Them e	Topic/The me&Class	achable unit / deliverable lesson
SETS	**Set Concepts**	**LESSON 1**
		Identifying finite and infinite sets **Finite sets** are sets whose number of elements can be determined. **Infinite sets** are sets whose number of elements cannot be determined. **Examples of finite and infinite sets.** 1. Set A = {all vowel letters} A = {a , e , i , o , u} A is a finite set. Set A is finite set because its number of elements can be determined. 2. B = {all prime numbers} B = (2 , 3 , 5 , 7 , 11 , 13 , 17 , 19 , …………………} Set B is an infinite set. Set B is an infinite set because its number of elements cannot be determined. **Activity;** State whether the sets below are finite of infinite sets. 1. K = {all factors of 24} 2. M = {odd numbers less than 12} 3. P = {all even numbers} 4. X = {all multiples of 7} 5. Y = { all multiple of 16 between 40 and 100}
Sets	Set concepts	**Lesson 2** **Forming subsets from finite sets.** **A subset** is any set got from the given set. **An empty set** is a subset of every set. **Any given set** is a subset of itself. **Examples;** 1. Form subsets from set A given that A = { } **Solution** Subset { } 2. List all the subsets that can be formed from a set of all prime numbers less than 7. **solution** The given set is {2 , 3 , 5}

		Subsets { } , {2} , {3} , {5} , {2 , 3} , {2 , 5} , {3 , 5} , {2 , 3 , 5} **Activity:** 1. Given that V = {7, 9}. List all the subsets that can be formed from set V. 2. If set M is a set of all composite numbers less than 4. List all the subsets that can be obtained from set M. 3. Given that L = {0, 2 , 4}. Form all the subsets from set L. 4. X = {all factors of 9}. List all the subsets that can be formed from set X. 5. D = {a , b , c , d}. List all the subsets that can be obtained from set D. 6. If K = {all prime numbers less than 3}. List all the subsets from set K. 7. A = {all even numbers between 0 and 9}. List all the subsets that can be formed from set from set A.
Sets	**Set concepts**	**Lesson 3** **Forming proper and improper subsets.** **Proper subsets** are smaller sets got from the given set. **The given set** (mother set) is not a proper subset. **Improper subsets** refer to the given set. **Examples;** 1. List all the proper subsets from set A, if A = {0, 2}. **Proper subsets.** { } , {0} , {2} **NOTE:** {0 , 2} as an example of an improper subset. 2. Given that N = {a , e , i} a) List all the proper subsets from set N. **Proper subsets.** { } , {a} , {e} , {i} , {a,e} , {a , i} , {e , i} **NOTE:** {a , e , i} is an example of an improper subset. b) List all improper subsets from set N. **Improper subsets** { } , {a} , {e} , {i} , {a,e} , {a , i} , {e , i}, {a , e , i}. **Activity;** 1. M = {c, u, p}. List all the proper subsets from set M. 2. List all the proper subsets in set V if V = {6 , 8} 3. Given that Y = {first 3 square numbers} a) List all the elements of set Y. b) Form all the proper subsets from set Y. c) List all the improper subsets from set Y.

		4. List all proper subsets that can be formed from a set of the first four whole numbers.
Sets	**Set Concepts**	**Lesson 4**

Finding the number of subsets

Deriving the formula of finding the number of subsets.

-Any set with elements has number of subsets that can be expressed in powers of two.

Number of elements	Subsets
0	1
1	2
2	4
3	8
4	16
5	32

For example considering a set with 5 elements, to get the number of subsets, you will use 2^5 which can be obtained from the steps below.

2	32
2	16
2	8
2	4
2	2
	1

$\mathbf{2^5}$

- When the number of subsets is expressed in powers of two, the index is equivalent to the number of elements in a given set.

Hence, number of subsets = $\mathbf{2^n}$

Where **n** stands for the number of elements.

Examples

1. Find the number of subsets in a set below.

A = {a , e , i , o , u , d}

Number of subsets = 2^n

$= 2^6$

$= 2x2x2x2x2x2$

$= \mathbf{64}$

2. If n (K) = 7, find the number of subsets in set K.

Solution

Number of subsets = 2^n

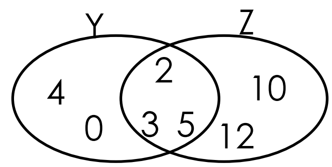
$= 2^7$

$= 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$

$= 128$

Activity

1. Find the number of subsets in set P with 5 elements.
2. Use the Venn diagram below to answer the questions that follow.



a) How many subsets can be formed from members in Z∩Y.

b) Find the number of subsets that can be formed from set Z.

c) How many subsets cab be got from set Y-Z?

3. If set L has one element, how many subsets can be got from set L?

Lesson 5

Proper subsets

- Proper subsets has less number of elements as compared to its mother set.
- Subtract 1 from the number of subsets to obtain the proper subsets.

Thus

Proper subsets = $2^n – 1$

examples

Number of proper subsets= $2^n – 1$

$= 2^7 – 1$

$= (2x2x2x2x2x2x2) – 1$

$=128 – 1$

$=127$

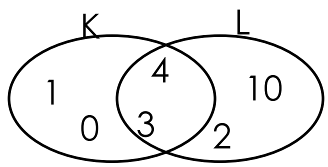
2. If M = {g, o, a, t}. Find the number of proper subsets that can be obtained from set M.

Number of proper subsets $= 2^n - 1$
$= 2^4 - 1$
$= (2 \times 2 \times 2 \times 2) - 1$
$= 16 - 1$
$= 15$

Activity

1. Given set K = {All prime numbers less than 11}, Calculate the number of proper subsets in set K.

2. Use the Venn diagram below to answer the questions that follow.



a) How many proper subsets can be formed from members in K∩L?
b) Calculate the number of proper subsets that can be formed from members in K U L.
3. Find the number of proper subsets that can be got from set Y, if Y = {40, 50, 60, 70, 80}.
4. If n (Z) = 3, how many proper subsets can be got from set Z?

Lesson 6
Finding the number of elements when given the number of Subsets and proper subsets
Example 1
-State the formula for finding number of subsets or proper subsets as may be required in the question.
- Substitute the unknown number of subsets with the value given.
- Or substitute the unknown number of subsets with the value given and simplify.
- Express the number in powers of two.
- Power numbers of the same base have their powers (exponents) the same
Example
1. Set Y has 16 subsets, how many elements are in set Y?
2^n = number of subsets.
$2n = 16$
Factorize 16 and express it in powers of 2

2	16
2	8
2	4
2	2
	1

$2^n = 2^4$

$n = 4$

Example 2

How many elements are in a set of 31 proper subsets?

$2^n - 1$ = Number of proper subsets

$2^n - 1 = 31$

$2^n - 1 + 1 = 31 + 1$

$2^n = 32$

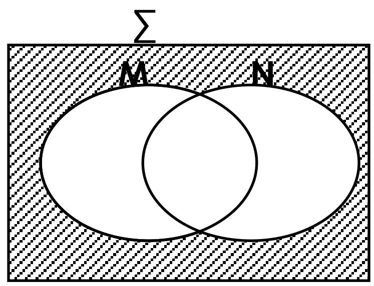
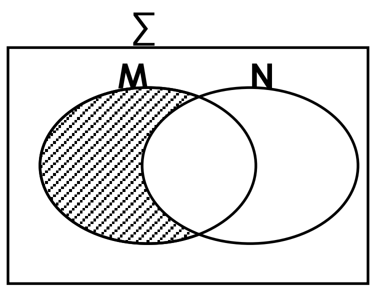
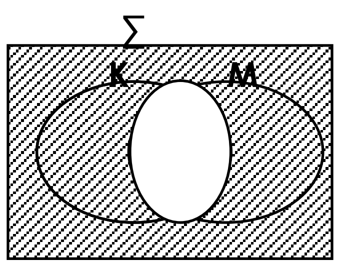
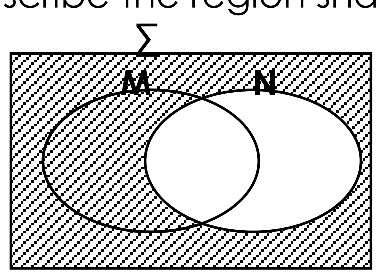
2	32
2	16
2	8
2	4
2	2
	1

$2^n = 2^5$

$n = 5$

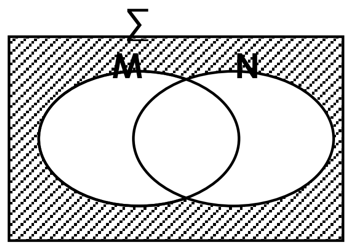
<u>Activity</u>

1. Calculate the number of elements in a set with 128 subsets
2. Odongo listed 7 proper subsets from set K, how many elements were in set K.
3. Given that set M has 256 subsets, find the number of elements in set M.
4. If set N has the following proper subsets, list down all the elements of set N: { } , {1} , {2} , {3}, {2,3} , {1,2} , {1,2,3} , {1, 3}
5. Given that set P has 15 proper subsets, find n (P).

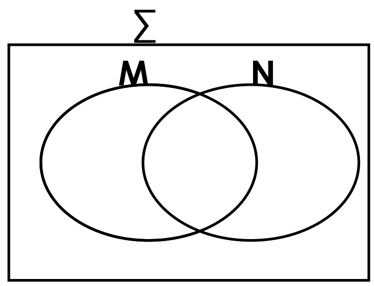
Sets	**Set Concepts**	**Lesson 7** **Regions on a two event Venn diagram.** **-** Identify the required region. - Describe the shaded regions. - Shade the given region in the question. **Examples** 1. Shade the region of (MUN)ᴵ  2. Shade the region of M only (M – N)  3. Describe the shaded regions in the Venn diagram below;  **$(M \cap K)'$** 4. Given the Venn diagram below describe the region shaded below.  **N'**

Activity

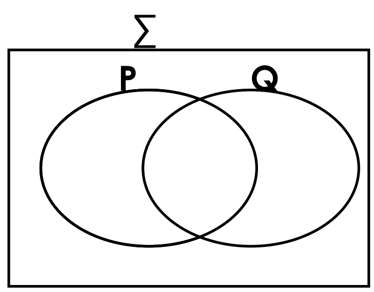
1. What region of the Venn diagram is unshaded below;



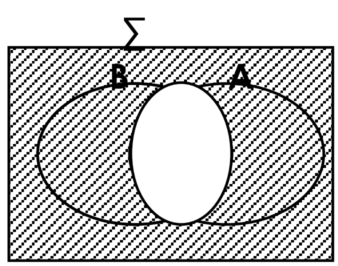
2. Shade the region of N – M on the Venn diagram.



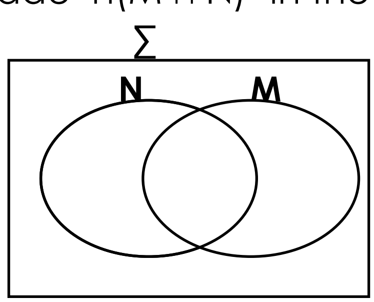
3.Shade (P - Q)' in the Venn diagram below:



4. Describe the unshaded region in the Venn diagram below:



5. Shade n(M ∩ N)' in the Venn diagram below:



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<td>Sets</td>
<td>Set Concepts</td>
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Lesson 8

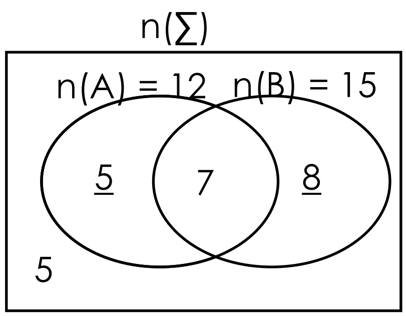
Representing information on a Venn diagram

- Identify the regions on the Venn diagram.
- Fill the Venn diagram correctly using the information.

Example

1. Given that n(A) = 12, n(B) = 15, n(A∩B) = 7 and n(AUB)ꞌ = 5

a) Complete the Venn diagram below;



n(A) only
12 – 7 = 5

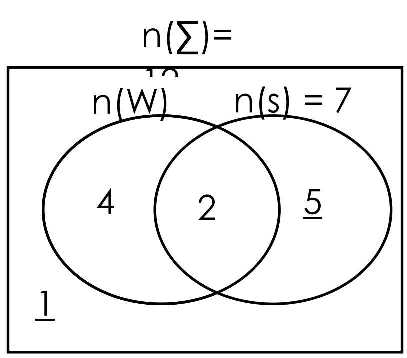
n(B) only
15 – 7 = 8

b) Find n(∑)

n(∑) = 5 + 7 + 8 + 5
12 + 13
n(∑) = 25

2. In a group of 12 members , 4 members take water (W) only, 7 members take soda (S), 2 members take soda and water and some take other drinks;

Complete the Venn diagram below;



N(WUS)ꞌ
12 – (4 + 2 + 5)
12 – 11
1

n(S) only
7 – 2 = 5

<u>Activity</u>

1. If set P = {All composite numbers less than 16}
Q = {1 , 3, 5 , 7 , 9 , 11 , 13 , 15}

a) List down the members of set P.

b) Find n(P) and n(∑)

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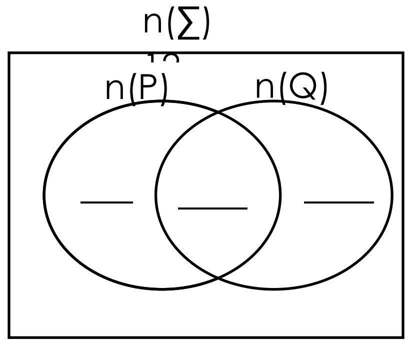
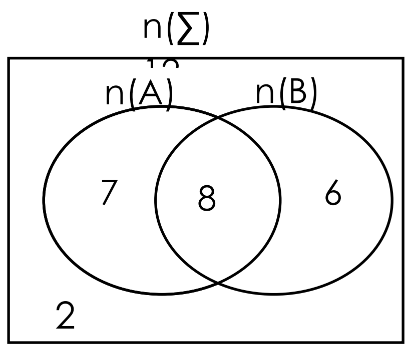
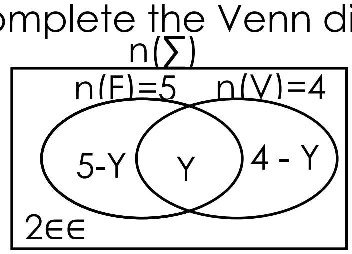
<tr><td></td><td></td><td>c) Use the information above to complete the Venn diagram below;


2.Study the Venn diagram below carefully and use it to answer the questions that follow:


(a)Find n(∑)

(b)Find n(A)'
(c)Find n(B – A)'</td></tr>
<tr><td>Sets</td><td>Set concepts</td><td>Lesson 9
Solving problems involving Venn diagram (Use of the number of elements in the universal set).
- Identify the regions of a Venn diagram given and values given
- Fills the Venn diagram with the information given.
- Forms an equation from the Venn diagram.
- Solve the equation formed.
1. In a class of 8 boys, 5 play football (F), 4 play volley (V), Y play both games while 2 play other games.
a) Complete the Venn diagram below.

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b) Find the value of Y in the diagram.

$5 - Y + Y + 4 - Y + 2 = 8$

$5 + 4 + 2 - Y = 8$

$11 - Y = 8$

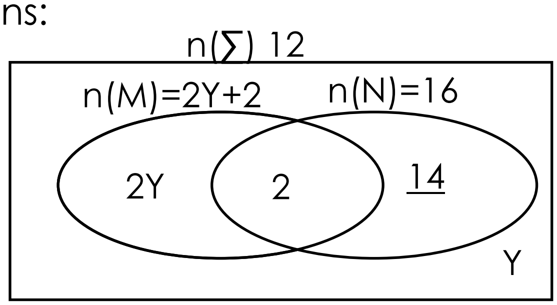
$11 - 11 - Y = 8 - 11$

$-Y = -3$

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

$Y = 3$

2. Use the Venn diagram below to answer the following questions:



a) Complete the Venn diagram above.

n(N) only

$16 - 2 = 14$

b) Find the value of y.

$2Y + 2 + 14 + Y = 31$

$2Y + Y + 2 + 14 = 31$

$3Y + 16 = 31$

$3Y + 16 - 16 = 31 - 16$

$\frac{3Y}{3} = \frac{15}{3}$

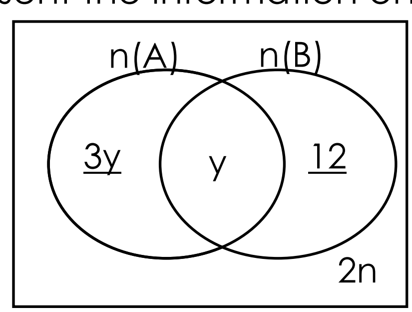
$Y = 5$

c) Find $n(M \cap N)^{I}$

d) Calculate the number of elements in the universal set.

2. In a village of 40 members, 20 members take Fanta (F), 12 members take pepsi (P) only, 3y take Fanta (F) only, 2n take other drinks while only Y members take both Fanta and Pepsi

a) Represent the information on the Venn diagram.



b) Find the value of y and n.

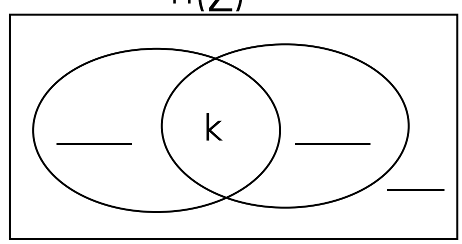
$3y + y = 20$	$20 + 12 + 2n = 40$
$4y = 20$	$32 + 2n = 40$
$\frac{4y}{4} = \frac{20}{4}$	$32 - 32 + 2n = 40 - 32$
$y = 5$	$\frac{2n}{2} = \frac{8}{2}$
	$n = 4$

Activity:

1. In a class of 44, 27 pupils like matooke (M), 22 like Rice (R), 2 don't like any of the two while some pupils like both Matooke and Rice.

a) Use the above information to complete the Venn diagram below.

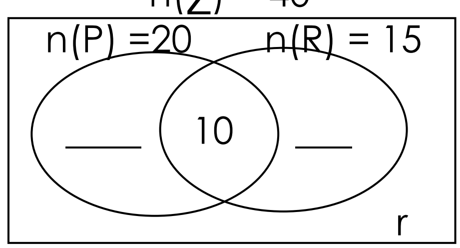
n(∑) =



b) Find the value of k.

2. Study the Venn diagram below and complete it correctly.

n(∑) = 40



b) Find the value of r.

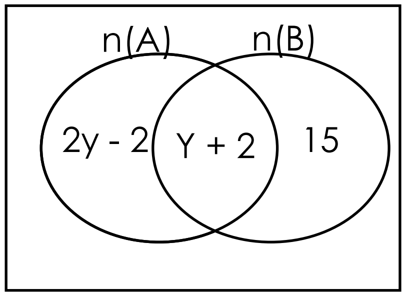
Lesson 10

Using parts of a Venn diagram to form and solve equations.

- Define all the different parts / regions in the Venn diagram.
- Identify the data / values in the phrases of the question with the regions of the Venn diagram.
- Fill in the Venn diagram and identify the region with full information that can form an equation.
- Use the phrases of comparison given to form the equation.
- Solve the equation.

Examples;

1. Given the Venn diagram below, n(A) = n(B) only.



3y

a) Find the value of y.

$2y - 2 + y + 2 = 15$

$2y + y + 2 - 2 = 15$

$3y \quad = 15$

$3 \quad\quad 3$

$y \quad = 5$

b) Find n(A) only.

(2 x y) – 2

(2 x 5) – 2

10 – 2

8

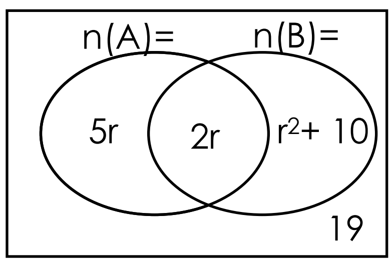
c) How many members take other drinks?

$n(FUP)^{I} = 2n$

2 x 4 = 8 members

Activity

1. Given the Venn diagram below, use it to answer the questions that follow.

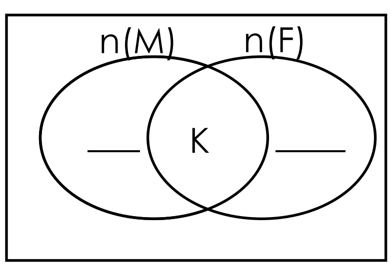


a) If n(B)only = $n(AUB)^{I}$, find the value of r.

b) Find n(∑)

2. In Masafu hospital 20 patients have malaria (M), 15 patients have fractures (F) only while p of them had both malaria and fractures.

a) Represent the information on the Venn diagram.



a) If $\frac{1}{5}$ of the fracture patients (F) only have fractures (F) and malaria, find the value of K.

b) How many patients are in Masafu hospital.

Sets	Set concepts	Lesson 11

Sets

Set concepts

Lesson 11

Probability of simple events.

- Probability is a likeness of an event to happen. (chance)
- For the coin, the two sides make the total chances (sample space)
- Tail and head make the sample space.
- When the coins increase the sample space also increases.
- One coin has a sample space of 2 (H,T)
- Two coins have a sample space of 4.
- Probability is expressed as a fraction.

Examples;

1. If a coin is tossed once, What is the probability of a head appearing on top?

H	**T**

Probability

n(D) , desired chances

n(E) , sample space

$\frac{1}{2}$

2. John tossed two coins at once, what was the probability of having a tail on top for both coins.

	H	T
H	**HH**	**HT**
T	**TH**	**TT**

Probability

n(D) D – stands for desired chances

n(E) E – Total events

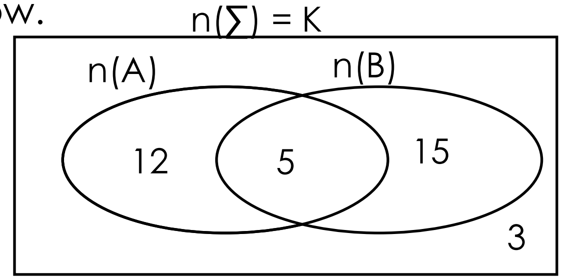
$\frac{1}{4}$

Probability on a dice

- A dice has 6 faces numbered from 1 to 6
- Each face has a chance to appear on top when tossed.
- These faces have different kinds of numbers thus odd, even , square , prime , composite and others.

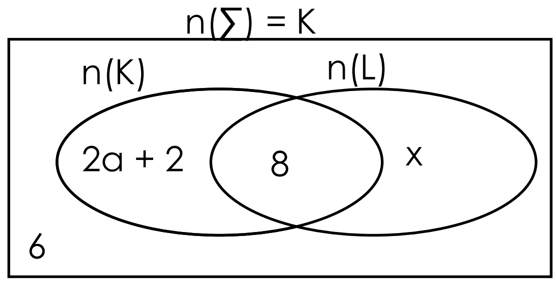
1. Onyango tossed a dice once, what is the probability that a prime number will appear on top.

Sample space	**Desired chances**	**Probability**
{1 , 2 , 3 , 4 , 5 , 6}	{2 , 3 , 5}	$\frac{n(D)}{n(E)}$
n(E) = 6	n(D) = 3	$\frac{3}{6}$

		2. If a dice is tossed once what is the probability that a sum of 2 and 3 will appear on top? **Sample space** {1 ,2 , 3 , 4 , 5 , 6} n(E) = 6 **Desired chances** 2 + 3 = 5n(D) 5 n(D) = 1 **Probability** n(E) $\frac{1}{6}$ **Activity;** 1. Peter tossed two coins at once, what is the probability that Head tail will appear on top on both coins. 2. A teacher asked his learner to toss a dice once, what is the probability that a composite number appear on top. 3. A dice was tossed once. Find the probability that; a) A prime number will appear on top. b) A number less than 5 will appear on top. c) An odd number will appear on top.
Sets	**Set concept**	**Lesson 12** **Probability from two event Venn diagram.** - n(E) is the sample space n(E) - Identify the region asked in the questions. - Find the elements in the region. - Express the number as a fraction of the total number of elements in the universal set. **Examples;** 1. Use the Venn diagram below to answer the questions that follow. n(∑) = K  a) Find the value of K. K = 12 + 5 + 15 + 3 K = 35 b) Find the probability of picking an elephant from set B only. n(D) = 15 n(E) = 35 **Probability** $\frac{n(D)}{n(E)}$ | $\frac{15}{35}$

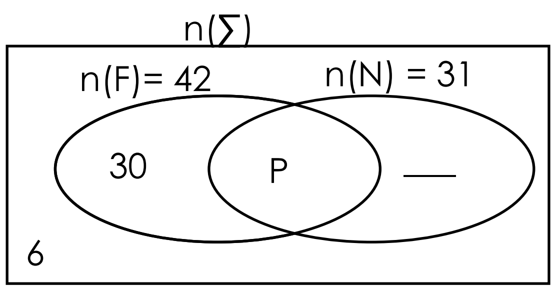
Activity:

1. Study the Venn diagram below carefully:



a) Find the value of a.
b) Find the value of x if n(∑) = 49
c) Find the probability of picking a member that is under $n(K)^{I}$

2. In a class, 42 pupils enjoy football (F), 31 enjoy netball (N), P enjoy both Football and netball while 3 enjoy neither football nor netball.
a) Use the above information to complete the Venn diagram below.



a) Find the value of P.
b) What is the probability of picking a pupil who does not like football?

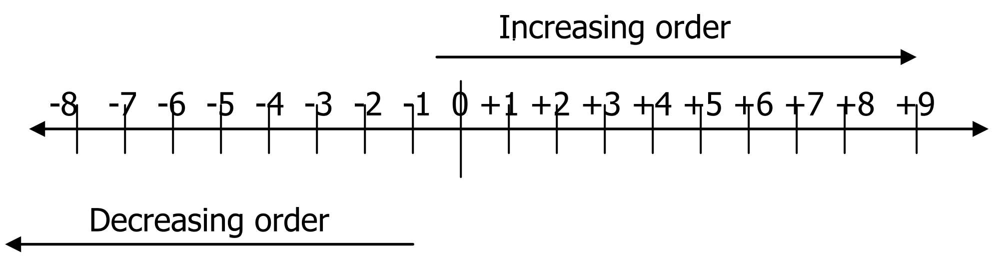
P.7 Maths. Lesson Notes .

INTEGERS:

Integers are a set of numbers, which include: positive numbers, negative numbers and zero. Positive and Negative numbers are called directed numbers because the sign used indicates which direction to go from zero.

ORDER OF INTEGERS**:**

Any integer to the right of any given integer on the number line is greater than the one to the left of that given integer, and any integer to the left of any given integer is less than that given integer.



Meaning of signs used in integers

Addition means Continue.

Subtraction/Minus means Turn back

Positive means Forward movement

Negative means Backward movement.

REVISION EXERCISE 17:

1: Evaluate $8 + {}^{-}3$

2: Work out $10 - {}^{-}2$

3: Simplify: $-\mathbf{9} - {}^{-}4$

4: Work out $-5 - 8$

5: Simplify: $-12 - -4$

6: Evaluate: $-6 - -11$

7: What is the sum of -3 and -12?

8: Simplify $(-5) - (-7)$

9: Work out $-4 - (-8)$

10: Simplify: $-2 - -2$

11: Work out: $-18 + {}^{+}20$

12: Add: ${}^{+}2 + {}^{+}5$ using number line

13: Workout; $? + +5 = 0$

14: Add: $+4 + -6$ using number line

15: Simplify: $7m + ? = 0$

16: Evaluate: $-15 - -18$

17: Evaluate: $-9 - -4$

18: Show on a number line $4 - -2$

19: Simplify: $(-7) - (-3) - (+2)$

20: Simplify: $(-5) - (-10) + (-6)$

REVISION EXERCISE 18:

1: Simplify: $^{-}4 - {}^{-}20$

2: Work out: $^{-}3 \times +5$

3: Simplify: $^{-}18m - {}^{-}10m$

4: Add: $^{-}3 + {}^{-}4$

5: Evaluate: $(^{-}5) - (^{-}1) - (^{-}3)$

6: Show $^{-}2 - {}^{-}5$ on a number line.

