 3 2
ones
fives
twenty fives

EXERCISE

Give the place value of the following.

1. 23five
2. 43six
3. 41five
4. 372eight
5. 683nine
6. 312four
7. 24five
8. 231seven
9. 314five

NOTE: To get the next place value from ones, multiply the previous one by the given base.

LESSON

SUBTOPIC : READING AND WRITING BASES

Example 1

1111two = one,one,one,one base two

Example 2

123four = one,two,three base four

EXERCISE

1. 5te2 twelve
2. 125seven
3. t24eleven
4. 568nine
5. te21twelve
6. 3423five
7. 21210three

LESSON

SUBTOPIC : CHANGING FROM BASE 10 TO OTHER BASES

When we are changing from base 10 to other bases, we divide by that base.

Example 1

Change 25ten to base seven

B	No.	R
7	25	4
7	3	3
	0	

25ten = 34 seven

EXERCISE

Change to base three

1. 19ten
2. 31ten
3. 26ten

Change to base four

4. 19ten
5. 31ten
6. 26ten

Change to base six

7. 19ten
8. 31ten
9. 26ten

Change to base seven

10. 19ten
11. 31ten
12. 26ten

LESSON

SUBTOPIC : CHANGING FROM OTHER BASES TO BASE TEN

When we are changing from other bases to base ten we expand.

Example 1

Change 204 five to base ten

204five= (2x52)+(0x51)+(4x50)

= (2x5x5)+(0x5)+(4x1)

= 50 +0 +4

= 54 Ans

EXERCISE

1. 463seven
2. 834nine
3. 1011two
4. 122three
5. 763eight
6. 1021four
7. 112twelve

LESSON

SUBTOPIC : CHANGING FROM ONE BASE TO ANOTHER.

When we are changing from one base to another, we first change to base ten then divide by the base you are changing to.

Example 1

Change 101two to base three

101two = (1x22)+(0x21)+(1x20)

= (1x2x2)+(0x2)+(1x1)

= 4 + 0 + 1

=5ten

B	No	R
3	5	2
3	1	1
	0	

101two = 12 three

EXERCISE

1. Change 21three to base two
2. Change 123four to base five
3. Change 234five to base four
4. Change 234five to base six
5. Change 1001two to base five
6. Change 222four to base five
7. Change 341five to base seven
8. Change 53seven to base nine

LESSON

SUBTOPIC : ADDITION OF BASES

Example 1

Add 111two 110two

111two
+ 110two
1101two

EXERCISE

1. 255six + 422six
2. 122four + 322four
3. 635seven + 461seven
4. 444seven + 545seven
5. 702nine + 678nine
6. 2211three + 1122three
7. 2456nine + 2463 nine
8. 321four + 123four
9. 673eight + 267eight

LESSON

SUBTOPIC ; SUBTRACTION OF BASES

Example 1

53six – 45six

53six
\- 45six
4six

EXERCISE

1. 33four– 22four
2. 111two – 101two
3. 203five –112five
4. 132four – 33four
5. 354six – 245six
6. 464eight – 237eight
7. 563seen – 155nine

LESSON

SUBTOPIC : SOLVING FOR THE UNKNOWN BASES

Example 1

If 17x = 15 ten. Find x
(1xx1)+(7xx0) = 15
x + 7 = 15
x +7 – 7 = 15 – 7
x = 8

NOTE: Expand if it is in any base apart from base ten. Ie if its in base ten leave it as it is.

EXERCISE

1. 23x = 11ten

2. 24x = 42five
3. 77y = 63ten
4. 45x = 32nine
5. 100n = 213six
6. p2 = 54nine
8. 33P = 15ten
9. 42x = 34ten
10. 13x = 11ten
11. 31x = 41six
12. 16seven = 15x
13. 23x = 21five

Finding the unknown base.

Example 1 $23_{ten} = 35_{x}$

2 3 = 3 5

$10^1 \quad 10^o = x^1 \quad x^o$

$(2 \times 10^1) + (3 \times 10^o) = (3 \times x^1) + (5 \times x^o)$

$2 \times 10 + 3 \times 1 = 3 \times x + 5 \times 1$

20 + 3 = 3x + 5

23 – 5 = 3x + 5 – 5

18 = 3x

3 3

6 = x

x = **6 (The base is 6).**

Find the unknown base.

1. 102four = 24p 2. 44p = 35nine 3. 46t = 42ten 4. 112three = 22x

5. 23q = 19ten 6. 31y = 221three 7. 55m = 43eight 8. p2 = 54nin

OPERATION ON NUMBERS

LESSON

Addition and subtraction of whole numbers

Example 1

4194+925

4194
+ 925
5119

Example 2

65 717-579

65717
- 579
65138

ACTIVITY

EXERCISE 3:1 PAGE 45

Multiplication and division of whole numbers

Example 1

A Factory produced 4395 crates of soda. If each crate contains 24 bottles. How many bottles did it produce?

Solution

4395
× 24
17580
+ 87900
105480

Example 2

Divide 3816648 by 132

Activity

Exercise 3:2 page 46

Lesson

Distributive property

Example1

use a distributive property to solve.

a) (379x27)+(27x21)
27(379+21)
27x400=10800

b) (137x42) – (37x42)
42(137-37)
42x100=4200

c) (156÷13) - (260 ÷13)
(156+260)÷13
416÷ 13= 32

Exercise

Pupils will do the exercise on p.47 a new mkpri. mathsbk, numbers; 2,3,6,7,10,11,16,14

Lesson

Associative property

Example1
a+(b+c)=(a+b)+c

Example 2
a×(b×c)=(a×b)×**c**

Activity
Teachers own collection

Lesson

Commutative property
Example1
a+b=b+a

example2
a×b=b×a

activity
Teachers own collection

LESSON
INDICES
Laws of indices
NOTE; to multiply powers of the same base, keep the common base and add the indices.

Example 1
i) 4^2X4^4
4^{2+4}
4^6
$^{II)}y^axy^b$
y^{a+b}
Exercise
Express the following in powers.
1.2 x 2 x 2 x 2 x 2
2.$10^1x2^2x10^0$

3.3^9x3^3
4.5x5^2x5^3
5.2^2x2^3x2
6.7^3x7^2
7.c^5xc^2

LESSON
laws of indices in division
NOTE
To divide powers of the same base, keep the base and subtract the indices.

Example 1
a)4^3 ÷4^2
4^{3-2}
4^1=4
b)$p^{3a÷}$ p^a
p^{3a-a} = p^{2a}

Exercise

simplify
a)$2^{4÷}$ 2^2
b)a^{10}÷a^7
c) $m^{7÷}$ m^2
d)13^{2x}÷13^x
e)n^{10}÷n^3
f) $10^{3\ ÷}10^2$

LESSON
SUBTOPIC ; SCIENTIFIC FORM

1. Only one digit should be left on the left hand side of the decimal point.
2. Powers of ten will be used
3. A power is obtained from the number of decimal places after the decimal point.

Example 1

2678 = 2.678 x 10^3

Example 2

76799 = 7. 6799 x 104

EXERCISE
1. 269

2. 58213
3. 5223
4. 676739
5. 87999
6. 97
7. 102

LESSON

APPLICATION OF INDICES

Example 1
$2^x=32$
$2^x=2^5$
$X=5$

Example 2
Solve $2^x x3^3=108$
$2^x x3^3= 2^2x3^3$ ______
3^3 3^3
$2^x= 2^2$
$X =2$
Example 3
$2^x \div 2^1=8$
$2^{x-1}=2^3$
$x-1=3$
$x-1+1=3+1$
$x=4$
Exercise
1.2x=25
2.2a=16
3. $4^x x4^1=256$
4. $2^3x5^y=200$
5. $5^{3x}\div 5^x=625$
6. $4^{2x}\div 4^x=64$
7. $3^y\div 3^2=9$
8. $2^{3y}\div 2^y=16$

TOPIC : PATTERNS AND SEQUENCES

DIVISIBILITY TEST OF 2 TO 11

Test of 3

A number is divisible by three if the sum of its digits is divisible by three
E.g. 741=7+4+1=12 and 12 is a multiple of three therefore 741 is divisible by three.

LESSON

PRIME NUMBERS.

A prime number is a number with only two factors that is, "one and itself".
Examples of prime numbers:
2,3,5,7,11,13,17,19,23,29,31,41,43,47,53,59,61,67,71,73,79,83,89,97
Exercise:

1. Give a set of prime numbers between 1 and 10.
2. Write elements in a set of prime numbers between 10 and 30.
3. List members in a set of prime numbers between 30 and 50.
4. How many prime numbers are there between 50 and 60?
5. How many prime numbers are there between 70 and 80?
6. How many prime numbers are there between 90 and 100?
7. What is the sum of the 3rd and seventh prime number?
8. What is the sum of prime numbers between 80 and 100?
9. How many even prime numbers are there between 1 and 100?

LESSON

COMPARING PRIME NUMBERS AND COMPOSITE NUMBERS:

No.	Set of facts	No. of facts	Type of No.

0	0	1	Not prime
1	1	1	Not prime
2	1,2	2	Prime number
3	1,3	2	Prime number
4	1,2,4	3	Composite no.
5	1,5	2	Prime number
6	1,2,3,6	4	Composite no.
7	1,7	2	Prime number
8	1,2,4,8	4	Composite no.

A REVIEW ON FACTORS.

Factors are numbers that divide exactly. They don’t leave any reminder.

Example: List all the factors of 10. (**Look for numbers that divide 10 equally)**

10 ÷ 1 = 10 10 ÷ 2 = 5 10 ÷ 5 = 2 10 ÷ 10 =1

Example: What are the factors of 24?

24 ÷ 1 = 24 24 ÷ 2 = 12 24 ÷ 3 = 8 24 ÷ 4 = 6

24 ÷ 6 = 4 24 ÷ 8 =2 24 ÷ 12 = 2 24 ÷ 24 = 1

F_{24} = {1,2,3,4,6,8,12,24}.

Exercise: List all factors of the following:

1. 6 2. 8 3. 12 4. 15 5. 18
6. 20 7. 24 8. 30 9. 36 10. 48

Find the common factors of:

1. 15 and 12 2. 18 and 20 3. 12 and 8 4. 20 and 24
5. 30 and 36 6. 8 and 28 7. 12 and 54

LESSON

Week 13: PRIME FACTORISATION

These are factors, which are prime numbers. Prime numbers = {2,3,5,7,11,13,17,19,23, ………}

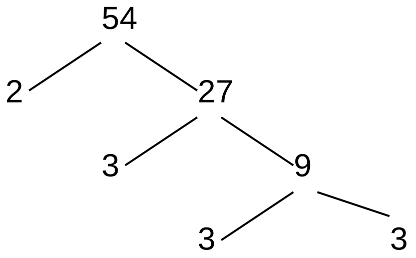
Example 1: Find the prime factors of 54.

A list of prime factors/numbers = {2,3,5,7,11,………..}.

Ladder Method

2	54
3	27
3	9
3	3
	1

Factor tree method



$PF_{54} = \{2_1, 3_1, 3_2, 3_3\}$ **or** **$\{2^1 \times 3^2\}$**

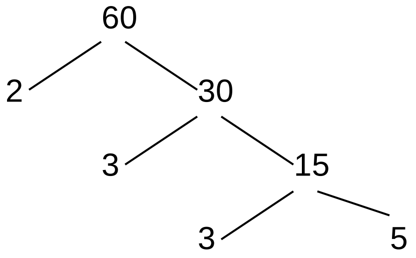
Set notation/subscript method orPower form/multiplication method

Example 2: Prime factorise 60.

Ladder Method

2	60
2	30
3	15
5	5
	1

Factor tree method



$PF_{60} = \{2_1, 2_2, 3_1, 5_1\}$ **or** **$\{2_2 \times 3_1 \times 5_1\}$**

Exercise: Prime factorise the following.

1. 18 2. 30 3. 24 4. 36 5. 40
6. 45 7. 54 8. 60 9. 70 10. 84

More practice work in page 82 MK 6.

LESSON

FINDING THE PRIME FACTORISED NUMBER.

Example 1: Find the number which is prime factorised to get:- $\{2_1, 2_2, 2_3, 3_1\}$

Number = 2 x 2 x 2 x 3 = **24**

Example 2: Find the number whose factorization is $\{2_2 \times 3_2 \times 5_1\}$.

No. = 2 x 2 x 3 x 3 x 5

= 4 x 9 x 5

= 20 x 9

180

Exercise:

Find the numbers whose prime factorization are given below.

1. $\{2_1, 2_2, 2_3\}$
2. $\{3_1, 5_1, 7_1\}$
3. $\{2^1 \times 3^2 \times 5^2\}$
4. $\{2_1, 2_2, 3_1\}$
5. $\{2_1, 3_1, 3_2\}$
6. $\{2_1, 2_2, 3_1, 3_2\}$
7. 7. $\{2^2 \times 5^1 \times 7^1\}$
8. $\{2_2, 5_1, 7_1\}$

LESSON

Finding the unknown prime factor.

Example: The prime factors of 60 are:- 2 x 2 x p x 5. Find p or 2 | 60

2x2xpx5=60

2 x 2 x p x 5 = 60 2 30

2x2x3x5=60

$\frac{20p}{20} = \frac{60}{20}$ 3 15 | p = 3

p = **3** 5 5

1

Prime factorize and find the missing number.

1. If PF_{30} = 2 x w x 5, find x.
2. PF_{36} = 22 x r2, find r.
3. PF_{70} = 2 x 5 x n, find n.
4. PF_{90} = p x 33 x 5, find p.
5. PF_{100} = 22 x k, find k.

6. The prime factorization of 120 is 2 x 2 x 2 x m x n. Find the value of m and n.

7. The prime factorization of 144 is $a^4 \times b^2$; find a and b.

LESSON
VALUES OF POWERS OF NUMBERS.

Example 1: Find the value of 2^4.

$2^4 = 2 \times 2 \times 2 \times 2$

$= 4 \times 4$

$= \mathbf{\underline{16}}$

Example 2: What is the value of 7^3?

$7^3 = 7 \times 7 \times 7$

$= 49 \times 7$

$= \mathbf{\underline{343}}$

Exercise: Find the value of each of the following.

1. 2^3 2. 2^7 3. 4^2 4. 3^4 5. 3^3

6. 8^4 7. 6^2 8. 7^3 9. 2^1 10. 11^3

LESSON
EXPRESSING A NUMBER AS A PRODUCT OF ANOTHER.

Example 1: Write 32 in powers of 2.

2	32
2	16
2	8
2	4
2	2
	1

$\mathbf{32 = 2 \times 2 \times 2 \times 2 \times 2 = 2^5}$

Write 64 in powers of 4

4	64
4	16
4	4
	1

$\mathbf{64 = 4 \times 4 \times 4 = 4^3}$

Exercise: Work out: Express

1. 64 in powers of 2. 2. 49 in powers of 7. 3. 256 in powers of 4.
4. 343 in powers of 7. 5. 261 in powers of 6. 6. 729 in powers of 3.
7. 8 in powers of 2. 8. 169 in powers of 13.

Finding the unknown, say **$7^x = 49$.**

LESSON
SQUARE ROOTS AND SQUARE NUMBERS

4X4=16

4is the square root of 16

the teacher uses prime factorization to find the square root.

16 is a square of 4.

A square is a number got after multiplying a number by its self.

Example 1

Find the square root of 144

144
2^72
2^36
2^18
2^9
3 ^3
3^1
(2x2)x(2x2)x(3x3)
2 x 2 x 3 =12
The square root of 144 is 12

Exercise

1.Find the squares of the following.

a.8

b.11.

c.0.5

2.find the square root of the following

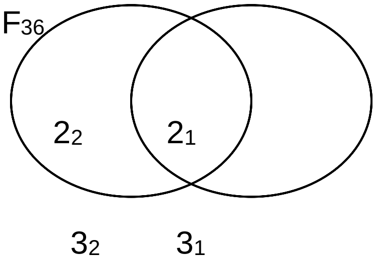
a) 64 b)289 c)1225

d) square roots of decimals and mixed fractions

LESSON

REPRESENTING PRIME FACTORS ON VENN DIAGRAMS.

Use a venn diagram to show prime factors of 36 and 30.



2	36	2	30

F_{30}

2	18	3	15

5_1

3	9	5	5
3	3		1
	1		

$F_{36} = \{2_1, 2_2, 3_1, 3_2\}$ **$F_{30} = \{2_1, 3_1, 5_1\}$**

<u>Represent the prime factors of the following pairs of numbers.</u>

1. 24 and 30 2. 30 and 48 3. 48 and 60 4. 18 and 40

5. 15 and 20 6. 36 and 54.

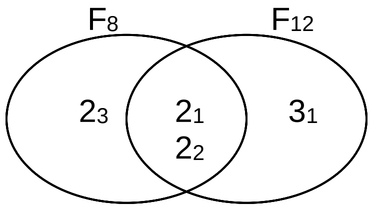
LESSON

FINDING THE GCF AND LCM.

<u>Example:</u> Find the GCF and LCM of 8 and 12 using a venn diagram.

2	8	2	12
2	4	2	6
2	2	3	3
	1		1

$F_8 = \{2_1, 2_2, 2_3\}$ **$F_{12} = \{2_1, 2_2, 3_1\}$**



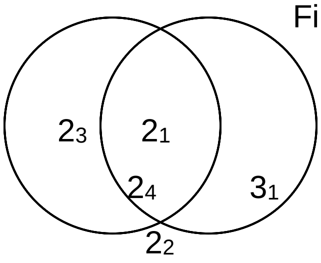
a). GCF = 2 x 2 (Intersection)
= **<u>4</u>**

b). LCM = 2 x 2 x 2 x 3 = **<u>24</u> r** (common product)

<u>Exercise:</u> Study the venn diagrams and answer the questions that follow.

1. Find; a). $F_{16} \cap F_{12}$ b). GCF of 16

and 12

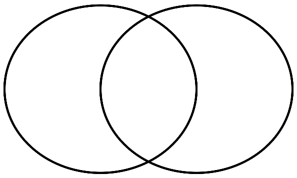


c). $F_{16} \cup F_{12}$ d). LCM of 16

and 12

2. What is; a). $F_{36} \cap F_{30}$ b). $F_{36} \cup$

F_{30}

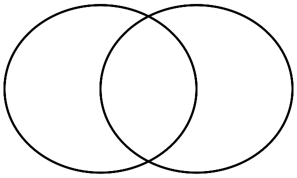


c). the GCF of 36 and 30?

d). the LCM of 36 and 30.

3. Find; a). F30 ∩ F50 b). GCF of 30

and 50

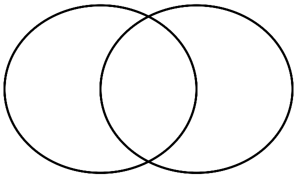


c). F30 ∪ F50 d). LCM of 30

and 50.