7: Decrease: $^{-}4a$ by $^{-}2a$

8: Show2 X 6 on a number line.

9: Work out: $^{-}81 \div 3$

10: Evaluate: $^{-}7 - {}^{-}7$

11: Work out: $5 + {}^{-}2$

12: Calculate: $^{-}18 \div {}^{-}3$

13: Simplify: $^{-}10 - {}^{+}15$

14 Work out $4 - {}^{-}3$ on a number line

15: Simplify: $(^{-}5) - (^{-}2) + (^{-}7)$

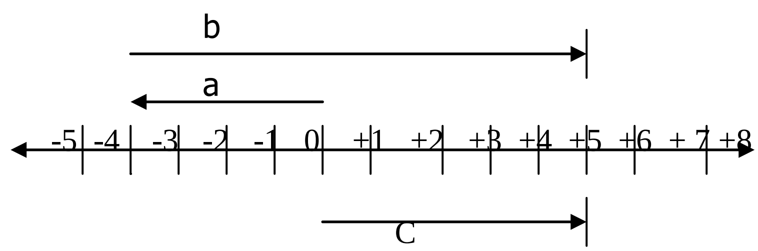
16: Add: $^{-}2.6 + {}^{-}3.2$

17: Evaluate: $^{-}7 - {}^{-}3$

18: Simplify: $^{-}8m - 4m$

19: Evaluate $(11) - (^{-}3) - (^{+}12)$

20: Give a mathematical statement for the figure below.(Hence Find a, b, c)



APPLICATION OF INTEGERS:

Examples:

1: A man was born in 17 BC and died in 35AD immediately after his birthday. How old was he when he died?

Solution: BC = -ve = $35 - {}^{-}17$ AD = +ve = 35 +17 = **<u>52 years</u>**

2: The temperature of ice was -3^{0}c and that of water was 100^{0}c calculate the difference in temperature.

Solution: = $100 - {}^{-}3$ = 100+3 = **<u>103^{0}c</u>**

3: 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: Mary had a debt of 200,000/= from each of her 4 friends.

How much debt had she in all?

Solution: Debt = -ve 200,000 x4 =800,000/

She had a debt of 800,000//= (-800,000)/=

If she sold her car at 2,000,000/=,how much did she remain with after paying the Debt?

Solution: 2000,000-800,000

1200,000/= remained

5: A teacher gave a test of 20 questions and a warded 2 marks for each correct answer given and deducted a mark for each answer got wrong.

If a pupil got 18 numbers correct, what mark did the pupil get?

Solution: correct = 18 x2 = 36

Wrong = 2 x $^-$1 = -2

34 marks

b: If a pupil obtained 25 marks, how many numbers did the pupil get correct?

(Ii) How many numbers did the pupil fail?

Solution: Let correct numbers be n then wrong is (20 – m)

Correct	wrong	total mark
n.	(20 – n)	25
2n	-1(20 –n) =	25

2n – 20 + n = 25

2n +n –20 = 25

3n –20 + 20 = 25 +20 correct = **15 numbers**

$\frac{3n}{3} = \frac{45}{3}$ Wrong = **5 numbers**

REVISION EXERCISE 19:

1: A frog jumped 3 steps 5times before diving into the pond. What distance had it covered before diving into the pond if each step is 1 metre?

2: The temperature on the slopes of a mountain was 20^0c and the temperature at its peak was -15^0c. Find the difference in temperature.

3: A motorist moved 100 metres forward and reversed 120 metres. How far is he from the starting point?

4: A man climbed electric pole 10 steps upwards and slipped 4 steps down wards. How far is he from the ground if each step represents one metre?

5: The temperature of ice dropped by 2^0c and by another 3^0c. Find the final temperature of the ice?

6: A passenger missed the bus by 5 minutes. If the next bus arrived 15 minutes later. How long did the passenger wait at the bus park?

7: On a rainy day the temperature was 3^0c below zero in the morning. In the afternoon the temperature rose by only 8^0c. What was the temperature in the afternoon?

8: The normal body temperature of a human being is 37^0C. Before treatment 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.

9: Kato put ice at -15^0C into a kettle and boiled it to 100^0C.He waited till the temperature dropped by 50^0C and drank it

a: What was the temperature difference between ice and boiled water?

B: What was the difference in temperature between ice and the water which Kato drank?

10: Akello can run a race in a time of 5 seconds less than 5 minutes. Achom can run the same race in 2 seconds more than Akello. What is Achom's time for the race?

11: Peter went 20 minutes earlier to the airport to wait for his brother. If the plane arrived 15 minutes late. How long did Peter wait at the airport?

12: An electric pole is 500 cm long .if 85 cm is below the ground. What part of the pole is above the ground?

13: A man walked 10 steps backward and then 15 steps forward ward. What distance was he away from the starting point if each step is equals 50 cm?

14: The temperature of ice is -5^0c and the temperature of boiling water is 100^0c.

What is the difference in temperature?

15: The temperature during the day in London was 15^0c,but during the night the temperature dropped by 20^0c.What was the temperature during the night?

16: A football team scored 4points and lost 3, Scored 2 points and lost 1 and lastly scored 6points and lost 3. What was the total score after scoring the six successive games given?

17: Badru moved 6 spaces forward, then 3 spaces backwards and more 2 spaces forward.

a) How many spaces did he move forward?

b) How far is he from the starting point if each step =1metre?

18: A man climbed an electric pole. He started climbing 3 steps upwards and slips One step down wards in that order. Find the number of steps he is from the ground after Slipping 4 steps downwards.

c) What distance was he from the ground if each step 50cm?

19: When marking a test, a teacher a warded 3 marks for every question got correct and subtracted a mark for any wrong answer.

If the test contained 25 questions and a pupil got 22 numbers correct,

a: How many narks did the pupil get?

B: A pupil scored 40 marks, how many numbers did the pupil get correct?

20: A mathematics examination contains 30 questions. 3marks are a warded for every answer got correct but a mark is deducted for every number failed.

d) If a candidate got 25 questions correct, how many marks did the candidate score?

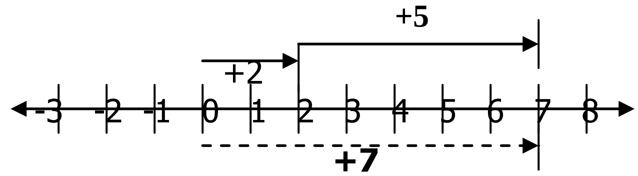
B **:** If a candidate scored 66 marks, how many numbers did that candidate fail?

21: The temperature at the foot of mount Rwenzori was 15^0c. When a climber reached at the top of it, the temperature dropped by 17^0c. What was the temperature at top of the mountain?

ANSWERS

REVISION EXERCISE 17

1: $^{+}5$ 12:

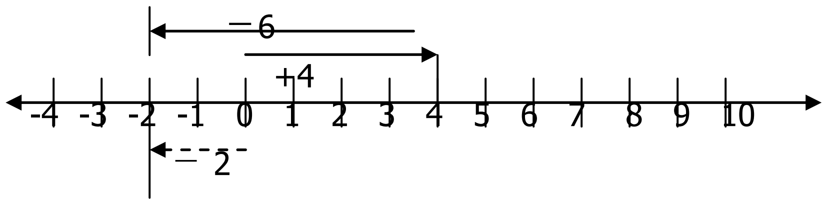


2: 12

3: -5 13:` -5

4: -13

5: -8 14:

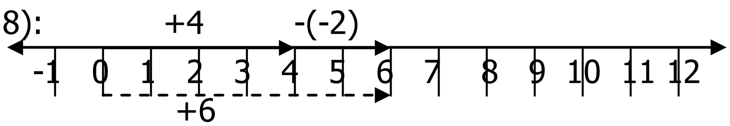


6: $^{+}5$

7: -15 15: -7m

8: $^{+}2$ 16: 3

9: $^{+}4$ 17: -5 (18):

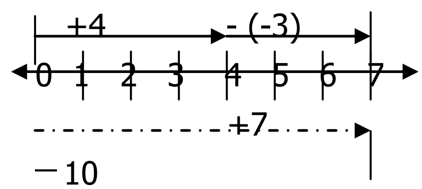


10: 0 19: -6

11: $^{+}2$ 20: -1 (19) -6 20: -1

REVISION EXERCISE 18

1: 16 9: -27 14:



2: -15 10: 0

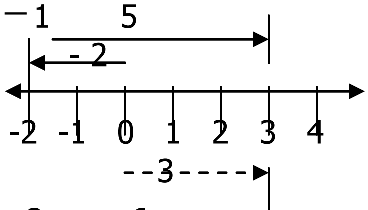
3: -8M 11: 3

4: -7 12: 6 15: -10

5: -1 13: -25 16: -5.8

17: - 4

6:

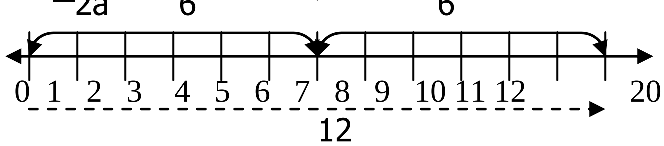


18: -12m

19: 2

7: -2a

8:



20: a)= -4 b) = +9 ©= +5

REVISION EXERCISE 19

1:	15 metres	10:	4 minutes 57 sec.	18:	8steps
2:	35^0c	11:	35 minutes	b):	400cm
3:	20 metres behind	12:	415 cm	19:	60 marks
4:	6 metres	13:	500 cm	19b):	18 correct
5:	-5^0c	14:	105^0c	20:	70 marks
6:	20 minutes	15:	-5^0c	20b:	6 wrong
7:	5^0c	16:	5 points		

8:	39^0c	17:	8 spaces	21:	-2^0c
9:	115^0c	b):	5 metres		
	e) 65^0c				

ALGEBRA.

REVISION EXERCISE 20:

Work out the following:

1: Simplify: p + p + p + p

2: Work out: 4b + 2b + a – b

3: Solve: 2n + 3 = 9

4: Work out: 2x +6 +4x + 4

5: Simplify: 10m – 3k – 3m +2k

6: Simplify: 14p – ⁻6p

7: Work out: 4xy +7ac + 5xy – 3ac.

8: Solve: 3y –3 = 6

9: Simplify: 6a – 9b –2 a +12b

10: Work out: $2m^2 + 8m^2$

11: Simplify: 12y + 8y – 10y

12: Work out: 2(p +3k) +p

13: If r = ⁻3 and k = ⁻ 6 Find r – k

14: Evaluate: $2m^2$ when m =3

15: Simplify: $ab^2 – 5ab^2 + 3ab^2$

16: Solve: 15 + x = 20

17: Subtract 2y – 4 from 4y – 5

18: Simplify: 2(3m + n) + (2m+ n)

19: Work put: $2n^2$ = 32

20; Simplify: ½ (4w + 6t)

REVISION EXERCISE: 21

1: **⁻ 2($\overline{m + n}$)** **2:** **(3a + b) (-y)** **3:** **4y(2a +b)**

4: **(5 + a+ c) p** **5:** **3z (4y – 5z)** **6:** **4(2a –3b)**

7: **⁻ p (⁻ 3p + 7y)** **8:** **⁻ 2 (⁻ x – 4)** **9:** **⁻ (3m +5m**

10 **⁻ 2 (⁻ 2y – 4)** **11:** **(9x – 4) – (x –2)** **12:** **6(p + 2) – 2(p+4)**

13: **5(q +3) – 3 (q – 1)** **14:** **4(x –2) – 3(x – 2)** **15:** **(3x+5) –(2x +3)**

16: **⁻ 6x(⁻1 + 2)** **17:** **2(a +3b) + 3(a +b)** **18:** **⁻4 (n – 6) + 2(3n –2)**

19: **(7m –1) +(m –6)** **20:** **3(t +4) –2(t +5)**

MORE ON THE REMOVAL OF BRACKETS.

REVISION EXERCISE: 22

Simplify the following:

1: $(k+1) + (2k+3)$

2: $(2m + 3) + (4m + 4)$

3: $(3y + 5) -(2y +2)$

4: $(4r + 6) -(r +3)$

5: $(7m -1) + (2m - 5)$

6: $(8k -2) + (3k - 4)$

7: $(10p -6) -(3p - 6)$

8: $^{2}/_{3}(6a + 9b) - {}^{1}/_{2}(4a + 2b)$

9: $4(f +5) + 3(f +7)$

10: $5(2n +3) + 2(n - 6)$

11: $6(3m + 4) - 2(5m +10)$

12: $7(p - 2) + 2(p + 4)$

13: $9(2 + a) + (6 - 4a)$

14: $3(y + 8) -2(y +10)$

15: $4(t + 2) - 3(t - 4)$

16: $5(m -3) -2(m +4)$

17: $4(k +2) -3(k -2)$

18: $5(x - 4) - 4(x - 6)$

19: $2(n -1) + 3(n -2)$

20: $\frac{1}{4}(16m +12w) - {}^{1}/_{3}(6m + 6w)$

EQUATIONS:

An equation is a mathematical statement, which states that the sides are equal

REVISION EXERCISE: 23

Solve the following equations

1: $2m + 3m = 20$

2: $2x + 4 = x + 11$

3: $^{2}/_{3} P = 4$`

4: $(p -3) + (p - 4) = 1$

5: $4\,{}^{1}/_{3}x + 2 = 15$

6: $m + {}^{m}/_{5} = 6$

7: $5(t -2) -3(t - 4) = 14$

8: $3(y -1) = 21$

9: $6(k -2) + 3(k + 1) = 0$

10: $0.4 k - 0.8 = 2.4$

11: $7(2r -5) -(r + 8) = {}^{-}17$

12: $(2p -5) -(p + 9) = 12$

13: $5(a - 4) + 3 + 2(a -3) = 33$

14: $5(3 -4k) -8 (2k + 4) = 19$

15: $2\,{}^{1}/_{3} n + 2 = 9$

16: $4p + 0.5 - 0.2p = 8.1$

17: $^{6}/_{11}p -3p = 54$

18: $\dfrac{3y -1}{2} = \dfrac{7y + 1}{6}$

19: $2/3(6a +9) + 2/5(5a -10) = 26$

20: $\frac{3}{4}(8m +4) - {}^{1}/_{3}(6m - 9) = 18$

REVISION EXERCISE 24:

Solve the following:

1: $\frac{4}{x+1} = \frac{3}{x-3}$

2 $\frac{x+6}{8} + \frac{x}{4} = 3$

3: $\frac{y-1}{2} + \frac{y}{5} = 3$

4: $\frac{n-5}{2} + \frac{n}{8} = 5$

5: $\frac{x+3}{3} = \frac{5x+1}{9}$

6: $\frac{x-3}{3} = \frac{x+3}{5}$

7: $\frac{3y-8}{4} = \frac{2y-3}{5}$

8: $\frac{y+2}{5} = \frac{y+4}{7}$

9: $\frac{k+2}{9} = \frac{k+4}{11}$

10: $\frac{3m+2}{2} = \frac{6m+11}{5}$

11: $\frac{4x-5}{7} = \frac{5x-4}{11}$

12: $\frac{n-3}{4} = \frac{n+2}{9}$

13: $\frac{y-4}{y-2} = \frac{2}{3}$

14: $\frac{x-4}{5} = \frac{4}{5}$

15: $\frac{x-11}{3} = \frac{x - {}^{-}1}{5}$

16 $\frac{x+5}{5} + \frac{x}{5} = 5$

17: $\frac{3k-2}{10} = \frac{k\quad}{5}1:$

18: $\frac{t-2}{8} = \frac{1}{4}$

19: $\frac{1}{3}(2m-5) = \frac{m-2}{2}$

20: $\frac{1}{5}(2r+3) = \frac{1}{3}(r+2)$

REVISION EXERCISE 25:

1: Solve; $t - 8 = 12$

2: Simplify: $-2(x + 2y)$

3: If $^{1}/_{3}$ of a number is 7. Find the number

4: Simplify: $3m-6n+2m$

5: Solve: $n + 4 = 11$

5: The mean of 2a,3,6 and 7 is 8 .Find a

7: The range of two numbers is 2. if the bigger number is -3, find the smaller number.

8: Given that a =4, b=1 and c = 3 Find: a) 3(a + b)

9: Simplify the following: a) $^2/_5$ (15m –20 p), (b) -3 ($-$ x $-$4) (c) $^2/_3$(6a + 12b)

10: Solve: 4/7 x – 2x = $-$10 11: ½ m^2 = 18

12: Given that ½ of a number is 20. Find the number.

13: When a number is multiplied by 5 and 8 is added to it the result is 23. What is the number?

14: Kato has x pens, Peter has 2x pens and John has 9pens. If the total number of pens which they have is 18. How many pens has Kato?

15: Alice is (k+2) years old, her father is twice as old. If their total age is 36 years, how old is Alice?

16: A book costs shs. 4,000 more than a pen. If their total cost is shs 24,000. Find the cost of each item.

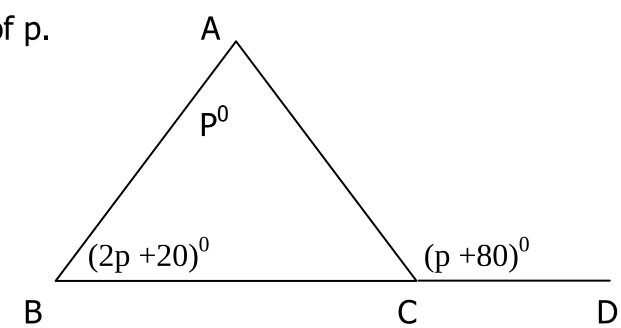
17: Among is 4 years younger than Acham, if their total age is 18 years. What are their ages?

18: A goat and a cock cost shs. 64,000. If the goat costs three times the cost of the cock. What is the cost of each?

19: Rose is 6 years younger than Betty. If their total is 24 years. How old is each now

20: In the figure below find the value of p.

b) What is the size of angle ACD?



REVISION EXERCISE 26:

1: Simplify: $12m^7 \div 3m^3$ 2: Solve: 5(n +4) =30

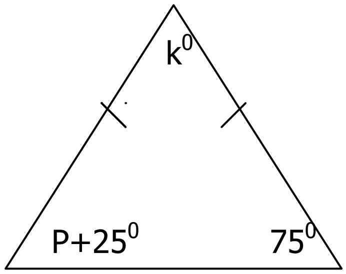
3: Solve: 1/8 k^2 =2 4: Solve: 1/7m^2 = 28

5: Subtract: a) x –1 from 2x 2 6: Simplify: a) $15n^9 \div 5n^3$

7: If ¾ of Peter's income is shs.120, 000. What is his income?

8: Solve the following: a) $^1/_5$ t –7 =10

9: The figure below is an isosceles triangle.



(I) Find the value of p i

(ii) What is the size of the angle marked k

10: Work out: b) $\frac{3a-4}{2} + \frac{2a+7}{5}$

11: Work out: a) $25a^9 \div 5a^6$ b) $\frac{4m \times 3m^4 \times 2x^3}{12m^5}$ c) $2^{-2} + 3^{-2}$

12: Solve: a) $2n - 4 = 16 + n$ b) Solve: $12 - p = 2p$ c) $3(x - 1) - 3(3 - x) = 0$

13: A hen costs shs.2000 less than a cock. If both birds cost shs.16000. What is the cost of each?

14: Think of a number, add 2 to it and divide the result by 3. if the answer is 4 what is the number?

15: A man bought 5p cows; he sold 3p of the cows. Later his brother gave him 5p cows. If now he has 21 cows. Find the value of p.

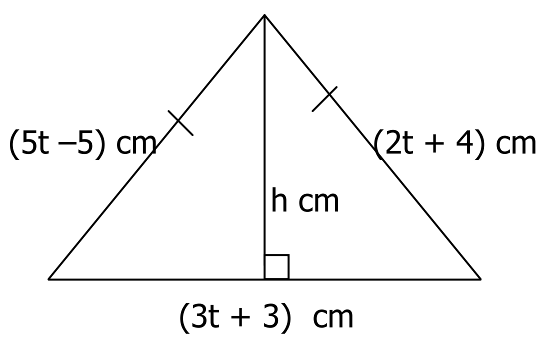
16: A ball and a pair of boots cost shs 150,000. If a ball costs twice as much as a pair of boots find the cost of each.

17: The length of a rectangle is twice its width. If its perimeter is 30 cm.

Find: (i) Actual length of the rectangle.

(ii) Actual width of the rectangle. (iii) Calculate its area.

18: Study the figure carefully and answer the questions that follow.



a) Find the value of t

b) Find height

c) Work out its area.

d) Find its perimeter

19: Okello has 2(m + 3) heads of cattle on his farm. Musana has 20 more heads of cattle than Okello. If they have altogether a total of 64 heads of cattle, find out how many each has.

20: It takes a motorist y + 3 hours to travel from Kampala to Masaka. If it takes him one hour more to travel from Masaka to kisoro and the whole journey took him 6 hours. a) Find the value of y

b) If the distance from Kampala to Kisoro is 420 km. At what speed was the motorist traveling?

REVISION EXERCISE 27:

1: Simplify: $4a + 11a - 2a$

2: Simplify: $8m + 3m - 12$

3: Solve: $n - 2 = 4$

4: Work out: $3k - 2m + 4k + 5m$

5: Solve: $\frac{n}{3} - 4 = 7$

6: Solve: $\frac{1}{4} y^2 = 400$

7: Simplify: $2(4m - 7b)$

8: Work out $\frac{5a^{10} \times 12a \times 3a^6}{9a^7}$

9: Solve: $2^{2x} = 64$

10: $^3/_5$ of a number is 12. Find ¼ of the number.

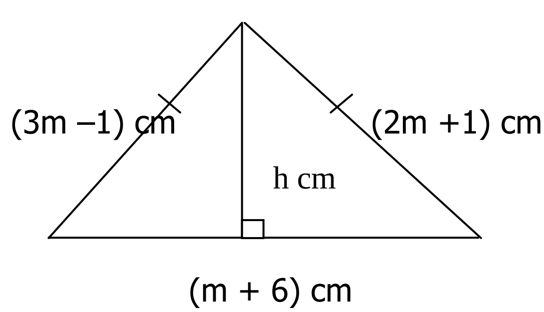
11: Work out: $4(p + 1) - 3(p - 4)$

12: The three sides of a scalene triangle are 3m cm, 5m cm and 4m cm. If the perimeter of the triangle is 48cm

a) What is the value of m? b) Find the range of the sides.

13: A book and a pen cost shs. 4800, if the cost of the book is twice the cost of the pen find the cost of each item.

14: The figure below is an isosceles triangle.



a) Find the value of m

b) Work out its perimeter

c) Calculate its area.

15: Kato is12 years old and Okello is 4 years old. In how many years' time will Kato's age be twice the age of Okello?

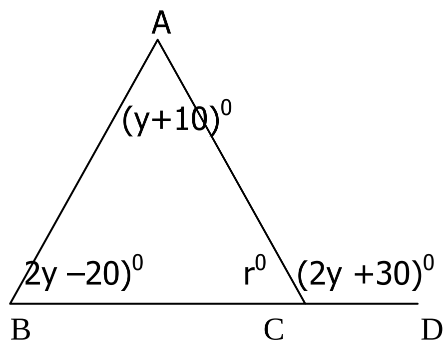
16: The area of a rectangular garden is 72 $m^{2.}$ If the length is twice the width, Find

a) The length. b) The width, c) The perimeter.

17: Aida is twice as old as Amina who is 2 years older than Saida. If Saida is 9 years old, what are the ages of Aida and Amina?

18: Akello is 30 years older than her daughter. In 5 years' time Akello will be twice as old as her daughter .a) What are their present ages? b) What will be their ages in 5 years' time?

19: Study the figure below carefully and answer the questions that follow



a) Find the value of y.

b) What is the size of angle r?

c) Find the size of angle ACD.

20: Mugisha bought twice as many orange trees as mango trees. If he planted (X –3) mango trees and he had –planted a total of 240 trees altogether.

a) How many trees of each type did he plant?

b) How many more orange trees did he plant than mango trees?

c) If he paid shs 2500 for each mango tree and shs. 3000 for each orange, how much money did he spend altogether?

MORE APPLICATION OF ALGEBRA.

AGES IN TIME TO COME AND TIME AGO.

Example 1

John is 20 years older than peter. In 10 years time, John will be twice as old as Peter.

a) How old is each of them now? b) What will be their ages in 10 year's time?

Solution: Let Peter's age be x

	Peter		**John**	**In 10 year's time.**
Now	x		(x + 20) years	Peter x + 10
10 years	(x + 10)	=	(x + 20 + 10)	10 + 10
time	2(x + 10)	=	(x+30)	**<u>20 years old</u>**
	2x + 20 –20	=	x + 30 –20	
	2x – x	=	x – x + 10	
	x	**=**	**10**	John **=** x + 30

Now **Peter = <u>10 years</u>**. **John** = x+20 10 + 30

10 + 20 =**<u>30years</u>** **<u>40 years old</u>.**

Example 2

A son is 15 years younger than his father. In 6 year's time the son's age will be half the age of the father.

a) How old is each now? b) What will be their ages in 6 year's time?

Solution: Let the son's age be n

	<u>Son</u>		**<u>Father</u>**		
Now	n –15		n	Their ages in 6 year's time.	
6 year's	(n –15 +6)	=	½ of (n + 6)		
time	2(n – 9)	=	½ x2(n +6)	**Father**	**Son**
	2n –18	=	n +6	n + 6	n-9
	2n –18 +18	=	n + 6 + 18	24 + 6	24 -9
	2n –n	=	n – n +24	**30 years.**	**15 years**
	n	=	24	**Son**	

Father = 24 year **son** n –15

24 –15 **<u>9 years old</u>**

Example 3:

Betty is 3 years younger than Mary. 5 years ago Betty was ½ the age of Mary.

a) How old is each now? b) What will be their ages in 5 year's time?

Solution:	Let Betty's age be k			
	Betty		**Mary**	**Their ages 5 years ago.**
Now	k –3		k	
5 years	(k –3 –5)	=	½ (k –5)	Betty = k –8
ago	2(k – 8)	=	(k –5)	= 11 –8
	2k –16 +16	=	k – 5 + 16	= Was 3 years old.
	2k – k	=	k – k + 11	
	k	=	11	Mary = k –5
	Mary = 11 years.		Betty = k –3	=11 –5
			11 –3 = **8 years.**	**= <u>was 6 years old.</u>**

Example 4:

A daughter is 3 years old and the mother is 21 years old. In how many years' time will the mother's age be 3 times the age of the daughter?

Solution: Let time to come be y

	Daughter		**Mother**	9 – 9 +3y =21 –9 +y
Now	3 years		21 years.	3y –y = 12 +y – y
Y- years	3(3 + y)	=	(21+ y)	2y/2 = 12/2
	9 + 3y	=	21 + y	y = 6. **In 6year'stime**

Example 5:

Peter is 9 years old and James is 15 years old. In how many years ago was James' age twice the age of Peter?

Solution: Let time ago be n

	Peter		**James**.	Ago	18 –2n = 15 – n
Now:	6 years		15 years.		18 –2n + 2n = 15 –n +2n
n years	2(9 – n)	=	(15 – n)		18 –15 = 15 –15 =n
					3 = n
					<u>It was 3 years ago</u>

Example 6:

The length of a rectangular garden is 3 times its width. If the difference of its dimensions measurements is 36 metres Find it's a) Length and width. b) Perimeter c) Area

Solution: Let the width be x

Length.		**Width**		Perimeter = 2(54 + 18)m
3X		X		**=** 2 X 72
3X – X	=	36	=	**<u>= 144 metres</u>**.
$\frac{2X}{2}$	=	$\frac{36}{2}$		
x	=	18		Area = 54 m X 18m
				= $\underline{\mathbf{972\ m^2}}$

Width =**<u>18 metres</u>** Length= 18 X 3

<u>= **54 metres**</u>

REVISION EXERCISE 28:

1**:** A father is 20 years older his son .In 10 years time a father will be twice the age of his son.

a) Calculate their present ages. b) What will be their ages in 10 years' time?

2: Solve and find the solution set, $3 - 3k \geq 15$

3: Atim is 15 years younger than Peter. In 5 years time Peter's age will be twice the age of Atim.

a) Find their ages now. b) How old will each be in 5 years' time?

4: John is 15 years younger than Tom. In 8 years' time John's age will be half the age of Tom's age? a) How old is each of them now? b) What will be their ages then?

5: Andrew is 28 years old and Mondo is 4 years old. In how many years will Mondo's age be $^1/_3$ times the age of Andrew?

a) How old will each be then?

6: A son is 20 years younger than the mother. In 15 years time the son will be half the age of the mother

a) Calculate their present ages. b) What will be their ages in 15 years' time?

7: Annet 15 years older than Jane. In 8 years time a mother will be twice as old as the daughter a) Calculate their present ages b) How old will each be then?

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

a) Calculate their present ages. b) Work out their ages in 10 years' time.

9: Peter is 18 years older than John now .10 years ago Peter was twice as old as John

a) How old is each of them now?

10: Annette is 12 years younger than Musa now. 6 years ago Annette's age was ½ the age of Musa. a) Work out their present ages.

11: Mary is 16 years younger than Susan now. 8 years ago Mary was $^1/_3$ the age of Susan.
a) How old is each of them now?
b) What were their ages 8 years ago?

12: Mary is 10 yeas old and Aisha is 30 years old. a) In ho many years' time will Mary's age be half the age of Aisha? b) What will be their ages then?

13: A trader bought 8 radios at shs. (t –13000) each and 2 bicycles at shs. (t –2000) each. If he spent shs.530, 000 for buying the items.

a) How much did he spend on radios? b) What did he spend on bicycles?

14: The mean of 3 consecutive even numbers is 16.

a) Work out: a) numbers. b) Their range c) their median

15: The length of a rectangular garden is 4 times its width. If the difference of its measurements is 48 metres.

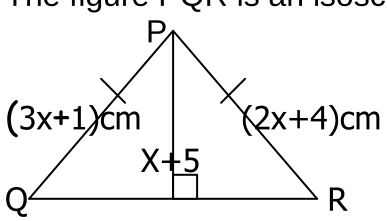
a) Work out its perimeter. b) Calculate its area.

16: a) The mean of 4 positive integers is 9.5.Work out the median of the numbers

b) The range of two consecutive numbers is 2.If the bigger numbers is –3. Find the smaller number

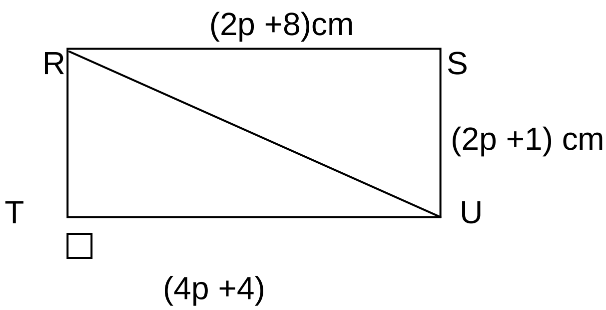
d) The sum of three consecutive counting numbers is 45. Find the numbers

17: The figure PQR is an isosceles triangle use it to answer questions that follow.



a) What is the value of x
b) Work out its area?
c) Find its perimeter

18 The three sides of a rectangle taken in order are: $(4p + 4)$, $(2p + 1)$ and $(2p+8)$cm respectively as shown below.



a) Find the value of p

b) What is the length of the diagonal RU?

c) Calculate the area of the triangle RTU

19: The mean of 6 consecutive numbers is 4 ½, a) Find the numbers.
b) Work out their median.

20: Solve and find the solution set; $^{-}4 \leq 2x \leq 8$

REVISION EXERCISE 29:

1: Work out: $^{t}/_{3} = 12$

2: Solve: $4 - p = 3$

3: Solve: $2q^2 - 4 = 14$

4: What must be added to $y + 4$ to get $2y + 10$?

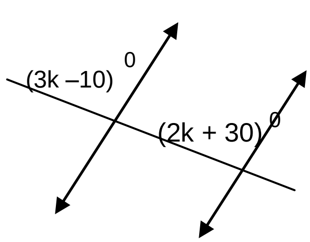
5: Subtract $r - 4$ from $3r - 7$

6: Solve: $\frac{m + 2}{3} + \frac{m}{3} = 4$

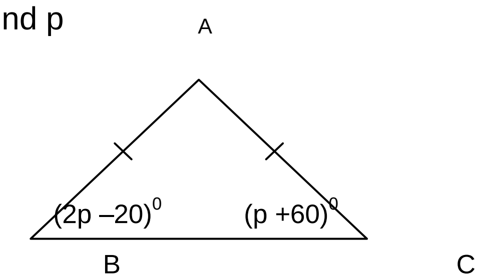
7: Simplify: $\frac{40p^5 - 10p^5}{15p^2}$

8: The LCM of two numbers is 48 and their GCF is 4. If the first number is 16, find the other number.

9: Find the value of k



10: Find p

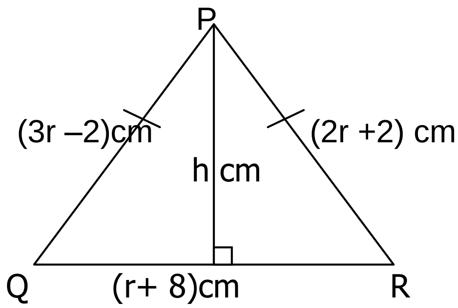


11: In the figure beside find: a) The value of r

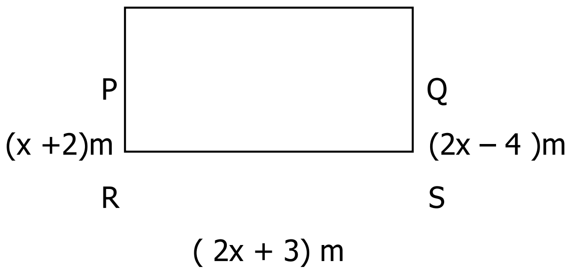
b) The perimeter

c) The height

d) Its area



12: The figure PQRS is a rectangular plot of land.



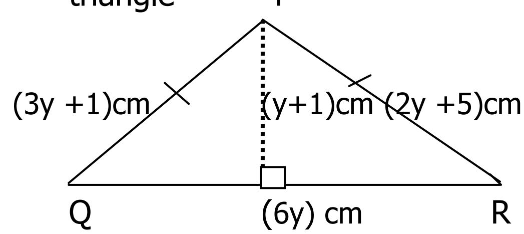
a) Find the actual value of the:

X (i) ii Length (iii) Width

a) Work out its perimeter

b) d) Find its area.

13: The figure below is an isosceles triangle

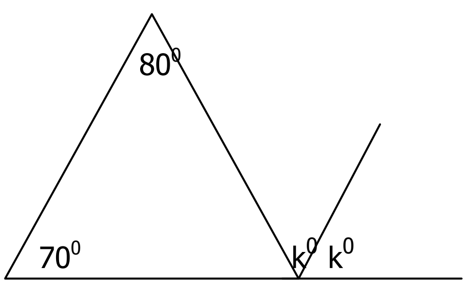


a) What is the value of y

b) Work out its area?

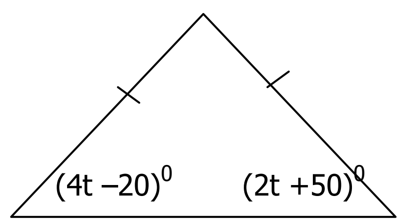
c) Find its perimeter.

14: In the figure below find the value of k

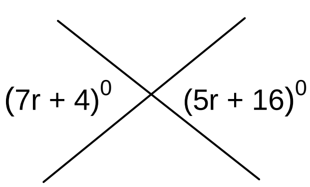


15: The figure below is an isosceles triangle

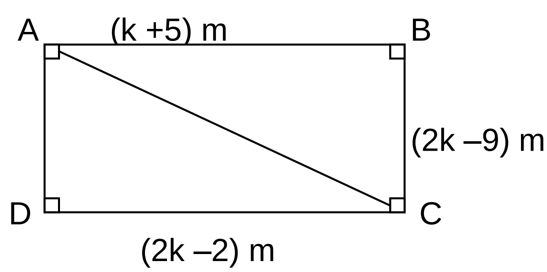
Find the value of t



16: Find the value r in the figure below



17: The figure below is a rectangular garden



a) Find the value of k b) What is its Length and width.

c) What is its perimeter? d) Calculate its area.

e) Work out the length of the diagonal AD

18: Solve and find the solution set:

a) $2(y - 2) \geq 6$ b) $-15 \leq 3x \leq$

19: Solve and find the solution set.

a) $\frac{3}{5}x - 4 \leq -1$ b) $-\frac{3}{4}y - 2 < 1$

20: Solve and find the solution set:

a) $2(q - 2) > 4$ b) $9 \geq 2x + 1 \geq -3$

ANSWERS

REVISION EXERCISE 20

1:	4p	6:	20p	11:	10y	16:	x =5
2:	5b + a	7:	9xy + 4ac	12:	3p + 6k	17:	2y –1
3:	n = 3	8:	y =3	13:	3	18:	8m + 3n
4:	6x + 10	9:	4a + 3b	14:	18	19:	n =4
5:	7m – k	10:	$10m^2$	15:	$-ab^2$	20:	2w + 3t

REVISION EXERCISE 21

1:	–2m – 2n	6:	8a –12b	11:	8x –2	16:	– 6x
2:	–3ay – by	7:	$3p^2 - 7yp$	12:	4p + 4	17:	5a + 9b
3:	8ya + 4yb	8:	2x + 8	13:	2q + 18	18:	2n + 20
4:	5p + ap +cp	9:	– 8m	14:	x –2	19:	8m –7
5:	$12zy - 15z^2$	10:	4y + 8	15:	x + 2	20:	t + 2

REVISION EXERCISE 22

1:	3k + 4	6:	11k – 6	11:	8m + 4	16:	3m – 23
2:	6m + 7	7:	7p –12	12:	9p – 6	17:	k + 14
3:	y + 3	8:	2a + 5b	13:	5a + 24	18:	x + 4

4:	3r + 3	9:	7f + 41	14:	y + 4	19:	5n – 8
5:	9m – 6	10:	12n + 3	15:	t + 20	20:	2m + w

REVISION EXERCISE 23

1:	m = 4	6:	m = 5	11:	r =2	16:	p = 2
2:	x = 7	7:	t = 6	12:	p = 26	17:	p = $^{-}$22
3:	p = 6	8:	y = 8	13:	a = 8	18:	y = 2
4:	p = 4	9:	k =1	14:	k = $^{-}$1	19:	a = 4
5:	X = 3	10:	k =8	15:	n = 3	20:	m =3

REVISION EXERCISE 24

1:	x=15	5:	x=4	9:	k=7	13:	y=8	17:	k=2
2:	x= 6	6:	x=12	10:	m=4	14:	x=8	18:	t=4
3:	y=5	7:	x=4	11:	x=3	15:	x=29	19:	x=4
4:	x=8	8:	y=3	12:	n=7	16:	x=10	20:	r=1

REVISION EXERCISE 25

1:	t =20	8:a) 15, (b) 14, (c) 17		15:	Alice is 12 years.
2:	–2x – 4y	9:a) 6m – 8 p (b) 3x +12		16:	Pen10, 000/=, Book 14000/=
3:	no. is 21	10:a) X =7		17:	Among 7 yrs. Acham 11 yrs.
4:	5m – 10n	11:	m =6	18:	Cock=16,000/=. Goat 48000/
5:	n =7	12:	no. is 40	19:	Betty is 15 y Rose 9 yrs
6:	a =8	13:	x =3		
7:	smaller no –5	14:	Kato =.3 pens	20:	p =30. (b) Angle ACD =110^0

REVISION EXERCISE: 26

1:	$4m^4$	9: p=50, k =30^0	17:	Length =10 cm, Width=5cm Area = $50cn^2$
2:	n =2	10: $\frac{19a - 6}{10}$		

3: k =4 11:a) $5a^3$, (b) $2m^3$ (c) $^{13}/_{36}$ 18: a) t =3 (b) height = 8cm

4: m =14 12:a) n=20, (b) p=4, (c) x=2 Area = 48 cm^2

5: x +3 13: Cock = 9000/= Perimeter = 32 cm.

6: $6m^3$ 19: Okello has 22 heads of cattle

7: 160,000/= 14: n =10 Musana has 42 heads of cattle

8: t =50 15: p=3=, 20: y = 2

16: Ball 100,000/= b) Speed was 70 km/hr

Boots 50,000/=

REVISION EXERCISE 27

1: 13a 9: x = 3 14: a) m =2 19: a) y= 40,(b) r=70^0

2: 11m – 12 10: No. is 20 b) Perimeter =18cm c) <ACD=110^0

3: n = 6 11: p +16 c) Area = 12 cm^2 20: 80 mango trees

4: 7k + m 12: m= 4 15: in 4 years' time 160 Orange trees

5: n = 33 b) Range = 8 16: Length=12 m, b) 80 more orange trees

6: y =40 13: Pen = 16,000/= b) Width =6m, c) 680,000/=

7: 8m – 14b b) Book =32,000/= (c) Perim. =36m

8: $20a^{10}$ 17: **Aida** =22yres, **Amina**=11yrs.

18: **Now:** Daughter =25 years

Akello = 55 years.

(b) 5 years' time: Daughter =30 years

Akello = 60 years

REVISION EXERCISE 28

1: **Now** Son = 10 years, Father =30years

10 years' time: Son = 20 years

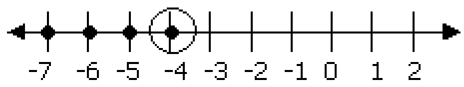
Father = 40 years

8: **Now**: Son =10 years

Father= 30 years.

In10 years' time: Son =20

Father = 40 years.

2: 

Solution set K: K < - 4 = {…-7-6, -5,-4}

3: **Now**: Peter =25 years, Atim =10 years.

b) In 5yr's time: Peter =30 yrs, Atim = 15 yrs.

4: **Now:** John =7years, Tom = 22 years.

a) In 8 yrs time John =15 years

Tom = 30 years.

5: It will be in 8 years' time.

b) Mondo will be 12 years.

c) Andrew will be 36 years.

6: **Now:** Son = 5 years

Mother = 25 years.

b) In 15 yrs time: Son = 20 years.

mother = 40 years.

7: **Now:** Jane= 6 years, Annet=20 years.

Their ages then: Jane will be 14 years.

Annet will be 28 years.

9: **Now** John = 28 years

Peter = 46 years

10 yrs ago: John was 18 yrs

Peter was 36 years.

10: **Now**: Musa = 30 years.

Annet = 18 years.

6 yrs ago: Musa was 24 years

Annet was 12 years.

11: **Now:** Mary=16,Susan=32yrs

8 yrs ago: Mary was 8 years

Susan was 24 years.

12: **In 10 years' time**

Mary=20yrs,Aisha=40yrs.

13: Radios = 400,000/=

Bicycles = 130,000/=

14: Nos. are 14, 16, 18.

Range = 4

Median = 16

15: Perimeter = 160 metres

Area = 1024 m^2

16: median = 9.5

Smaller no = $^{-}5$

18: p = 2

RU = 13 cm, Area =30cm

19: The numbers are:

2, 3, 4, 5, 6 and 7

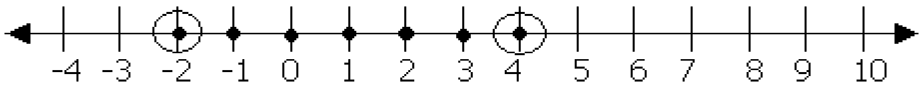
Nos. are: 14,15 and16

Median = 4.5

17: $x=3$ Perimeter= 32 cm

Area = 48cm

20: $-2 \le x \le 4$



Solution set X : X = { -2, -1, 0, 1, 2, 3, 4}

REVISION EXERCISE 29

1: $t = 36$
2: $p = 1$
3: $q = 3$
4: $y + 6$
5: $2r - 3$
6: $m = 5$
7: $2p^3$
8: 12
9: $k = 40$
10: $p = 80$

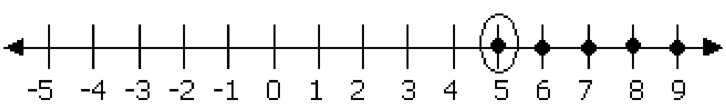
11: $r = 4$
perimeter = 32 cm
Height = 8cm
Area = 48 cm^2

12: $x = 6$, Length =15cm
Width = 8cm
Perimeter = 46 cm
Area = 120cm^2

13: $y = 4$
Area = 60cm^2
Perimeter = 50cm

14: $k = 75$
15: $t = 35$
16: $t = 6$
17: $k = 7$
Length= 12 cm
Width = 5cm
Perimeter =34 cm
Area = 60cm^2
Diagonal AD = 13 cm.

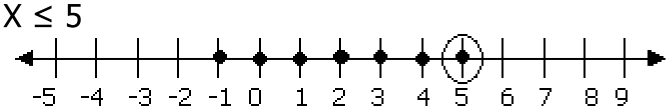
18:a) $y \ge 5$



Solution set y: y ={5, 6, 7, 8, ……….}

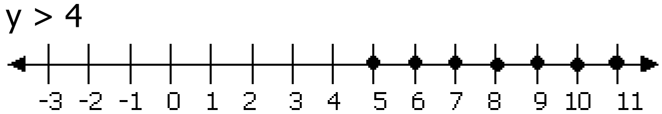
18b) i) $-5 \le x \le 2$
Solution set: X : X = { -5, -4, -3, -2, -1, 0, 1, 2}

19:a) $X \le 5$



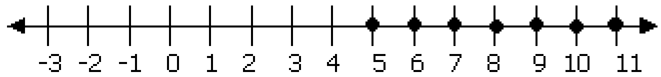
Solution set: X: X = { …..-1, 0, 1, 2, 3, 4, 5}

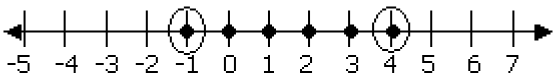
19b) $y > 4$



Solution set: y : y = {4, 5, 6, 7, …..}

20: a) $q > 4$ 20 b) $4 \geq x \geq -1$





Solution set q: q ={5, 6, 7, 8, …} Solution set X : X ={ -1, 0, 1, 2, 3, 4}

MEASURES

Week 1- Topic: **BUYING AND SELLING.**

Example 1:

Hana had 8,000/= and bought the following items:
3kg of sugar at 1000/= per kg
1 ½ kg of salt at 800/= per kg
2 bars of soap at 700/= each.

a). Find his total expenditure.

Working:

Sugar costs	(3 x 1000)/=	3,000/=
Salt costs	(1 ½ x 800)/=	1,200/=
Soap costs	(2 x 700)/=	1,400/=
Total Expenditure		**5,600/=**

Side work
$^3/_2$ x 800 = 1200

b). Calculate her balance
Balance = (8,000 – 5,600)=
= **2,400/=**

Example 2:

Angel had 20,000/= and bought the following items;
3kg of meat at 2,400/= per kg.
750grams of liver at 4,000/= per kg
40 mangoes at 1,000/=.

a). Find Angels total expenditure and balance.

Working

Meat costs	(3 x 2,400/=) =	7,200/=
Liver costs	(3/4 x 4,000/=)	3,000/=
Mangoes cost	=	1,000/=
Total Expenditure		**11,000/=**

Side work
1000g = 1kg
750g = $\frac{750}{1000}$kg
¾ x 4,000 = 3000

b). Balance = (20,000 – 11,000) =
= **9,000/=**

Exercise:

1. Eva had 15,000/= and bought the following items;
2 ½ kg of meat at 2000/= per kg.
500g of salt at 700/= per kg
2 bars of soap at 1,800/=
Calculate her total expenditure and balance.
2. Sam had 10,000/= and bought the following items;

A shirt at 7000/=
2 kg of maize at 700/= per kg.
750g of sugar at 1,600/= per kg.
Find her total expenditure and balance.

3. Study the table below and answer the questions that follow.

Items	Costs
Meat	2,400/= per kg
Sugar	1,600/= per kg
Rice	900/= per kg
Cooking oil	1,200/= per litre

a). Find the cost of;

i. 2¼ kg of meat
ii. 250grams of sugar
iii. 1 ½ kg of rice
iv. 3 litres of cooking oil

4. Oba bought the items shown below.
4kg of beans at 600/= per kg
1 ¼ kg of soya at 2,000/= per kg
10 eggs at 2000/=
7 sweets at 1500/= per sweet.

a). After buying the above items, he was left with 1500/= in his pocket. How much money had he before buying the items above?

COMPLETING BILLS.

Example 1

Study Mandela's Bill and fill in the missing information.

Item	Quantity	Unit cost	Total cost
Millet	3kg	1,800/=	…………………
Beans	2 ½ kg	600/=	…………………
Meat	1 ¾ kg	2,000/=	…………………
Soap	2 bars	900/=	…………………
		Total Expenditure	

NOTE: What do we do to get the total cost?
Multiply quantity by unit cost

Example 2:

The table below shows Hamza's shopping bill. Study it carefully and answer the questions that follow.

Quantity	Item	Price for @	Amount
3	Loaves of bread	800/=	…………………
? kg	Sugar	1,200/=	7,200/=
8 dozens	E. Books	………	14,400/=
		Total Expenditure	………….

Solution:

Bread 3 x 800 = 2,400/=
Sugar 7,200 : 1,200 = 6kg
Ex. Books 14,400 : 8 = 1,800/=

Total Expenditure: 2,400/=
7,200/=
+ 14,400/=
24,000/=

Exercise 1:

1. Study and complete the bills.

Item	Quantity	Unit cost per kg	Total
Salt	500g	Sh. 500	………
Curry powder	250g	Sh. 3,000	………
Sugar	750g	Sh. 1,200	…….
		Total Expenditure	…….

2.

Item	Quantity	Unit cost per kg	Total
Rice	2kg	Sh. 900	………
Meat	2 ½ kg	Sh. ……	5,000/=
Sugar	………kg	Sh. 1,200	2,400/=
Bananas	………bunches	Sh. 3,000	3,000/=
		Total Expenditure	…….

More practice work on page 216 MK 6.

Topic II: **UGANDA CURRENCY.**

Finding the number of notes in a bundle.

Example 1:

If bank notes are numbered from AP 003782 to AP 0038881. How many notes are there?

Working: (First Note subtracted from Last Note)

0 0 3 8 8 1
\- 0 0 3 7 8 2

9 9 + 1 = 100 Notes.

Exercise:
1. Ben has a bundle of notes numbered from AP 004300 to AP 004399. How many bank notes does Ben have?
2. Muna has bank notes numbered from AX 004810 to AX 004910. How many bank notes does Muna have?
3. Find the number of bank notes numbered from:
   i. KJ 00700 to KJ 00891
   ii. YQ 00666 to YQ 00696
   iii. UG 03344 to UG 03411

CALCULATING THE AMOUNT OF MONEY IN A BUNDLE.

Example 1:

Lala has bank notes of 1000/= numbered from AP 004300 to AP 004399.

a). How many bank notes does Lala have?
b). How much money does Lala have?

AP 0 0 4 3 9 9
\- AP 0 0 4 3 0 0
9 9 + 1
100 notes.

Amount of money in a bundle:
100 notes x 1000/=
100,000/=

Exercise 1:

1. Taha had bundle of 1,000 shilling notes numbered from AC 502830 to AC 502839. How much money does he have?
2. 5,000 shilling notes are numbered from AC 412389 to AC 412397. How much money is this?
3. Ngobi has 10,000 shilling notes numbered from MT 301422 to MT 301437. How much money has Ngobi?
4. A school bursar is paying salary to teachers. How many 1,000/= notes will he give to a worker who gets a salary of Shs. 90,000?
5. How many 500 shilling coins are equivalent to one ten thousand shilling note?

More practice exercises on page 281 MK 6.

Week II- Topic: **CHANGING FROM UGANDA CURRENCY TO OTHER CURRENCIES / VIS-VASA.**

Example 1:

If 1 US dollar is bout at Ug Sh. 1700/= and sold at 17,200. How much will a tourist get from US $ 650 when he is in Uganda?

Working: **1 US $ = 1720**
650US$ = 1720 x 650
= 1,118,000/=

Example 2:

Musa has Ug Sh. 340,000/=. How many US $ will he obtain from this amount?
17000 Ug Sh = 1 US $
340,000 Ug Sh = $\frac{340,000}{1700}$
= **200 US $**

Exercise:

Use the table given below to answer the questions that follow.

CURRENCY	BUYING	SELLING
1 US $	Ug Sh 1700	Ug. 1,720
1 K Sh.	Ug Sh. 19	Ug Sh. 20

1. Daddy has 860,000/=. How much money in dollars does he have?
2. Convert Ug Sh. 34,000 to Kenya shillings.
3. Nambi sold 10kg of maize to a Kenyan lady at K Sh. 21 per kg. How much money did she get in Uganda shillings?
4. A lorry driven transported coffee from Kampala to Nairobi for Ush. 380,000. How much money did he get in K Sh?

5. Convert 510,000/= (U Sh) to dollars using the rate given in the table above.

More practice work on page 220 MK 6

USING GRAPHS TO CHANGE CURRENCY.

1. The graph below shows the exchange rate of Uganda shillings against US dollar. Use it to answer the questions that follow.

a). How many Ug Sh are equivalent to US $ 7?
b). Convert US $ 7.5 to Ug Sh.
c). Nakku bought a dress at U Sh. 6500/=. How much money did she spend in dollars?
d). How many Ug Sh. Are equivalent to US $ 9.5?
e). If Musa bought a radio at US $ 11.5, how much did he spend in Ug Sh?
f). Given that 1 US $ costs Ug Sh. 1,035, how many dollars will I get for Ug Sh. 67,275?

A REVIEW: **CHANGING HRS TO MINUTES.**

Note: 1 hr = 60 MIN.

1 min. = 60 sec

1 hr. = 3600 seconds.

Example 1 : Change 3 hrs to min.
1 hr = 60 min.
3 hrs = (3 x 60)min
= **180 minutes Answer**

Example 2: How many minutes are there in 6 ½ hours?
6 ½ hours = ?
1 hr = 60 min.
6 ½ hrs = (6 ½ x 60)min
= ($^{13}/_{2}$ x 60)min
= (13 x 30)min
= **390 minutes Answer**

Exercise:

Change the following hours to minutes.

1.	2 hrs	2.	4 ½ hrs	3.	4 ¼ hrs	4.	3 ½ hrs
5.	10 ½ hrs	6.	1 ½ hrs	7.	9 ¾ hrs	8.	4 hrs

CHANGING FROM MINUTES TO HOURS.

Example 1: Change 120 minutes to hours.

60 min = 1 hr

120 min. = ($^{120}/_{60}$)hrs

= **2 hours**

Example 2: Change 130 minutes to hours.

60 min. = 1 hr

130 min. = ($^{130}/_{60}$) hrs

= $^{13}/_{6}$

= **2 $^{1}/_{6}$ hrs Answer**.