4. Find; a). F24 ∩ F108 b). GCF of 24

and 108



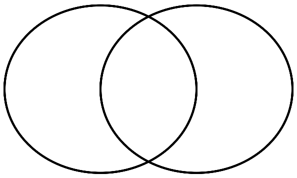
c). F24 ∪ F108 d). LCM of 24

and 108

LESSON

FINDING THE UNKNOWN IN VENN DIAGAMS.

<u>Example 1:</u> Find the value of x and y, GCF and LCM.



a). $Fx = \{2_1, 2_2, 2_3, 3_1\}$

$x = 2 \times 2 \times 2 \times 3$

$x = 8 \times 3$

x = **<u>24</u> .**

b). $Fy = \{2_1, 2_2, 3_1, 3_2, 3_3\}$

$y = 2 \times 2 \times 3 \times 3 \times 3$

$y = 4 \times 27$

Y = <u>108</u>

c). GCF = 2 x 2 x 3

= 4 x 3

= **<u>12</u>**

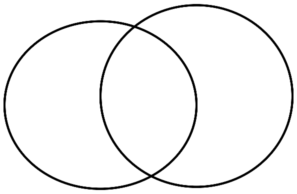
d). LCM = 2 x 2 x 2 x 3 x 3 x 3

8 x 27

<u>216</u>

<u>Exercise:</u> Study the venn diagrams and answer the questions that follow.

1.

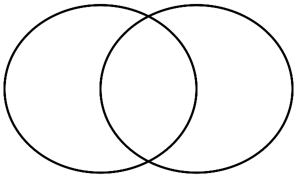


a). Find the value of; i. x ii. y

b). Find the GCF of x and y.

c). Find the LCM of x and y.

2.

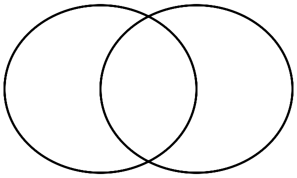


a). Find the value of; i. x ii. y

b). Find the GCF of 12 and 18.

c). Find the LCM of 12 and 18.

3.

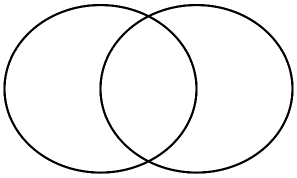


a). Find the value of; i. x ii. y

b). Find the LCM of 54 and 60.

c). Find the LCM of 54 and 60.

4.



a). Find the value of; i. x ii. y

b). Find the GCF of q and p.

c). Find the LCM of q and p.

More practice exercise on page 89 MK 6.

Lesson

CUBE NUMBERS CUBE ROOTS

Definition: Cube numbers are numbers got when a counting number is multiplied by its self-thrice

Examples 1

Number	Working	Cube number
1	1×1×1	1
2	2×2×2	8
3	3×3×3	27

Example2

Find the cube root 64

2	64
2	32
2	16
2	8
2	4
2	2
	1

$(2\times\cancel{2}\times\cancel{2})\times(2\times\cancel{2}\times\cancel{2})$

2×2=4

Activity

1: Find the cube of;

4
6
8
7
10
2: find the cube root of;

125

216

512

TRIANGULAR NUMBERS

Definition: Triangular numbers are sums of consecutive counting numbers

Examples

Consecutive counting numbers	Triangular numbers
1	1
1+2	3
1+2+3	6
1+2+3+4	10
1+2+3+4+5	15

Example 2

Find the twentieth triangular number

Solution

$$\frac{n(n+1)}{2}$$

$$\frac{20(20+1)}{2}$$

$$\frac{\cancel{20}\times 21}{\cancel{2}}$$

$\underline{210}$

Activity

1: list the first ten triangular numbers
2: find the ninth triangular numbers
3: calculate the product of the fifth and the fifteenth triangular numbers

CONSECUTIVE NUMBERS (counting, even and odd)

Examples

The sum of three consecutive counting numbers is 96.
Find the numbers.

Solution

1st	2nd	3rd	sum
y	Y+1	Y+2	96

y+y+1+y+2=96
y+y+y+1+2=96
3y+3 =96
3y+3-3 =96-3

$$\frac{\cancel{3}y}{\cancel{3}} = \frac{\cancel{93}}{\cancel{3}}$$

$\underline{Y = 31}$

1^{st}no	2^{nd}	3^{rd}
y=31	y+1	y+2
	31+1	31+2
32 33		

Activity
Teachers own collection

lesson

COMPLETING PATTERNS AND SEQUENCES

Examples

1: find the next number in the sequence1, 3, 5, 7, _, _

Solution

1 3 5 7 9 11
+ 2 +2 +2 +2 +2

2:find the next number in the sequence 2,5,4,7,6,_,_

Solution

2 5 4 7 6 9 8
+3 -1 +3 -1 +3 -1

Activity
Find the next number in the sequence
1:0,2,4,6 8,_
2:2,3,5,7,_
3:121,100,81,64,49,_
4:81,27,9,3,1_

TOPIC: ALGEBRA

REFERENCE: MK PRIMARY MATHS BK 6 NEW AND OLD EDITIONS.
: MK PRIMARY MATHS BOOK SEVEN NEW AND OLD EDITION.
: UNDERSTANDING MATHS BOOK 6
: UNDERSTANDING MATHS BOOK 7
: UNDERSTANDING MATHS BOOK 5

METHODS : Discussion
: Question and answer
: Observation
:

ACTIVITIES : Doing the exercise.
: Answering questions.
: Drawing the clock faces

It is a branch of mathematics in which symbols and letters are used to represent numbers.
Letters are called terms. Examples: 3a, 5y, 2p etc.
The terms with the same letters are called like terms while terms with different letters
Are called unlike terms.
Examples: 7p+8w. They cannot be simplified any further.
In mathematics 4x2 ca be written as 2+2+2+2
Similarly in algebra 5a can be written as a+a+a+a+a =5a

LESSON

HOW TO SIMPLIFY EXPRESSIONS WITH MANY TERMS

Example 1: Simplify: $3a - 8a + 5a + 9a - 2a$
Solution: First group all the terms with positive signs
$3a + 5a + 9a - 8a - 2a.$
$= 17a - 10a$
= 7a

This method is called grouping positives and negative terms

a) Example $ab^2 - 5ab^2 + 3ab^2$
$ab^2 + 3ab^2 - 5ab^2$
$4ab^2 - 5ab^2$
$-ab^2$

b 6ab –2ab – 3ab
6ab – 5ab
ab

Let pupils do Exercise 22:5 & 22:6 MK PRI MTC new edition p. 430 BK 7

Numbers I) 1,2,3,4,8 & 9
II) 2,4,5,6,7 & 8

LESSON

COLLECTION OF LIKE TERMS

NB A term without a sign is a positive term. A sign before the term is the

term for that term

Examples: i -m + 2p +5m –8p –m ii 3xy –5ac +4xy +6ac
-m +-m +5m –8p +2p 3xy +4xy –5ac +6ac
-2m +5m –6p 7xy +6ac –5ac
3m –6p 7xy +ac

iii 4a +6b –9a +2b iv 8w –5k –11w +4k
4a –9a +6b +2b8w –11w -5k + 4k
-5a +8b **-3w -k**

Let pupils do exercise 22:7 MK PRI MTC new edition page 431 numbersbk 7
1,2,3,4,7,8,9,13,and14

LESSON

REMOVING BRACKETS

Expressions which involve brackets must have terms inside the

Brackets simplified first, then collect the like terms

Example 3(2x + 4x)

= 6x +12x

= **18x**

If the terms inside the brackets are unlike then you have to use the terms outside the brackets in order to remove the brackets

Example: 2(3y +6p)

6y +12p

Positive sign before the brackets

From the above examples it is clear that any positive sign (term) outside the brackets does not change the sign of the term inside the brackets .On the other hand a negative sign outside the brackets changes the sign inside the brackets

Examples 5(3m +2a**)**
15m+10a

(b) - (5-n)
-5 +n

(c) -3(4a – 6y)
-12a + 18y

(b) -x (-2x +3y)
$2x^2$ –3xy

(e) -13(x+4) –21(1-x)

-13x –52 –21+21x

-13x +21x –52-21

8x –73

(f) (a-b)(a+b)

a^2 +ab –ab –b^2

a^2-b^2

Let pupils do exercise 22:9 MK primtc pupils book page 432 numbers 1,3,4,7,6,and 11 also Exercise 22:10 MK bk 7 page 433 numbers 1,2,4,7,8,11and 12

LESSON
SUBTRACTION OF EXPRESSIONS

I Before subtracting any expression from another ,the terms must be put into brackets

ii) Start writing the terms which come immediately after the word from, insert the subtraction sign .

Example **i**Subtract12x from –8x ii Subtract: 2m-3w from 4m +w

(-8x) – (12x) (4m+w) –(2m-3w)

-8x –12x 4m+w –2m +3w

-20x 4m –2m +w+3w
2m+4w

iii Subtract: 2x +y from 3x +2y Subtract: 2(x+3)from 3(x+1)
(3x+2y) –(2x+y) 3(x+1) –2(x+3)
3x +2y –2x+y 3x +3 –2x -6
3x –2x +2y +y 3x-2x +3-6
x +3y x –3

Thrice the difference between x and 7: 3(x-7)
Let the pupils do exercise 23:13 MK 2000 page 410 new edition
Numbers 2 a,b,c,d,e
1 Let the term to be subtracted from be given any unknown,which is not in the terms mentioned.
2 Put the terms in brackets

2 Let the terms you have give given be left alone on one side by making them positive. Example: I) What must be subtracted from 3x+2y to give x +3y?

Solution

Let the number to be subtracted be w
(3x+2y) –(w) = (x+3y)
(3x +2y) –w+w = (x+3y) +w
(3x+2y) –(x +3y) = w
3x +2y –x –3y = w
3x –x +2y –3y = w
2x –y = w

ii) What must be subtracted from 4a +m to get 2a +4m
Let the number be n
(4a +m) –(n) = (2a +4m)
(4a +m) –n+n = (2a+4m) +n
(4a +m)-(2a + 4m) = n
4a +m –2a –4m = n
4a –2a +m-4m = n
2a –3m = n

iii) What must be added to 4a+b to make 6a –3b?
Let it be m
(4a+b) + m = (6a –3b)
(4a +b) –(4a+b)+m = (6a-3b) – (4a+b)
m = 6a-3b –4a-b
m = 6a-4a-3b-b
m = **2a-4b**

iv What must be added to ½ to get ¾

Solution Let the number added be p

P + ½ = ¾

P + ½ -½ = ¾ - ½

$P = \frac{6-4}{8}$

P = ¼

Exercise: Let pupilsdo Exercise below

1: **W**hat must be subtracted from ¾ to get 1/3 ?

2 What must be subtracted from 3x + y to get x + y?

3 What must be added to x to get 2x – 5?

4 What must be added to –m to get 3m- 6?

4 What must be added to 2p +2k to get k – 4p

LESSON
SUBSTITUTION:

It means to replace (put in place).Usually each letter is given a representation

Examples: Given that a =3, b =4 and c = 5 a(b^2 – c)

Evaluate: 3(5+4) 3 (4^2 – 5)

3(7) 3 (4x4 –5)

3x7 3(16 – 5)

21 3x11

33

2: If a = 5,b = 10, c = 6, d = `1/2 and e =1/5

Work out the followinga) 4(a + b) (b) -3(a + 3c)

4(5 + 10) -3(5+ 3x6)

4 x15 -3 (5 + 18)

= 60 -3 x23

= -69

(c) d(b- 6) (d) ad(b – c)

½ (10 –6) 5 x ½(10 – 6)

½ (4) 5 x ½ x4

½ x 4 5 x 2

= 2 = 10

If x =a +2b and y = 2a-b. Express 3x –y in terms of a and b

Solution 3x – y = 3(a+2b) – (2a-b) (2x+y) = 2(a+2b) +(2a – b)

3a + 6b - 2a + b = 2a +4b +2a -b

3a –2a +6b +b = 2a+2a+4b-b

a + 7b = **4a +3b**

If a=3x, b=6y c= 2z Work out the following:

a) 3(b-2c) b) -a(b+c)

3(6y-2x2z) -3x(6y+2z)

3(6y –4z) (-3x x 6y) + (-3x x 2z)

18y –12z-18xy – 6xy

Exercise:

Let pupils do the following exercise.

Given that a = -2 , b=3 ,Find the value of : 1)$a-b^2$ ii $b^2 -a$

2) If x= -3,y=2, and p = -1, Evaluate

I x +y+p ii xyp iii 2y +x-y iv 2x-p v 3xy +px

3) If a= (x-y) and b= (x+y) Write the expression for :

I a+b ii b-a iii a – b in terms of x and y

Let pupils do exercise 22:12 on MK primtc new edition page 434 numbers

1) a ,c , f , h. 2) a, c, g, h, i. 3) a, b.

LESSON

REMOVING BRACKETS INVOLVING FRACTIONS:

i) $^{1}/_{3}$(3a+9b) ii ½(4a + 6ab) – $^{2}/_{3}$ (9a –12ab)

$$= \ ^{1}/_{3} \times \cancel{3}a + \cancel{1/3 \times 9}\overset{3}{}b$$

= **a+3b**

$$\frac{\overset{2a}{\cancel{4a}} + \overset{3ab}{\cancel{6ab}}}{\cancel{2}} - \frac{\overset{6a}{\cancel{18a}} + \overset{8ab}{\cancel{24ab}}}{3}$$

2a+3ab –6a +8ab

2a-6a +3ab+8ab

-4a +11ab

iii $^{2}/_{7}$(42b –14a)

$$\frac{2 \times \overset{6b}{\cancel{42b}} - 2 \times \overset{2a}{\cancel{14a}}}{\cancel{7}} = \mathbf{12b - 4a}$$

Let the pupils do Exercise 23:15 Mk primtc new edition page 436 numbers 1,3,5,7,8,9,10.

EXERCISE : 22:16 numbers 1,5,8,9,10,and 7.

LESSON

FRACTIONAL TERMS:

In fractional terms ,any term without a denominator is assumed to have the denominator as 1. Example: a + $^{a}/_{5}$ ii $x/_{2}$ + $x/_{3}$

5xa +a/5 x5 6X x + x X 6 LCM = 6

5a +a2 3

1 3x + 2x

= **6a**6

5x

6

iii) p + p/3

3Xp + p/ 3 LCM =3

1

= 3p +p

3 **= 4p**

3

iv) b/4 – b/3 LCM =12

3 4

b/4 x12 - b/3 x12

12

3b –4b

12

-b

12

v) x +1 + x-2 Lcm =6

2 3

6 (x+1) + 6(x-2)

2 3

3x + 3 + 2x – 4

3x + 2x +3 –4

5x -1

5 6

vi) 2n +3 - 2n –5 Lcm = 12

3 4

12(2n +3) – 12 (2n –5)

3 4

4(2n + 3) - 3(2n –5)

12

8n +12 – 6n +15

12

8n – 6n +12+15

12

2n +27

12

5x +4 - 2x –8 Lcm =10

2 5

10(5x +4) – 10(2x – 8)

2 5

5(5x +4) – 2(2x – 8)

10

25x +20 –4x +16 25x –4x –4 +16

10 10

21x + 36

10

Let the teacher give more examples on various fractions

Give pupils the following exercise to do

Exercise 22;17 MK new edition bk 7 page 437 numbers 1,4,6,7,8 and exe 22:18 nos.7,8,9 &10.

LESSON

Equations: This is a mathematical statement which shows that the two sides are equal.

Example: Solve:I) y +4 =6

Y+4 –4 = 6 –4

Y **= 2**

ii) p – 7 = 12

p –7 +7 = 12 +7

p **= 19**

iii) 4m = 36

$\frac{\cancel{4}m}{\cancel{4}} = \frac{36}{4}$

m =9

iv) $\frac{x}{6} = 5$

$\frac{\cancel{6}x}{\cancel{6}} = 5x6$

x = 30

Solve: $\frac{3y+3}{3} + 2 = \frac{2y+12}{2}$ LCM = 6

$\frac{6(3y+3)}{3} + 2x6 = \frac{6(2y+12)}{2}$

6y +6 + 12 = 6y +36

6y + 18 – 18 = 6y +36 –18

6y –6y = 18

= **18**

iv) 4p = 48

$\frac{\cancel{4}p}{4} = \frac{48}{4}$

p = 12

Let pupils do exercises on page 452 MK primtcbk 7

EXE 22:38. 1,4,7

EXE 22:39 2,5,7,B6,4C

EXE 22:40 16,B5, 7C, 3C

LESSON

EQUATIONS INVOLVING BRACKETS

NB: before any equation of this nature can be solved ,brackets must be removed first Examples: 2(m+2) = 12

2m + 4 = 12

2m + 4 – 4 = 12 –4

$\frac{\cancel{2}m}{\cancel{2}} = \frac{8}{2}$

m = 4

ii 3(p + 4) = 36

3p + 12 = 36

3p +12 –12 = 36 - 12

$\frac{\cancel{3}p}{3} = \frac{24}{\cancel{3}}$

p = 8

ii) $4(x-5) = 16$

$4x - 20 + 20 = 16 + 20$

$\frac{\cancel{4}x}{\cancel{4}} = \frac{\cancel{36}}{-4}$

3

$x = 9$

iv) $6(4y - 3) = 6$

$24y - 18 + 18 = 6 + 18$

$\frac{24y}{24} = \frac{24}{24}$

$y = \underline{1}$

$3m^2 = 12$

$\frac{3m^2}{3} = \frac{12}{3}$

4

$\sqrt{m^2} = \sqrt{4}$

$m = 4$

vi) $4p2 = 100$

$\frac{4p2}{4} = \frac{100}{4}$

$\sqrt{p2} = \sqrt{25}$

$p = 5$

Let pupils do Exercise 22:42 MK primtc new edition p.455 numbers 1,4,5,10,9,7,14

LESSON
EQUATIONS WITH FRACTIONAL COEFFICIENTS:

Examples: I) $\frac{1}{2}t = 6$

$2 \times \frac{1}{2}t = 6 \times 2$

$t = 12$

ii) $4\frac{1}{3}p + 2 = 15$

$3 \times 13p + 2 - 2 = 15 - 2 \times 3$

$\frac{13p}{13} = \frac{13 \times 3}{13}$

$p = 3$

iii) $0.4m + 0.5 = 2.1$

$\frac{\cancel{4}m \times 10}{\cancel{10}} + \frac{\cancel{5} \times 10}{\cancel{10}} = \frac{10 \times 21}{10}$

$4m + 5 - 5 = 21 - 5$

$\frac{\cancel{4}m}{\cancel{4}} = \frac{16}{4}$

$m = 4$

iv) $p - \frac{2}{3}p = 7$

$3 \times p - \frac{2}{3}p \times 3 = 7 \times 3$

$3p - 2p = 21$

$p = 21$

v) $\frac{1}{4}n - 6 = -6$

$4 \times \frac{1}{4}n - 6 + 6 = -6 + 6$

$\frac{\cancel{4}x}{\cancel{4}} = \frac{0}{4}$

5

$x = 0$

vi) $\frac{1}{3}y^2 = 3$

$3 \times \frac{1}{3}y^2 = 3 \times 3$

$\sqrt{y^2} = \sqrt{9}$

$y = 3$

$\frac{1}{5}m^2 = 20$

$\cancel{5} \times \frac{1}{\cancel{5}}m^2 = 20 \times 5$

$\sqrt{m^2} = \sqrt{100}$

$m = 10$

vii) $\frac{1}{7}r^2 = 28$

$\cancel{7} \times \frac{1}{7}r^2 = 28 \times 7$

$\sqrt{r^2} = \sqrt{196}$

$r = 14$

$\frac{1}{12}n^2 = 48$

$\cancel{12} \times \frac{\cancel{1}}{12}n^2 = 48 \times 12$

$\sqrt{n^2} = \sqrt{576}$

$n = 24$

Exercise: Let pupils do exercise 22: 44 MK primtc new editoin page 457 numbers 1,2,6,12,13,17,19,21.