Change the following minutes to hours.

1.	180 min.	2.	280 min.	3.	420 min.	4.	240 min.
5.	360 min.	6.	140 min.	7.	135 min.	8.	80 min.

CHANGING MINUTES TO SECONDS.

Example 1: Change 4 minutes to seconds.

1 min = 60 seconds

4 min. = 4 x 60 seconds

= 240 seconds

Exercise:

1.	10 min	2.	25 min.	3.	48 min.	4.	12 min.
5.	30 min.	6.	20 min.	7.	42 min.	8.	60 min.

CHANGING HOURS TO SECONDS.

Example 1: How many seconds are there in 2 hours?
1 hr. = 3600 seconds
2 hrs = 2 x 3600 seconds
= 7200 seconds

Example 2: How many seconds are there in 2 ½ hrs?
1 hr = 3600 seconds
2 ½ hrs = (2 ½ x 3600)seconds
= ($^{5}/_{2}$ x 3600)
= 5 x 1800
= **9000 seconds**

Change the following hours to seconds.

1.	½ hr	2.	3 ½ hr	3.	6 ½ hr	4.	2 ¼ hr	5.	5 hrs
6.	9 hrs	7.	4 hrs	8.	7 hrs	9.	8 ¾ hrs		

DURATION OF EVENTS.

Example 1: How many hours are there between 2.3- am and 9.00 am?

9.00 am (1 hr = 60 min), 60 – 30 = 30 min.

\- 2.30 am **(There are 6 hrs 30 min. / 6 30/60 hrs = 6 ½ hrs)**

6.30 am

Example 2: What duration is there between 4.00 am to 3.00 pm?

Step 1: **Time to Mid-day:**

$$\begin{array}{r} 12.00 \\ -\ \ 4.00 \\ \hline \mathbf{8.00} \\ \hline\hline \end{array}$$ **or 8 hrs.**

Step 2: **Time after mid-day = 3 hours**

Step 3: **Total time = 8.00**

$$\begin{array}{r} \mathbf{8.00} \\ +\ \mathbf{3.00} \\ \hline \mathbf{11.00} \\ \hline\hline \end{array}$$ **or 11 hrs.**

Using the examples above, find the time between the following:

1. 7.00 am and 11.00 am
2. 2.30 am and 12.00 noon
3. 1.30 am and 10.15 am
4. 3.30 am and 10.30 am
5. 4.15 am and 11.30 am
6. 9.30 am and 1.30 pm
7. 8.50 am and 2.40 pm
8. 11.00 am and 4.20 pm

APPLICATION OF TIME DURATION

Converting 12 hr clock to 24 hr clock.

Introduction:

The 24 hr clock is used by people who operate both day and night. E.g in train & aeroplanes etc.

The 24 hr clock gives time in hours (hrs) while the 12 hr clock gives time in am or pm.

NOTE:	**12 hr clock**		**24 hr clock**
i.	A day starts at 12.00 mid-night this is		00 00 hrs
ii.	Then 30 min. past midnight (12.30)am is		00 30 hrs
iii.	1.00 am	is	01 00 hrs
iv.	Then 12.00 noon	is	12 00 hrs
v.	12.30 pm	is	12.30 hrs.
vi.	1.00 pm (lunch)	is	1300 hrs
vii.	2.30 pm	is	14.00 hrs

Exercise:

1. Fill in the missing time in the table below.

Time in am/pm	Time in 24 hr system
1.00 am	
2.00 am	
3.00 am	
10.00 am	
11.30 am	
12.00 noon	
1.00 pm	
2.00 pm	
3.00 pm	

6.00 pm	
11.00 pm	
12.00 pm	

2. Using the above table, change from 12 hr system to 24 hrs system.

Example 1: 5.00 am

The 24 hr/12 hr clock system diagram.

	Hrs	Min	
	5	00 am	
+	00	00	
	05	**00 hrs**	**Answer**

Example 2: 2.20 pm

	Hrs	Min.	
	2	20	
+	12	00	
	14	**20 hrs**	**Answer**

Exercise:

1. 12.20 am (After mid-night)

	Hrs	Min.
	12	20 am
-	12	00
	00	**20 hrs**

2. 12.30 pm

	Hrs	Min.
	12	30 pm
+	00	00
	12	**30 hrs**

Exercise:

Change the following to 24 hr system.

1.	5.30 am	2.	4.30 am	3.	3.30 pm	4.	8.00 am
5.	6.00 pm	6.	7.20 pm	7.	4.00 am	8.	2.15 pm

Change the following to 12 hr system.

1.	10 00 hrs	2.	17 00 hrs	3.	08 15 hrs	4.	03 00 hrs
5.	12 30 hrs	6.	02 20 hrs	7.	21 15 hrs	8.	13 00 hrs

INTERPRINTING TIME TABLES.

1.

STATION	ARRIVAL	DEPARTURE
A	….	06 00 hrs
B	09 30 hrs	09 55 hrs
C	17 10 hrs	17 45 hrs
D	23 50 hrs	00 10 hrs
E	02 15 hrs	…..

a). Repeat the above time table using am/pm system.
b). Find the total time taken from station A to station E.
c). How long did the train take to travel from:
i. station A to station B ii. station B to station E.
d). For how long did the train stop at:
i. station B ii. station D?

2. Copy the time table below and answer the questions as given by the teacher.

ROUTE	DEPARTURE TIME	TIME TAKEN	ARRIVAL TIME
A	07 30 hrs		12 hrs 30 min
B	20 00 hrs		4 hrs
C	10 15 hrs		7 hrs 40 min.

Topic: **TRAVEL PROBLEMS.**

Finding the distance traveled.

Example 1: Find the distance traveled by a car in 3 hrs at 60km/hr.

S = 60kph D = S x T
T = 3 hrs = 60kph x 3 hrs
= **180km.**

Example 2 : A bus travelled at 120kph for 45 minutes. Find the distance covered.

S = 120kph D = S x T
T = 45 min. = 45/60 hrs = 120kph x 45/60 hrs
= **90km**

Exercise: Calculate the distance covered.

i. A speed of 30kph for 4 hrs.
ii. A speed of 80kph for ½ hr.
iii. A speed of 80kph for 1 ½ hrs.
iv. A speed of 160kph for ¼ hr.
v. A speed of 55kph for 3 hrs.
vi. A speed of 120kph for 20 min.
vii. A speed of 60kph for 40 min.
viii. A speed of 140kph for 30 min.

More practice exercises on page 229 – 230 MK 6.

Finding time taken.

Example 1: How long will a car take to cover a distance of 120km at a speed of 40kph.

D = 120km
S = 40 kph

$$\text{Time} = \frac{D}{S} = \frac{120\text{km}}{40\text{kph}} = \mathbf{3\ hrs.}$$

Exercise: Calculate the time taken.

1. A distance of 80km covered at 20km/hr.
2. A distance of 350km covered at 60kph.
3. A distance of 120km covered at 40kph.
4. A distance of 140km covered at 70kph.
5. A distance of 140km covered at 70kph.

More practice exercises on page 231 – 233 MK 6 and MK 7.

CALCULATING HOW MUCH LONGER.

Example 1: A car covered a distance of 120km at an average speed of 60km/hr. How much longer does it take if it moves at 40km/hr?

$T = \frac{D}{T} = \frac{120\text{km}}{60\text{kph}}$ **= 2 hrs**	$T = \frac{D}{T}$ $\frac{120\text{km}}{40\text{kph}}$ **= 3 hrs**	Difference 3 – 2 = 1 hr longer

Exercise:

1. At 30kph a car can cover a distance of 750km. In how many hours can the same car cover the same journey at 50kph?
2. At 40km/hr a car can cover a distance of 240km. How many hours less can the same car cover the journey at 60km/hr?
3. How many more hours will a car traveling at 70km/hr take to cover a 350km journey if its average speed is reduced to 50km/hr?
4. A distance of 360km can be covered at a speed of 90kph. How much longer will the same distance be covered at 40kph?

More practice exercises on page …

Finding Speed.

Example 1: A car travels for 3 hrs to cover a distance of 210km. At what speed does the car travel?

$$S = \frac{D}{T} = \frac{210\text{km}}{3\text{hrs}} = \mathbf{70kph}$$

Exercise:

1. Study the table below and answer the questions that follow.

	Distance	Time taken	Speed
a	160km	4 hrs	
b	120km	2 hrs	
c	180km	4 hrs	
d	200km	4 hrs	
e	264km	3 hrs	
f	360km	9 hrs	
g	450km	5 hrs	

2. A bus traveled for 2 hrs to cover a distance of 120km. At what speed was the bus traveling?
3. At what speed was the car traveling to cover a distance of 320km in 4 hours?
4. A bus traveled for 30 minutes to cover a distance of 60km. Calculate its speed.

EXPRESSING KPH AS METRES PER SECOND.

Example 1: Express 72km/hr as m/sec.

Change km to metres and hours to seconds.

1km = 1000m , 1 hr = 3600 sec.

$$72\text{kph} = \frac{72 \times 1000\text{m}}{1 \times 3600 \text{ sec}}$$
$$= \frac{20\text{m}}{1 \text{ sec.}}$$
$$= \mathbf{20m/sec}.$$

Example 2: Express 360km/hr as m/sec.

Change km to metres and hrs to seconds.

1km = 1000m , 1hr = 3600 sec.

$$360\text{kph} = \frac{360 \times 1000\text{m}}{1 \times 3600 \text{ sec}}$$
$$= \frac{100 \text{ m}}{1 \text{ sec.}}$$
$$= \mathbf{100m/sec.}$$

Express the speed below in m/second.

1.	36km/hr	2.	54km/hr	3.	72km/hr	4.	252km/hr
5.	396km/hr	6.	90km/hr	7.	144km/hr	8.	216km/hr
9.	432km/hr	10.	756km/hr				

Changing speed from m/sec to km/hr.

Example 1: Change 20m/sec to km/he.

First change m to km and seconds to hrs.

1000 m = 1 km , 3600 sec. = 1hr

$20m = \frac{20}{1000} km$

$1 sec. = \frac{1}{3600} hr$

$20m/sec = \frac{20}{1000} \times \frac{3600}{1} kph$

= 2 x 36 kph

= **72kph.**

Exercise:

Change from m/sec. to kph.

1. 5m/sec	2. 20m/sec.	3. 30m/sec.	4. 40m/sec.
5. 25m/sec	6. 50m/sec	7. 70m/sec.	8. 60m/sec.

FINDING THE AVERAGE SPEED.

Example 1: A car takes 3 hours to cover a certain journey at 60kph but it takes only 2hrs to return through the same distance. Calculate the average speed for the whole journey.

Going

D = S x T
= 60 x 3
= 180km

Return

S = D ÷ T
$= \frac{180}{2}$
= 90kph

Average Speed to & fro.

AS = $\frac{\text{Total D}}{\text{Total T}}$
$= \frac{180 + 180}{3 + 2} km$
$= \frac{360km}{5 hr}$
= **72kph**.

Exercise
1. A car takes 2 hours to cover a certain distance at 60kph but it returns in 3 hrs. Calculate the average speed of the car for the whole journey.
2. Kampala is 140km from Masaka. A car takes 3 hrs to travel from Kampala to Masaka and 2 hrs coming back. Calculate the average speed for the whole journey.
3. Lira is 124km from Kitgum. A bus takes 1 ½ hrs from Kitgum to Lira and 2 ½ hrs going back. Find its average speed.
4. A lorry takes 4 hrs to travel from Kampala to Lyantonde at 45kph, but it returns in 6 hrs. Calculate the average speed for the whole journey.

More practice exercises on page 238 MK 6.

INTERPRETING TRAVEL GRAPHS.

A motorist traveled from A to B for 2 hrs at a speed of 80km/hr. He rested at B for 1 hr and continued to C at 100kph for another 2 hrs. Study the graph carefully.

Travel Graph.

a). What is the scale on the vertical axis?
b). What is the distance from A to B?
c). What happened at B?
d). What is the distance from B to C?
e). At what time did he arrive at C?
f). What time did he take from A to B?
g). Calculate the motorists average speed for the whole journey.

Practice work on page 240 MK 6.

PERIMETERS.

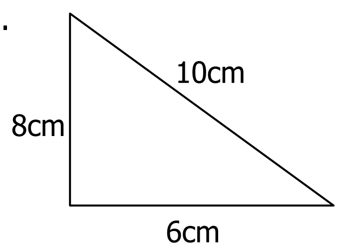
Practical work: Measuring perimeter of classroom objects in cm or m.

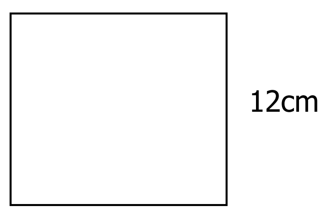
Recording the results in a table as the one shown below.

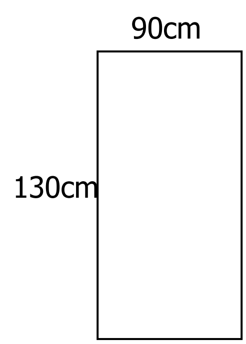
OBJECT	No. OF SIDES	PERIMETER (cm/m)

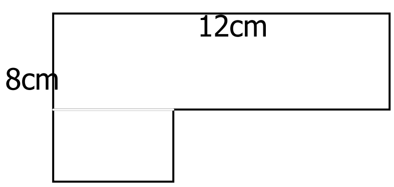
Calculating the perimeter of geometrical figures.

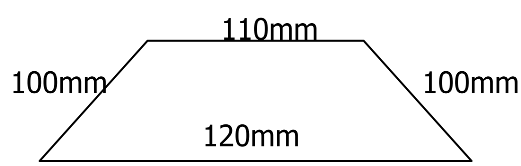
a).

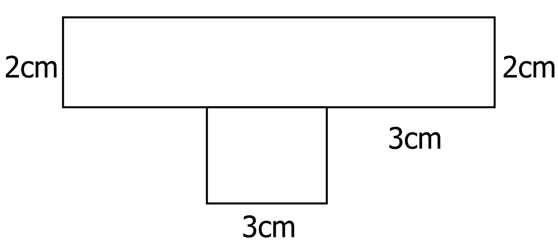








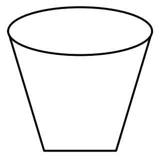


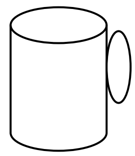


CIRCUMFERENCE.

Using stripes to measure circumference of round ends of objects.

E.g





PRIMARY SEVEN TERM III MTC LESSON NOTES

FINDING DIAMETER OF CIRCULAR ENDS USING A STRING.

Defining the term 'diameter'.
Finding "PI" using circumference and diameter.
Recording results in the table.

	Object	Diameter	Circumference	$\frac{\text{Circumference}}{\text{Diameter}}$
a				
b				
c				
d				

Work out the values of $\frac{\text{circumference}}{\text{diameter}}$ in (a) , (b) , (c) and (d). The figure you get ranges between 3.1 to 3.16, this is pi (π)

$C \div D = \pi$
$\pi = 3.14$ or $3\frac{1}{4}$ or $^{22}/_{7}$

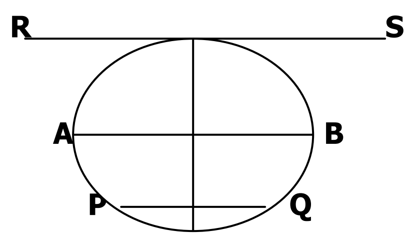
Explanation: If $\frac{C}{D} = \pi$, then

$D \times \frac{C}{D} = \pi \times D$

$C = \underline{\pi D}$

Calculating circumference using radius of diameter.

NOTE: **Radius = $\frac{d}{2}$**



PQ = chord

RS = Tangent

ACB = diameter

AC = radius

CB = radius

<u>Examples 1:</u> Find the circumference of a circle whose radius is 5cm (**Use π = 3.14**)

$C = 2\pi r$
$= 2 \times 3.14 \times 5$
$= 10 \times 3.14$ cm
$=$ **<u>31.4cm</u>**

<u>Example 2:</u> Calculate the circumference of a circle whose radius is 3 ½ cm (**Use $\pi = {}^{22}/_{7}$**)

$C = 2\pi r$
$= 2 \times \frac{22}{7} \times \frac{7}{2}$
$=$ **<u>22cm.</u>**

<u>Example 3:</u> Calculate the circumference of a circle whose radius is 3 cm. (**Use π = 3.14**)

$C = 2\pi r$
$= 2 \times 3.14 \times 3$
$= 6 \times 3.14$
$=$ **<u>9.42cm</u>**.

<u>Exercise:</u>

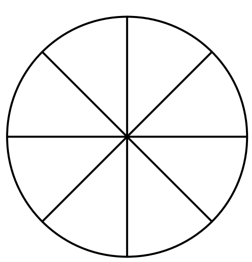
1. Find the circumference of a circle whose diameter is 5cm. (**Use π = 3.14**)
2. A circular plate has a diameter of 14cm, calculate its circumference. (Let $\pi = {}^{22}/_{7}$)
3. A circular bottom of a mug has a radius of 50mm. Find its circumference. (**Use π = 3.14**)
4. Find the circumference of a circle whose radius is 7cm. (Take $\pi = {}^{22}/_{7}$)
5. Calculate the circumference of a circle whose diameter is 20mm. (**Use π = 3.14**)
6. The radius of a circular basin is 21cm. Calculate its circumference. (Take $\pi = {}^{22}/_{7}$)

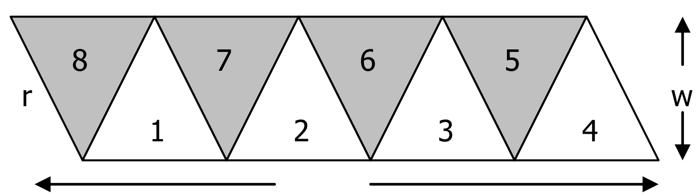
More practice exercises on page 328 MK 6.

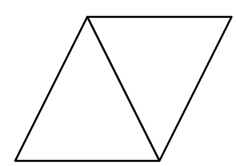
<u>AREA OF CIRCLES/ QUADRANTS / SEMI-CIRCLES / VOLUME AREA OF A CYLINDER.</u>

<u>AREA OF A CIRCLE.</u>

Practical work on finding area of a circle.





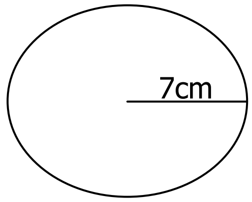


NOTE: **Length (l) = ½ C = ½ ($2\pi r$) = $\frac{2\pi r}{2}$ = πr**
Width (w) = radius (r)
Area of the rectangle formed = l x w
= $\pi r \times r$
$\underline{\pi r^2}$

So area of a circle = $\underline{\pi r^2}$

Find the area of a circle using the radius.

Example 1: Find the area of a circle of radius 7cm. (**Take** $\pi = {}^{22}/_{7}$)



A = πr^2

$= {}^{22}/_{7} \times 7 \times 7\ cm^2$

$= 22 \times 7\ cm^2$

$=$ **154cm²**.

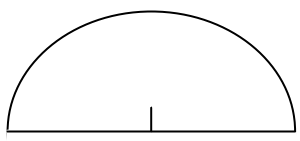
Exercise:

1. Take $\pi = {}^{22}/_{7}$ to find the area of a circle of radius given.
 a). 14cm b). 42cm c). 28cm d). 35cm e). 21cm
 f). 1.4m
2. Take $\pi = 3.14$ to find the area of a circle of radius given below.
 a). 2cm b). 4cm c). 20cm d). 10cm e). 3cm
 f). 5cm
3. Find the area of a circle whose diameter is given below. (Take $\pi = {}^{22}/_{7}$)
 a). 7cm b). 14cm c). 21cm d). 10 ½ cm e). 35cm
 f). 28cm

4. Find the area of a circle whose diameter is given below. (**Use** $\pi = 3.14$)
 a). 2cm b). 4cm c). 5cm d). 3cm e). 6cm
 f). 8cm

AREA OF A SEMI-CIRCLE , QUADRANT OR SECTOR.

Example 1: Calculate the area of a semi-circle of radius 10cm. (**Use** π = **3.14)**



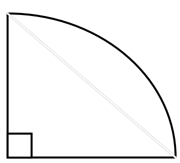
Area of semi-circle = $\frac{1}{2} \pi r^2$

$\frac{1}{2} \times 3.14 \times 10 \times 10\ cm^2$

$1.57 \times 10 \times 10\ cm^2$

157cm²

Example 2: Calculate the area of a quadrant with a radius of 14cm. (Take $\pi = {}^{22}/_{7}$)



$= \frac{1}{4} \times {}^{22}/_{7} \times 14 \times 14$

$= 11 \times 14\ cm^2$

$=$ **154cm²**.

Example 3: Calculate the area of a sector whose centre angle is 45^o and radius 28cm.

Area of sector $= {}^{1}/_{8}\ \pi\ \mathbf{r^2}$

$= {}^{1}/_{8} \times {}^{22}/_{7} \times 28 \times 28\ cm^2$

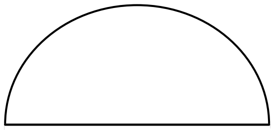
$= 11 \times 28\ cm^2$

$=$ **308cm²**.

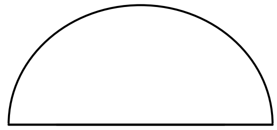
${}^{45}/_{360} = {}^{1}/_{8}$

Exercise.

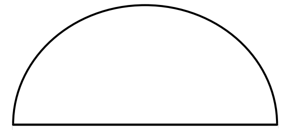
Apply the examples above to find the area of the figures below.



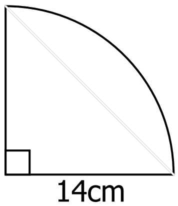
7cm

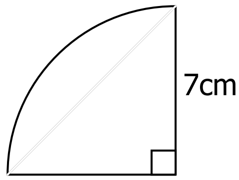


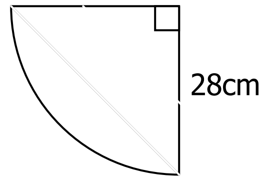
2.8

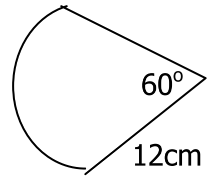


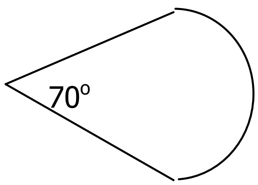
28cm

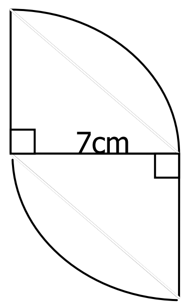






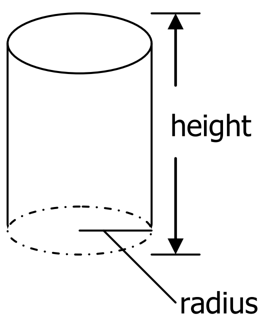






VOLUME OF A CYLINDER.

Working:

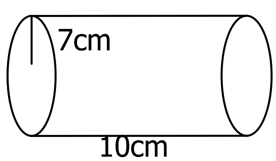


Volume = Area of cross section x height

$\mathbf{V = \pi\ r^{2\ x}\ h}$

$\mathbf{V = \pi\ r^2 h}$

Example 1: Find the volume of the cylinder below. (Take $\pi = {}^{22}/_{7}$)



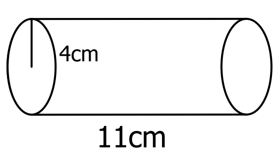
$\mathbf{V = \pi\ r^2 h}$

$V = {}^{22}/_{7} \times 7 \times 7 \times 10cm^3$

$V = 22 \times 7 \times 10cm^3$

V = **<u>$1540cm^3$.</u>**

Example 2: Find the volume of the cylinder below. (**Let π = 3.14**)



$V = \pi r^2 h$

$V = 3.14 \times 4 \times 4 \times 11cm^3$

$V = 3.14 \times 16 \times 11cm^3$

$V = 5024 \times 11cm^3$

V = **<u>$552.64cm^3$</u>**

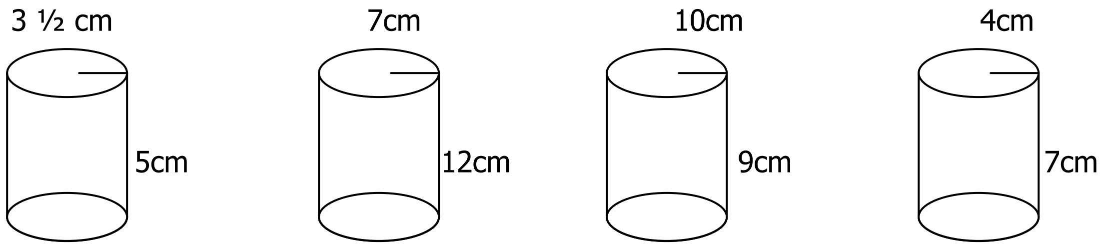
<u>sw</u>

5024

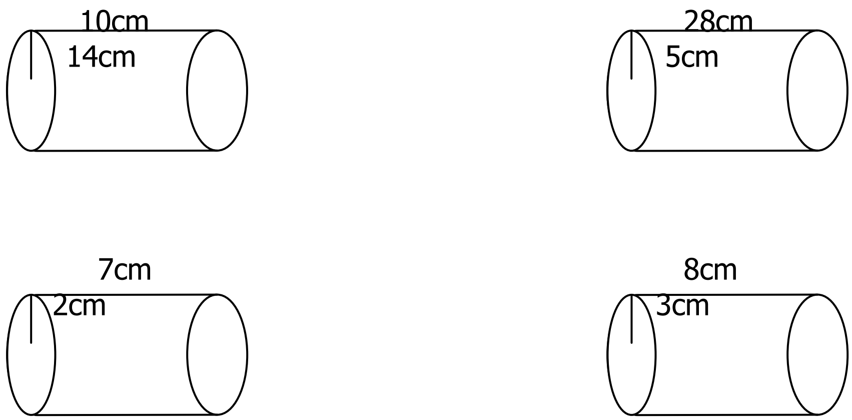
x 11

Exercise:

1. Find the volume of cylinders below. (**Take** $\pi = {}^{22}/_{7}$)

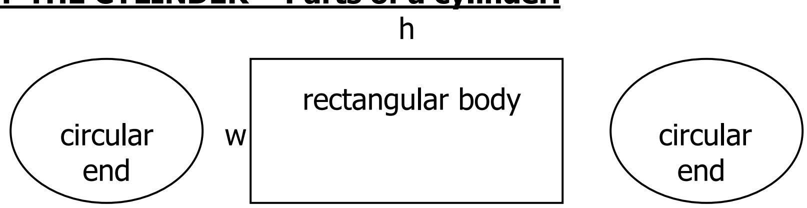


2.



3. **Word problems (MK 7 Ppls Copy Pg 312)**

<u>AREA OF THE CYLINDER – Parts of a cylinder.</u>



Note: **w (width) = 2** π r

So Area of rectangular body = $2\pi r \times h$

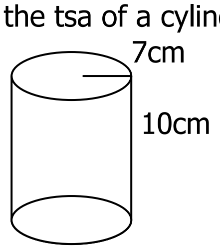
$= 2\pi r h$

1. Therefore: **TSA of a closed cylinder is** $\underline{\pi r^2 + \pi r^2 + 2\pi r h}$

TSA = $\underline{\mathbf{2\pi r^2 + 2\pi r h}}$ **OR** $\underline{\mathbf{2\pi r(r + h)}}$

Example:

Find the tsa of a cylinder of radius 7cm and height 10cm. (**Let** $\pi = {}^{22}/_{7}$)



TSA = $2\pi r(r + h)$

$2 \times {}^{22}/_{7} \times 7(7 + 10)cm^2$

$2 \times 22(7 + 10)cm^2$

$44 \times 17cm^2$

TSA = $\underline{\mathbf{748cm^2}}$**.**

1. Find the total surface area of a closed cylinder with:

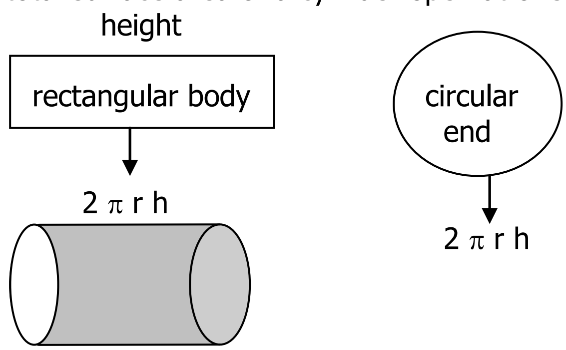
a). radius 7cm , height 11cm

b). radius 8cm , height 10cm

c). radius 5cm , height 12cm

d). radius 3 ½ cm , height 8cm.

2. Find the total surface area of a cylinder open at one end.



TSA = ** $2 \pi r h + \pi r^2$ **OR $\pi r (r + 2h)$

Example: Find the TSA of a cylinder of radius 7cm and height 8cm which is open at one end.

TSA $= \pi r (r + 2h)$
$= {}^{22}/_{7} \times 7 (7 + 2 \times 8)$
$= 22 \times 23$
$=$ **<u>506cm²</u>** ($\underline{\mathbf{506cm^2}}$)

<u>Calculate the TSA of cylinders whose one end is open of the following radius and height.</u>

i. radius 14cm , height 15cm.

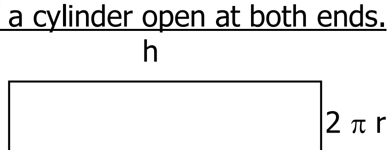
ii. radius 21cm , height 20cm.

iii. radius 7.7cm , height 2cm.

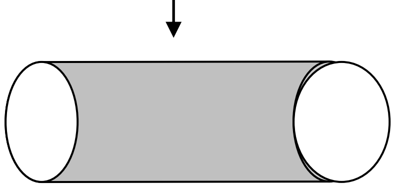
iv. radius 10 ½ cm, height 15cm.

v. radius 7cm , height 9cm.

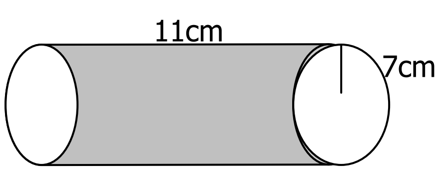
3. <u>TSA of a cylinder open at both ends.</u>



TSA = 2 $\pi r \times h$ **OR 2** $\pi r h$



Example: Calculate the total surface area of a cylinder of radius 7cm and height 11cm and whose both ends are open.



TSA = 2 $\pi r h$
$= 2 \times {}^{22}/_{7} \times 7 \times 11$
$= 2 \times 22 \times 11 \text{ cm}^2$
$= 44 \times 11 \text{ cm}^2$
$= \underline{\mathbf{484cm^2}}$

<u>Calculate the TSA of a cylinder whose both ends are open with the following dimensions.</u>

i. radius 7cm , height 9cm

ii. radius 20cm , height 10 ½ cm

v. radius 14cm , height 10cm

vi. radius 3 ½ cm , height 5cm

iii. radius 8cm , height 10cm

iv. radius 2.1m , height 10cm

vii. radius 4m , height 5m.

viii. radius 8cm , height 11cm.

<u>CONVERTING ARE TO HECTARE.</u>

<u>CONVERTING M^2 TO KM.</u>

1 are = 100m^2.

$\boxed{\text{1 are}}$ = $\boxed{100m^2}$ 10m

10m

1 are = 100m^2

Therefore to change are to m^2, you just multiply by 100.
Change 0.5 are to m^2.
1 are = 100m^2
0.5are = 0.5 x 100m^2

$= \frac{5}{10} \times 100m^2$

= **<u>50m^2</u>**

1. <u>Change the following ares to m^2</u>.

i.	0.4 are	ii.	1.2 are	iii.	5 ½ are	iv.	10 are
v.	11 are	vi.	110 are				

2. <u>Change the following m2 to are</u>.

i.	300m^2	ii.	400m^2	iii.	40m^2	iv.	55m^2
v.	2500m^2	vi.	3600m^2	viii.	4900m^2	ix	640m^2

<u>CONVERTING M^2 TO HECTARES.</u>

1 ha = 10,000m^2

$\boxed{10{,}000m^2}$ = $\boxed{\text{1 ha}}$

100m

<u>Example :</u> Convert 20,000m2 to hectares.

10,000m^2 = 1 hectare

$20{,}000m^2 = \left(\frac{20{,}000}{10{,}000}\right)$ ha

= **<u>2 ha.</u>**

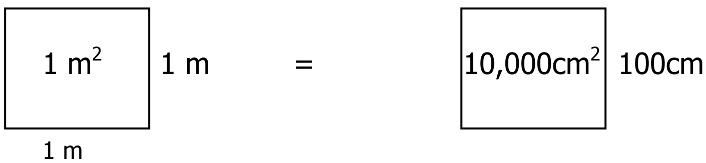
Exercise:

Convert the following m2 to hectares.

1. $30,000m^2$ 2. $40,000m^2$ 3. $2,500m^2$ 4. $3,600m^2$
5. $4,900m^2$ 6. $3,500m^2$

CHANGING SQUARE METRES TO SQUARE CENTIMETRES.

A square metre (m^2) means an area of;



Example: Express $1.2m^2$ in cm^2.

1m = 100cm

$1m^2 = (100 \times 100)cm^2$

$1m^2 = 10,000\ cm^2$

$1.2m^2 = (1.2 \times 10,000)cm^2$

$= \underline{\mathbf{12,000cm^2}}$

Change the following to square centimetres.

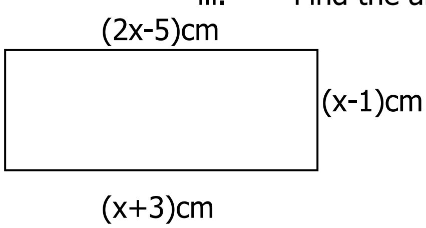
1. $3cm^2$ 2. $5m^2$ 3. $4m^2$ 4. $8.2m^2$ 5. 10.5^2

Change the following from cm^2 to m^2.

1. $13,000cm^2$ 2. $40,000cm^2$ 3, $25,000cm^2$ 4. $15,000m^2$

FINDING THE UNKNOWN AND AREA OF RECTANGULAR SHAPES.

Example:
i. Find the value of x.
ii. Find the width and length.
iii. Find the area of the figure.



Step a: **2x-5 = x+3**
2x-x=3+5
x = 8

Step b: **Length = x+3**
8 + 3
11cm

Width = x – 1
8 – 1
7cm

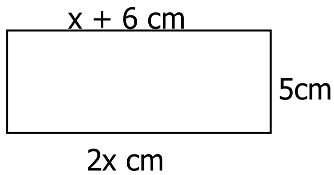
Therefore: **Area of the rectangle = l x w**

$= \mathbf{11 \times 7\ cm^2}$

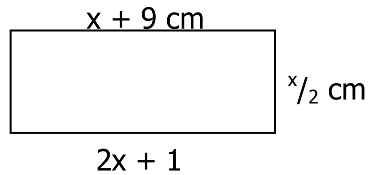
$= \underline{\mathbf{77cm^2}}$

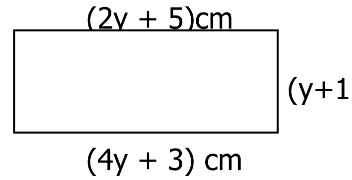
Find the unknown, the width and the length and the area of the rectangles below.

1.



2.

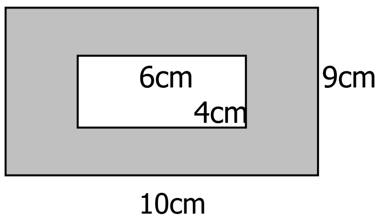




More practice exercises on page 335.

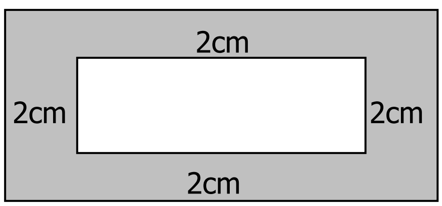
<u>FINDING THE AREA OF SHADED PART.</u>

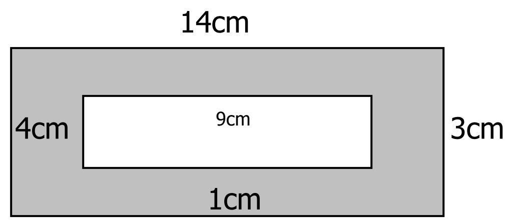
<u>Example:</u> Find the area of the shade part.



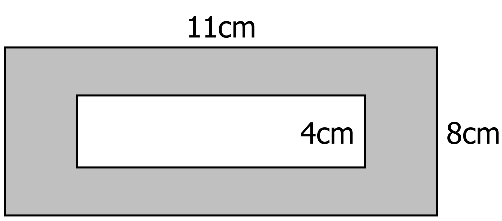
Area of the outer rectangle = l x w
= 10 x 9cm^2
= **<u>90cm^2</u>**
Area of the inner rectangle = 6 x 4cm^2
= 24cm^2
Area of the shaded part = 90 – 24 cm^2
= **<u>66cm^2</u>**

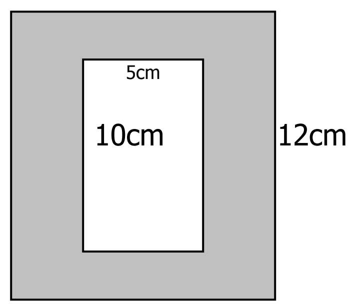
<u>Find the area of the shaded part.</u>





7cm





<u>FINDING THE AREA OF A TRIANGLE USING UNIT SQUARES.</u>

Count Squares:

Area = 8sq. units

OR

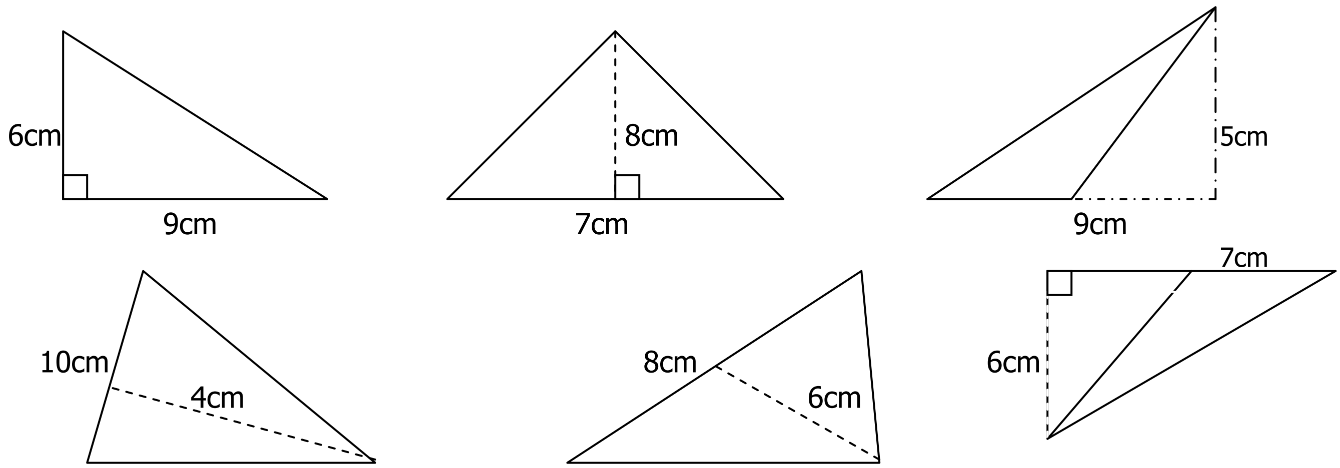
Area = ½ x b x h   base = 4cm

½ x 4 x 4   height= 4cm

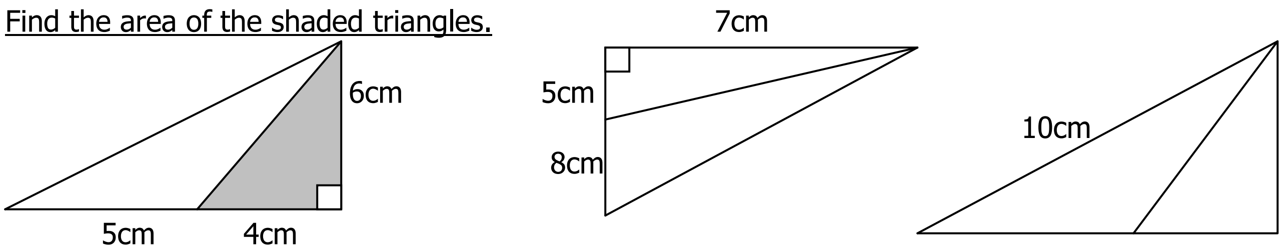
<u>8sq. units</u>

Exercise: Find the area of the triangle.

1.



2. Find the area of the shaded triangles.



3. Pythagoras' Theorem (Pr. Mtcs. Rev, Wambuzi, 46).

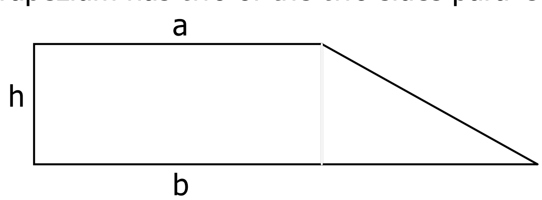
FINDING THE BASE OR HEIGHT.

1. Find the base of the triangle whose area is $20cm^2$ and height 8cm.
2. Fid the base of the triangle whose area is $28cm^2$ and height is 14cm.
3. The height of a triangle is 9cm and its area is $36cm^2$. Find the base.
4. The area of a triangle is $40cm^2$. Find the height if the base is 10cm.

More practice exercices on page 342.

AREA OF A TRAPEZIUM.

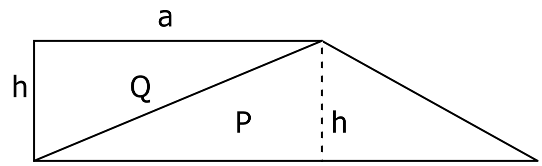
A trapezium has two of the two sides parallel.



h = height
a = short side (//)
b = long side (//)

To find the area of a trapezium, we consider the area of a triangle.

Discussion:



Area of triangle Q = $\frac{1}{2} \times a \times h = {}^{ah}/_{2}$

Area of triangle P = $\frac{1}{2} \times b \times h$ **=** ${}^{bh}/_{2}$

Total Area = ${}^{ah}/_{2} + {}^{bh}/_{2}$

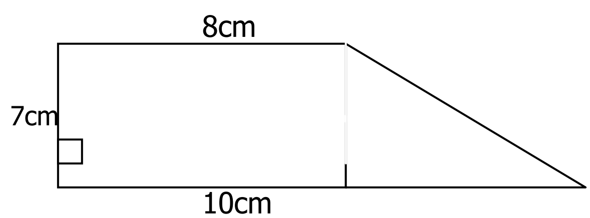
$$= \frac{ah + bh}{2}$$

$$= \frac{h(a + b)}{2}$$

or $= \frac{1}{2} h(a + b)$

Therefore are of trapezium = $\underline{\underline{\frac{1}{2} h(a + b)}}$

Example: Find the area of the trapezium below:



A = ½ h(a + b)

$= \frac{1}{2} \times 7\ (b + 10)cm^2$

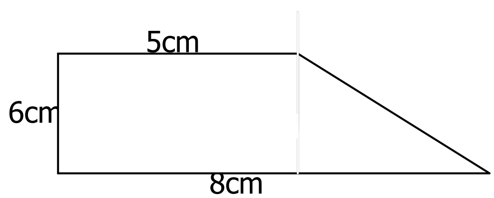
$= \frac{1}{2} \times 7 \times 18cm$

$= \underline{\underline{\mathbf{63cm^2}}}$

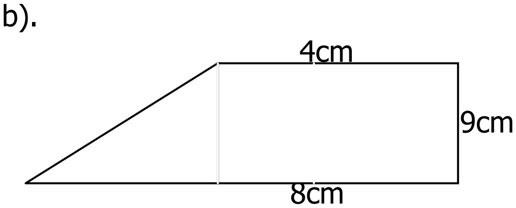
Exercise:

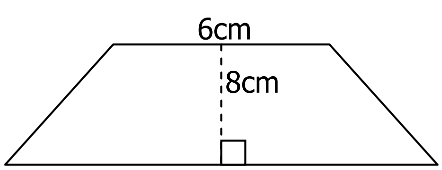
1. Find the area of the given figures.

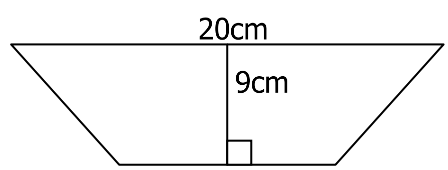
a)



b).



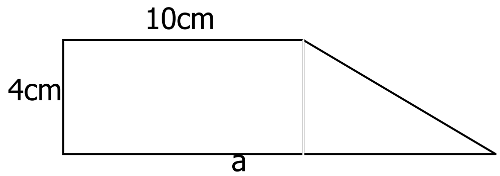




FINDING ONE SIDE OF A TRAPEZIUM.

Example:

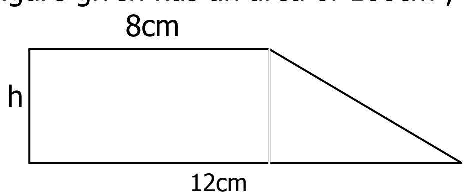
The area of a trapezium is $60cm^2$, the height is 4cm and one of the parallel sides is 10cm. Find the length of the second parallel side.



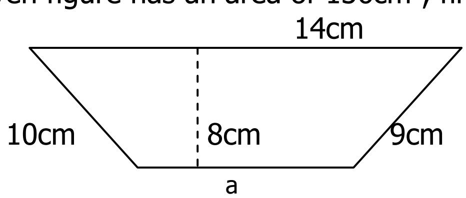
A = ½ h(a + b)
60 = ½ x 4(a + 10)
60 = 2(a + 10)
60 = 2a + 20
60 = 2a + 20 – 20
60 – 20 = 2a
40 = 2a
a = 20cm

Exercise.

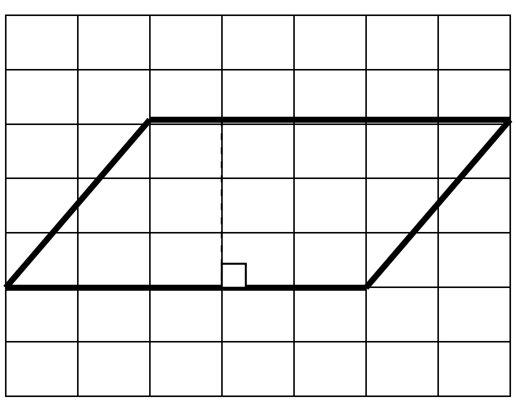
1. Find the second parallel side of a trapezium if the area is $56cm^2$, height 8cm and one of the parallel sides is 4cm.
2. The figure given has an area of $100cm^2$, find the value of h.



3. A = ½ h(a + b). Find the value of A if b = 6cm, h = 9cm and a = 10cm.
4. The area of a trapezium is 120cm2 and height is 10cm. Find the length of one of the parallel sides if the second one is 10cm.
5. The given figure has an area of $136cm^2$, find the value of a.



AREA OF A PARALLELOGRAM.

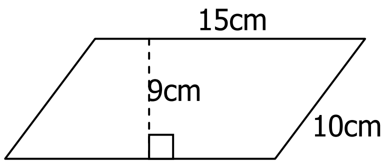


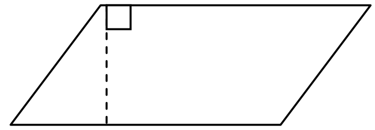
A = base x height
= 5 x 3
= <u>15sq. units.</u>

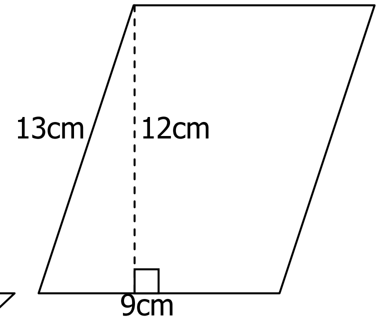
count squares
11 complete squares
2 (ooo)
+ 2 (✓✓✓✓)
15 sq. units.

Exercise:

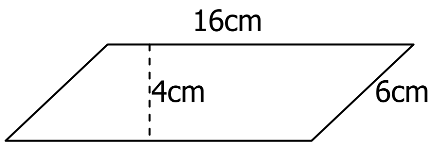
1. Find the area of the parallelograms shown.

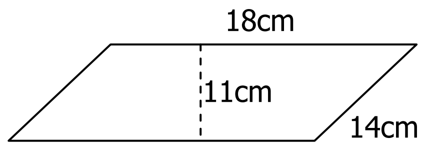






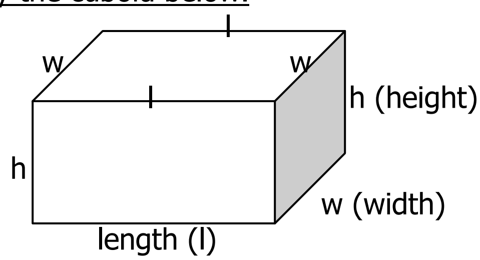
More practice work on page 347 MK 6



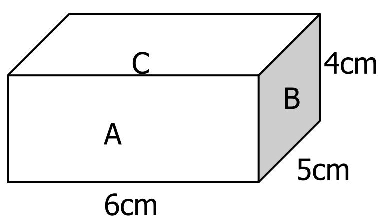


TOTAL SURFACE AREA OF A CUBOID.

Study the cuboid below.



Find the Total Surface Area of the cuboid.



lengthh = 6cm
width = 5cm
height = 4cm

TSA = 2(l x w + l x h + h x w)

= (2(lw + 2lh + 2hw
= 2 x 6x5 + 2 x6x4 + 2 5x4
= 2 x 30 + 2 x 24 + 2 x 20cm^2
= 60 + 48 + 40cm^2
148
= 148cm^2.

OR

Area of faces A = l x h = 6 x 4cm^2.
= 24 x 2 (there are two faces)
= 48cm^2

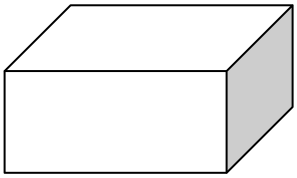
Area of faces B = 2 x h = 5 x 4cm^2
= 20 x 2 (there are two faces)
= 40cm^2

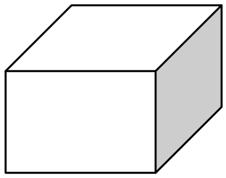
Area of faces C = l x w = 6 x 5cm^2
=30 x 2 (there are two faces)
= 60cm^2

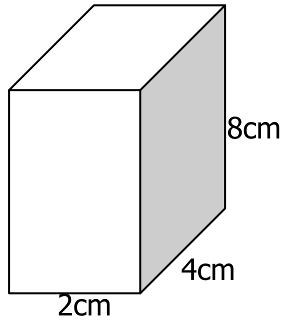
Total Surface Area = 48 + 40 + 60cm^2

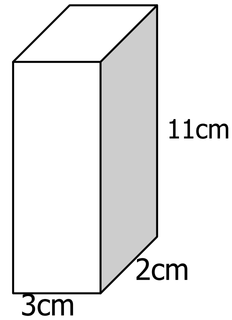
= **148cm^2.**

Find the total surface area of the cuboids.









Practice work page 349 MK 6.

TOTAL SURFACE AREA OF A CUBE.

A cube has all faces equal. It has square faces.

Diagram:

Total surface area = six times the area of one face.

Area of one face = side x side

$= s \times s = s^2$

Total surface area = $6 \times s^2$

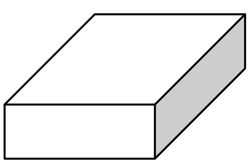
$= \mathbf{6s^2}$

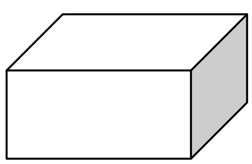
Exercise:

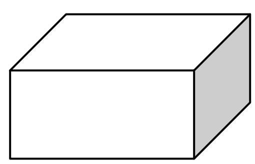
1. Find the total surface of the cube whose side is:

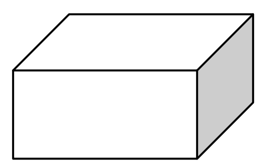
a). 5cm b). 6cm c). 7cm d). 8cm e). 10cm
f). 11cm g). 14cm h). 12cm i). 3cm

2. Find the total surface area of the cube.



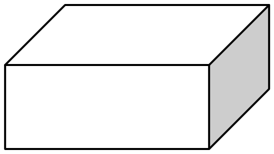






More practice exercises on page 351 MK 6.

FINDING THE LENGTH OF EACH SIDE OF THE CUBE



The TSA of a cube 384cm^2, find the length of each side of a square.

TSA = 6s^2

$384 = 6s^2$

$\frac{384}{6} = \frac{6s^2}{6}$

s = **8cm**

$64 = \sqrt{s^2}$

$8 = s$

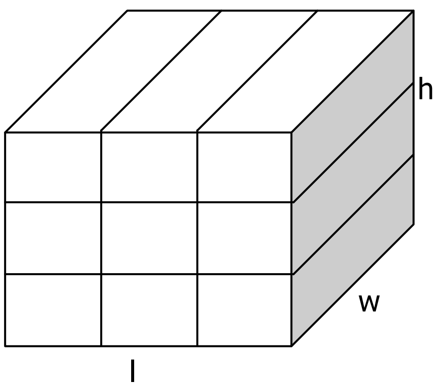
Each side = 8cm

Find the length of each side of a cube whose total surface area is;

1.	96	2.	150	3.	486	4.	216	5.	294
6.	1350	7.	384	8.	2166	9.	1734		

FINDING VOLUME OF A CUBE / CUBOID.

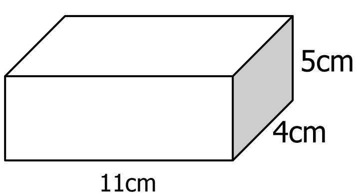
1. What is volume?
2. Counting cubes.



a). Find the number of cubes along the length.
b). Number of cubes along the width.
c). Number of cubes along the height.

3. Comparing the number of cubes along the length, width and height with the total number of cubes.
4. Calculating volume using (l x w x h)

Calculate the volume of a rectangular prism below.



V = length x width x height
= l x w x h
= 11 x 4 x 5cm3
= 11 x 20
= **220cm^2**

Find the volume of the cuboid whose sides are given below.

No.	Length (cm)	Width (cm)	Height (cm)
1.	9	4	3
2	7	5	3
3.	6	4	5
4.	9	4	5

No	Length (cm)	Width (cm)	Height (cm)
5.	6	10	4
6.	4	8	6
7.	8	4	5
8.	10	5	8

FINDING THE SIDE OF A RECTANGULAR PRISM / CUBOID.

Example:
Find the height of the rectangular prism whose volume is 180cm3, length 9cm and width 4cm.