1 Exe 22:45; 1A,5A,4B,6B,C6

2 Exercise 22:46; 2,6,7,14,16,17,18

LESSON

APPLICATION OF ALGEBRA :

1 Think of a number add 4 to it the result is 10 find the number.

Solution: Let the number be p

$$P + 4 = 10$$
$$P + 4 - 4 = 10 - 4$$
$$\mathbf{P = 6}$$

2: Think ofa number, multiply it by 2 then divide the result by 3, the answer is 10 What is the number?

Solution: Let the number be y

$$\frac{Yx2}{3} = 10$$
$$\cancel{3x}\ \frac{2y}{\cancel{3}} = 10x3$$
$$\frac{2y}{2} = \frac{30}{2}$$
$$\mathbf{y = 15}$$

3: A sheep costs 6000/=more a goat. If their total cost is 70,000/= Find the cost of each animal.

Solution: Let the cost of a goat be p:

Goat Sheep

P p +6000**/=**

$$P+p+6000 = 70,000=$$
$$2p +6000-6000 = 70,000 - 6000$$
$$\frac{2p}{2} = \frac{64,0000}{2}$$
$$\mathbf{p = 32000=}$$

Goat =32000/=

Sheep p + 6000

32000 +6000 =38,000/=

4: A book costs twice as much a pen .If their total cost is 600/=. Find the cost of each item?

Solution Let the cost of a pen be n

Pen book

n 2xn

$$n+2n = 600$$
$$\frac{3n}{3} = \frac{600}{3}$$
$$\mathbf{n = 200/=}$$

Pen =200/=

Book 2x200

400/=

5: Alice is 4 years younger than Abbo, If their total age is 24years .Find their ages.

Solution: Let the age of Abbo be y years

Alice **Abbo**

Y y – 4

Alice **= 14 years**

Y+y –4 = 24

2y – 4 +4 = 24 +4 Abbo = 2-y

$\frac{2y}{2} = \frac{28}{2}$ = 14 -4

y = 14 Abbo =10 years

6.Peter is 5 years older than Moses.If their total age is 49 years Ho old is Moses?

Solution: Peter Moses

Y+5 y

Y+y+5 = 49

2y +5-5 49 – 5 $\frac{2y}{2} = \frac{44}{2}$ y = 22

Moses is 22 years

A ball and a pair of boots cost 150,000/=If boots cost twice as muchas as a ball Find the cost of each.**Solution:** Let the cost of the ball be p then boots be 2p

P +2p =150.000= **Ball =50,000**

$\frac{3p}{3} = \frac{150,000}{3}$ Boots = 2x 50,000

100,0000/=

8: A mother bought 8 exercise books at shs.(x-150) each and two mathematical sets at .

(x+100).each .If she spent shs.5300.altogether.How much did she spend on:

a) books? b) sets.

Solution: 8(x-150**) +**2(x + 100) = 5300 Books 8(630 –150)

8x - 1200 + 2x +200 = 5300 8 x 480

8x+2x – 1200 + 200 = 5300 **<u>3840/=</u>**

10x - 1000 +1000 = 5300 + 1000. Sets 2(630 + 100)

$\frac{\cancel{10x}}{\cancel{10}} = \frac{\cancel{6}300}{\cancel{10}}$ 2 x 730

x = <u>630</u> <u>1460/=</u>

9: **Solve**: $\frac{3y+3}{4} + 2 = \frac{2y+12}{3}$ Get L.C.M of 4 and 3

Solution: $\overset{3}{\cancel{12}}\frac{(3y+3)}{\cancel{4}} + 2\times12 = \overset{4}{\cancel{12}}\frac{(2y+12)}{3}$

9y + 9 +24 = 8y + 48

9y + 33 = 8y +48 – 33

9y –8y = 15

<u>y = 15</u>

10: Betty, Joyce and Alice shaired 72000=such that Betty got 3 times as much as Alice Alice got twice as much as Joyce. Calculate their shairs.

Solution: Joyce Alice Betty

P 2p 3x2p = 72000=

P+2p+6p = 72000=

$\frac{9p}{9} = \frac{72000}{9}$

p = 8000= **Joyce = 8000= Alice = 2x8000**

16000= Betty =3x16000

= 48,000=

Exercise:

1:The number of boys in a school is less than the number of girls by 80. If there 300 pupils in the school how many boys are in the school in the school?

2:Kato was told to share 45000= with Nakato .If Kato got twice as much as Nakato Find their shares.

3:Ashirt and a dress cost 14400/= If a shirt costs 6400/=less than a dress What are their costs?

4: John bought 2kg of sugar at 3p/= and 1 kg of salt at p + 200/=.Work out the value p if John spent 37000/=

Let pupils do exercise 3:nos 1------9on page 31 primary maths revision and practice G .Wambuzi

iii) Exercise 22:51 MK PRI MTC new edition pages 464nos 2,3,4,5,6,11,13,17.

LESSON
FORMATION OF EQUATIONS ABOUT TIME TO COME.

1: Afather is 20 years older his son .In 10 years time a father will be twice the age of his son. a) Calculate their ages now.

Solution: let the sonspresent age be n

Son Father
Now: n n+20
10 yrs time 2 (n+10) = (n+20 +10) Son = 10 year
2n + 20 = n +30
2n + 20 – 20 = n +30 – 20 Father = n+20
2n – n = 10 = 10 +20
n = 10 = 30 years

What will be their ages then?

Solution: son n+10 Father n+30
10 +10 10 +30
20 years 40 years

The should give more examples related to given information

2: Anne is 15 years younger than Peter.In 5 years time Anne's age will be half the age of Peter .Find their ages now.

Solution: Anne Peter
Now m -15 m **Peter = 25years now**
15 years time (m –15+5) = 2x 1/2(m+5)
2(m –10) = m+5
2m –20 +20 = m+5 +20 Anne = m -15
2m – m = 25 25 - 15
m = 25 = 10years

What will be their ages then? Anne 25 –10 Peter = m +5
15years 25 +5
30 years

3:A son is 20 years younger than the mother. In 10 years time the son will be half the age

of the mother . Calculate their present ages. Solution Let the mother's age be y

Son mother

now y-20 y

10yrs time (y-20+10) = ½(y+10) = 2y – y = 30

2x(y-10) = 2x1/2(y+10) y = 30

2y –20+20 = y +10 +20 = **mother =30 years**

= Son y-20

30 – 20 = **10years**

a) What will their ages be then?

Solution Mother y+10 son : y-20+10

30 +10 30 –20 +10

40 years 10+10

20 years

Let the teacher give more examples of the related exercise.

Exercise

1 A mother 14 years older than her daughter. In 8 years time a mother will be twice the age of the daughter Calculate their ages now.

Let the daughter's age be n

Daughter mother

(Now) N n+14

8 yrs time 2 (n+8) = (n+14+8) Their ages then:

2n +16 = n+22 **son** n+8

2n +16-16 = n+22-16 6+8 = **14year**s

n = 6

Son = 6years mother n+14+8

Mother n+14 6+14+8

6+14 **=20years28 years**

2: Susan is 3 years younger than Rose . In 2 years time their total age will be 51 years What are their ages?

Solution: Let Rose's age be p

Rose Susan **Rose =25 year Susan p-3**

Now p p-3 25-3

2yr's time (p+2) (p-3+2) **22 years**

p+2+p-3+2 =51 Their ages then

p+p+2+2-3 =51 **Rose: Susan**

2p+1-1 = 51-1 p+2 p-3+2

$\cancel{2}$p $\overline{}$50 25 +2 25-3+2

$\cancel{2}$ $\cancel{}$2 **27 years** 22+2

p = 25 24 years

3: A father is 3 times as old as his son .In 10 years time the son will be half the age of the father. Calculate their present ages.

Let the son's age be x

Son father
now X 3x

10yr's time 2(n+10) = ½(3n+10) **Son = 10 years Father**
3x10
$2n +20 \cancel{=} \cancel{2x1}/2(3n+10)$ **30**
years
2n +20-20 = 3n +10-20 **Their ages then**
2n-3n = -10 **son Father**
-n = -10 n+10 3x10 +10
-1 = -1 10 +10 30+10
n = 10 20 years 40 years

4:Peter is 20 years older than John now .10 years ago Peter was twice as old as John How old are they now?

Solution: Let John's age be y
John Peter
Now Y y+20 John: Peter
Ago 2(y-15) = (y+20-15) 35 years y+20
2y –30 = y+5 35+20
2y –30+30 = y+5+30 Their ages ago
55 yeas
2y –y = y+35 John y+20-15
y = 35 y-15 35+20-
15
35-15 55-15
20 years 40
years

3 Annet is 20 years younger than Musa now.10 years ago Annet was ½ the age of Musa . Work out their present ages.

Solution: Let Musa's age be **m** **2(m-30) = ½X2(m-10) Musa 50 yrs**
Annet Musa 2m-60+60 = m-10 +60 Annet (m-20)
Now m-20 m 2m-m = 50 50-
20
Ago 2 (m-20-10) = ½(m-10) m =5030years
How old were they then?
Musa Annet
m-10 m-30
50-10 50 - 30

40 years20 yers

The teacher should give more numbers for exercise so as to get better revision.

LESSON
FINDING TIME TO COME GIVEN DIFFERENT AGES OR MEASUREMENTS:

1: Mary is 10 yeas old and Aisha is 30 years old .In ho many year's time will Mary be half the age of Aisha?

Solution: **Let time to come be t**

Mary Aisha

10 years 30 years t = 10year's

Time to come (10+t)2 = 2x½(30+t)

20+2t = 30+t

20-20 +2t = 30-20 +t

2t –t = 10

2: **A** daughter is 3years old .A mother is 21 years old .In how many year's time will the mother be 3 times the age of the daughter.

Solution: Let time to come be p

Daughter mother

Now 3 years 21 years 9-9+3p =21-9+p

Time to come 3(3+p) = (21+p) 3p-p =12

9+3p = 21+p 2p = 12

~~2~~ ~~2~~

p 6 <u>6years</u>

<u>time</u>

What will be their ages then?

Daughter 3+p Mother 21+p

3+6 = 9years 21+6 =27 years

Exercise: Let children do the following exercise in their exercise books.

1:Peter is 22 years old and john is 4 years old .In how many year's time will Peter's agebe 4 times the age of John?

2 Jane is 3 years old .Betty is 7 years old. At what time will Jane's age be half the age of Betty?

3: Moses is 26 years old and George is 4 years old .In how many years time will Moses be 6 times as old as George?

4: Paul is 14 years old and Sarah is 2 years old .At time will Sarah be ¼ the age of Paul?

5:Afather is 28 years old and a son is 6 years .In how many year's time will the son be 1/3 of the fathers age.

6: Kato is 3 times as old as Jojo. The difference in their ages is 36 years. Find their ages

LESSON

CONSECUTIVE NUMBERS

Consecutive means one number following the other in the order continuously without interruption. or they are numbers which come after each other in a logical sequence.
There are various types of consecutive numbers ,namely:

a) Consecutive even numbers e.g{0,2,4,6,8,10,----}
b) Consecutive odd numbers e.g {1,3,5,7,9,11,----}
c) Consecutive prime numbers e.g {2,3,5,7,11,13,17,19,---}
d) Consecutive natural or counting numbers e.g {1,2,3,4,5,6,7,8,---}
e) Consecutive whole numbers e.g {0,1,2,3,4,5,6,7,8,---}

NB: When you study the above patterns you realise that:

i: Consecutive even numbers increase in the order of adding 2 numbers.
ii: Consecutive odd numbers also increase in the order of adding 2 numbers.
iii: Consecutive natural /counting numbers increase in the order of adding 1 number.

Example 1: The sum of three consecutive counting numbers is 45 .Find the numbers

Solution: Let the numbers be:

1st 2nd 3rd 1st **14**
m m+1 m+2 2nd m+1
m+m+1+m+2 = 45 14+1 = **15**
3m+3 -3 = 45 –3
3m = 42 3rd m+2
3 3 14+2
m = **14** **16**

Example 2: The sum of 3 consecutive odd numbers is 57.Find the numbers.

Solution: i: List down the order of numbers.{ **1**,2,**3**,4,**5,**6,**7**,8.9,10,**11,**12, ,**13, --}**
ii: Identify the numbers in the order (sequence)
iii: Find the number of spaces between the numbers, you will find out there are two spaces between the consecutive numbers.

Let the numbers be: 1st 2nd 3rd
n: n+2 n+4 1st = **17**
n+n+2+n+4 = 57
3n+6-6 = 57-6 2nd = n+2
3n = 51 = 17+2
3 3 = **19**
n = 17 **3rd = 17+4 = 21**

This formula works for both consecutive odd numbers and even numbers.

Example 3:` The sum of 3 consecutive even numbers is 78.Find the numbers.
Solution : Use the steps as in the consecutive odd numbers.

1st 2nd 3rd
p p+2 p+4 1st**=** **24**
p+p+2+p+4 = 78
3p+6-6 = 78 – 6 2nd = 24+2
3p = 72 **26**
3 3 3rd = 24+4
p = **24** = **28**

Exercise:

1: The sum of 4 consecutive even numbers is 86 .Find the numbers.

2: The sum of 3 consecutive odd number is 95
a) Find the numbers .
b) Calculate the median
c) Work out their mean
d) What is the product of the 1st and the last numbers.

3: The sum of 4 consecutive odd numbers is 88 .
a) Calculate the range of the numbers .
b) Calculate their median.
c) Work out the mean.

LESSON

THE MEAN OF CONSECUTIVE NUMBERS.

1: The mean of 3 consecutive even numbers is 16.
a) Work out the numbers .
d) Calculate the range of the numbers.
e) What is their median.

Solution: Let the consecutive numbers be y 1st **= 14**
1st 2nd 3rd
y y+2 y+4 = 16 2nd = 14+2
3x(y+y+2+y+4) = 16x3 **16**
3 1
3n+6+-6 = 48 –6 3rd = 14+4

3n = 42 = **18**
3 3 Range = 18 – 14 =4
n = 14 Median = 14, 16,18
= 16

2; The mean of 4 positive integers is 9.5.Work out the median of the numbers.
Solution: Let the integers be m.
4m = 32 median
8,**9,10**,11
4(4m+6) = 9.5x4 4 4 9+10
4 4m+6-6 = 38-6 **m = 8 2 = 9.5**

3: The average of five consecutive even numbers is 16 .What are the numbers?
Solution :The numbers are: x,x+2,x+4,x+6,x+8

5 (5x +20) = 16x5 numbers are : **12,14,16,18,20.**
5
5x +20+-20 = 80 –20
5x = 60
4 5 5
x = 12

4: The mean of 6consecutive numbers is 4 ½ .Find the numbers.
Solution: Let the numbers be**:**
Y,y+1,y+2,y+3,y+4,y+5.

$\frac{Y+y+1+y+2+y+3+y+4+y+5}{6}$ = $^{9/}2$
3
6(6y +15) = 6x 9/2
6
6y +15 - 15 = 27 -15 **y = 2**
6y =12 The numbers are : **2,3,4,5,6,7,**
5 6 6

5: The range of two consecutive numbers is 2.If the bigger numbers is –3 . Find the smaller number.
Solution: Let the number be m
Range bigger no. small no.
2 -3 - m **m = -5**
2+3 = -3+3 -m
5 = -m

6: The range of two numbers is 4.If the smaller numbers is –12.Find the bigger number
Solution: Let the bigger number be n
Range = bigger no – smaller no.
4 = n -$^-$12 4 – 12 = n+12 - 12
4 = n+12 **-8 = n**

LESSON

INEQUALITIES AND SOLUTION SETS:

1 An inequalityis a mathematical statement which states that two sides are not equal.

Symbols used. < ---------- Less than

\> -----------Greater than

≤ ------------- Less than and equal to

≥ ------------- Greater and equal to.

When solving numbers involving inequalities it is important to maintain
The inequality sign.

1: **Example1:** Given that set P has integers greater than 2.Then set P={ 3,4,5,--

2: **Example2**: Given that set A: is a set of integers less than –4.Then set A { -5,-6,-7,-8,---}

3: **Example 3:** If set B has a set of integers greater and equal to 4.State elements in set B. Then set B ={ 4,5,6,7,8---}

Exercise:

Let pupils do the following exercise by putting correct symbols to make the Statement true.

1: 12-------------------3   2: 101 cm--------------- 1m

3: 6x------------------3x+4x   4: ½ ----------------------1/3

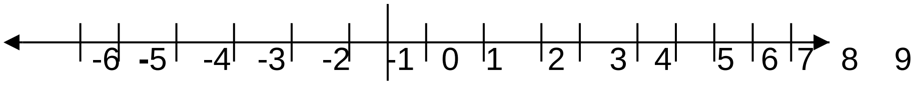
5: 0.001----------------0.1   6: 124gms----------------- 1kg.

7: 1 litre----------------500mls.   8: 1 fourscore-------------1 gross

Lesson

Representation of sets on a number line.

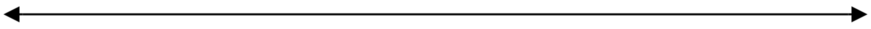
Example i: If $x < 4$ represent it on the number line and write the solution set.



Solution set : x : x = { 3,2,1,0,-1,-2,-3,----}

Example ii If $5 > y > -2$. Find the solution set.

NB: It must be made clear that in all questions involving solution sets number Lines must be drawn.



Solution set : y: y = {4,3,2,1,0,-1,-2,-----} it is an infinite set.

Example iii If $6 \geq x \geq 4$ Write dawn the solution set.

Solution:

Solution set x : x = { 6,5,4,3,2,1,-1,-2,-,3,-4.} it is a finite set.
Example iv: Write a mathematical statement represented on the number line

a)

Solution set: $^{-}2 \leq x < 5$

b)

Solution set: $y \geq {}^{-}3$

c)

Solution set: $-2 \leq x \leq 3$

Exercise: Represent the statements below on the number line and find the solution set.

i) $x < 6$ ii) $y \geq {}^{-}4$ iii) $4 \leq y < 8$

iv) $7 > x\ {}^{-}2$ v) $-6 \leq x \leq -1$

Write the mathematical statement represented on the number line.

vi)

vii)

ix)

NB: It must be noted that the circled on the number line is included in the solution set.
Ref: Primary mathematics for Uganda revision and practice by G. Wambuzi page 36-37.