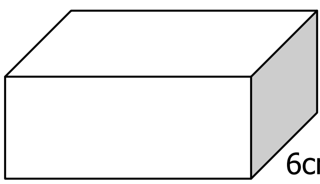
L x w x h = volume

$$\frac{9 \times 4 \times h}{9 \times 4} = \frac{180}{9 \times 4}$$

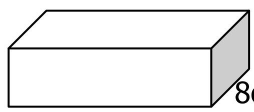
h = **5cm**

Exercise:

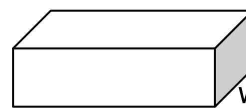
1. Find the missing side.



Volume = 120cm^3



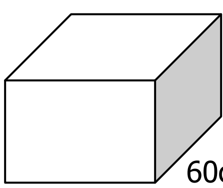
Volume = 168cm^3



Volume = 420cm^3

More practice work on page 357 MK 6.

Finding Volume in Litres.
A rectangular tank is 30cm by 60cm by 90cm. Find the volume in litres.



V = l x w x h

= (30 x 60 x 90)cm^3

1 litre = 1000cm

No. of litres = $\frac{30 \times 60 \times 90}{1000}$ cm^3

= **162 litres.**

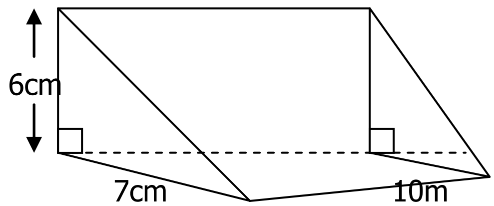
2. Calculate the volume of rectangular tanks in litres whose length, width and height are given below.

No.	Length (cm)	Width (cm)	Height (cm)
1.	40	60	80
2	70	30	50
3.	100	70	80

No	Length (cm)	Width (cm)	Height (cm)
4.	90	40	70
5.	80	30	40
6.	60	70	120

Word problems on page 358 MK 6.

VOLUME OF A TRIANGULAR PRISM.

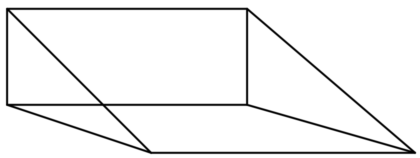


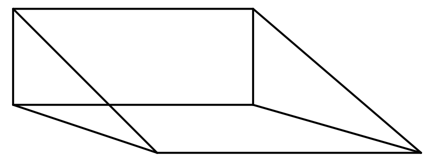
Volume = Area of the triangular face times the length.
= (1/2 x b x h) x l

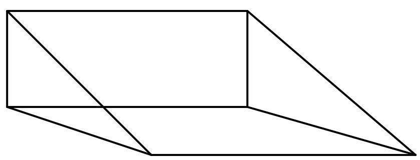
Volume = (½ x b x h) x l
= (½ x 7 x 6) x 10cm^3
= 21 x 10
= 210cm^3

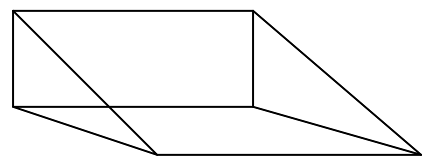
Exercise:

1. Find the volume of the prisms below.





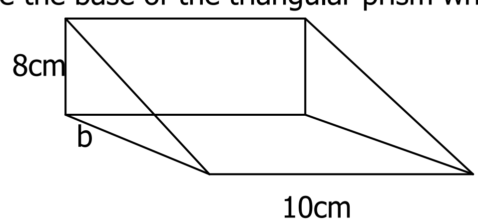




FINDING THE UNKNOWN SIDE WHEN VOLUME IS GIVEN.

Example:

Calculate the base of the triangular prism whose volume is 240cm^3, height is 8cm and length is 10cm.



½ x b x h x l = V
½ x b x 8 x 10 = 240
½ b x 80 = 240
40b = 240
40 40
b = **6cm.**

Exercise:

1. Use the example above to complete the table below.

PRISM	BASE	HEIGHT	LENGTH	VOLUME
A	____	9cm	4cm	180cm^3
B	____	12cm	15cm	540cm^3
C	____	15cm	20cm	9000cm^3
D	____	10cm	8cm	360cm^3
E	4	7cm	10cm	_____

2. Word problems, MK 7, 390.

CHANGING LITRES TO MILLILITRES.

Using	Kl	Hl	Dl	L	dl	cl	ml
	1	0	0	0	0	0	0
				1	0	0	0

1000 milliliters = 1 litre

Example:
Change 7 litres millilitrse
1 litre = 1000 millilitres
7 litres = 7 x 1000
= **7000 milliliters**

Change litres (l) to milliliters (ml)

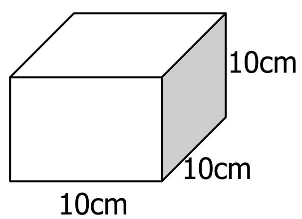
1.	3 litres	2.	4 ½ litres	3.	2 ¼ litres	4.	5 litres
5.	8 ½ litres	6.	13 litres	7.	8 ½ litres	8.	6 ½ litres

Expressing millilitres as litres.

1.	2000ml	2.	2500ml	3.	700ml	4.	4000ml	5.	4500ml
6.	870ml	7.	12,000ml	8.	850ml	9.	350ml		

Word problems on page 363 MK 6.

COMPARING CC, MILLILITRES AND LITRES.



1 litre = $10 \times 10 \times 10\ cm^3$
= $1000cm^3$
= 1000cc

From: Kl Hl Dl l dl cl ml

Explanation: 1 litre = 1000 cc

1 litre = 1000 ml

Hence: 1000cc = 1000ml

1 cc = 1 ml

Example I:

Express 2000ml in litres.

1000ml = 1 litre

2000ml = $\frac{2000}{1000}$ l

= **2 litres.**

Example II:

Change 3700cm2 to litres.

$1000cm^3$ = 1 litre

$3700cm^3$ = $\frac{3700}{1000}$ l

= **3.7 litres**

Change the following to litres.

1.	4000cm3	2.	7000ml	3.	2500cm3	4.	8850ml
5.	18300ml	6.	26500cm2	7.	45650ml	8.	690ml

ESTIMATING WEIGHT (Mass)

1kg is equal to 1000g

Kg Hg Dg g dg cg ml

1 0 0 0

½ kg = 500g

¼kg = 250g

Object	Estimated mass	Measured Mass
A tin of sugar		
Your Maths. text		
A tin full of stones		
Class monitor		
A box of chalk		

Express the following g as kg.

1.	2000g	2.	250g	3.	500g	4.	2400g	5.	1100g
6.	58000g	7.	7000g	8.	800g	9.	4000g	10.	200g

Express the following kg as grams.

1.	4kg	2.	6 ½ kg	3.	15kg	4.	1/5kg	5.	0.5kg
6.	7 ½ kg	7.	0.25kg	8.	¼ kg	9.	9kg	10.	12.7kg

GEOMETRY

Constructing of angles.

1. An angle of 60^o and 120^o

2. An angle of 45^o, 90^o and 135^o.

3. An angle of 30^o and 150^o.

4. An angle of 75^o.

   Construct $30^o/150^o$, then bisect 150^o to get 75^o

Construction of parallel lines.

1. Draw the first line.
2. Adjust your compass (keep the radius).
3. Fix the compass on the line you have drawn.

Construction of circles of given radius.

1. A circle of radius 3cm.
2. A circle of 3.5cm
3. Construct a triangle in a circle of radius; a). 3.5 b). 4cm
4. Construct a circle of radius 2 ½ cm.

Construction of regular polygons.

1. A regular hexagon in a circle of 3cm.

2. A square of side 5cm.

3. Constructing a square given the radius of a circle.

4. Constructing a square using a ruler and a pair of compasses.

5. Constructing a regular pentagon:

   We use the centre angle;

   Centre angle = $^{360}/_{5}$ = 72°

   I Draw a line mark in it a point.

   II At o draw an angle of 72o.

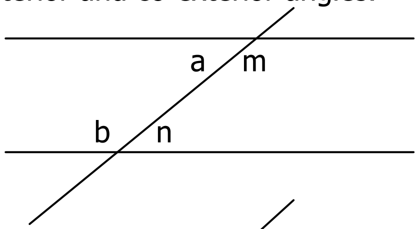
   III Open your pair of compasses to a radius of 1.5cm. Use O as the centre of the circle.

   IV Mark off AB, use it to get other points diagram:

6. Try: Construct a regular octagon.

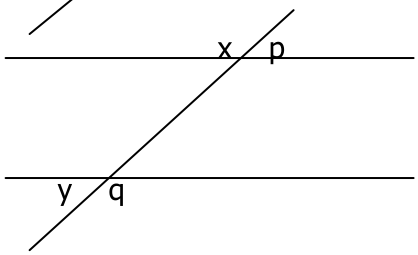
Angle properties of parallel lines.

1. Co-interior and co-exterior angles.



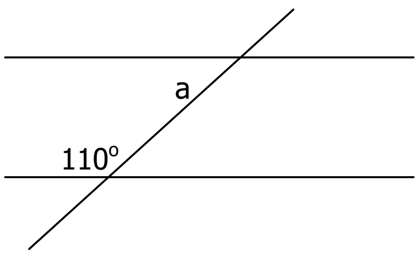
<a and <b are co-interior angles.
<a + <b = 180°

2.

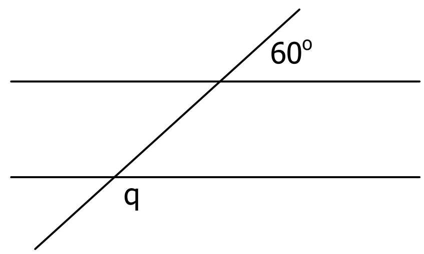


<x and <y are co-exterior angles
<x + <y = 180°

3. Find angle a.



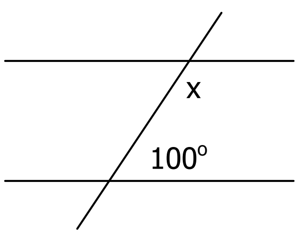
4. Find angle q.

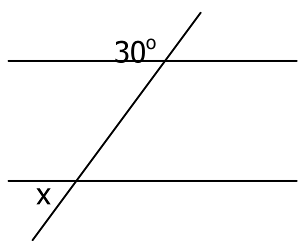


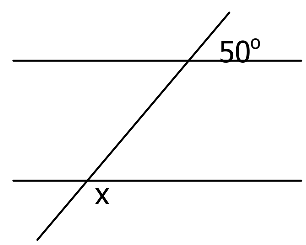
Exercise:

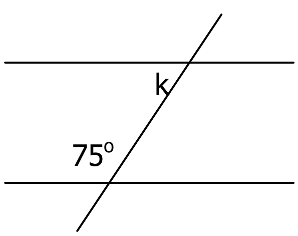
Find the size of the marked angle.

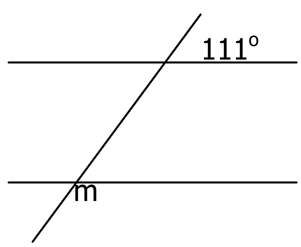
1.

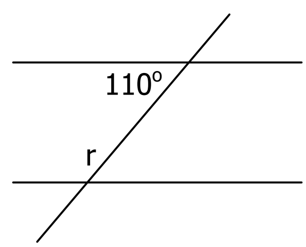


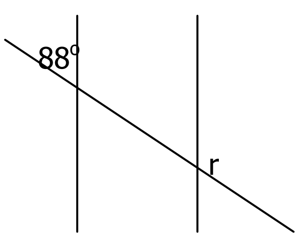


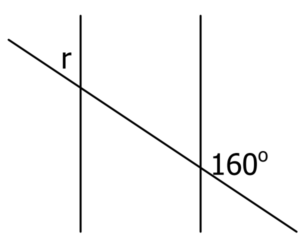






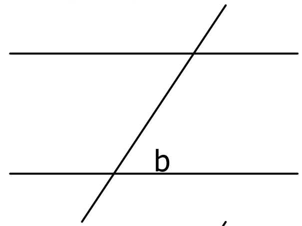






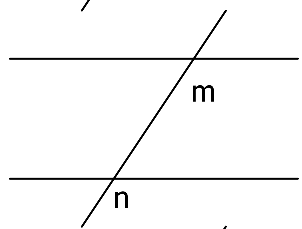
Corresponding angles.

1.



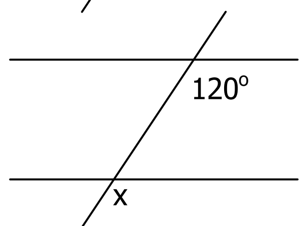
<a and <b are corresponding angles.
<a = <b

2.



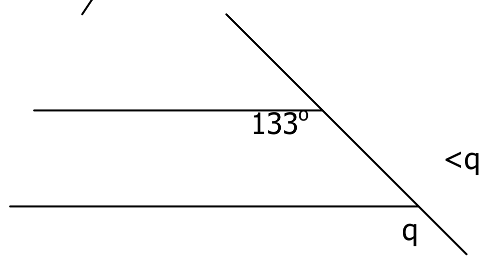
<m and <n are corresponding angles.
<m = <n

3.



<x = 120° (Corresponding angles)

4.

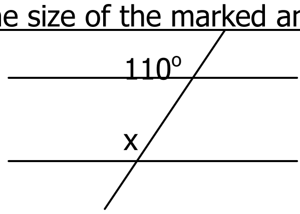


<q = 133° (Corresponding angles)

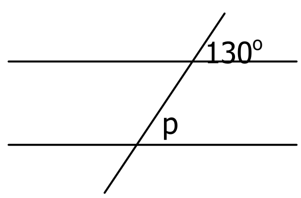
Exercise:

Find the size of the marked angles.

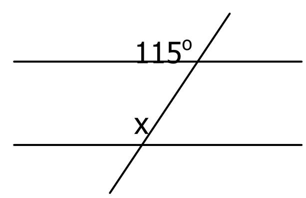
1.



2.

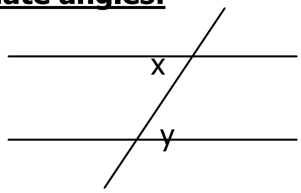


3.

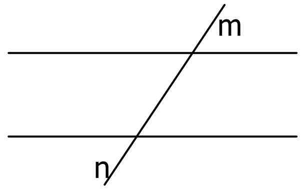


More practice work on page 270 MK 6.

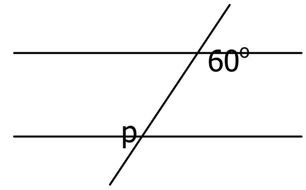
<u>Alternate angles:</u>



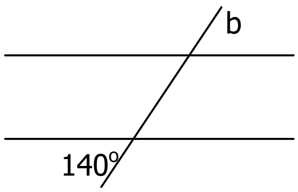
<x and <y are alternate interior angles.
<x = <y



<m and <n are alternate Exterior angles.
<m = <n



Find <p
<p = 60°
(alternate interior)

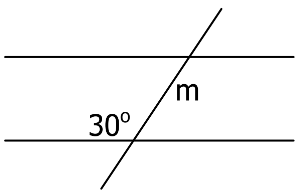


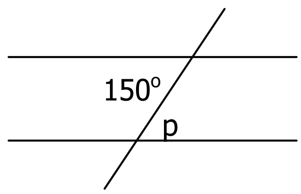
Find <b.
<b = 140° (alternate exterior)

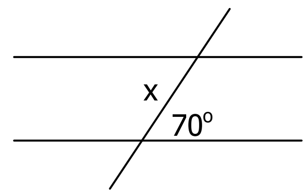
<u>Exercise:</u>

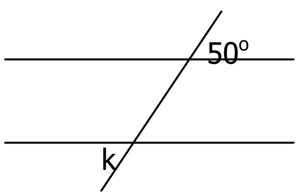
<u>Find the size of the marked angles.</u>

1.





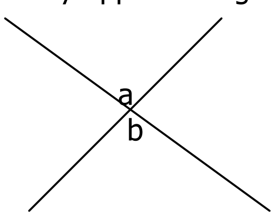




More practice work on page 271 MK 6.

<u>Vertically opposite angles:</u>

Vertically opposite angles are equal.

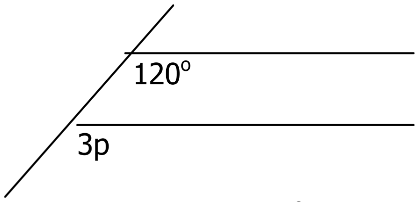


<a and <b are vertically opposite angles.
<a = <b

MIXED PROBLEMS

Finding the unknown in corresponding or alternate angles:

Example 1: Find the value of p.

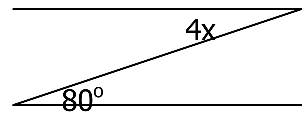


$3p = 120^\circ$

$\frac{3p}{3} = \frac{120}{3}$

$p = \underline{\mathbf{40^\circ}}$

Example 1: Find the value of x.

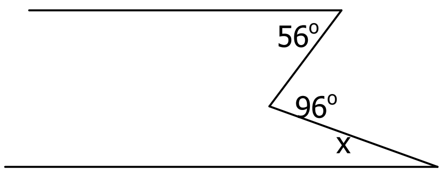


$4x = 80^\circ$ (alternate angle)

$\frac{4x}{4} = \frac{80}{4}$

$x = \underline{\mathbf{20^\circ}}$

Example 3:

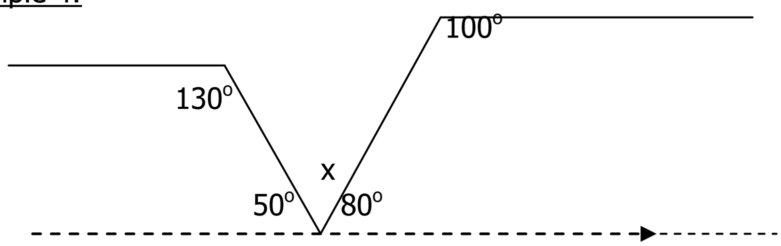


$x + 56^\circ = 96^\circ$

$x - 56 + 56 = 96^\circ - 56^\circ$

$x = \underline{\mathbf{40^\circ}}$

Example 4:

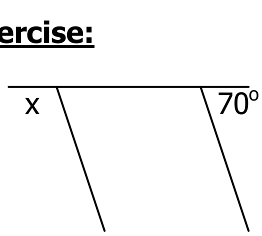


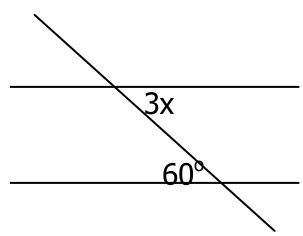
$x + 50 + 80 = 180o$

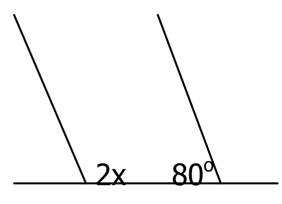
$x+130 - 130 = 180 - 130$

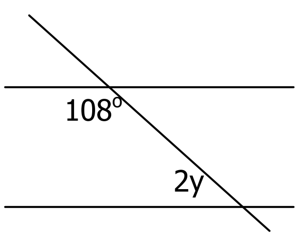
$x = \underline{\mathbf{50^\circ}}$

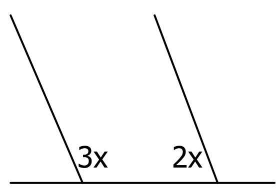
Exercise:

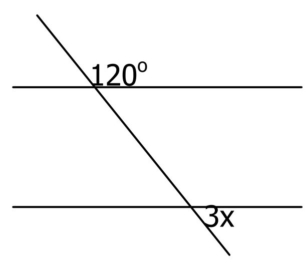


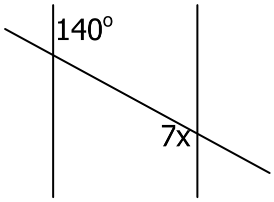


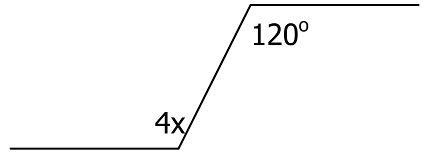


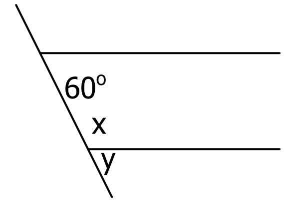


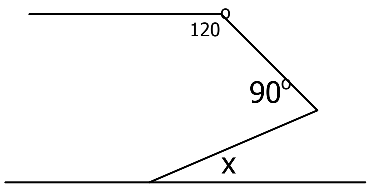


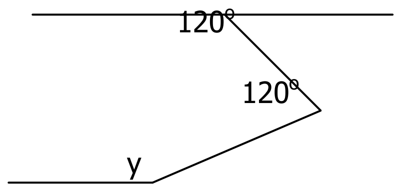


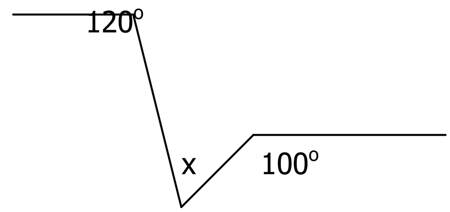

140°
7x


120°
4x


60°
x
y


120°
90°
x


120°
120°
y


120°
x
100°

NUMBER FACTS AND SEQUENCES DIVISIBILITY BY 2, 3, 4 and 5.

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 $1 + 4 + 4 = 9$ $(9 \div 3 = 3)$
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.

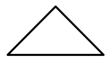
1.	0	2.	6	3.	36	4.	1	5.	7
6.	356	7.	2	8.	18	9.	244	10.	3
11.	19	12.	10000						

4. Divisibility test by 5:
   A number is divisible by 5 if it ends with o or 5.

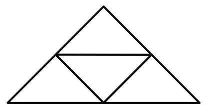
a). Write down multiples of 5 less than 60. $M_5 = \{ \qquad \}$
b). Underline only those numbers that are divisible by 5:- 142, 345, 700, 1196, 752, 850, 1190
c). List the missing multiples of 5:- {170, ___, 180, ___, 190, ___, 200, ___, 210, ___, 220}

<u>TRIANGULAR NUMBERS - TRIANGULAR PATTERNS</u>

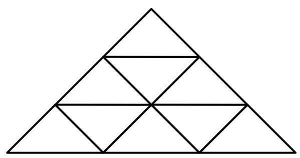
1



1 + 2 = 3



1 + 2 + 3 = 6



1 + 2 + 3 + 4 = 10

<u>Using triangular patterns given the next 3 triangular numbers.</u>

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

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

<u>Example:</u>

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

= **<u>28.</u>**

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

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

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

= <u>28</u> (Is the sum)

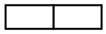
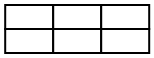
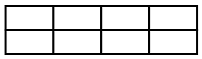
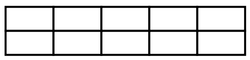
<u>Exercise:</u>

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 $\frac{n(n+1)}{2}$ to get;

    i. the 30^{th} triangular number   ii. the sum of all numbers from 1 to 50
6. How many sticks will the next grouping have?

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

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

Exercise:

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

WHOLE NUMBER AND COUNTING.

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.

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.

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).**

$n + n + n + 1 + 2 = 36$

$3n + 3 = 36$

$3n + 3 - 3 = 36 - 3$

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

$n = \underline{11}$

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.

Consecutive Even/Odd Numbers.

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

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

Form an equation and solve for x:

$x + (x + 2) + (x + 4) = 24$	
$3x + 6 = 24$	$x = 6$
$3x + 6 - 6 = 24 - 6$	$x+2 = 6 + 2 = 8$
$3x = 18$	$x + 4 = 6 + 4 = 10$
3 3	
x = **6 Answer**	

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

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

$p + (p + 2) + (p + 4) + (p + 6)$	
$4p + 12 = 32$	$p = 5$
$4p + 12 - 12 = 32 - 12$	$p + 2 = 5 + 2 = 7$
$4p = 20$	$p + 4 = 5 + 4 = 9$
4 4	$p + 6 = 5 + 6 = 11$
p = **5 Answer**	

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.

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.

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)**

$10 \div 1 = 10$ $10 \div 2 = 5$ $10 \div 5 = 2$ $10 \div 10 = 1$

Example: What are the factors of 24?

$24 \div 1 = 24$ $24 \div 2 = 12$ $24 \div 3 = 8$ $24 \div 4 = 6$

$24 \div 6 = 4$ $24 \div 8 = 2$ $24 \div 12 = 2$ $24 \div 24 = 1$

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	

PRIME FACTORISATION

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

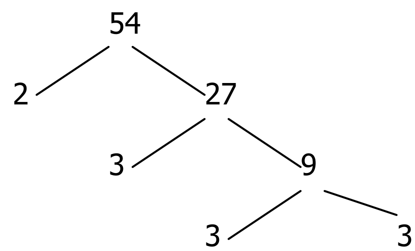
Example 1: Find the prime factors of 54.

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 $\{2^1 \times 3^2\}$

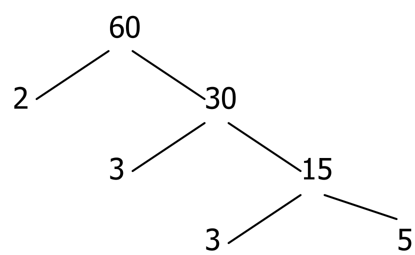
Set notation/subscript method or Power form/multiplication method

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.

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. $\{2_2, 5_1, 7_1\}$

Finding the unknown prime factor.

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

$2 \times 2 \times p \times 5 = 60$

$\frac{20p}{20} = \frac{60}{20}$

p = **3**

2	60	2x2xpx5=60
2	30	2x2x3x5=60
3	15	p = 3
5	5	
	1	

Prime factorise 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.

VALUES OF POWERS OF NUMBERS.

Example 1: Find the value of 2^4.

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

$= 4 \times 4$

$= \mathbf{16}$

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

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

$= 49 \times 7$

$= \mathbf{343}$

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

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.

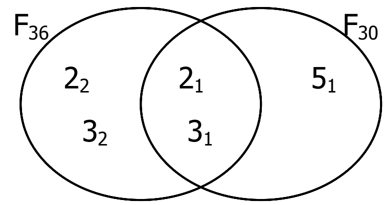
Finding the unknown, say $\mathbf{7^x = 49}$.

REPRESENTING PRIME FACTORS ON VENN DIAGRAMS.

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

2	36
2	18
3	9
3	3
	1

2	30
3	15
5	5
	1



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

Represent the prime factors of the following pairs of numbers.

1. 24 and 30
2. 30 and 48
3. 48 and 60
4. 18 and 40
5. 15 and 20
6. 36 and 54.

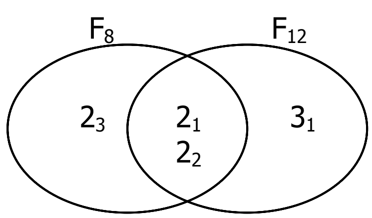
FINDING THE GCF AND LCM.

Example: Find the GCF and LCM of 8 and 12 using a venn diagram.

2	8
2	4
2	2
	1

2	12
2	6
3	3
	1

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

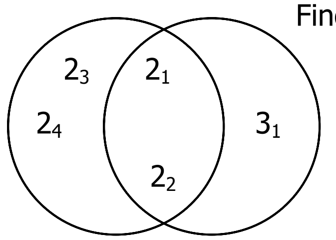


a). GCF = 2 x 2 (Intersection)
= **<u>4</u> Answer**

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

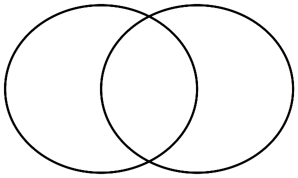
Exercise: Study the venn diagrams and answer the questions that follow.

1.