LESSON
SOLVING INEQUALITIES AND FINDING SOLUTION SETS .

Example I

If x – 4 > 3. Solve and find the solution set

X – 4 + 4 > 3 +4

Example ii

$\frac{3y}{4} + 2 < 11$

\ $\underline{4}$ x 3y + 2 x 4 < 11 x4

X > 7

4

3y + 8 –8 < 44 -8

3y < 36

3 **3**

Solution set x : x = { 8,9,10,---}

Y < 12.

Solution set y: y = { 11,10,9,8,7,6,5,4----}

Example iii) Solve for t and find the solution set.

4- 6t < 16

4- 4- 6t < 16 – 4

~~-6~~t > 12

~~-6~~ -6

t >⁻2

Solution set

t: t = { -1,0,1,2,3,---}

NB It must be noted that an inequality is divided by a negative sign, the inequality sign changes. ie<to>, ≤ to ≥

Example: iv Solve and find the solution set.

⁻3x + 1 ≤ 13.

-3x +1 –1 ≤ 13 –3

~~-3x~~ ≥ ~~12~~

-3 **-3**

x ≥ - 4

Solution set:

x : x = { -4,-3,-2,-1,0,1,2,3----}

Example v Solve and find the solution set

2 - $\frac{3y}{8}$ < 8

8x2 – $\frac{3y}{\cancel{8}}$ x8 < 8 x8

16 –3y < 64

16 –16 –3y < 64-16

~~-3y~~ > ~~48~~

3 3 -3

y > -!6

Solution set

y: y = { -15,-14,13,-12,-11,-----}

Exercise 3 page 38 primary maths revision and practice by Wambuzi.

1: p +8< 10 2: y – 7 > 4 3: 4x ≤ 20 4: 3b ≥ 42.

5: $\frac{2x}{5}$ - 4**>**10 6: -2a < - 8 7: - 3x +3 ≥ 24 8: 2 – $\frac{3y}{8}$ < 8

9.Solve and find the solution set: 16 > 4x > 4

Solution: ~~16 > 4x > 4~~ **Solution set**:

$\cancel{\ }4 \quad \cancel{\ }4 \cancel{\ } \quad 4$

$\underline{4 > x > 1}$ $\qquad x : x = \underline{\{3,2\}}$

10. Solve and find the solution set 13 ≥ 3x +1 ≥ 7

Solution: **13 – 1 ≥ 3x +1 –1 ≥ 7 –1.** **Solution set:**

♦ $\frac{\cancel{12} \geq \cancel{3}x \geq \cancel{6}}{\cancel{3} \quad 3 \quad \cancel{3}}$

4 ≥ x ≥ 2 $\qquad$ **x:x = {4,3,2,}**

PATTERNS AND SEQUENCES.
LESSON
DIVISIBILITY TESTS.

1. Divide the following numbers by 2: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9
Any number ending with an even digit or ending with 0,2,4,6,8 is divisible by 2.

Exercise:
Choose numbers divisible by 2 from the following.

1. 10 2. 310 3. 11 4. 314 5. 36
6. 196 7. 22 8. 313 9. 907 10. 23
11. 105 12. 998

2. Divisibility by 3: **Any number is exactly divisible by three if the sum of the digits is divisible by 3.**

Example: Is 144 divisible by 3?
Sum of digits 1 + 4 + 4 = 9 (9 ÷ 3 = 3)
List only those numbers which are exactly divisible by 3.

Exercise:

1. 0 2. 10 3. 91 4. 1 5. 11
6. 93 7. 2 8. 13 9. 155 10. 3
11. 90 12. 768

3. Divisibility by 4:
A number is divisible by 4 if its last two digits are zero or divisible by 4.
Find only those numbers that are exactly divisible by 4.

1. 0 2. 6 3. 36 4. 1 5. 7
6. 356 7. 2 8. 18 9. 244 10. 3
11. 19 12. 10000

4. Divisibility test by 5:

A number is divisible by 5 if it ends with o or 5.

a). Write down multiples of 5 less than 60. $M_5 = \{ \quad \}$

b). Underline only those numbers that are divisible by 5:- 142, 345, 700, 1196, 752, 850, 1190

c). List the missing multiples of 5:- {170, ___, 180, ___, 190, ___, 200, ___, 210, ___, 220}

5. Divisibility test for 6

A number is divisible by 6 if it is divisible by 2 and 3.

6. Divisibility test for 7

When the last digit of a number is doubled and the result is subtracted from the number formed by the remaining digits. The outcome is divisible by 7

Eg take the number 861

The last digit is 1 and the number formed by the remaining digits is 86,double 1 (1+1)=2

Subtract 2 from 86 to give (86-2)=84

84 is divisible by 7. hence 861 is also divisible by 7

7. Test for 8

A number is divisible by 8 if the number formed by the last three digits is divisible by 8

Eg in the number 7960, 960 is the number formed by the last three digits is divisible by 8 therefore, 7960 is divisible by 8.

8.Test for 9

A number is divisible by 9 if the sum of its digits is divisible by 9

9. Test for 10

A number is divisible by 10 if the digit in the ones place is 0.

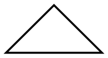
10.Test for 11

A number is divisible by 11 if the difference between the sum of the digits in even places and the sum of the digits in the odd place is zero or divisible by 11.

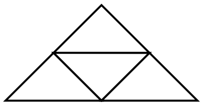
LESSON
TYPES OF NUMBERS

i) TRIANGULAR NUMBERS - TRIANGULAR PATTERNS

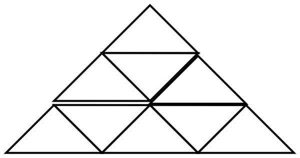
1



1 + 2 = 3



1 + 2 + 3 = 6



1 + 2 + 3 + 4 = 10

Using triangular patterns given the next 3 triangular numbers.

When you add consecutive numbers from 1, the sum is always a triangular number.

Triangular numbers = {1,3,6,10,15,21,28,36, ……}.

Example:

What is the sum of the first 7 counting numbers?

List of numbers.

Sum = 1 + 2 + 3 + 4 + 5 + 6 + 7

= 6 + 9 + 13

= 15 + 13

= **28.**

The sum can also be obtained by using a short method: $n\frac{(n+1)}{2}$

$$\text{So } n\frac{(n+1)}{2} = 7\frac{(7+1)}{2}$$

$$= \frac{7 \times 8}{2} = \frac{56}{2}$$

$$= \underline{28} \text{ (Is the sum)}$$

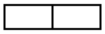
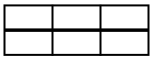
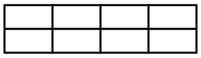
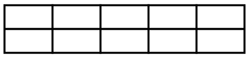
Exercise:

1. List all triangular numbers less than 30.
2. What is the sum of the first 10 triangular numbers.
3. Fill in the missing numbers – {1, ___, 6, 10, ____, ____ }
4. What is the sum of the third and sixth triangular numbers.
5. Use the formular $n\frac{(n+1)}{2}$ to get;
   i. the 30th triangular number
   ii. the sum of all numbers from 1 to 50
6. How many sticks will the next grouping have?

Lesson

RECTANGULAR NUMBERS.

1. Rectangular numbers can be arranged to make a rectangle.

Rectangle	No. of squares
	2
	6
	8
	10

Arrange squares to form the next four rectangular numbers.
Rectangular numbers are = {2,6,8,10,12,14,15,20}
How to obtain rectangular numbers.

Exercise:
Study the rectangular patterns above then draw and write rectangular numbers for each of these.

1. 2 by 3 2. 3 by 6 3. 4 by 6 4. 4 by 7 5. 3 by 7
6. 6 by 7 7. 3 by 5 8. 4 by 9

Lesson

SQUARE NUMBERS:

Study the table below.

1 x 1 = 1 2 x 2 = 4 3 x 3 = 9 4 x 4 = 16 5 x 5 = 25
6 x 6 = 36 7 x 7 = 49 8 x 8 = 64 9 x 9 = 81 10 x 10 = 100
11 x 11 = 121 12 x 12 = 144

What is the square of:
1. 9 2. 16 3. 49 4. 100 5. 81

Note: The shape formed by triangular number is a triangle.
The shape formed by square number is a square.

Example:

1 x 1 2 x 2 3 x 3 4 x 4

How is the next number obtained?

Method 1:

1 + 3 = 4
4 + 5 = 9
9 + 7 = 16
16 + 9 = 25
25 + 11 = 36

Method 2:

1 = 1
1 + 3 = 4
1 + 3 + 5 = 9
1 + 3 + 5 + 7 = 16
1 + 3 + 5 + 7 + 9 = 25
1 + 3 + 5 + 7 + 9 + 11 = 36

Obtain the next four square numbers using the same method.

Method 3:

1 x 1	2 x 2	3 x 3	4 x 4	5 x 5
1^2	2^2	3^2	4^2	5^2

<u>Exercise:</u>

1. Find the value of the unknown.
1 x 1 = a   2 x 2 = k   4 x k = 16   y x y= 25
z = 7 x 7   8 = p x p   11 x 11 = f   13 x b = 139

2. Work out the following.
a). 62 = k   b). 10t = 100   c). 169 = k2   d). 20a = 400
e). k = 92   f). 12n = 144

3. What is the square of:
a). 11   b). 17   c). 14   d). 16   e). 13
f). 19   g). 12   h). 18   i). 15

LESSON

<u>iv) WHOLE NUMBER AND COUNTING.</u>

1. whole numbers = {0,1,2,3,4,5,6,……}

Note: a). whole numbers are all positive numbers.
b). o is not a counting number.

Counting Number:- {1,2,3,4,5,6,7,8,9,……}

Exercise:

1. Give a set of counting numbers between 5 and 11.
2. Give a set of the first five whole number.
3. Write elements in a set of counting numbers greater than 15 but less than 24.
4. List elements in a set of counting numbers which are divisible by 3.

Practice work on page 73 MK 6.

Lesson

EVEN NUMBERS / ODD NUMBERS.

0 X 2	1 X 2	2 X 2	3 X 2	4 X 2	5 X 2
0	2	4	6	8	10

Even numbers are = {0,2,4,6,8,10,……} (**2 x n = 2n)**

Odd numbers are = {1,3,5,7,9,11,13,15,17,…….} (**2n + 1)**

Note: If n is a whole number.

A whole number x 2 = 2n (even number)

A whole number x 2 plus 1 = 2n + 1 = odd number.

Exercise:

1. List elements in a set of even numbers below 20.
2. List elements in a set of even numbers between 8 and 30.
3. What is the first even number?
4. List down members in a set of even numbers divisible by 3 less than 50.
5. List down elements in a set of odd numbers greater than 4 but less than 20.

More practice work on page 74 MK 6.

Lesson

FINDING CONSECUTIVE NUMBERS.

1. Counting numbers.

Example: The sum of three consecutive counting numbers is 36. What are these numbers?

Let them be **n , (n+1), (n+2).**

n + n + n + 1 + 2 = 36

3n + 3 = 36

3n + 3 – 3 = 36 – 3

$$\frac{3n}{3} = \frac{33}{3}$$

n = <u>11</u>

The 1st n = 11

The 2nd n +1 = 11 + 1 = 12

The 3rd n + 2 = 11 + 2 = 13

Exercise:

1. The sum of 3 consecutive counting numbers is 21. What are these numbers?
2. The sum of 3 consecutive counting numbers is 39. Find these numbers.
3. Find the consecutive counting numbers whose total is 51.
4. Find 4 consecutive counting numbers whose sum is 86.
5. List down 3 consecutive counting numbers whose total is 72.

More practice work on page 76 MK 6.

LESSON

Consecutive Even/Odd Numbers.

Example 1: The sum of 3 consecutive even numbers is 24. List down the three numbers.

Let the 1st number be: (x)
2nd number be: (x+2)
3rd number be: (x+4)

Form an equation and solve for x:
x + (x +2) + (x + 4) = 24
3x + 6 = 24
3x + 6 – 6 = 24 – 6
3x = 18
3 3
x = **<u>6</u>**

x = 6
x+2 = 6 + 2 = 8
x + 4 = 6 + 4 = 10

Example 2: The sum of 4 consecutive odd numbers is 32. What are the numbers?

Let the 1st number be: p
2nd number be: p + 2
3rd number be: p + 4
4th number be: p + 6

p + (p + 2) + (p + 4) + (p + 6)
4p + 12 = 32
4p + 12 – 12 = 32 – 12
4p = 20

p = 5
p + 2 = 5 +2 = 7
p + 4 = 5 + 4 = 9

4   4   p + 6 = 5 + 6 = 11

p = **5**

Exercise:

1. Find the three consecutive even numbers whose total is 42.
2. The sum of 3 consecutive odd numbers is 45. Find the numbers.
3. The sum of 3 consecutive even numbers is 36. Find the third if two of then are 12 and 14.
4. The sum of 4 consecutive even numbers is 52. List all the number.
5. Find the bar consecutive odd numbers whose total is 88.

More practice work on page 76 MK 6.

Lesson

PRIME NUMBERS.

A prime number is a number with only two factors that is, “one and itself”.

Examples of prime numbers:

2,3,5,7,11,13,17,19,23,29,31,41,43,47,53,59,61,67,71,73,79,83,89,97

Exercise:

1. Give a set of prime numbers between 1 and 10.
2. Write elements in a set of prime numbers between 10 and 30.
3. List members in a set of prime numbers between 30 and 50.
4. How many prime numbers are there between 50 and 60?
5. How many prime numbers are there between 70 and 80?
6. How many prime numbers are there between 90 and 100?
7. What is the sum of the 3rd and seventh prime number?
8. What is the sum of prime numbers between 80 and 100?
9. How many even prime numbers are there between 1 and 100?

COMPARING PRIME NUMBERS AND COMPOSITE NUMBERS:

No.	Set of facts	No. of facts	Type of No.
0	0	1	Not prime
1	1	1	Not prime
2	1,2	2	Prime number
3	1,3	2	Prime number
4	1,2,4	3	Composite no.
5	1,5	2	Prime number
6	1,2,3,6	4	Composite no.
7	1,7	2	Prime number
8	1,2,4,8	4	Composite no.

vii) A **composite number** is a number with more than two factors.

viii) **cube numbers**

A cube number is a number got after multiplying a number by itself three times.

Example
2x2x2=8
8 is a cube number.
2 is a cube root of 8.

FRACTIONS

LESSON

A fraction is part of a whole.

A fraction is written with two main parts.

The numerator

The denominator.

the top part of a fraction is the numerator and the bottom part is the denominator.

Eg ½ 1 is the numerator and 2 is the denominator.

TYPES OF FRACTIONS

There are three main types of fractions.

Proper fractions

These are fractions whose numerator is smaller than the denominator.

e.g ½ , ¾ , $^5/_6$

Improper fractions

These are fractions whose numerator is bigger than the denominator.

e.g. $^5/_4$, $^3/_2$, $^{19}/_5$

Mixed fractions

These are fractions that have both whole numbers and fractions.

e.g. $1^5/_6$, $3^5/_6$, $12^1/_2$

EXPRESSING IMPROPER FRACTIONS AS MIXED FRACTIONS

Example I

Express $^9/_5$ as a mixed fraction.

$9 \div 5 = 1$ remainder 4

$= \underline{\mathbf{1^4/_5}}$

Example II

Express $^{30}/_7$ as a mixed fraction.

$30 \div 7 = 4$ remainder 2

$= \underline{\mathbf{4^2/_7}}$

EXERCISE F 1

Express the following as mixed fractions.

$^3/_2$

$^{11}/_3$

$^{17}/_4$

$^{15}/_7$

$^{50}/_8$

6. $^2/_7$

LESSON

EXPRESSING MIXED FRACTIONS AS IMPROPER FRACTIONS.

Example I

Express $4^2/_3$ as an improper fraction

$$4^2/_3 = \frac{\text{W x D + N}}{\text{D}}$$

$$= \frac{4 \times 3 + 2}{3}$$

$$= \frac{12 + 2}{3}$$

$$\underline{\mathbf{= {}^{14}/_3}}$$

Example II

Express $5^1/_4$ as an improper fraction.

$$5^1/_4 = \frac{\text{W x D + N}}{\text{D}}$$

$$= \frac{5 \times 4 + 1}{4}$$

$$= \frac{20 + 1}{4}$$

$$\underline{= \mathbf{{}^{21}/_4}}$$

EXERCISE F 2

Express each of these fractions as improper fractions.

$1\,\frac{1}{2}$

$3\ {}^{1}/_{10}$

$3.10\,{}^{3}/_{5}$

$2\,{}^{7}/_{8}$

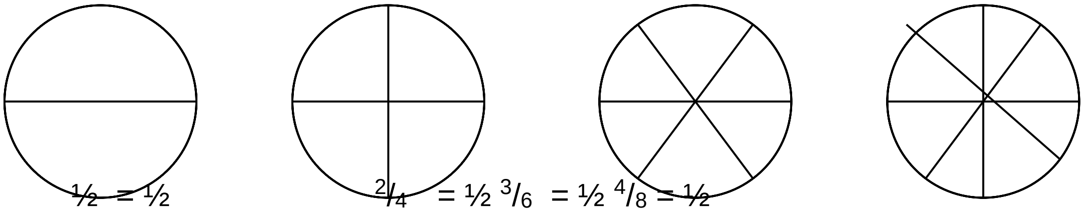
$5\,{}^{1}/_{6}$

$4\,{}^{3}/_{7}$

LESSON

EQUIVALENT FRACTIONS

The diagrams below represent half



$\frac{1}{2} = \frac{1}{2}$ $\quad {}^{2}/_{4} = \frac{1}{2}$ $\quad {}^{3}/_{6} = \frac{1}{2}$ $\quad {}^{4}/_{8} = \frac{1}{2}$

Example I

Write four fractions equivalent to ½.

$\frac{1}{2} = \frac{1 \times 2}{2 \times 2}, \quad \frac{1 \times 3}{2 \times 3}, \quad \frac{1 \times 4}{2 \times 4}, \quad \frac{1 \times 5}{2 \times 5}$

$\frac{1}{2} = {}^{2}/_{4},\ {}^{3}/_{6},\ {}^{4}/_{8},\ {}^{5}/_{10}$

Example II

Write four fractions equivalent to ${}^{2}/_{7}$.

${}^{2}/_{7} = \frac{2 \times 2}{7 \times 2}, \quad \frac{2 \times 3}{7 \times 3}, \quad \frac{2 \times 4}{7 \times 4}, \quad \frac{2 \times 5}{7 \times 5}$

${}^{2}/_{7} = {}^{4}/_{14},{}^{6}/_{21},{}^{8}/_{28},{}^{10}/_{35}$

EXERCISE

Write five equivalent fractions to each of these.