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

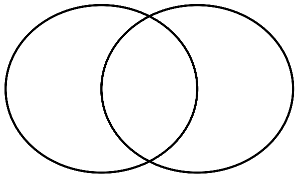
c). $F_{16} \cup F_{12}$ d). LCM of 16 and 12

2. 

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

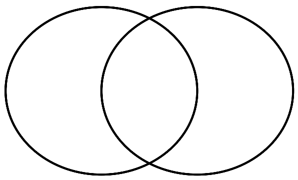
c). the GCF of 36 and 30?

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.

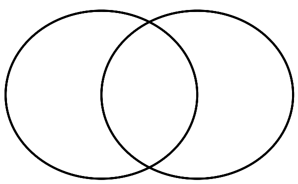
4. 

Find; a). F24 ∩ F108 b). GCF of 24 and 108

c). F24 ∪ F108 d). LCM of 24 and 108

<u>FINDING THE UNKNOWN IN VENN DIAGAMS.</u>

<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 x 2 x 2 x 3 =

x = 8 x 3 =

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

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

y = 2 x 2 x 3 x 3 x 3

y = 4 x 27

Y = <u>108</u> Answer

c). GCF = 2 x 2 x 3

= 4 x 3 =

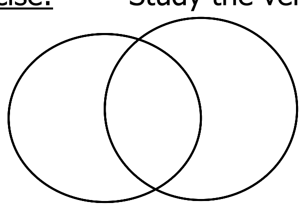
= **<u>12</u> Answer**

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

8 x 27 =

<u>216</u> Answer

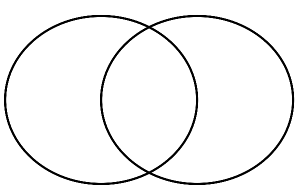
<u>Exercise:</u> Study the venn diagrams and answer the questions that follow.

1. 

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

b). Find the GCF of x and y.

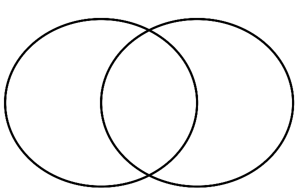
c). Find the LCM of x and y.

2. 

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

b). Find the GCF of 12 and 18.

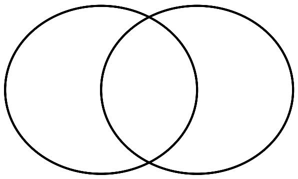
c). Find the LCM of 12 and 18.

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.

<u>FRACTIONS:</u>

1. $48 - 12\,^1/_3 = (48 - 12) - ^1/_3$

$= 36 - ^1/_3$

$= 35 + (1 - ^1/_3)$

$= 35 + ^2/_3$

$= \mathbf{35\,^2/_3}$

2a). Let the fraction be x

x = 0.333………. (i)

10x = 10 x 0.333

10x = 3.333 (ii)

10x .x = 3.333

= **<u>0.333</u>**

b). $\frac{9x}{9} = \frac{3}{9}$

$x = ^1/_3$

c). 0.212121…..

Let the fraction be y

y = 0.212121……..(i)

100y = 100 x 0.212121

100y = 21.212121……..(ii)

100y – y = 21.212121 – 0.212121

$\frac{99y}{99} = \frac{21}{99}$

. $y = ^7/_{33}$

d). Let the fraction be x.

k = 0.2333

10k = 10 x 0.2333

10k = 2.333 ………(i)

10k x 10 = 10 x 2.333

100k = 23.33 …….(ii)

100k – 10k = 23.33

90k = 21

$\frac{90k}{90} = \frac{21}{90}$

$k = ^7/_{30}$

2. $½ - ^1/_5 + ^1/_4$

BODMAS

$½ + ¼ - ^1/_5 = \frac{10 + 5 - 4}{20}$

$\frac{15 - 4}{20} = ^{11}/_{20}$

3. 1 – 5/12 = 12/12 – 5/12 = 7/12

Maths Lesson Notes.

OPERATION NUMBERS

Addition (up to 7 digits)

Example 1:

M	HTh	TTh	Th	H	T	O
1	2	3	4	6	7	8
+	2	1	4	2	1	0
1	4	4	8	8	8	8

M	HTh	TTh	Th	H	T	O
1	7	8	4	3	6	4
+	3	3	6	8	9	7
2	1	2	1	2	6	1

Work out:

1. 1 1 3 4 5 + 1 6 7 8
2. 3 3 2 4 5 + 7 2 4 5
3. 2 4 3 2 1 + 6 7 4 2
4. 8 2 4 5 3 6 2 + 6 7 8 9
5. 2 3 4 5 6 + 3 1 4 5
6. 6 3 4 5 8 2 + 9 8 6 7
7. Word problems on Pg 55 Mk 6.

Subtraction

Example 1:

```
  1 2 0 1 8 6
-   2 0 1 2 3
-------------
  1 0 0 0 6 3
```

Example 2:

```
  5 2 3 3 1 8 6
- 1 3 4 5 1 0 2
---------------
  3 8 8 8 0 8 4
```

Work out:

1. 2 4 5 1 6 3 - 4 3 1 7 8
2. 7 5 8 3 6 1 4 - 5 8 9 3 1 3 8
3. 5 4 3 3 2 5 - 2 8 4 7 6
4. 2 1 8 4 1 4 9 - 4 3 6 2 4 8
5. 3 4 5 2 4 8 - 2 3 1 3 2
6. 6 7 5 4 2 3 - 1 5 3 2 1 6
7. **Word problems involving subtraction – MK 6, Pg 58**

Multiplication (A 3 digit number by a 2 digit number).

Example 1:

```
    1 4 3
    x 1 8
  1 1 4 4
+ 1 4 3 0
```

Example 2:

```
        1 3 2 4
        x 1 3 2
        2 6 4 8
      3 9 7 2 0
  + 1 3 2 4 0 0
```

Work out.

1.a) 1 3 4 5 3 x 1 2 7   b) 1 4 4 5 x 1 3 5   c) 1 6 7 5 x 2 6 3   d) 2 4 5 x 5 2

e) 1 4 3 8 4 x 1 3 6   f) 2 4 6 3 x 1 8 3   g) 3 4 5 6 x 2 1 4   h) 1 6 3 x 3 5

Word problem involving multiplication – MK 6 Pg 59

Division

Example 1:

1976 ÷ 13

```
            1 5 2  Answer
       13 ) 1 9 7 6
1x13      - 1 3
            6 7
5x13       -6 5
              2 6
2x13          2 6
```

Table 13

1 x 13 = 13
2 x 13 = 26
3 x 13 = 39
4 x 13 = 52
5 x 13 = 65

Example 2:

6360 ÷ 120

```
            120 ) 6 3 6 0
5 x 120         - 6 0 0
                    3 6 0
3 x 120           - 3 6 0
```

Work out

1. 17) 5 9 8 4 2. 72) 5 9 6 1 6 3. 25) 5 3 2 5

4. 83) 5 4 7 8 0 5. 34) 8 0 9 2 6. 38) 8 9 4 5 2

7. 46) 6 3 0 2 8. 110) 1 3 2 0

Word problems involving division.

Addition and subtraction without brackets.

Example 1: Work out: 14 – 16 + 6

14 – 16 + 6 = (14 + 6) - 16

= 20 – 16

= **4 Answer**

Work out:

1. 18 – 14 + 3 + 10 2. 11 – 10 + 5 3. 25 – 18 + 5

4. 7 – 5 + 8 5. 14 + 6 + 3 – 5

Addition and subtraction with brackets.

Example 1: Work out: (4 – 3) + 7

(4 – 3) + 7 (**Work out what is in the brackets)**

1 + 7 = **8 Answer.**

Work to do:

1. (7 + 9) – 3 2. (9 – 5) + 7 3. (13 – 5) + 12

Multiplication and division with/without brackets.

Examples 1:

32 : 8 x 2 (**Here use "BODMAS)**

32 : 8 x 2 = (32 : 8) x 2

4 x 2 = **8 Answer**

Example 2:

(15 x 8) : 2 **(Here again use BODMAS)**

(15 x 8) : 2 = (15 x 8) : 2

120 : 2 = **60 Answer**

Work out:

1.	24 : 6 x 5	2.	16 x 3 : 6	3.	15 x 4 : 2
4.	72 : 8 x 3	5.	81 : 3 x 2	6.	(12 x 3) : 8

Using all operations (BODMAS)

Work out: I

1.	3 + 8 x 4	2.	15 + 4 x 9	3.	18 x 7 + 12
4.	6 x 7 + 8 + 9 x 3	5.	2 x 3 + 4 + 5 x 6	6.	13 x 9 + 7 + 3 + 9
7.	3 x 7 + 8 x 9	8.	12 + 13 x 8	9.	5 x 9 + 6

Work to do: II

1.	15 x 3 + 10 : 2 – 5	2.	90 – 50 : 25 x 5	3.	(5 x 3) +10 : 2 – 5
4.	300 : 15 x 2	5.	(35 : 7) – (18 : 6)	6.	50 : 10 + 40 : 4
7.	(24 : 2) x (3 x 6) : (18 : 2)	8.	30 x 11 + 105 : 5	9.	(25 – 7) : 3

Commutative property

a). Addition

a + b = b + a

7 + 4 = 4 + 7 (check)

11 = 11

b). Multiplication

a x b = b x a

7 x 4 = 4 x 7

28 = 28

Using commutative property to complete the following statements.

Associative property of:

a). <u>Addition</u>

3 + (8 + 9) = (3 + 8) + 9

3 + 17 = 11 + 9

20 = 20

b). <u>Multiplication</u>

(4 x 6) x 5 = 4 x (6 x 5)

24 x 5 = 4 x 30

120 = 120

Complete the statements below using associative property.

Distributive Property

<u>Example:</u> (4 x 5) + (4 x 6)

Put 4 outside the baskets (It's a common factor)

4 (5 + 6)

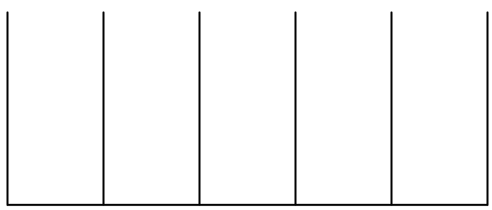
4 x 11 = **<u>44 Answer</u>**

<u>Using distributive property, work out the following.</u>

Numeration System

<u>Millions</u>

a). Show 999999 on an abacus

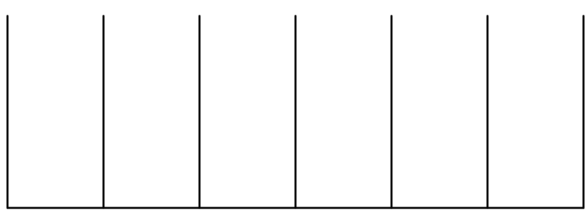


Hth	Tth	T	H	T	O
9	9	9	9	9	9

b).

$$\begin{array}{r} 999999 \\ +\quad\quad 1 \\ \hline 1{,}000{,}000 \\ \hline \end{array}$$

c). Show 1,000,000 on an abacus.



M	Hth	Tth	T	H	T	O
1	0	0	0	0	0	0

The new number has six zeros. It is called one million.

Identify the place value of each digit.

a). 7277 b). 201481 c). 100020 d). 4138294

Finding the value of each digit.

Example 1: 2748

2 7 4 8

ones

tens

hundreds

Thousands

The value of 2 = 2 x 1000 = 2000

The value of 7 = 7 x 1000 = 700

The value of 4 = 4 x 10 = 40

The value of 8 = 8 x 1 = 8

Find the value of each digit in the following.

a). 935 b). 40521 c). 7,432,876 d). 3033

e). 1936

EXPANDING NUMBERS

Example 1: Expand 6347295

6 3 4 7 2 9 5

Ones (**5 x 1)**

Tens (**9 x 10)**

Hundreds **(2 x 100)**

Thousands **(7 x 1000)**

Ten thousands **(4 x 10,000)**

Hundreds thousands (**3 x 100,000)**

Millions (**6 x 1,000,000)**

6 3 4 7 2 9 5 =

6000000 + 300000 + 40000 + 7000 + 200 + 90 + 5

Exercise:

Expand the following.

a). 5,119,023 b). 7,654,321 c). 108,450 d). 712

e). 9,536,008 f). 800,004

Expand using powers.

Example: 7,267,439

7 2 6 7 4 3 9

Ones (9 x 1)

Tens (3 x 10)

Hundreds (4 x 100)

Thousands (7 x 1000)

Ten thousands (6 x 10,000)

Hundred thousands (2 x 100,000)

Millions (7 x 1,000,000)

7267439 =

(7 x 106) + (2 x105) + (6 x 104) + (7 x 103) + (4 x 102) + (3 x 101) + (9 x 10o)

Expand using powers.

1. 935 2. 354212 3. 7277 4. 238

5. 4773468

Expand using powers.

1. 49.5 2. 127.4 3. 24.15 4. 45.256

Expressing numbers in words.

Example: Write in words 2, 045, 300

M	Thou	Unit
2	045	300

Two million
Forty five thousand
Three hundred

Express the following in words.

1. 3, 542, 125 2. 760,000 3. 760,000 4. 101,740

5. 70,006 6. 530,540

Expressing in figures.

Example: Seven million three hundreds twenty six thousand eight hundreds fifty seven.

Seven million = 7,000,000

Three hundred Twenty six thousand	=	326,000
Eight hundred forty seven	=	847
		7,326,847

Express the following in figures.

1. Three million forty three
2. Two million eight hundred thousand
3. One million two hundred thirty four thousand five hundred sixty eight.
4. Six million three hundred nineteen
5. Seven million three hundred fifty two thousand
6. Nine million forty seven thousand thirty six.
7. **More work on page 32 (Understanding Mtcs Bk 6).**

READING DECIMALS.

Examples

Fraction	**Name**	**Decimal**
$^{1}/_{10}$	one tenth	0.1
$^{2}/_{10}$	two tenths	0.2
$^{3}/_{10}$	______	0.3
$^{4}/_{10}$	______	0.4
$^{5}/_{10}$	______	0.5
$^{1}/_{100}$	one hundredth	0.01
$^{2}/_{100}$	two hundredths	0.02
$^{7}/_{100}$	seven hundredths	0.07

Exercise:

	Fraction	Name	Decimal
1.	$^{15}/_{100}$	______	______
2.	$^{16}/_{100}$	______	______
3.	$^{20}/_{100}$	______	______
4.	$^{25}/_{100}$	______	______

Place values of decimals / values of decimals.

Example 1: What is the place value of each number in 4.6?

4 . 6

Tenths

Ones

6 tenths = 6 x 0.1 = 0.6

4 ones = 4 x 1 = 4.0

Example 2: What is the value of each digit in 6.78?

6 . 7 8

hundredths

tenths

Ones

8 hundredths = 8 x 0.01 = 0.08

7 tenths = 7 x 0.1 = 0.70

6 ones = 6 x 1 = 6.00

What is the place value of each digit?

1.	6.5	2.	7.385	3.	6.815	4.	12.01
5.	8.734	6.	9.4	7.	25.012	8.	21.47

Writing wholes and decimals in figures.

Example 1: Thirty six and four tenths

Thirty six = 3 6

Four tenths = 0.4

36.4 Answer

Example 2: Twenty six and fifty two thousandths

Twenty six = 2 6

Fifty two thousandths = 0 . 0 5 2

2 6 . 0 5 2 Answ

Write the following decimals in figures.

1. Five tenths
2. Eighteen hundredths
3. Six and six hundredths
4. Twelve and four tenths
5. Seven and thirty six hundredths
6. Ninety four and eight thousandths

7. Fifty four and one hundred twenty six thousands

Writing decimals in words.

1. 0.4 2. 0.5 3. 3.04 4. 6.07 5. 14.001
6. 48.013 7. 8.125 8. 6.085

ROUNDING OFF WHOLE NUMBERS.

Example 1: Round off to the nearest tens: 24

```
    T O
    2 4
+   0
    2 0 Answer
```

Example 2: Round off 3 7 7 to the nearest tens.

```
  H   T   O
  3   7   7
  +   1
  3   8   0  Answer
```

Exercise:

Round off to the nearest tens.

Round off to the nearest hundreds.

1. 263 2. 1265 3. 1648 4. 586 5. 952
6. 7837 7. 2563 8. 2539 9. 8923 10. 3989

Round off decimals to the nearest whole number, tenths and hundredths.

Example 1: Round off 4.37 to the nearest whole number.

```
  4 . 3 7
  0
  4   Answer
```

Example 2: Round of 29.973 to the nearest tenths.

```
  29 . 9  7 3
+         1
  30 . 0 Answer
```

Example 3: Round off 2 9 . 9 7 3

$$\begin{array}{r} 29.973 \\ +\quad 0 \\ \hline 29.97 \end{array}$$

Round off to the nearest whole number.

1. 1.42 2. 5.40 3. 5.68 4. 3.45 5. 2.36

Round off to the nearest tenths.

1. 1.32 2. 9.87 3. 7.46 4. 3.73 5. 5.49

Round off to the nearest hundredths.

1. 12.623 2. 20.841 3. 12.998 4. 21.685 5. 6.829

ROMAN / HINDU ARABIC NUMERALS.

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

1. The following are repeated numerals.

   I , X , C and M e.g

   2 = II , 20 = XX , 300 = CCC , 2000 = MM

   Maximum 3 times.

2. The following are not repeated; V , L and D

3. Numbers with 6, 7 and 8 are additional Roman numerals.

   6 = 5 + 1 = VI 8 = 5 + 3 = VIII 60 = 50 + 10 = LX

   7 = 5 + 2 = VII 600 = 500 + 100 = DC 800 = 500 + 300 = DCCC

Expressing Hind u Numerals in Roman numerals.

Example 1:

70 + 5

LXX + V

LXXV

Example 2:

555 = 500 + 50 + 5

D + L + V

DLV

Example 3:

445 = 400 + 40 + 5

CD + XL + V

CDXLV

Express the following in Roman numerals.

1. 68 2. 489 3. 572 4. 72 5. 445

6. 141 7. 392 8. 458 9. 764 10. 868

Express the following to Hindu Arabic numerals.

1. XIX 2. XCV 3. XXI 4. XXIV 5. CXIX

6. CX 7. CIV 8. XLVIII 9. CL 10. LXXV

11. XC 12. CD

Word problems involving Roman Numerals Pg. 50 Mk 6.

BASES

Changing from base five to base ten.

Example 1: Change 42_{five} to base ten (notation base)

4 2
5^1 5^o
$(4 \times 5^1) + (2 \times 5^o)$
$4 \times 5 + 2 \times 1$
$20 + 2$
22_{ten}

b). Change 233five to base ten.

2 3 3
5^2 5^1 5^o
$(2x5^2) + (3x5^1) + (3x5^o)$
$2 \times 5 \times 5 + 3 \times 5 + 3 \times 1$
$10 \times 5 + 15 + 3$
$50 + 18 =$ **68_{tenb}**

Work to do.

1. 433_{five} 2. 213_{five} 3. 23_{five} 4. 134_{five} 5. 114_{five}

Change from base two to base ten.

1. 111_{two} 2. 1001_{two} 3. 101_{two} 4. 1111_{two} 5. 1011_{two}

Changing from one base to another base.

Example 1: Change 23_{five} to base three.

First change to base ten

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

5^1 5^o $= 2 \times 5 + 3 \times 1$

$= 10 + 3$

= **<u>13ten</u>**

3	13	Rem
3	4	1
	1	1

<u>111three</u>

<u>Exercise:</u>

<u>Change from base five to base three.</u>

1. 44_{five} 2. 124_{five} 3. 134_{five} 4. 324_{five} 5. 224_{five}

6. 111_{five}

<u>Change from base three to base five.</u>

<u>Example 1:</u> Change 122_{three} to base five.

First change to base ten.

1 2 2 = (1 x 32) + (2 x 31) + (2 x 3o)

3_2 3_1 3_o = 1 x 3 x 3 + 2 x 3 + 2 x 1

= 9 + 6 + 2 = **<u>17 ten</u>**

5	17	Rem
	3 →	2

= **<u>32five</u>**

<u>Change to base five.</u>

1. 222_{three} 2. 112_{three} 3. 221_{three} 4. 122_{three} 5. 121_{three}

<u>Finding the unknown base.</u>

<u>Example 1</u> $23_{ten} = 35_x$

2 3 = 3 5

10^1 10^o = x^1 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

$6 = x$

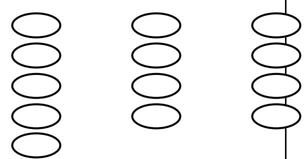
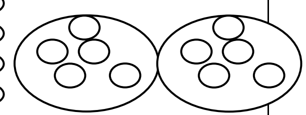
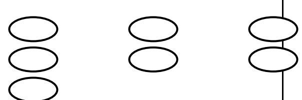
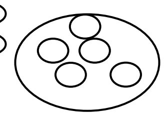
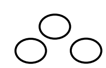
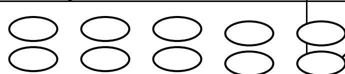
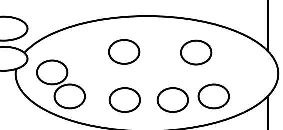
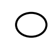
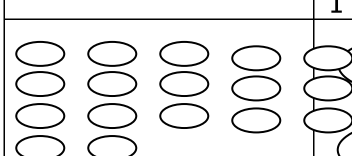
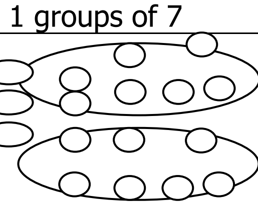
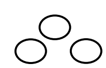
x = **<u>6 Answer (The base is 6).</u>**

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 = 54nine

NITE 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

Addition in finite 5 using clock faces.

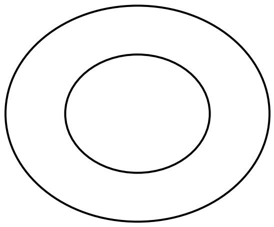
Example 1: Add: 3 + 4 = ___ (Finite 5)

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)

Application of finite system.

Example 1: If today is a Friday, what day of the week will it be after 23 days?

Day + 23 = x (finite 7)
Days of the week in finite 7

*** Order of days of the week

***	M	T	W	Th	F	S	S
	1	2	3	4	5	6	0

Day + 23 = x (finite 7)
Fri + 23 = x (finite 7)

$5 + 23 = x$ (finite 7)

$x = 5 + 23$ ( )

$x = 28$ ( )

$= 28 - 7 = 4$ rem 0

$x = 0$ (represents Sunday)

The day will be Sunday.

<u>Example 2:</u> John went to London in April. He will return after 18 months. In which month will John

return?

J	F	M	A	M	J	J	A	S	O	N	D
1	2	3	4	5	6	7	8	9	t	e	o

Month + 18 = x (mod 12)

April + 18 = x (mod 12)

$4 + 18 = x$ (mod 12)

$x = 28$

$= 28 : 12$

$= 1$ rem. 10 or t

$= t$

$x =$ October

$\because$ **He will return in October.**

<u>Example 3:</u> It's 5.00 pm. What time will it be after 9 hours?

$5 + 9 = x$ (finite 12)

$14 = x$ (finite 12)"

$x = 14 : 12$

$x = 1$ rem. 2

$x = 2$ or 2.00 am.

<u>Work out:</u> Page 253 MK 6 / Pg 219 Under Mtc Bk 6

<u>SCIENTIFIC NOTATION/STANDARD FORM</u>

P.7 MATHS LESSON NOTES TERM III

GRAPHS AND GRAPHS 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: $\underline{2, 3}, \underline{4, 6}, \underline{7, 8}$

Median = $\frac{4 + 6}{2}$ (**Since there are 2 numbers in the middle)**

$= \frac{10}{2}$ = Median = **5 Answer.**

b). **Range:** Range = highest – smallest

8 – 2 = **6 Answer.**

a). What is the median?
b). What is the range?

Exercise: 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

Find the mean.

Example 1: Find the arithmetic mean of; 2, 4, 7, 2, 8 and 1?

$$\text{Mean} = \frac{\text{Sum of items}}{\text{No. of items}} = \frac{2+4+7+2+8+1}{6} = \frac{24}{6} = \textbf{4 Answer.}$$

Work out: Find the mean of the following.

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

Inverse problems on average.

Example: 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 x 6 = **30 Answer.**

Work out on MK 6 Pg 172.

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

$$\textbf{Av. Of 8} = \frac{56}{8}$$

7 Answer.

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). **Mean =** $\mathbf{\frac{Sum}{Number} = \frac{(50 \times 2) + (40 \times 1) + (30 \times 3) + (70 \times 1)}{2 + 1 + 3 + 1}}$

$$\mathbf{= \frac{100 + 40 + 90 + 70}{7} = \frac{300}{7} = 42\,{}^{6}/_{7}\ \text{Answer.}}$$

Work out:

Table 1, Table 2 on page 175, MK 6.

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 o o o o o o o o o o o
Hala	o o o o o o o
Pearl	o o o o o o o o o o o o o o o o o o o

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

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

DRAWING SOME OF THE 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 grap

DRAWING A COORDINATE GRAPH.

a). Plot the following points A (+3, +1) B(-3, +1)

b). Join the points.

c). What figure is formed?

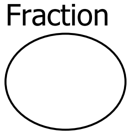
Activity: Chn will draw graphs with guidance of the teacher. They will follow the order (x, y).

Join the points.

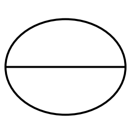
Name the figure formed – Ref.: MK 7 Pg)

PIE CHARTS

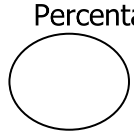
Fraction



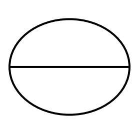
1 whole



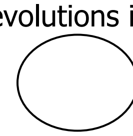
Percentage



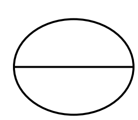
100%



Revolutions in degrees



1 complete run 360^{o}

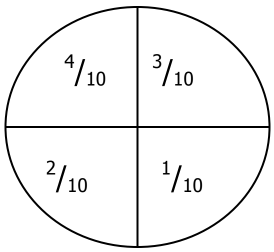


½ whole	½ of 100% 50%	½ pf run ½ of 360 = 180^o
¼ whole	¼ of 100% 25%	¼ of run ¼ of 360 = 90^o

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	$^4/_{10}$	$(^4/_{10} \times 360)^o$	
Food	$^3/_{10}$	$(^3/_{10} \times 360)^o$	
Others	$^1/_{10}$	$(^1/_{10} \times 360)^o$	
Saving	$^2/_{10}$	$(^2/_{10} \times 360)^o$	

b). (4/10 x 30,000) = 4 x 3000 = 12,000

(3/10 x 30,000) = 3 x 3000 = 9,000

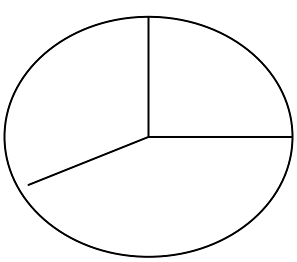
(1/10 x 30,000) = 1 x 3000 = 3,000

(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?)**

$x + 210^o = 360^o – 210^o$

$x + 210^o – 210^o = 360^o – 210^o$

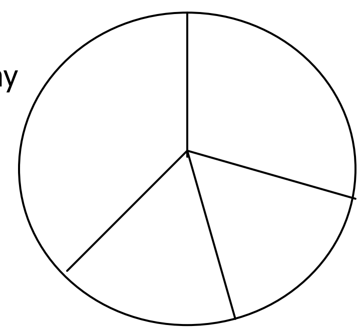
x = **<u>150^o Answer</u>**

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

<u>A PIE GIVEN IN PERCENTAGES.</u>



The pie chart shows 240 pupils who passed 4 papers. How many pupils passed in each subject?