${}^{2}/_{3}$

${}^{9}/_{10}$

${}^{4}/_{5}$

${}^{4}/_{9}$

${}^{8}/_{10}$

Complete the equivalent fraction below.

1. ${}^{2}/_{11} = {}^{4}/_{c},\ {}^{a}/_{33},\ {}^{8}/_{d},\ {}^{b}/_{55},\ {}^{12}/_{e}$
2. ${}^{2}/_{12} = {}^{4}/_{g},\ {}^{d}/_{36},\ {}^{e}/_{48},\ {}^{10}/_{h},\ {}^{f}/_{72}$
3. ${}^{2}/_{11} = {}^{a}/_{16},\ {}^{9}/_{d},\ {}^{b}/_{32},\ {}^{15}/_{e},\ {}^{c}/_{48}$

LESSON

REDUCING FRACTIONS

i) To reduce a fraction is to simplify it to its simplest terms.

ii) This is done by dividing the numerator and denominator by their GCF.

Example I

Reduce $^{12}/_{24}$ to its simplest terms.

F12 = {1, 2, 3, 4, 6, 12}

F24 = {1, 2, 3, 4, 6, 8, 12, 24}

CF = {1, 2, 3, 4, 6, 12}

GCF = 12

$\frac{12 \div 12}{24 \div 12}$

= $\frac{1}{2}$

Example II

Reduce $^{18}/_{20}$ to its simplest terms.

F18 = {1, 2, 3, 6, 9, 18}

F20 = {1, 2, 4, 5, 10,20}}

CF = {1,2}

GCF = 2

$\frac{18 \div 2}{20 \div 2}$

= $\mathbf{^{9}/_{10}}$

EXERCISE F 4

$^{2}/_{4}$

$^{9}/_{10}$

$^{20}/_{30}$

$^{30}/_{90}$

$^{8}/_{12}$

$^{5}/_{10}$

$^{12}/_{18}$

LESSON

ORDERING FRACTIONS

To order fractions is to arrange fractions in ascending or descending order.

Ascending order means from smallest to highest.

Descending means from biggest to smallest.

We can use the LCM to determine the size of the fraction in natural numbers.

Example I

Arrange $^{1}/_{3}$, ½, ¼ in ascending order.

LCM of 3, 2 and 4 = 12 **(Find LCM by prime factorisation using the ladder)**

$^1/_{\cancel{3}} \times \cancel{12}\,^2$ $\quad$ $^1/_{\cancel{2}}, \times \cancel{12}\,^6$ $\quad$ $^1/_4 \times \cancel{12}\,^3$

$1 \times 2 = 2$ $\quad$ $1 \times 6 = 6$ $\quad$ $1 \times 3 = 3$

Ascending order = ¼, $^1/_3$, ½.

Example II

Arrange $^7/_{12}$, $^3/_8$, $^5/_8$ in descending order.

LCM of 12 and 8 = 24 **(Find LCM by prime factorisation using the ladder)**

$^7/_{\cancel{12}} \times \cancel{24}\,^2$ $\quad$ $^3/_{\cancel{8}}, \times \cancel{24}\,^3$ $\quad$ $^5/_{\cancel{8}} \times \cancel{24}\,^3$

$7 \times 2 = 14$ $\quad$ $3 \times 3 = 9$ $\quad$ $5 \times 3 = 15$

Descending order = $^5/_8$, $^7/_{12}$, $^3/_8$

EXERCISE

Arrange the following fractions as instructed in brackets

1. $^3/_4$, $^2/_3$, $^1/_2$. (ascending)
2. $^5/_6$, $^5/_8$, $^5/_{12}$. (ascending)
3. $^1/_2$, $^1/_3$, $^1/_4$, $^1/_6$. (descending)
4. $^5/_6$, $^4/_5$, $^7/_{10}$, $^2/_3$. (descending)
5. $^3/_4$, $^2/_3$, $^5/_6$. (ascending)
6. $^5/_6$, $^4/_5$, $^7/_{10}$, $^2/_3$. (descending)
7. Which is smaller $^5/_6$ or $^5/_8$?
8. Which is bigger $^1/_2$ or $^2/_{12}$?

LESSON

ADDITION OF FRACTIONS

To add fractions, find the LCM of the denominators of the fractions.

Example I

Add: ¼ + ½ **(Find LCM of 2 and 4 by prime factorisation using the ladder)**

$= \underline{(4 \div 4 \times 1) + (4 \div 2 \times 1)}$

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

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

Example II

Add: $^5/_6 + {}^3/_8$**(Find LCM of 6 and 8 by prime factorisation using the ladder)**

$\underline{20 + 9} = \quad \underline{29}$***(Change to a mixed fraction)***

24 24

<u>= $1^{5}/_{24}$</u>

Example III

EXERCISE

Add the following:

$^{1}/_{3}{}^{+}\,{}^{1}/_{2}$

$^{4}/_{3}{}^{+}\,{}^{1}/_{2}$

$^{7}/_{10}{}^{+}\,{}^{1}/_{20}$

$^{1}/_{5}{}^{+}\,{}^{1}/_{2}$

$^{2}/_{7}{}^{+}\,{}^{3}/_{4}$

$^{2}/_{9}{}^{+}\,{}^{1}/_{6}$

ADDITION OF WHOLES TO FRACTIONS

<u>Example I</u>

Add: ¾ + 5

= 5 + ¾

= **<u>5 ¾</u>**

<u>Example II</u>

Add: 3 $^{2}/_{5}$ + 7

= 3 + 7 + $^{2}/_{5}$**(First add the wholes alone)**

= 10 + $^{2}/_{5}$

= <u>10 $^{2}/_{5}$</u>

<u>Example III</u>

Add: 5 $^{3}/_{7}$+ 12

= 5 + 12 + $^{3}/_{7}$**(First add the wholes alone)**

= 17 + $^{3}/_{7}$

= **<u>$17^{3}/_{7}$</u>**

EXERCISE

Add the following

$^{1}/_{5}$+ 3

10 + $1^{5}/_{7}$

4 $^{1}/_{5}$+ 6

22 $^{1}/_{5}$ + 13

2 $^{3}/_{7}$ + 8

1 $^{1}/_{4}$+ 9

Lesson

MORE ON ADDITION

<u>Example I</u>

Add: $6^{2}/_{3}$ + $^{5}/_{6}$

= <u>6 x 3 + 2</u>**(mixed to improper)**

<u>Example II</u>

$^{1}/_{15}$ + $1^{1}/_{3}$ + $^{3}/_{5}$**(mixed to fractions)**

= $^{1}/_{15}$ +$^{4}/_{3}$ + $^{3}/_{5}$**(LCM of 15, 3 and 5 = 15)**

3

$= {}^{20}/_{3} + {}^{5}/_{6}$ **LCM of 3 and 6 = 6**

$= \frac{\underline{40 + 5}}{6}$

$= {}^{45}/_{6}$ **Change to mixed fraction**

$\underline{= 7^{3}/_{6}}$

$= \frac{\underline{1 + 20 + 9}}{15}$

$= {}^{30}/_{15}$ **(reduce by the HCF)**

$\underline{= \ 2}$

EXERCISE

1. $5 + 4^{2}/_{3}$
2. $3^{3}/_{7} + 4$
3. $2^{1}/_{5} + {}^{2}/_{3}$
4. ${}^{1}/_{15} + 3^{1}/_{2}$
5. ${}^{3}/_{4} + 4^{1}/_{8} + 2^{5}/_{8}$
6. ${}^{1}/_{6} + {}^{5}/_{9} + 1^{1}/_{3}$

Lesson
WORD PROBLEMS INVOLVING ADDITION OF FRACTIONS

Example I

John filled ½ of a tank with water in the morning and ${}^{2}/_{5}$ in the afternoon. Hat fraction o he tank was full with water?

Morning + Afternoon

$½ + {}^{2}/_{5}$ **LCM of 2 and 5 = 10**

$= \frac{\underline{5 + 4}}{10}$

$= \underline{\mathbf{{}^{9}/_{10}}}$

<u>The tank was filled with</u> $\underline{{}^{9}/_{10}}$

Example II

Abdel had 1½ cakes. Jane had $2^{3}/_{4}$ cakes and Rose had ¾ of a cake. How many cakes did they have altogether?

Abdel + Rose + Jane

$1^{1}/_{2} + {}^{3}/_{4} + +2^{3}/_{4}$ **(Change to improper)**

$= {}^{3}/_{2} + {}^{3}/_{4} + {}^{11}/_{4}$ **(LCM of 2 and 4 = 4)**

$= \underline{6 + 3 + 11}$

4

= $^{20}/_{4}$ (**reduce the fraction to its simplest terms**)

= **<u>5 cakes.</u>**

EXERCISE

$^{2}/_{3}$ of the seats in a bus is filled by adults and ¼ by children. What fraction of the seats in the bus is occupied?

A worker painted 3 $^{1}/_{9}$ wall on Monday and $^{4}/_{9}$ on Tuesday. What fraction of the house was painted on Monday?

In a school library, $^{5}/_{15}$ of the books are mathematics, $^{1}/_{6}$ of the books are English and $^{1}/_{3}$ are Science. What fraction do the three books represent altogether?

A mother gave sugar canes to her children. The daughter got 1 ½ and the sun got 2 ¼ How many sugarcanes are these altogether?

At Mullisa P. S. $^{2}/_{3}$ of the day is spent on classroom activities, $^{3}/_{12}$ on music and $^{1}/_{8}$ on games. Express these as one fraction.

LESSON

SUBTRACTION OF FRACTIONS

<u>Example I</u>

½ – $^{1}/_{3}$. LCM of 2 and 3 = 6

$= \frac{3 - 2}{6}$

$= \underline{^{1}/_{6}}$

<u>Example II</u>

5 – $2^{5}/_{12}$. **Change mixed to improper fraction.**

= $^{5}/_{1} - ^{29}/_{12}$ **LCM of 1 and 12 = 12**

$= \frac{60 - 29}{12}$

= $^{31}/_{12}$

Change to mixed fraction.

= **$\underline{2^{7}/_{12}}$**

Example III

$2^{2}/_{5} - 1^{1}/_{4}$ **Change mixed to improper fraction**

= $^{14}/_{5} - {}^{5}/_{4}$ **LCM of 5 and 4 = 20**

= $\dfrac{\mathbf{56 - 25}}{20}$

= $^{31}/_{20}$ **Change to mixed fraction.**

= **$\underline{1^{11}/_{20}}$**

EXERCISE 7

$^{4}/_{5} - {}^{1}/_{5}$

$1^{1}/_{10} - {}^{1}/_{2}$

$3 - {}^{1}/_{2}$

$3^{1}/_{5} - 1^{1}/_{10}$

$3^{3}/_{4} - 1^{1}/_{4}$

$2^{3}/_{8} - 1^{1}/_{8}$

Lesson

WORD PROBLEMS INVOLVING SUBTRACTION OF FRACTIONS

Example I

A baby was given $^{5}/_{6}$litres of milk and drunk $^{7}/_{12}$litres. How much milk remained?

Given – drunk

= $^{5}/_{6} - {}^{7}/_{12}$ **LCM of 6 and 12 = 12**

= $\dfrac{10 - 7}{12}$

= $^{3}/_{12}$. **Reduce to simplest term**.

= **$\underline{¼ \text{ litres}}$**

Example II

2½ litres of water were removed from a container of 5 ¼ litres. How much water remained?

Water remaining = 5 ¼ – 2 ½

= $^{21}/_{4} - {}^{5}/_{2}$ **LCM of 4 and 2 = 4**

= $\dfrac{21 - 10}{4}$

= $^{11}/_{4}$. Change to mixed fraction.

= **2 ¾ litres of water remained**.

LESSON

ADDITION AND SUBTRACTION OF FRACTIONS

Example I

$\frac{1}{2} + {}^{1}/_{3} - \frac{1}{4}$ **LCM of 2, 3 and 4 = 12**

$= \frac{6 + 4 - 3}{12}$ **Add first**

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

$=$ **${}^{7}/_{12}$**.

Example II

Work out:

${}^{5}/_{6} - {}^{5}/_{9} + {}^{7}/_{18}$ **Collect positive integers first**

$= {}^{5}/_{6} + {}^{7}/_{18} - {}^{5}/$**LCM of 6, 18 and 9 = 18**

$= \frac{15 + 7 - 10}{18}$ **Add first**

$= \frac{22 - 10}{18}$ **Then subtract**

$= {}^{12}/_{18}$ **Reduce to simplest term**

$= \underline{12 \div 6} \;\; = 2$

$18 \div 6 \;\; = 3$

$=$ **${}^{2}/_{3}$**

Example III

Work out: $7^{1}/_{2} - 3^{1}/_{4} + 1^{3}/_{12}$

$7^{1}/_{2} - 3^{1}/_{4} + 1^{3}/_{12}$ **Change to improper fraction first.**

$= {}^{15}/_{2} - {}^{13}/_{4} + {}^{15}/_{12}$ **Collect positive terms**

$= {}^{15}/_{2} + {}^{15}/_{12} - {}^{13}/_{4}$ **LCM of 2, 12 and 4 = 12**

$= \frac{90 + 15 - 39}{12}$ **Add first**

$= \frac{105 - 39}{12}$

$= \underline{66 \div 6} = \underline{11}$

$12 \div 6 \;\; = 2$

$= {}^{11}/_{2}$ **Change to mixed fraction.**

=**5 ½**

EXERCISE f8

1. ${}^{5}/_{4} + {}^{1}/_{5} - {}^{1}/_{2}$

2. ${}^{2}/_{3} - {}^{5}/_{6} + \frac{3}{4}$

3. $1^{1}/_{2} + 2^{1}/_{3} - \frac{1}{4}$

4. $2^{1}/_{6} – 3^{1}/_{2} + 5$

5. $5^{1}/_{5} + 1^{4}/_{5} – 3$

6. $^{2}/_{3} + ^{3}/_{5} – ^{7}/_{15}$

LESSON

MULTIPLICATION OF FRACTIONS

Example I

¼ x 3 **Make 3 a fraction.**

= ¼ x $^{3}/_{1}$

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

= **¾**

Example II

$^{2}/_{3}$ x 21 **Make 21 a fraction**

= $^{2}/_{3}$ x $^{21}/_{1}$

$= \frac{2 \text{ x } \cancel{21}^{7}}{_{1}\cancel{3} \text{ x } 1}$

$= \frac{2 \text{ x } 7}{1 \text{ x } 1}$

= **14**

Example III

½ of 16 **‘of’ means multiplication**

= ½ x 16 **make 16 a fraction**

= ½ x $^{16}/_{1}$

$= \frac{1 \text{ x } \cancel{16}^{8}}{_{1}\cancel{2} \text{ x } 1}$

= 1 x 8

1 x 1

= **8**

Example IV

$2^{1}/_{3}$ of 27 **of means multiplication.**

= $2^{1}/_{3}$ x 27 **make 27 a fraction**

= $2^{1}/_{3}$ x $^{27}/_{1}$ **mixed to improper fraction**

= $^{7}/_{3}$ x $^{27}/_{1}$

$= \frac{7 \text{ x } \cancel{27}^{9}}{_{1}\cancel{3} \text{ x } 1}$

$= \frac{7 \text{ x } 9}{1 \text{ x } 1}$

= **63**

EXERCISE

Multiply:

$^{1}/_{3}$ x 3

$^{2}/_{3}$ of 15

$2^{2}/_{5}$ of 20

$^{1}/_{10}$ x $^{2}/_{9}$

$^{2}/_{5}$ x 10

$1^{5}/_{7}$ of 21

$^{1}/_{2}$ x ¼

$^{1}/_{8}$ x $^{1}/_{5}$

Lesson

WORD PROBLEMS INVOLVING MULTIPLICATION OF FRACTIONS

Example I

What is ¼ of 1 hour?

= ¼ of 1 hour

= ¼ of 60 minutes

= ¼ x 60

= ¼ x $^{60}/_{1}$.

$= \frac{1 \text{ x } \cancel{60}^{15}}{{}_{1}4 \text{ x } 1}$

= 1 x 15

= **15 minutes.**

Example II

A mathematics book contains 200 pages. A pupil reads $^{3}/_{5}$ of the book. How many pages did the pupil read?

A pupil read $^{3}/_{5}$ of 200 pages.

= $^{3}/_{5}$ of 200 pages

= $^{3}/_{5}$ x $^{200}/_{1}$

$= \frac{3 \text{ x } \cancel{200}^{40}}{{}_{1}\cancel{5} \text{ x } 1}$ pages

$= \frac{3 \text{ x } 40}{1 \text{ x } 1}$ pages

= **120 pages**.

EXERCISE

What is $^{1}/_{6}$ of 24 kilograms?

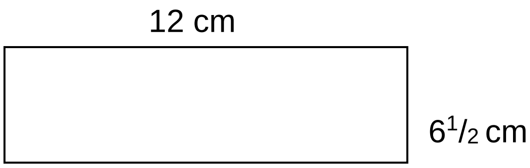
What is $^{1}/_{5}$ of 30 litres?

A man received of his salary. If his salary was sh. 20,000, how much money did he receive?

Sempa wants to visit his uncle who lives near Kabale town. The journey to Kabale is 40 kilometres away. If his uncle’s home is at $^{7}/_{8}$ of the journey, how far is it in km?

A man had sh. 1,000. He gave away $^{2}/_{5}$ of it to his wife. How much money did he give to his wife?

Find the area of the rectangle below.



LESSON

RECIPROCALS OF FRACTIONS

Reciprocal of a fraction is the opposite of a given fraction.

The numerator of the fraction becomes the denominator and the denominator becomes the numerator.

Eg. a) The reciprocal of ¼ = $^{4}/_{1}$

b) The reciprocal of $^{2}/_{3}$ = $^{3}/_{2}$

c) The reciprocal of $^{5}/_{8}$ = $^{8}/_{5}$ etc.

If a whole number is given, make it a fraction by putting it over 1 and give its reciprocal

Eg. a) The reciprocal of 6 = $^{6}/_{1}$ = $^{1}/_{6}$

b) The reciprocal of 10 = $^{10}/_{1}$ = $^{1}/_{10}$.

If a mixed fraction is given, change it to an improper fraction and then give the reciprocal of the improper fraction.

Eg. a) The reciprocal of 1½ = $^{3}/_{2}$ =$^{2}/_{3}$.

b) The reciprocal of $33^{1}/_{3}$.= $^{100}/_{3}$ = $^{3}/_{100}$.

RECIPROCALS OF FRACTIONS BY CALCULATION

We should take note that a number multiplied by its reciprocal gives 1.

Example I

What is the reciprocal of $^{3}/_{5}$?

Let the reciprocal of $^{3}/_{5}$ be y

$^{3}/_{5}$ x y = 1

$^{3}/_{5}$ x $^{y}/_{1}$ = 1

$^{3y}/_{5}$ = 1 **Make 1 a fraction**.

$^{3y}/_{5}$ = $^{1}/_{1}$. **Cross-multiply**

3y x 1 = 5 x 1

3y = 5

3y = 5 **divide both sides by 3**

$^{3y}/_{3}$ = $^{5}/_{3}$

y = $^{5}/_{3}$.

$\therefore$ <u>The reciprocal of $^{3}/_{5}$ is $^{5}/_{3}$</u>.

EXERCISE

A. ***Calculate the reciprocal of each of the following***.

½

$^{5}/_{3}$.

$^{5}/_{3}$.

7

23

14

$3^{1}/_{8}$.

$4^{7}/_{12}$.

B. ***Find the product of the given number and its reciprocal***.

5

$^{3}/_{8}$.

3 ½

10

$^{4}/_{9}$.

<u>LESSON</u>

DIVISION OF FRACTIONS

Example I

Divide $^{1}/_{5} \div 4$ **Make 4 a fraction**

= $^{1}/_{5} \div {}^{4}/_{1}$. **Change (÷) to (x) then reciprocal of $^{4}/_{1}$ = $^{1}/_{4}$**.

= $^{1}/_{5}$ x ¼

= $\frac{\mathbf{1 \times 1}}{5 \times 4}$

= $\underline{\mathbf{^{1}/_{20}}}$.

Example II

½ ÷ ¼ **Change (÷) to (x) then reciprocal of $^{1}/_{4}$ = $^{4}/_{1}$.**

= ½ x $^{4}/_{1}$.

$= \frac{1 \times \cancel{4}^{2}}{{}_{1}\cancel{2} \times 1}$

$= 1 \times 2$

$= \underline{\mathbf{2}}$

EXERCISE C 15

1. $^{1}/_{6} \div 4$
2. $^{1}/_{3} \div 2$
3. $^{2}/_{3} \div 4$
4. $^{3}/_{7} \div 3$
5. $^{4}/_{20} \div {}^{1}/_{4}$
6. $^{5}/_{8}$ of the bread was shared among 16 children. How much bread was given out?

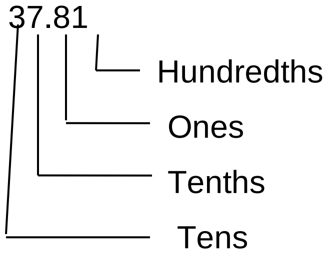
LESSON

DECIMALS

Place values of decimals

Examples 1

Write the place value of each digit in the number 37.81



Activity

Exercise 2:10 no 1 and 3

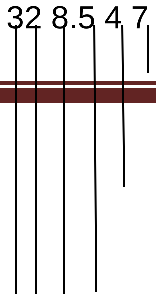
Lesson

Values of decimals

Example 1

Write the value of each digit in the number 328.547

Solution



7×1/1000=7/1000

=0.007

4×1/100 =4/100

=0.04

5×1/10 =5/10

=0.5

8×1 =8

2×10 =20

3×100 =300

Activity

Find the value of each digit in the numbers below

1:534.698

2:17.045

3:0.936

4:8.607

Lesson

Writing decimals in words

Examples

Write the following decimals in words

1:0.345

0.345=$\frac{345}{1000}$

=three hundred forty five thousandths

2:23.15

Solution

23.15=23 and $\frac{15}{100}$

=Twenty three and fifteen hundredths

Activity

Exercise 2:9 page 27

Lesson

Writing decimal words in figures

Example

Write sixteen and fourteen hundredths in figures

Solution

Sixteen =16

Fourteen hundredths = + 0.14

16.14

Activity

Exercise 2:9 page 27

Lesson

EXPRESSING FRACTIONS AS DECIMALS.

NOTE:

a) $^{1}/_{1}$. = 1 (***The denominator has no zero, so gives no decimal place***)

b) $^{1}/_{10}$. = 0.1 (***The denominator has 1 zero, so gives 1 decimal place***)

c) $^{1}/_{100}$. = 0.01 (***The denominator has 2 zeros, so gives 2 decimal places***)

Example I

a) Write 25 as a decimal number.

= $^{25}/_{1}$. = **25.** (***No zero, no decimal place***)

b) Write $^{25}/_{10}$.as a decimal fraction.

= $^{25}/_{10}$. = **2.5** (***1 zero, 1 decimal place***)

c) Write $^{25}/_{100}$. as a decimal fraction.

= $^{25}/_{100}$. = **0.25** (***2 zeros, 2 decimal places***)

NB: The zero before the decimal point is used to keep the place of whole numbers.

Example II

Express $3^{1}/_{10}$. as a decimal number.

First change to improper fraction.

Example III

Express $7^{5}/_{100}$. as a decimal fraction

First change to improper fraction.

$3^{1}/_{10}$. = $\frac{(10 \text{ x } 3) + 1}{10}$

= $^{31}/_{10}$.

= **3.1** (***1 zero, 1 decimal place***)

$7^{5}/_{100}$. = $\frac{100 \text{ x } 7 + 5}{100}$

= $^{705}/_{100}$.

= **7.05** (**2 zeros,2 de. places**.)

EXERCISE

Express these fractions as decimals

1. $^{15}/_{1}$.
2. $^{125}/_{100}$.
3. $^{65}/_{10}$.
4. $^{625}/_{1}$.
5. $^{625}/_{100}$.
6. $^{25}/_{10}$.
7. $9^{5}/_{10}$.
8. $5^{25}/_{100}$.
9. $13^{7}/_{10}$.
10. $4^{9}/_{100}$.
11. $15^{8}/_{100}$.
12. $2^{3}/_{1}$

Lesson

CONVERTING DECIMALS TO FRACTIONS

NOTE.:

a) 1 decimal place gives 1 zero on the denominator. Eg 0.5 = $^{5}/_{10}$.

b) 2 decimal places give 1 zeros on the denominator. Eg 0.05 = $^{5}/_{100}$.

Example I

Express 6.9 as a common fraction.

6.9 = $^{69}/_{10}$. (**1 decimal place gives 1 zero on the denominator**.)

= $^{69}/_{10}$. **Change to mixed fraction**.

= **$6^{9}/_{10}$**.

Example II

Express 3.05 as a common fraction.

3.05 = $^{305}/_{100}$. (**2 decimal places give 1 zeros on the denominator**.)

= $^{305}/_{100}$. (**Change to mixed fraction**)

= $3^{5}/_{100}$. (**Reduce $^{5}/_{100}$ to give $^{1}/_{20}$**.)

= **$3^{1}/_{20}$**.

EXERCISE

***Express as common fractions and reduce where necessary*.**

1. 0.1
2. 2.5
3. 0.25
4. 6.75
5. 64.41
6. 11.2

LESSON

ORDERING DECIMALS

Example I

Arrange from the smallest: 0.1, 1.1, 0.11

Change to common fractions. $= {}^{1}/_{10},\ {}^{11}/_{10},\ {}^{11}/_{100}.$

The biggest denominator is the LCM. = 100

Multiply each fraction by the LCM $= \frac{1}{1\cancel{0}} \times 10\cancel{0} = \mathbf{10}$ (1st)

$= \frac{11}{1\cancel{0}} \times 10\cancel{0} = \mathbf{110}$ (2nd)

$= \frac{11}{1\cancel{00}} \times 1\cancel{00} = \mathbf{11}$ (3rd)

From smallest = 0.1, 0.11, 1.1.

Example II

Arrange from the smallest: 0.22, 0.2, 1.2

Change to common fractions. $= {}^{22}/_{100},\ {}^{2}/_{10},\ {}^{12}/_{10}.$

The biggest denominator is the LCM. = 100

Multiply each fraction by the LCM $= \frac{22}{1\cancel{00}} \times 1\cancel{00} = \mathbf{22}$ (2nd)

$= \frac{2}{1\cancel{0}} \times 10\cancel{0} = \mathbf{20}$ (3rd)

$= \frac{12}{1\cancel{0}} \times 10\cancel{0} = \mathbf{120}$ (1st)

From biggest = 1.2, 0.22, 0.2.

Example III

Which is less than the other? 0.2 or 0.1 (Use < or > correctly)

0.2 0.1

Change to common fractions. = $^{2}/_{10}$, $^{1}/_{10}$

The biggest denominator is the LCM. = 10

Multiply each fraction by the LCM $= \frac{2}{1\cancel{0}} \times 1\cancel{0} = 2$

$= \frac{1}{1\cancel{0}} \times 1\cancel{0} = 1$

$\therefore 0.2 > 0.1$

EXERCISE

A. Arrange the decimals as instructed in the brackets.

1. 0.1, 0.3, 0.33 (from smallest)
2. 2.2, 0.22, 0.02 (from biggest)
3. 1.05, 0.15, 1.5. (from smallest.)
4. 0.08, 0.8, 0.34. (from biggest)

B. Compare by replacing the star with < or > (show your working)

5. 0.2 * 0.3
6. 5.4 * 5.3
7. 0.5 * 0.9
8. 0.8 * 0.9

Lesson

ROUNDING OFF DECIMALS

Examples

1 Round off 2.36 to the nearest tenths (1 place of decimal)

Solution

$$\begin{array}{l} 2.36 \\ \underline{+1} \\ \underline{2.4} \end{array}$$

2.36≈2.4

Activity

Ref mk pri mtc book 7 page 32 -34

LESSON

ADDITION OF DECIMAL FRACTIONS

Example I

Add: 14.9 + 8.02 + 36.48

Arrange vertically and put the decimal point in line

$$\begin{array}{r} 14.90 \\ 8.02 \\ +\ \underline{36.48} \\ \underline{\mathbf{59.40}} \end{array}$$

Example II

Add: 0 . 45 + 13 . 2 + 52 . 00

Arrange vertically and put the decimal point in line

$$\begin{array}{r} 0.45 \\ 13.2 \\ +\ \underline{52.00} \\ \underline{\mathbf{65.65}} \end{array}$$

EXERCISE

Add the following:

1. 4.96 + 1.7 + 0.36
2. 0.56 + 5.8 + 58.00
3. 0.22 + 2.22 + 22.22
4. 2.7 + 8.92 + 0.37
5. 2.76 + 3.85 + 1.09
6. 65.5 + 4.5 + 20.8

Lesson

SUBTRACTION OF DECIMALS

Example I

97 .4 – 13 . 69

Arrange vertically and put the decimal points in line

$$\begin{array}{r} 97.40 \\ +\ \underline{13.69} \\ \underline{\mathbf{83.71}} \end{array}$$

Example II

63 – 19 . 78

Arrange vertically and put the decimal points in line

$$\begin{array}{r} 63.00 \\ +\ \underline{19.78} \\ \underline{\mathbf{43.22}} \end{array}$$

EXERCISE

Subtract the following:

1. 73 – 19.5
2. 12 – 9.5
3. 57.9 – 3.51
4. 8.54 – 2.34
5. 166 – 66.9
6. 14.9 – 3.51

Lesson

ADDITION AND SUBTRACTION OF FRACTIONS

Example I

Work out 13.75 – 27 + 91 .25

Collect positive terms first.

= 13.75 + 91.25 – 27 (**First add**)

= 13 . 75

+ 91 . 25

105. 00 (**Then subtract)**

- 27. 00

78. 00

EXERCISE

Work out:

1. 35.1 – 44.3 + 17.6
2. 8.24 + 22.9 – 7.8
3. 14 – 5.26 + 7.02
4. 6.25 – 4.7 + 3.42
5. 65.6 – 45.9 + 0.36
6. 7.98 – 9.08 + 4.07

LESSON

APPLICATION OF FRACTIONS

Example

A,B, and C contributed to start a company . A paid 3/10 of the cost, and B contributed 5/10 of the cost.

i) what fraction did C contribute?

ii) if C contributed sh.300,000, what was their total contribtion?

A and B contributed 3/10 + 5/10 =8/10

There4 C contributed 10/10 -8/10 =2/10 or 1/5

Let the total contribution be x.

1/5 of x =sh.30,000

5x1/5x = 30,000x 5

X =150,000.

Exercise

Pupils will do exercise in mk pupils bk 7 new edition page 77 to 79 numbers 1-5

LESSON

MORE ON APPLICATION.

Example

John spent 1/3 of his money on books, and 1/6 of the remainder on transport.

i)what fraction of his money was left?

ii) if he was left with sh.15,000, how much did he have at first?

<u>i)fraction spent on books</u> ………….. 1/3

fraction remaining……………..3/3 -1/3 = 2/3

fraction spent on transport 1/6 of 2/3………1/6 x 2/3 =2/18 or 1/9

total fraction spent on transport and books.

1/9 + 1/3 =$\frac{1+3}{9}$ =$\frac{4}{9}$

Fraction left after spending on transport and books

$\frac{\mathbf{9}}{9} - \frac{4}{9} = \frac{5}{9}$

ii) he was left with 5/9 of the total =15000

let the total be p

then 5/9 of p =15000

$\frac{5p}{9} = 15000$

9/5 x 5p/9 =15000 x 9/5

P =3000x 9

He had sh.27000 at first.

Exercise

Pupils will do exercise on page 78 mk new edition bk 7

The teacher will give pupils more practice to pupils.

LESSON

Example

Tap A can fill the tank in 6 minutes and tap B can fill the same tap in 3 minutes . how long will both taps take to fill the tank if they are opened at the same time?

Tap A fills 1/6 of the tank

Tap B fills 1/3 of the tank

Tap A and B fill $\frac{1}{6} + \frac{1}{3}$

$\mathbf{\frac{1+2}{6}}$

=3/6 or ½

Since ½ tank is filled in 1 minute

So divide the tank into halves

Each half takes a minute

1tank ÷ ½ =1 x 2/1

=2 minutes
Example 2
Tap A takes 3 minutes to fill the tank, and tap B takes 4 minutes to draw water from the tank. How many minutes will it take the tank if both taps are left open?

Exercise
Pupils will do the exercise 5:8 mkbk 7 new edition pg 79
Teacher will give more practice to the children.

LESSON
TERMINATING DECIMALS AND RECURRING DECIMALS

Example 1

Write 5/8 as a decimal fraction.

5÷8 =0.625

Example 2

Write 1/6 as a decimal fraction.

1÷ 6 =0.1666….

Exercise

Express the following as decimals.

1. ½ 2. 3/10 3. 3/8

4. 8/9 5.1/7 6. 6/11

LESSON
CHANGING RECURRING DECIMALS TO RATIONAL NUMBERS

Example1
Change 0.3 to a rational number.
Let the rational number be y
Y=0.333………………….i
10y=10x0.333
10y=3.333…..ii
Subtract i from ii
10y=3.333

$\underline{-Y= \ \ 0.333}$

9y=3

$\mathbf{\frac{9y}{9} = \frac{3}{9}}$

$$Y=\frac{1}{3}$$

Example 2

Express 2.6666….. to a rational number.

Let p = 2.666……..

10p =10 x 2.666

10p =26.66

Subtract i from ii

$$\begin{array}{l} 10p=26.66 \\ \underline{\ -\ P=2.66} \\ \underline{\quad 9p=24} \end{array}$$

$$\frac{9p}{9}=\frac{24}{9}$$

P=8/3 or **2**$\frac{2}{3}$

Example 3

Write 0.1333…. as a common fraction.

Exercise

Express the following as rational numbers.

- a) 0 .2….
- b) 0.123123…..
- c) 9.1212…..
- d) 0.2777……..
- e) 0.7272………
- f) 2.99…….

LESSON

DIVISION AND MULTIPLICATION OF DECIMALS

Divide

$$\frac{0.28\times0.81}{0.27\times4.2}$$

$$\frac{28}{100}\times\frac{81}{100}\div\frac{27}{100}\times\frac{42}{100}$$

Use reciprocal and multiply

$$\frac{28}{100}\times\frac{81}{100}\div\frac{100}{27}\times\frac{100}{42}$$

2/10=0.2

Exercise

Exe 5:17 mk pri mtc bk7 pg 86
Teacher will give pupils more practice.

LESSON

RATIOS AND PROPORTIONS

FINDING RATIOS

EXAMPLE 1

A class has 20 boys and 30 girls. What is the ratio of boys to girls?

Number of boy
Number of girls

202
30 = 3
The ratio of boys to girls is; 2:3
The ratio of girls to boys is; 3:2

Example 2
What is the ratio of 20cm to 2m?
1m=100cm
2m=2x100cm
=200cm
Therefore the ratio of 20cm to 2m=
20cm to 200cm
2:20
1: 10

EXERCISE

EXE 1;1 page 96 mk new edition bk 7 numbers 1,4,5,6,7,8.

LESSON

INCREASING AND DECREASING RATIOS

EXAMPLE1

Increase 80kg in the ratio of 5:4

New: old

? : 80kg

4parts make 80kg

1part makes $\frac{80}{4}$

4 parts make 20 x5 =100kg

OR

80 X $\frac{5}{4}$

29 X5 = 100KG

Example 2

A man’s salary decreased from sh.15,000 to sh.12,000. In what ratio did his salary decrease?
NEW : OLD

12000: 15000

12:15
4:5

Exercise

Exercise 7:2 mkmtcbk 7 new edition page 97

LESSON
SHARING QUANTITIES IN RATIOS

Example 1

Sharing 18mangoes in the ratio of 4:5

Total share 4+5=9

4 x 18
9
5 x 2 =10 mangoes.

Example 2

Dan and mike shared some money in the ratio of 3:5 respectively, if mike got sh. 3,000

a) how much did Dan get?
b) How much money was shared ?

Exercise
Exe 7:3 mkprimtcbk 7 page 99 numbers 1,3,5,6,7,11,12,13,14.

PROPORTIONS

Lesson
DIRECT PROPORTIONS

EXAMPLE 1
2books cost sh.200,what is the cost of 6 books?

2books cost sh. 200

1book costs sh. 200÷2

6books cost sh. 100x 6 =sh.600

Exercise

Exe 7 :4 mkprimtcbk 7 numbers 1-12, page 101.

LESSON

More work about direct proportions in mkprimtc new edition page 102 book7.

LESSON

INVERSE PROPORTION

EXAMPLE 1

4 girls take 9 days to do a job . how long will 12 girls take to do the job at the same rate?

4girls take 9 days

1 girl takes 9 x4 days

12 days take $\frac{9 \times 4}{12}$

=3days.

Example 2

12 men can build a classroom in 5 days.

a) how many men are needed to do the whole job in 1 day?

b) how long will 10 men take to do the job?

Work to do.

Exe 7: 6 mkprimtcbk 7 new edition page 104 numbers 3-10.

Lesson

PERCENTAGES

A REVIEW OF PREVIOUS WORK ON PERCENTAGES ON:

a)changing fractions to percentages

b) expressing percentages in fraction form

c) finding the part of the percentage

d) Expressing quantities as percentage of another quantity.

LESSON

SOLVING EQUATIONS INVOLVING PERENTAGES

Example 1: If 10% of a number is 40, what is the number?

Number be x.

10% of x = 40

$\frac{10}{10}x = 40$

$\frac{X}{10}x\ 10 = 40 \times 10$

X = 400

If 10% of the number = 40.

1% of the number = $\frac{40}{10}$

100% = $\frac{40}{10} \times 100$

= 40 x 10

= **400**

Example 2: 20% of the pupils in a school are girls. There are 35 girls in he school. How many pupils are there in the school?

$\frac{20}{100}$ x X = 35

$\frac{2}{10}$ of x = 35

If 20% of the number = 35.

1% of the number = 35

100% of the number = 35 x 100

$\frac{10}{2}$ x $\frac{2}{10}$ = 35 x $\frac{10}{2}$

x = 35 x 5

x = 175 Answer

20 = 35 x 5

= 175.

Work to do: More work on Pg 112.

LESSON

INCREASING QUANTITIES BY PERCENTAGES

Example 1: Increase Sh. 200 by 20%.

(100% + given%) of old number.

(100% + 20%) of 200.

= 120% of 200 = $\frac{120}{100}$ x 200

= 12 x 20

= Sh. 240

First find the increment.

= 20 x 200 = 2 x 20

= 40/-

Then add the increment to the old number.

New amount = (200 + 40)

= 240.

Example 2: The number of pupils in a school last year was 400. This year the number increased by 15%. What is the number of pupils in the school this year?

New number of pupils = (100% + 15%) of old number.

= $\frac{115}{100}$ x 400

= 115 x 4 = **460 pupils number of new pupils.**

Work to do: work on Pg.116

Example 2: The number of pupils in a school last year was 400. This year the number increased by 15%. What is the number of pupils in the school this year?

New number of pupils = (100% + 15%) of old number.

= 115 x 400
100

= 115 x 4 = **460 pupils number of new pupils.**

LESSON

DECREASING QUANTITIES BY PERCENTAGES

Example 7: Decrease 300 by 10%.

(100% - 10%) of 300 = 90 x 300 (10 x 300) = 10 x 3

100 100

= 90 x 3 The decrease = 30

= **270** **=**(300-30) = 270

Example 8: A man's salary is $ 800. How much will his salary be if it is cut by 12 ½ %.

Decrease 800 by 12 ½ % 12 ½ % as a fraction.

12 ½ % as a fraction = (25 x 1) = 25 x 1
200 100 100
100

= 25 = 1 The decrease = (1 x 800
200 8
8

= (8 - 1) of 800 = 100
8 8

= 7 x 800 The new number = (800-100)
8

= **700**

$= 7 \times 100$
$= \mathbf{700}$

Exercise on Pg 117.

FINDING PERCENTAGE PROFIT OR LOSS

Example 9: A trader bought a dress at Sh. 1600 and sold it at Sh. 2000.

a). Find her profit.

Profit = selling price - cost price
= Sh. (2000 – 1600)
= Sh. 400 profit.

b). Find the percentage profit.

$$\textbf{Percentage profit} = \frac{\textbf{Profit}}{\textbf{Cost price}} \times \textbf{100\%}$$

$$= \frac{400}{1600} \times 100\%$$

Profit = 25%

c). Mulema bought a goat at Sh. 35,000 and sold it at sh. 32,000.

i. Find the loss.

Loss = Cost price - Selling price

= Sh. 35,000 - 32,000)

= **Sh. 3,000 Answer.**

ii. What percentage was the loss?

$$\textbf{Percentage loss} = \frac{\textbf{Loss}}{\textbf{Cost price}} \times \textbf{100}$$

$$= \frac{3000}{35,000} \times 100 = \frac{3 \times 100}{35} = \frac{60}{7}\mathbf{8}\ {}^{4}/_{7}$$

Lesson

FINDING SIMPLE INTEREST

Interest = P × R × T where P is principal, R is rate in percentage, T is time

Example: A man deposited 12,000/= in a bank that offers an interest rate of 10% per year. how much interest will he get after 2 years?

Interest = P X R X T

= 12,000 X 10/100 X 2

= 1200 X 2

= 24,000/=

Exercise on page 159 MK6

Lesson

MORE WORK ON SIMPLE INTEREST

E.G.

b. Calculating the rate (R) when interest , time and principal are given.
c. Calculating the time (T) when interest, principal and rate are given.
d. Calculating Principal (P) when interest rate and time are given.

Reference: MK Pupils book7, page

TOPIC : INTEGERS

REFERENCE: :MK PRIMARY MATHS BK 6 NEW AND OLD EDITIONS.
: MK PRIMARY MATHS BOOK SEVEN NEW AND OLD EDITION.
: UNDERSTANDING MATHS BOOK 6
: UNDERSTANDING MATHS BOOK 7
: UNDERSTANDING MATHS BOOK 5

METHODS : Discussion
: Question and answer
: Observation
:

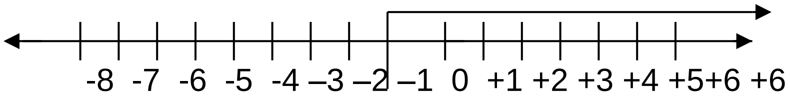
ACTIVITIES : Doing the exercise.
: Answering questions.
: Drawing the number lines.

Integers are a set of numbers, which lie on a number line and include both positives and negative numbers. Positive and Negative numbers are called **DIRECTED** numbers because the sign used indicates which direction to go from zero. Zero is neither a positive nor a negative.

ORDER OF INTEGERS

Any number to the right of any given integer on the number line is greater the one to the left of that given integer and any number to the left of any given integer is less than that given number.

Increasing order



Decreasing order.

EXERCISE:

LESSON
COMPARING INTEGERS

Supply the correct sign,>, <,or =

1 -33------------ -38 2: 0------------- -200 3: -20---------- 20 4: -1000--------5

6: +35------------- 35 etc

NB If the two signs are next to Each other or near one another it means multiply them.

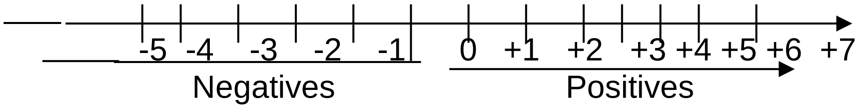
Example -4 - $^{-}$5 = -4+5
= 1

ii If the signs are not next to each other, the same sign means put the same sign and add the numbers. Example -3-6 = -9. But if the signs are different it means write the sign of the bigger number.

Example: i -5 +7 = 2, ii +6 –14 = -8

THE NUMBER LINE

It is a straight line in which positive and negative numbers can be represented. The numbers to the right of zero are positive integers while those to the left of zero are Negative integers.



Lesson
ADDITION OF INTEGERS

(a) Your face is your positive and your back is your negative
(c) The addition operation means face the direction of the arrow
(d) Always start facing the positive direction from the zero

NB Let the teacher demonstrate using the ground number line. More examples should be given to the pupils to practice on the ground number line and on the chalkboard.

Exercise: Let the pupils work out the following using the number line

1: +6 +4 =   ii -3 +7 =   iii -5 +4 =   iv 3+ -3 =
v 1+-7 =   vi 5+3 =   vii -4+9 =   viii -2+-4
=

Lesson

SUBTRACTION OF INTEGERS:
I Subtraction means turn and move to the required direction.
3 Always start by facing the positive direction.
NB Subtraction of integers is the same as adding the opposite of the second integer to

First integer. Example: 5-$^{-}$3

5+ $^{+}$3

(i) Positive means forward movement
(ii) Negative means backward movement
(iii) Subtraction means turn
(iv) Addition means continue

A ground number line should be used to illustrate the operation of the signs

Exercise: Let pupils do the following using the number line
1: 4-2   2 -7+$^{+}$8
3: 11-$^{-}$4   5: -2-$^{-}$2
4:-3-$^{-}$6   6: 3-$^{+}$9
Let pupils do more exercise understanding mathematics book 7 pages 91-93

LESSON

TABLE OF INTEGERS

+VE X +VE = +VE   +VE ÷ +VE =+VE
+VE X –VE = -VE   +VE ÷ -VE = -VE
-VE X –VE = +VE   -VE ÷ -VE = =VE

MULTIPLICATION OF INTEGERS:

Multiplication is regarded as repeated addition
Show 3X2 on the number line
3X2 means make a movement of 3 steps of 2spaces starting from zero
The teacher should guide the pupils to multiply integers using ground number line
Pupils should be allowed and be given more time to practice multiplying integers on the number line after which they should do the given exercise in their books

Let pupils do exercise 13:3 no 1 a,c,h,m.
Exercise:13:4nos. 1,2,5,6,8. Understanding maths book 7 pages 200-201.

LESSON

DIVISION OF INTEGERS**:** Division is regarded as repeated subtraction

I +25 ÷ +5 =+5 2: +24 ÷ -3 = -8
3: -36 ÷ -9 = +4 4: -18 ÷ 6 = -3

Let pupils do exercise 16:10 MK MTC NEW EDITION page 321 numbers: 1-12
Pupils should be encouraged to show all the working clearly.

LESSON 4

APPLICATION OF INTEGERS

Examples 1: A man was born in 17 BC and died in 35AD immediately after his birth day. How old was he when he died ?

Solution: BC =-ve = 35-$^{-}$17
AD = +ve = 35 +17
=**52 years**

2: The temperatureof ice was –3^0c and that of water was 100^0c calculate the difference in temperature.

Solution: = 100-$^{-}$3
= 100+3
= 103^0C

4 John arrived at the airport 15 minutes before the normal departure time for the plane .
If the plane was 35 minutes late, how long did John wait at the airport?
Solution: Before = -ve and late = +ve.

= 35-$^{-}$15
= 35+15
= 50minutes

4 Moses put ice at –25^0C into a kettle and boiled it to 100^0C.He waited till the temperature dropped by 50^0C.

a: What was the temperature the difference between ice and boiled water?

Solution: = 100^0C- $^{-}15^0$C
= 100+15
= 115^0C

b: What was the difference in temperature between ice and the water which Moses drank?

Solution: = 50^0C- $^{-}15^0$C
= 50 +15

= **<u>65^0C</u>**

5: Lucy runs a race in a time of 5seconds less than 5 minutes . Achom runs it in 2 seconds more than Lucy.What is Ahom's time for the race?

Solution Lucy: 5.00

- 05

4:55

4minutes 55seconds

Achom: 4: 55

+ 0: 02

4: 57 **<u>4 minutes 57 seconds</u>**

6: Mary had a debt of 200,000/= from each of her 4 friends.

b) How much debt had she in all?

Solution: Debt = -ve

200,000/= x4 =800,000/=

She had a debt of 800,000//= (-800,000)/=

c) If she sold her car at 2,000,000/=,how much did she remain with after paying the Debt?

Solution: 2000,000-800,000

<u>1200,000/= remained</u>

The normal body temperature of a human being is 370C.Before treatment a malaria

Patient had a 4^0C increase and after the treatment ,the temperature reduced by 2^0C.

Find the body temperature of the patient after treatment.

Solution 37^0C+4^0C

= 41^0C

After treatment = $41^0C - 2^0C$

= **<u>39^0C</u>**

7: A man climbed an electric pole. He started climbing 3 steps upwards and slips one step down in that order. Find the number of steps he is from the ground after slipping 4 steps downwards.

Solution Number of steps climbed is 3X4 =12

Number of steps slipped down = 4

= 12 – 4

= 8 steps from the ground

Alternatively the teacher should demonstrate the whole on the ground or chalkboard

Exercise: let pupils do exercise 16:11 MK new edition page 363
Numbers: 1,2,3,5,6,10,15,9.

TOPIC **: FINITE SYSTEMS**

REFERENCE: MK PRIMARY MATHS BK 6 NEW AND OLD EDITIONS.
: MK PRIMARY MATHS BOOK SEVEN NEW AND OLD EDITION.
: UNDERSTANDING MATHS BOOK 6
: UNDERSTANDING MATHS BOOK 7
: UNDERSTANDING MATHS BOOK 5

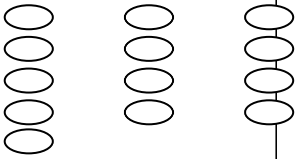
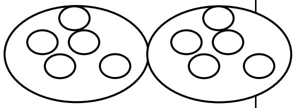
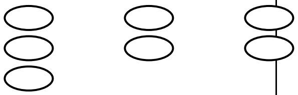
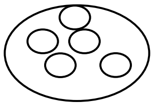
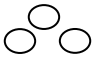
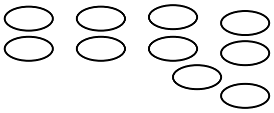
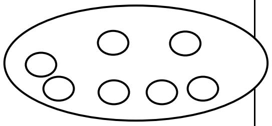
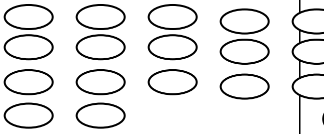
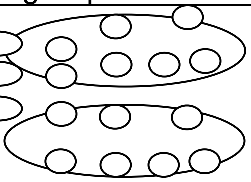
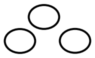
METHODS : Discussion
: Question and answer
: Observation
:

ACTIVITIES : Doing the exercise.
: Answering questions.
: Drawing the clock faces

1. Finite system is a way of finding remainders.
2. Finite system can also be called modular (mod) or clock arithmetic or remainder.
3. We have two types of clockfaces.
   a) Daily activity teller
   b) Special time teller

LESSON

FINITE SYSTEM

Counting system	No. of objects counted	No of groups	Remainder(s)
System five	 11 objects	 2 groups of 5	 1 remainder
	 7 objects	 1 group of 5	 3 remainder
System seven	 10 objects	 1 groups of 7	 3 remainders
	 17 objects	 2 groups of 7	 3 remainders

From the table above:

a). 11 in finite 5 is 1 b). 10 in finite 7 is 3 c). 7 in finite 5 is 2.

Find the possible remainder after grouping.

1. 2 in finite 5 2. 5 in finite 5 3. 4 in finite 5 4. 7 in finite 5

5. 13 in finite 5 6. 24 in finite 7 8. 10 in finite 7

LESSON

Addition in finite 5 using clock faces.

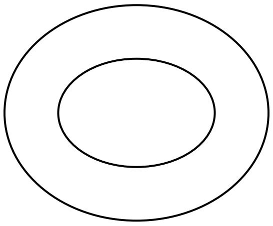
Example 1: Add: 3 + 4 = ___ (Finite 5)

Show the digits for finite 5 {0, 1, 2, 3, 4}.

3 + 4 = ___ (Finite 5)

5) 7

5
2
3 + 4 = 2 (Finite 5)



more 3 steps clockwise
more 4 steps more
Ans is where you end.
3 + 4 = 2 (Finite 5)

Using a clock face add:

1. 1 + 4 = __ (finite 5)
2. 2 + 5 = ___ (finite 7)
3. 2 + 3 = ___ (finite 5)
4. 3 + 6 = __ (mod. 7)
5. 4 + 4 = __ (finite 5)
6. 5 + 3 = ___ (mod. 7)

Add without using a clock face.

Example: 5 + 5 = x (finite 7)
x = 5 + 5 (finite 7)
= 10 (finite 7)
= 10 ÷ 7 (finite 7)
x = 3 (finite 7)

Exercise:

1. 2 + 3 = x (finite 5)
2. 3 + 3 = y (finite 5)
3. 4 + 4 = x (finite 5)
4. 4 + 5 = y (finite 7)
5. 3 + 4 = x (finite 7)
6. 6 + 8 = y (finite 12)
7. 4 + 9 = x (finite 12)
8. 3 + 4 + 1 = y (finite 5)

Lesson

SUBTOPIC : ADDITION WITHOUT USING A DIAL

Example 1

Add 5 + 5 = x (finite 7)
X = 5+5 (finite 7)
= 10 (finite 7)
= 10 : 7(finite 7)
= 1 rem 3 (finite 7)
x = 3 (finite 7)

EXERCISE

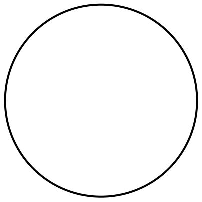
3+2 = x (finite 5)
3 + 4= x (finite 7)
2 + 3 + 4 = x (finite 5)
3 + 3 = y (finite5)
6 + 8 = y (finite 12)
1+ 2 + 5 = y (finite 7)

LESSON
SUBTOPIC : SUBTRACTION

Using a dial

EXAMPLE 1

Subtract 2 – 4 = ----(finite 5)



2– 4 = 3 (finite 5)

EXERCISE

3 – 5 = -----(finite 7)
2 – 3 = ----(finite 4)
4 – 7 = -----(finite 11)

Lesson
SUBTOPIC : SUBTRACTION WITHOUT A DIAL

Example 1

1– 6 = -----(finite 7)
(3 + 7)- 6 = ---(finite 7)
10 – 6 = ------(finite 7)
= 4 (finite 7)
3 – 6 = 4 (finite 7)

Example 2

X – 4 = 5 (finite 7)
X – 4 + 4 = 5 + 4(finite 7)
X = 9 (finite 7)

9 : 7 = 1 rem 2
x = 2(finite 7)

Example 3

P - 7 = 4 (finite 8)
P - 7 +7 = 4 + 7(finite 8)
P = 11 (finite 8)
11 : 8 = 1rem 3
p = 3 (finite 8)

EXERCISE

6 – 8 = -----(finite 5)
Y – 5 = 4 (finite 7)
p – 4 = 3 (finite 8)
3 + 2 – 7 = -----(finite 12)

x – 2 = 2 (finite 3)

4 – 7 = ----(finite 11)

2x – 3 = 3 (finite 4)

LESSON 8

MORE WORK ON FINITE SYSTEM

Example 1

3(x – 2) = 1 (finite 5)

3x – 6 = 1 (finite 5)

3x – 6 + 6 =1 + 6 (finite 5)

3x = 7 (finite 5)

(7 + 5) = 12 (finite 5)

3x = 12(finite 5)

3x/3 = 12/3 (finite 5)

x = 4 (finite 5)

EXERCISE

2(2x – 1) = 4 (finite 70

2(x – 2) = 1 (finite 3)

4(x – 2) = 3 (finite 5)

5(p – 1) = 2 (finite 7)

LESSON

SUBTOPIC : MULTIPLICATION OF FINITES

Example 1

4 x 5 = -----(finite 7)

= -----(finite 7)

20 : 7 = 2 rem 6 (finte 7)

x 5 = 6 (finite 7)

Example 2

x 4 = x (finite 12)

= x (finite 12)

x = 12 (finite 12)

Example 1

: 3 = ---(finite 7)

(5 + 7) : 3 = ----(finite 7)

12 : 3 = -----(finite 7)

12 : 3 = 4 rem. 0 (finite 7)

5: 3 = 4 (finite 7)

EXERCISE

1. 3 : 5 = ---(finite 12)
2. 4 : 3 = ---(finite 5)
3. 3 : 5 = ---(finite 6)
4. 4 : 6 = --- (finite 7)
5. 1 : 5 = --- (finite 6)

LESSON

SUBTOPIC: APPLICATION OF FINITE SYSTEM

Finite 7 is always applied in counting days of the week.

Finite 12 is applied in a 12-hr clock and months of the year

Finite 24 is applied on a 24-hr clock format

APPLICATION OF FINITE 7

A week has 7 days

12 Using: 12 = 1 rem.0(finite 12)

1 x 4 = 0 (finite 12)

EXERCISE

3 x 2 = X (FINITE 5)

8 x 9 = y (finite 12)

2 x 4 = x (finite 7)

3 x 6 = ----(finite 6)

7 x 5 = ---(finite 12)

LESSON

SUBTOPIC; DIVISION IN FINITE SYSTEM

<u>In the idea of finite system</u>

0 stands for Sunday

1 stands for Monday

2 stands for Tuesday

3 stands for Wednesday

4 stands for Thursday

5 stands for Friday

6 stands for Saturday.

Example 1

If today is Friday, what day of the week will it be after 23 days?

Friday stands for 5

5+ 23 = ----(finite 7)

28 = ----(finite 7)

28 : 7 = 4 rem. 0

= 0 (finite 7)

0 stands for Sunday, so it will be a Sunday.

EXERCISE

1. If today is Thursday, what day of the week will it be after 82 days
2. If today is Tuesday, what day of the week will it be after 8 days?
3. If today is Wednesday, what day of the week will it be after 97 days?
4. If today is Monday, what day of the week will it be after 25 days?
5. If today is Sunday, what day of the week will it be after 150 days?
6. If today is Tuesday, what day of the week will it be after 46 days from now?

LESSON

SUBTOPIC: APPLICATION OF SUBTRACTION TO FINITE 7

Example 1

Today is Tuesday, what day was it 47 days ago?

Tuesday stands for 2

7 47
42
5

6.   rem 5

2 -   5 = -----(finite 7)

(2 + 7) – 5 = ---(finite 7)

9   - 5 = 4 (finite 7)

Stands for Thursday. It was a Thursday.

EXERCISE

1. If Today is Friday, What day of the week was it 37 days ago?
2. Today is Friday. What day was it 85 days ago?
3. Today is Sunday. What day of the week was it 90 days ago?
4. Today is Monday. What day of the week was it 56 days ago?
5. Today is what day of the week was it 164 days ago?
6. Today is Friday. What day of the week was it 1000 days ago?

LESSON

SUBTOPIC; APPLICATION OF FINITE 12

12 hr.-clocks

ADDITION

Example 1

The time now is 8.00 pm. What time will it be after 15 hours from now?

8   + 15 = -----(finite 12)

23   = ----(finite 12)

23: 12   = 1 rem. 11 (finite 12)

8 + 15   = 11 (finite 12)

It will be 11.00pm.

NOTE: The time changes to p.m. if the quotient is an odd number.

EXERCISE

1. It is now 7.00am. What time will it be after 9 hrs from now?
2. We left Mbarara at 9.00pm. We arrived at Kampala after 14 hrs. What time did we arrive in Kampala?
3. It is 3.00am now. What time will it be after 14 hrs.?
4. It is 6.00pm. Now. What time will it be after 8 hrs? from now?
5. It is 8.00 am now What time will it be after 17 hrs from now?
6. It is 11.00pm. Now. What time will it be after 37 hrs?
7. It is 5.00am now. What time will it be after 183hrs

LESSON 14

SUBTOPIC : MONTHS OF THE YEAR FINITE 12

Example 1

1. It is Julynow, what month of the year will it be 5 months from now?

July is the 7th month of the year

Let July be 7

7+ 5 = ------ (finite 12)

12 = -----(finite 12)

12: 12 = 1 ream 0 (fin 12)

0 stands for December, so it will be December.

EXERCISE

1. It is January now, what month of the year will it be 20 months from now?
2. It is Feb now what month of the year will it be after 15 months from now?
3. It is September now, what month of the year will it be 7 months from now?

4. It is March now, what month of the year will it be after 30 months from now.
5. It is December now, what month of the year will it be after 4 months from now

GRAPHS AND INTERPRETATION.

Finding the mode and modal frequency.

Example: Jane got the following marks in nine tests; 8, 2, 6, 4, 5, 6, 9, 6, 2.

a). Find the modal mark. b). Find the modal frequency.

Number	Tally	Frequency
8		1
2		2
6		3
4		1
5		1
9		1

a). mode = 6 b).

Modal frequency = 3

i. What is mode? ii. What is modal frequency?

Work out:

Find the mode and modal frequency of the following:-

a). 1,0, 3, 04, 4, 3, 4, 1 b). 4, 3, 3, 4, 6, 7, 7, 0, 4 c). 6, 7, 5, 8, 4, 7, 6, 7

d). 1, 0, 4, 0, 3, 3, 4, 0 e). 3, 3, 3, 4, 4, 5, 5, 5, 6, 5

Find the median and range.

Example 1: Given that A = {2, 4, 6, 7, 8, 3}.

a). Find the median. b). Find the range of the number above.

a). **Median**:

Order of size: 2, 3, 4, 6, 7, 8

$$\underline{\quad}\ \ \underline{\quad}\ \ \underline{\quad}$$
$$\downarrow$$

Median = $\frac{4 + 6}{2}$ (**Since there are 2 numbers in the middle)**

= $\frac{10}{2}$ = Median = **<u>5.</u>** a). What is the median?

b). What is the range?

b). **<u>Range:</u>** Range = highest – smallest

=8 – 2

= **<u>6</u>**

<u>Exercise:</u> Find the median and range of the following;

a). 5, 7, 2, 8, 7 b). 7, 3, 1, 9, 5, 8, 7 c). 8, 4, 0, 8, 4, 7, 6, 7, 8

d). 6, 4, 4, 1, 5, 0, 8, 9, 3 e). 1, 3, 5, 7 5, 3, 1 f). 6, 4, 8, 1, 5

<u>Find the mean.</u>

<u>Example 1:</u> Find the arithmetic mean of; 2, 4, 7, 2, 8 and 1?

Mean = $\frac{\text{Sum of items}}{\text{No. of items}} = \frac{2 + 4 + 7 + 2 + 8 + 1}{6} = \frac{24}{6} = 4.$

<u>Work out:</u> <u>Find the mean of the following</u>.

1. 3, 6, 7, 4, 5 2. 4, 2, 6, 8 3. 5, 7, 2, 6, 10, 6

4. 7, 8, 7, 8, 5, 2, 5 5. 10, 12, 14, 10 6. 5, 10, 8, 7, 4, 8

Lesson

<u>Inverse problems on average.</u>

<u>Example:</u> The average of 5 numbers is 6. What is the sum of these numbers?

$$A = \frac{S}{N} = N \times A = \frac{S}{\cancel{N}} \times \cancel{N}$$

S = No. x Average

$5 \times 6 = \mathbf{\underline{30}}$

Work out on MK 6 Pg. 172.

Lesson

More inverse problems.

Example 2:

The average mark of 4 pupils if 6 and the average mark of 4 other pupils of 8.
What is the average mark of all the pupils?

1st total = (4 x 6) = 24
2nd total = (4 x 8) = 32
All total = 32 + 24 = 56
Total No. = 4 + 4 = 8

$$\text{Av. Of } 8 = \frac{56}{8}$$

7.

Work out MK 6 Pg. 173.

TABLE INTERPRETATION

Mark	50	40	30	70
No. of pupils	2	1	3	1

The above table shows marks got by pupils of a P.6 class at Kira Parents' School.

a). Find the modal mark. b). Find the range of marks.

c). Find the mean.

a). $$\text{Mean} = \frac{\text{Sum}}{\text{Number}} = \frac{(50 \times 2) + (40 \times 1) + (30 \times 3) + (70 \times 1)}{2 + 1 + 3 + 1}$$

$$= \frac{100 + 40 + 90 + 70}{7} = \frac{300}{7} = 42\,{}^{6}/_{7} \text{ Answer.}$$

Work out:

Table 1, Table 2 on page 175, MK 6.

Lesson

INTERPRETING PICTOGRAPHS.

A Review Exercise

If o represents 7 fruits, study the pictograph below and answer the questions that follow.

Name	No. of fruits
Kato	o oooooooooo
Hala	o oooooo
Pearl	o ooooooooooooooo

a). How many fruits has; i. Kato ii. Hala

iii. Pearl

Work out on Pg. 163 – MK 6

A REVISION ON BAR GRAPHS.

Study the graph below and answer the questions that follow.

a). Which type of food is liked most? b). which food least liked?

c). which two types of food are liked by the same number of pupils?

d). How many pupils are in the class? e). How many more pupils like rice than cassava?

Work to do – pg. 164 – MK 6

DRAWING GRAPHS (BAR GRAPHS).

The table below shows the type of food and the number of pupils who eat each type.

Type of food	Matooke	Rice	Millet	Posho	Cassava	Yams
No. of pupils	10	12	6	8	4	8

a). Represent the information above on a bar graph.

(The teacher will guide the pupils to draw a bar graph

LINE GRAPHS.

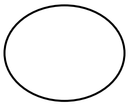
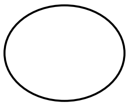
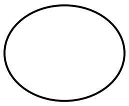
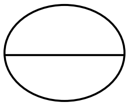
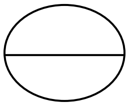
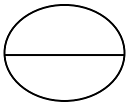
The graph above shows the cost of groundnuts in kg. Study it and answer the questions that follow.

a). What's the cost of one kg of groundnuts? b). What's the cost of 7kg of g/nuts?

c). How many kgs can one buy with 6,000/=? d). How much would 1 pay for 3kg of g/nuts?

Work to do: MK 6 Pg 167

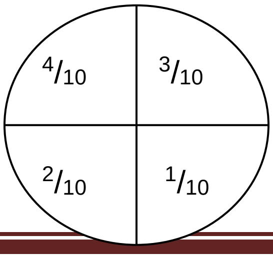
PIE CHARTS

Fraction	Percentage	Revolutions in
		
1 whole	100%	1 complete run 360°
		
½ whole	½ of 100% 50%	½ pf run ½ of 360 = 180°
¼ whole	¼ of 100% 25%	¼ of run ¼ of 360 = 90°

WHEN DATA IS IN FRACTIONS.

Example: The pie chart below shows how Kato spent 30,000/=.

a). Find the sector angle for each item. b). How much was spent on each item?



a).

Item	Fraction	Method	Sector Angle
Rent	$^{4}/_{10}$	$(^{4}/_{10} \text{ x } 360)^{o}$	
Food	$^{3}/_{10}$	$(^{3}/_{10} \text{ x } 360)^{o}$	
Others	$^{1}/_{10}$	$(^{1}/_{10} \text{ x } 360)^{o}$	
Saving	$^{2}/_{10}$	$(^{2}/_{10} \text{ x } 360)^{o}$	

b). (4/10 x 30,000) = 4 x 3000 = 12,000

(3/10 x 30,000) = 3 x 3000 = 9,000

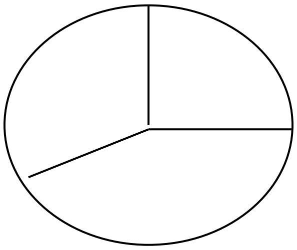
(1/10 x 30,000) = 1 x 3000 = 3,000

(2/10 x 30,000) = 2 x 3000 = 6,000

Work to do: MK 6 Pg. 180

Und. Mtc Pg. 137

WHEN SECTOR ANGLES ARE GIVEN.



The pie chart below shows how Sarah spent 120,000/=.

a). Find the value of x.

b). How much did she spend on each item?

a). $x + 120^{o} + 90^{o} = 360^{o}$ (**why?)**

$x + 210^{o} = 360^{o} – 210^{o}$

$x + 210^{o} – 210^{o} = 360^{o} – 210^{o}$

x = **150° Answer**

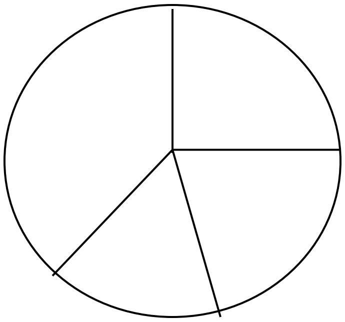
b).

Item	Sector ∠	Fraction	Method	Amount
Food	150^{o}	$^{150}/_{360}$	$^{150}/_{360}$ x 120,000	
Rent	90^{o}	$^{90}/_{360}$	$^{90}/_{360}$ x 120,000	
Trans	120^{o}	$^{120}/_{360}$	$^{120}/_{360}$ x 120,000	

Work to do: MK 6 Pg. 181 / Und. Mtc Pg. 138

A PIE CHART GIVEN IN PERCENTAGES.

The pie chart shows 240 pupils who passed 4 papers. How many pupils passed in each subject?



Subject	Percentage	Number
Math.	$^{40}/_{100}$	$^{40}/_{100}$ x 240 =
English	$^{25}/_{100}$	$^{25}/_{100}$ x 240 =
SST	$^{15}/_{100}$	$^{15}/_{100}$ x 240 =
Science	$^{20}/_{100}$	$^{20}/_{100}$ x 240 =

Work to do: MK 6 Pg. 183 / Und. Mtc Pg. 139

CONSTRUCTING A PIE CHART.

Example: A man spent ¼ of his income on food, $^{1}/_{3}$ on rent, $^{5}/_{12}$ on others. Represent this information on a circle graph.

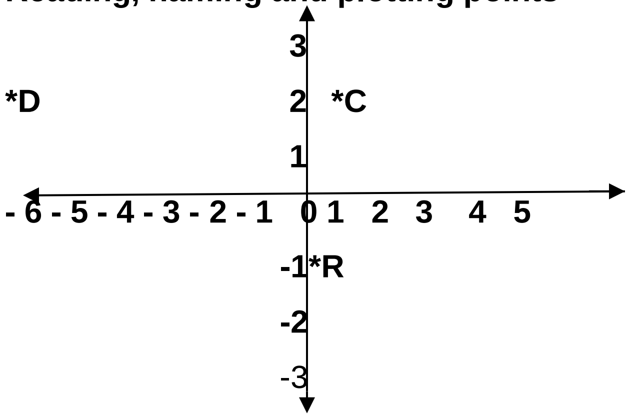
Item	Method	Sector ∠
Food	¼ x 360^{o}	90^{o}
Rent	$^{1}/_{3}$ x 360^{o}	120^{o}

Others	$^5/_{12} \times 360^o$	150^o

Work to do: MK 6 Pg. 186

COORDINATE GRAPH.

Reading, naming and plotting points



a) Write the coordinates of points C,D, and R

b).Plot the following points A (+3, +1) B (-3, +1) F(o,-3)

c).Join the points in b above.

d).What figure is formed?

e) Calculate the area of the figure.

Activity: Children will draw graphs with guidance of the teacher. They will follow the order (x, y).Join the points. Name the figure formed –

Ref.: MK 7 Page 178 to 183

Lesson

Lines formed by ordered pairs

Example1

a) Given the equation of the line: y=x+1.Complete the table below

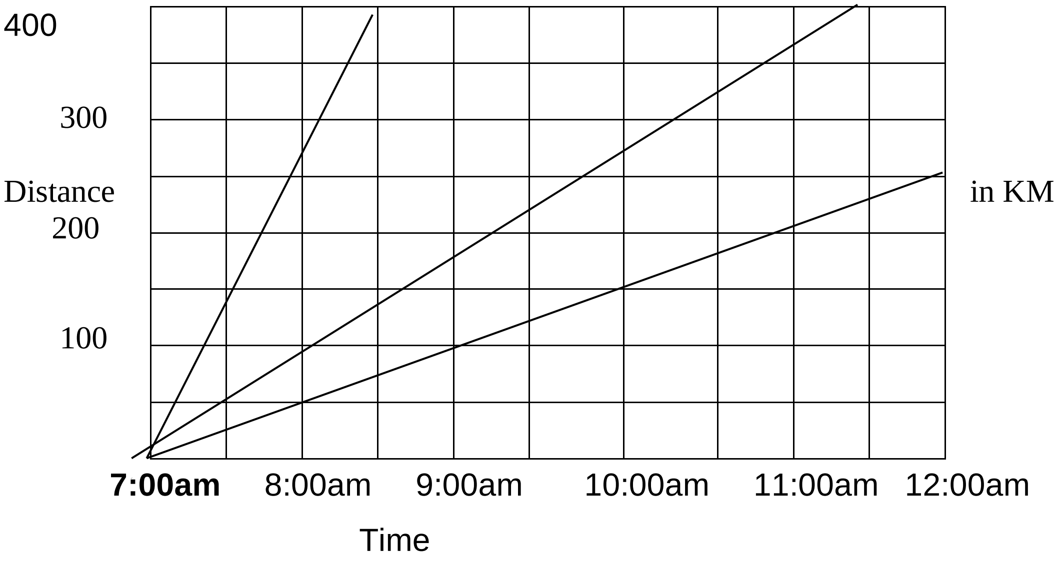
X	**-3**	**-2**		**1**		**3**
Y	**-2**		**0**		**2**	

b) Draw the line for the ordered pairs on the table above.

Lesson

Travel graphs

Interpreting travel graphs



a) What is the horizontal scale?

b) What is the vertical scale?

c) How far was the taxi at 9:30a.m?

d) At what speed was the helicopter travelling?

Activity

Ref Exercise on page 169 to 172

Lesson

Drawing travel graphs

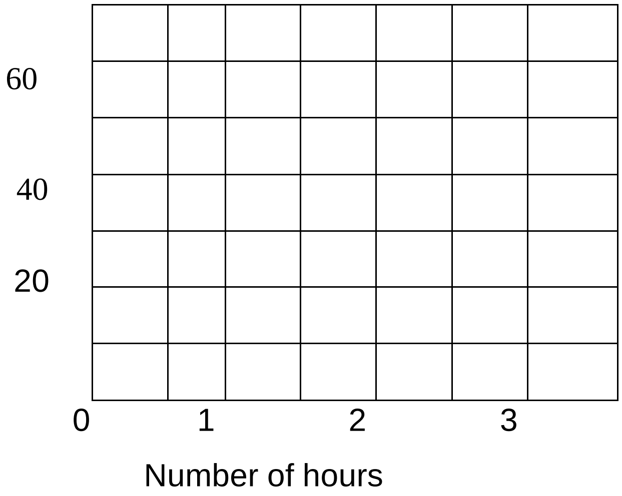
Example

A cyclist travelled from town P to town R as follows

-for 2hrs he cycled from town P to town Q a distance of 30 KM then rested for 1 hr.

He then continued for 1 hr to town R at a speed of 40km per hr.

Draw a travel graph to show the cyclists journey



GEOMENTRY 2 (Polygons)

Finding center angles or exterior angles

In regular polygons, Centre angles are equal to exterior angles. The size of each exterior angle or center angle will depend on the number of sides of a polygon.

REMEMBER

The sum of all exterior angles of any polygon is 360