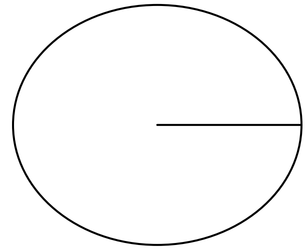
Subject	Percentage	Number
Maths.	$^{40}/_{100}$	$^{40}/_{100}$ x 240 =
English	$^{25}/_{100}$	$^{25}/_{100}$ x 240 =
SST	$^{15}/_{100}$	$^{15}/_{100}$ x 240 =
Science	$^{20}/_{100}$	$^{20}/_{100}$ x 240 =

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	$\frac{1}{4} \times 360^o$	90^o
Rent	$^1/_3 \times 360^o$	120^o
Others	$^5/_{12} \times 360^o$	150^o



Then use your protractor.

Work to do: MK 6 Pg 186

PROBABILITY (Chances)

1. What's probability?
2. Obvious chances:

Examples:
a). That chance that mama who is pregnant will give birth to a human being.
b). If today is Monday, the chance that tomorrow will be Tuesday.

3. Impossible chances.

Examples:
a). That the class prefect feeds on stones.
b). That Mama will deliver a cat.

TOSSING A COIN

Example: If a coin is tossed, what's the chance that a head will show up?

H	T

$\text{Prob.} = \frac{n(CA)}{n(TC)}$

$\frac{1}{2}$

TC = H , T
n(TC) = 2
CA = H
n(CA) = 1

Work out: Find the chance that;

a). a tail will show up when a coin is tossed once.

TOSSING A DICE

Example 1: If a dice is tossed once, what's the chance that a factor of 6 will show up?

$\text{Probability} = \frac{n(\text{chances asked})}{n(\text{total chances})}$

P = $\underline{n(CA)}$

n(TC) TC = {1,2,3,4,5,6}

n(TC) = 6

= $^4/_6$ Reduce F6 = {1,2,3,6}

CA = {1,2,3,6}

= **$^2/_3$ Answer** n(CA) = 4

Example 2: If a dice is tossed once, what is the probability than an even number will show up?

P = n(CA) / n(TC)	TC = {1,2,3,4,5,6}
	n(TC) = 6
= $^3/_6$	CA = {2,4,6}
= **½ Answer**	n(CA) = 3

Work on probability: (MK 6 Pg 191).

FRACTIONS(REVIEW)

1. A fraction is part of a whole.
2. A fraction is written with two main parts.
   a) The numerator
   b) The denominator.
3. 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.

a) Proper fractions

These are fractions whose numerator is smaller than the denominator.

e.g ½ , ¾ , $^5/_6$

b) Improper fractions

These are fractions whose numerator is bigger than the denominator.

e.g. $^5/_{4,}$ $^3/_{2,}$ $^{19}/_5$

c) 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 **Example II**

Express $^{9}/_{5}$ as a mixed fraction.

$9 \div 5 = 1$ remainder 4

$= \underline{\mathbf{1^{4}/_{5}}}$

Express $^{30}/_{7}$ as a mixed fraction.

$30 \div 7 = 4$ remainder 2

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

EXERCISE C 1

Express the following as mixed fractions.

1. $^{3}/_{2}$
2. $^{11}/_{3}$
3. $^{17}/_{4}$
4. $^{15}/_{7}$
5. $^{50}/_{8}$
6. $^{2}/_{7}$

EXPRESSING MIXED FRACTIONS IMPROPER FRACTIONS.

Example I

Express $4^{2}/_{3}$ as an improper fraction

$$4^{2}/_{3} = \frac{W \times D + N}{D}$$

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

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

$$= \mathbf{^{14}/_{3}}$$

Example II

Express $5^{1}/_{4}$ as an improper fraction.

$$5^{1}/_{4} = \frac{W \times D + N}{D}$$

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

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

$$= \mathbf{^{21}/_{4}}$$

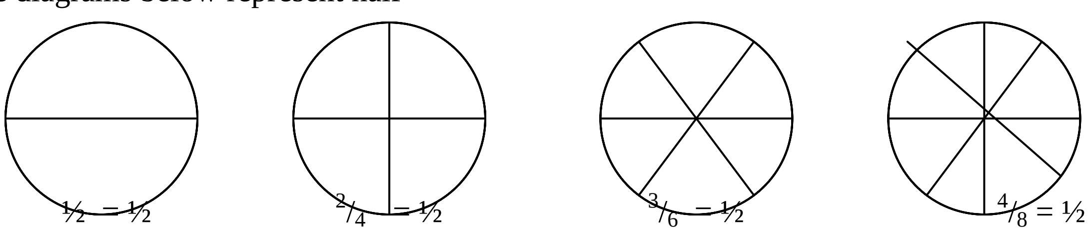
EXERCISEC 2

***Express each of these fractions as improper fractions*.**

1. 1 ½
2. $3\ ^{1}/_{10}$
3. $10^{3}/_{5}$
4. $2^{7}/_{8}$
5. $5^{1}/_{6}$
6. $4^{3}/_{7}$

EQUIVALENT FRACTIONS

The diagrams below represent half



Example I **Example II**

Write four fractions equivalent to ½. Write four fractions equivalent to $^2/_7$.

Example I

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

$\frac{1}{2} = {}^2/_4, {}^3/_6, {}^4/_8, {}^5/_{10}$

Example II

$^2/_7 = \frac{2 \times 2}{7 \times 2}, \frac{2 \times 3}{7 \times 3}, \frac{2 \times 4}{7 \times 4}, \frac{2 \times 5}{7 \times 5}$

$^2/_7 = {}^4/_{14}, {}^6/_{21}, {}^8/_{28}, {}^{10}/_{35}$

EXERCISE C 3

A. Write five equivalent fractions to each of these.

1. $^2/_3$
2. $^9/_{10}$
3. $^4/_5$
4. $^4/_9$
5. $^8/_{10}$

B. 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. $^2/_{11} = {}^a/_{16}, {}^9/_d, {}^b/_{32}, {}^{15}/_e, {}^c/_{48}$

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

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

= ½

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

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

= $^9/_{10}$

EXERCISE C 4

1. $^{2}/_{4}$
2. $^{9}/_{10}$
3. $^{20}/_{30}$
4. $^{30}/_{90}$
5. $^{8}/_{12}$
6. $^{5}/_{10}$
7. $^{12}/_{18}$

ORDERING FRACTIONS

1. To order fractions is to arrange fractions in ascending or descending order.
2. Ascending order means from smallest to highest.
3. Descending means from biggest to smallest.
4. 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)**

$^{1}/_{\cancel{3}} \times \cancel{12}^{\,2}$ $\quad$ $^{1}/_{\cancel{2}}, \times \cancel{12}^{\,6}$ $\quad$ $^{1}/_{\cancel{4}} \times \cancel{12}^{\,3}$

1 x 2 = 2 $\quad$ 1 x 6 = 6 $\quad$ 1 x 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 x 2 = 14 $\quad$ 3 x 3 = 9 $\quad$ 5 x 3 = 15

Descending order = $^{5}/_{8},\ ^{7}/_{12},\ ^{3}/_{8}$

EXERCISE C 5

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 $^{2}/_{12}$?

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)**

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

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

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

Example II

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

$\frac{20 + 9}{24} = \frac{29}{24}$ ***(Change to a mixed fraction)***

$= \mathbf{1^5/_{24}}$

Example III

EXERCISE C 6

Add the following:

1. $^1/_3 + {}^1/_2$
2. $^4/_3 + {}^1/_2$
3. $^7/_{10} + {}^1/_{20}$
4. $^1/_5 + {}^1/_2$
5. $^2/_7 + {}^3/_4$
6. $^2/_9 + {}^1/_6$

ADDITION OF WHOLES TO FRACTIONS

Example I

Add: ¾ + 5

= 5 + ¾

= **5 ¾**

Example II

Add: $3\ ^2/_5 + 7$

$= 3 + 7 + {}^2/_5$ **(First add the wholes alone)**

$= 10 + {}^2/_5$

$= \mathbf{10\ ^2/_5}$

Example III

Add: $5\,^3/_7 + 12$

$= 5 + 12 + ^3/_7$ **(First add the wholes alone)**

$= 17 + ^3/_7$

$= \underline{\mathbf{17^3/_7}}$

EXERCISE C 7

Add the following

1. $^1/_5 + 3$
2. $10 + 1^5/_7$
3. $4\,^1/_5 + 6$
4. $22\,^1/_5 + 13$
5. $2\,^3/_7 + 8$
6. $1\,^1/_4 + 9$

MORE ON ADDITION

Example I

Add: $6^2/_3 + ^5/_6$

$= \frac{6 \times 3 + 2}{3}$ **(mixed to improper)**

$= ^{20}/_3 + ^5/_6$ **LCM of 3 and 6 = 6**

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

$= ^{45}/_6$ **Change to mixed fraction**

$\underline{\mathbf{= 7^3/_6}}$

Example II

$^1/_{15} + 1^1/_3 + ^3/_5$ **(mixed to fractions)**

$= ^1/_{15} + ^4/_3 + ^3/_5$ **(LCM of 15, 3 and 5 = 15)**

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

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

$\underline{\mathbf{= \ 2}}$

EXERCISE C 8

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. $^1/_6 + ^5/_9 + 1^1/_3$

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

$\frac{1}{2} + {}^{2}/_{5}$ **LCM of 2 and 5 = 10**

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

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

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

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)**

$= \frac{6 + 3 + 11}{4}$

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

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

EXERCISE C 9

1. $^{2}/_{3}$ of the seats in a bus is filled by adults and ¼ by children. What fraction of the seats in the bus is occupied?
2. A worker painted $3\ ^{1}/_{9}$ wall on Monday and $^{4}/_{9}$ on Tuesday. What fraction of the house was painted on Monday?
3. 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?
4. 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?
5. 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.

SUBTRACTION OF FRACTIONS

Example I

$\frac{1}{2} - \frac{1}{3}$. LCM of 2 and 3 = 6

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

$= \frac{1}{6}$

Example II

$5 - 2\frac{5}{12}$. **Change mixed to improper fraction.**

$= \frac{5}{1} - \frac{29}{12}$ **LCM of 1 and 12 = 12**

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

$= \frac{31}{12}$

Change to mixed fraction.

$= \mathbf{2\frac{7}{12}}$

Example III

$2\frac{2}{5} - 1\frac{1}{4}$ **Change mixed to improper fraction**

$= \frac{14}{5} - \frac{5}{4}$ **LCM of 5 and 4 = 20**

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

$= \frac{31}{20}$ **Change to mixed fraction.**

$= \mathbf{1\frac{11}{20}}$

EXERCISE C 10

1. $\frac{4}{5} - \frac{1}{5}$
2. $1\frac{1}{10} - \frac{1}{2}$
3. $3 - \frac{1}{2}$
4. $3\frac{1}{5} - 1\frac{1}{10}$
5. $3\frac{3}{4} - 1\frac{1}{4}$
6. $2\frac{3}{8} - 1\frac{1}{8}$

WORD PROBLEMS INVOLVING SUBTRACTION OF FRACTIONS

Example I

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

Given – drunk

$= \frac{5}{6} - \frac{7}{12}$ **LCM of 6 and 12 = 12**

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

$= \frac{3}{12}$. **Reduce to simplest term**.

$=$ **¼ litres**

Example II

2 ½ litres of water were removed from a container of 5 ¼ litres. How much water remained?

Water remaining $= 5\tfrac{1}{4} - 2\tfrac{1}{2}$

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

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

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

= **<u>2 ¾ litres of water remained</u>**.

ADDITION AND SUBTRACTION OF FRACTIONS

<u>Example I</u>

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

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

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

$= \underline{{}^{7}/_{12}}$.

<u>Example II</u>

Work out:

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

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

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

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

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

$= \dfrac{12 \div 6 = 2}{18 \div 6 = 3}$

$= \underline{{}^{2}/_{3}}$

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**

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

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

$= \dfrac{66 \div 6 = 11}{12 \div 6 = 2}$

$= {}^{11}/_{2}$

Change to mixed fraction.

=**$5\frac{1}{2}$**

EXERCISE C 11

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. $^2/_3 + {}^3/_5 - {}^7/_{15}$

MULTIPLICATION OF FRACTIONS

Example I

$\frac{1}{4} \times 3$ **Make 3 a fraction.**

$= \frac{1}{4} \times {}^3/_1$

$= \dfrac{1 \times 3}{4 \times 1}$

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

Example II

$^2/_3 \times 21$ **Make 21 a fraction**

$= {}^2/_3 \times {}^{21}/_1$

$= \dfrac{2 \times \cancel{21}^{7}}{{}_{1}\cancel{3} \times 1}$

$= \dfrac{2 \times 7}{1 \times 1}$

$= \underline{\mathbf{14}}$

Example III

$\frac{1}{2}$ of 16 **'of' means multiplication**

$= \frac{1}{2} \times 16$ **make 16 a fraction**

$= \frac{1}{2} \times {}^{16}/_1$

$= \dfrac{1 \times \cancel{16}^{8}}{{}_{1}\cancel{2} \times 1}$

$= \dfrac{1 \times 8}{1 \times 1}$

$= \underline{\mathbf{8}}$

Example IV

$2^1/_3$ of 27 **of means multiplication.**

$= 2^1/_3 \times 27$ **make 27 a fraction**

$= 2^1/_3 \times {}^{27}/_1$ **mixed to improper fraction**

$= {}^7/_3 \times {}^{27}/_1$

$= \dfrac{7 \times \cancel{27}^{9}}{{}_{1}\cancel{3} \times 1}$

$= \dfrac{7 \times 9}{1 \times 1}$

$= \underline{\mathbf{63}}$

EXERCISE C 12

Multiply:

1. $^1/_3 \times 3$
2. $^2/_3$ of 15
3. $2^2/_5$ of 20
4. $^1/_{10} \times {}^2/_9$
5. $^2/_5 \times 10$
6. $1^5/_7$ of 21
7. $^1/_2 \times \frac{1}{4}$
8. $^1/_8 \times {}^1/$

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

$= \frac{1}{4} \times {}^{60}/_{1}.$

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

= 1 x 15

= **<u>15 minutes.</u>**

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

= $^{3}/_{5} \times {}^{200}/_{1}$

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

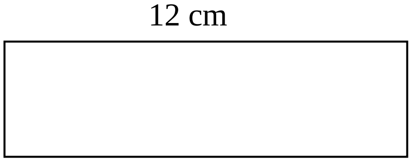
$= \frac{3 \times 40}{1 \times 1}$ pages

= **<u>120 pages</u>**.

EXERCISE C 13

1. What is $^{1}/_{6}$ of 24 kilograms?
2. What is $^{1}/_{5}$ of 30 litres?
3. A man received of his salary. If his salary was sh. 20,000, how much money did he receive?
4. 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?
5. 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?
6. Find the area of the rectangle below.

12 cm



$6^1/_2$ cm

RECIPROCALS OF FRACTIONS

1. Reciprocal of a fraction is the opposite of a given fraction.
2. 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.

3. 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 = $^{10}/_1$ = $^1/_{10}$.
4. 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 = $^5/_3$.

∴ The reciprocal of $^3/_5$ is $^5/_3$.

EXERCISE C 14

A. ***Calculate the reciprocal of each of the following***.

1. ½
2. $^5/_3$.
3. $^5/_3$.

4. 7
6. 14
8. $4\frac{7}{12}$.
5. 23
7. $3\frac{1}{8}$.
9.

B. ***Find the product of the given number and its reciprocal***.

1. 5
4. 10
2. $\frac{3}{8}$.
5. $\frac{4}{9}$.
3. 3 ½

DIVISION OF FRACTIONS

Example I

Divide $\frac{1}{5} \div 4$ **Make 4 a fraction**

$= \frac{1}{5} \div \frac{4}{1}$. **Change (÷) to (x) then reciprocal of $\frac{4}{1} = \frac{1}{4}$.**

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

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

$= \underline{\mathbf{\frac{1}{20}}}$.

Example II

$\frac{1}{2} \div \frac{1}{4}$ **Change (÷) to (x) then reciprocal of $\frac{1}{4} = \frac{4}{1}$.**

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

$= \frac{1 \times \cancel{4}^{2}}{{}_{1}\cancel{2} \times 1}$

$= 1 \times 2$

$= \underline{\mathbf{2}}$

EXERCISE C 15

1. $\frac{1}{6} \div 4$
4. $\frac{3}{7} \div 3$
2. $\frac{1}{3} \div 2$
5. $\frac{4}{20} \div \frac{1}{4}$
3. $\frac{2}{3} \div 4$
6. $\frac{5}{8}$ of the bread was shared among 16 children. How much bread was given out?

<u>EXPRESSING FRACTIONS AS FRACTIONS DECIMAL.</u>

<u>NOTE</u>:

a) $\frac{1}{1}$. = 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.

= $^{25}/_{1}$. = **<u>25.</u>** (***No zero, no decimal place***)

b) Write $^{25}/_{10}$.as a decimal fraction.

= $^{25}/_{10}$. = **<u>2.5</u>** (***1 zero, 1 decimal place***)

c) Write $^{25}/_{100}$. as a decimal fraction.

= $^{25}/_{100}$. = **<u>0.25</u>** (***2 zeros, 2 decimal places***)

<u>NB:</u> The zero before the decimal point is used to keep the place of whole numbers.

<u>Example II</u>

Express $3^{1}/_{10}$. as a decimal number.

First change to improper fraction.

$3^{1}/_{10}$. $= \frac{(10 \times 3) + 1}{10}$

$= ^{31}/_{10}$.

= **<u>3.1</u>** (***1 zero, 1 decimal place***)

<u>Example III</u>

Express $7^{5}/_{100}$. as a decimal fraction

First change to improper fraction.

$7^{5}/_{100}$. $= \frac{100 \times 7 + 5}{100}$

$= ^{705}/_{100}$.

= **<u>7.05</u>** (**2 zeros,2 de. places**.)

EXERCISE C 16

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. $2^{3}/_{10}$.

CONVERTING DECIMALS TO FRACTIONS

<u>NOTE.:</u>

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**.

= $\underline{\mathbf{6^{9}/_{10}}}$.

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 $^{1}/_{20}$**.)

= $\underline{\mathbf{3^{1}/_{20}}}$.

EXERCISE C 17

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

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 $= \frac{1}{1\cancel{0}} \times 10\cancel{0} = \mathbf{10}$ (1^{st})

$= \frac{11}{1\cancel{0}} \times 10\cancel{0} = \mathbf{110}$ (2^{nd})

$= \frac{11}{1\cancel{00}} \times 1\cancel{00} = \mathbf{11}$ (3^{rd})

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

$$\underline{\text{Multiply each fraction by the LCM} = \frac{22 \times 1\cancel{00}}{1\cancel{00}} = \mathbf{22}\ (2^{nd})}$$

$$= \frac{2 \times 10\cancel{0}}{1\cancel{0}} = \mathbf{20} \quad (3^{rd})$$

$$= \frac{12 \times 10\cancel{0}}{1\cancel{0}} = \mathbf{120} \quad (^{1st})$$

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

$$\underline{\text{Multiply each fraction by the LCM} = \frac{2 \times 1\cancel{0}}{1\cancel{0}} = 2}$$

$$= \frac{1 \times 1\cancel{0}}{1\cancel{0}} = 1$$

$\therefore \mathbf{0.2 > 0.1}$

EXERCISE C 18

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

ADDITION OF DECIMAL FRACTIONS

Example I

Add: 14.9 + 8.02 + 36.48

Arrange vertically and put the decimal point in line

14 . 90

Example II

Add: 0 . 45 + 13 . 2 + 52 . 00

Arrange vertically and put the decimal point in line

0 . 45

$$\begin{array}{r} 8.02 \\ +\ \underline{36.48} \\ \underline{\mathbf{59.40}} \end{array} \qquad \begin{array}{r} 13.2 \\ +\ \underline{52.00} \\ \underline{\mathbf{65.65}} \end{array}$$

EXERCISE C 19

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

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 C 20

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

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**)

$$\begin{array}{r} = 13.75 \\ +\ \underline{91.25} \\ \mathbf{105.00} \end{array}$$

(**Then subtract)**

$$\begin{array}{r} \mathbf{105.00} \\ -\ \underline{27.00} \\ \underline{\mathbf{78.00}} \end{array}$$

EXERCISE C 21

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

MULTIPLICATION AND DIVISION OF DECIMALS

Reference:

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.

SOLVING EQUATIONS INVOLVING PERENTAGES

Example 1: If 10% of a number is 40, what is the number?

Number be x.

10% of $x = 40$

$\frac{10x}{10} = 40$

$\frac{X}{10} \times 10 = 40 \times 10$

$\mathbf{X = \underline{400}}$

If 10% of the number = 40.

1% of the number $= \frac{40}{10}$

$100\% = \frac{40}{10} \times 100$

$= 40 \times 10$

$= \mathbf{\underline{400}}$

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?

$\frac{20}{100} \times X = 35$

$\frac{2}{10}$ of $x = 35$

$\frac{10}{2} \times \frac{2}{10} = 35 \times \frac{10}{2}$

$x = 35 \times 5$

x = <u>175 Answer</u>

If 20% of the number = 35.

1% of the number $= \underline{35}$

100% of the number $= \frac{35}{20} \times 100$

$= 35 \times 5$

$= \mathbf{\underline{175}}.$

Work to do: More work on Pg 152.

INCREASING QUANTITIES BY PERCENTAGES

Example 1: Increase Sh. 200 by 20%.

(100% + given%) of old number.

(100% + 20%) of 200.

$= 120\% \text{ of } 200 = \frac{120}{100} \times 200$

$= 12 \times 20$

= Sh. 240

First find the increment.

$= \frac{20}{100} \times 200 = 2 \times 20$

$= 40/-$

Then add the increment to the old number.

New amount = (200 + 40)

= 240.

Work to do: More work on Pg 153.

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.

$= \frac{115}{100} \times 400$

= 115 x 4 = **460 pupils number of new pupils.**

Exercise on Pg. 154.

DECREASING QUANTITIES BY PERCENTAGES

Example 7: Decrease 300 by 10%.

$(100\% - 10\%) \text{ of } 300 = \frac{90}{100} \times 300$

$= 90 \times 3$

= **270 Answer.**

$(\frac{10}{100} \times 300) = 10 \times 3$

The decrease = 30

=(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 $= (\frac{25}{200} \times \frac{1}{100})$

$= \frac{25}{200} = \frac{1}{8}$

$= (\frac{8}{8} - \frac{1}{8}) \text{ of } 800$

12 ½ % as a fraction.

$= \frac{25}{100} \times \frac{1}{100}$

The decrease $= (\frac{1}{8} \times 800$

$= 100$

$= \frac{7}{8} \times 800$

$= 7 \times 100$

$=$ **700 Answer**

The new number $= (800-100)$

$=$ **700**

Exercise on Pg 155.

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?

$$\textbf{Percentage loss} = \frac{\textbf{Loss}}{\textbf{Cost price}} \times \textbf{100}$$

$$= \frac{3000}{35,000} \times 100 = \frac{3 \times 100}{35} = \frac{60}{7} \;\; \mathbf{8\,{}^{4}/_{7}\,\%}$$

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

MORE WORK ON SIMPLE INTEREST

E.G.

a. Calculating the rate (R) when interest , time and principal are given.
b. Calculating the time (T) when interest, principal and rate are given.
c. Calculating Principal (P) when interest rate and time are given.

Reference: MK Pupils book7, page

CO-ORDINATES

Co-ordinates are also referred to as ordered pairs of numbers. The order is (x, y). They are used to find points on a graph of co-ordinates.

Note: The x and y co-ordinates are separated using a comma as shown below:
K(-3,1) M(6,7) N(0,4)

MARKING CO-ORDINATES ON A GRAPH

1. Name the coordinates for the points given:

a) Point A(0,0)	b) Point B(2,0)	c) Point G(0,2)	d) Point H(0,-3)
c) Point C	d) Point D	e) Point E	f) Point F
g) Point I	h) Point J	i) Point K	l) Point L
m) Point M	n) Point N	o) Point P	p) Point Q

NAMING GIVEN COORDINATES (POINTS)

2.Plot the following points on a graph:
Points:

a) A(0,4)	b) B(4,0)	c) C(6,4)	d) D(4,6)	e) E(-5,1)
f) F(1,-5)	g) G(-4,-1)	h) (-1,-4)	i) I(+3,-3)	j) (-3,+3)
k) K(0,-6)	l) L(-6,0)	m) M(0,0)	n) N(0,-2)	o) P(-2,0)

Diagram of a coordinate graph

PLOTTING GIVEN POINTS

3.Draw a coordinate graph and plot the following points:
Points:

a) P(0,3)	b) Q(3,0)	c) R(4,4)	d) S(2,-4)	e) T(-5,2)	f) U(4,-6)
g) V (4-5)	h) W(-3,-3)	i) B(-4,-1)	j) N(5,-1)	k) Y(0,-3)	l) L(-4,0)

4.Draw a coordinate graph and plot the following points. Study them and give your observation. Join the points together. They form a straight line.

NAMING LINES ON A COORDINATE GRAPH
Diagram:

1. Name any four coordinates on the line x=3 (*identify the line first, then select the points*)
(3,0) (3,1) (3,2), (3,-1) , (3,-2) , -------,---------,----------,--------,---------,Why?
2. Name any four coordinates on the line x= 5
------,--------,---------,----------,-----------,------------,--------------,Why?
3. Name any four coordinates on the line y=1
------, -------,----------,---------,----------,-----------,------------,Why?

Work to do:

4. Name any four coordinates on the line x= 4
5. Name any four points on the line y= 0
6. Give another name for the line x=0
7. What is another name for the line y= 0?
8. In coordinates (2, 4), ----- is the x coordinate while ------ is the y coordinate.
9. Draw a coordinate graph and plot the following points:
A(-2,4) B(-3,4) C(0,4) D(2,4) Join the points together. Name this line.
10. What is the coordinate of intersection of the lines x=2 and y=4?

PLOTTING FIGURES AND FINDING THEIR AREA

Diagram:

1.a)Name the following points: A(,) B(,) C(,) Join the together. Name the figure formed.

Find the area of the figure

A class discussion:

Method I: **counting squares**

Method II: **Enclosing the figure** in a large rectangle

Method III: **Using the formula**

Children should be able to explain when the above methods should be easily applied.

7. a) Name the coordinates for the following points:
P(,) Q(,) R(,) S(,) Join the points P to S, S to R, R to Q and Q to P.
b)Find the area of the figure formed

Diagram:

8. a)Name the points (coordinates) for:
P(,) Q(,) R(,) S(,).
Join the points together to form a quadrilateral.
What is the name of this quadrilateral?
b) Find the area of this figure.

SOME POLYGONS DO NOT HAVE CLEAR DIMENSIONS

9. a)For example figure XYZ whose points are X(-6,-4) Y(-3,-1) Z(+2,-6).Join these points together to form a triangle. Study this triangle carefully. Can you find its height and base?
b)Discuss it with your friends and choose the method to use to find its area.

FINDING THE EQUATION OF THE LINE

Diagram:

1.a) Line A in the graph above passes through the following points: (-3,-3) (-2,-2) (-1,-1) (0,0) (1,1) (2,2) (3,3) etc
Use the table to study the above points:

x	-3	-2	-1	0	1	2	3
y	-3	-2	-1	0	1	2	3

You will find that y=x. So the name or the equation of the line is y=x.

2.a) Line B on the graph above passes through the following points: (-3,-2) (-2,-1) (-1,0) (0,1) (1,2) (2,3)
Use the table to study the points above

x	-3	-2	-1	0	1	2
y	-2	-1	0	1	2	3

y = x

i) -2 = (-3) +**1**
ii) -1 = (-2) +**1**
iii) 0 = (-1) +**1**
iv) 1 = (0) +**1**

So for all values of x, you add one to get y. Hence the name or equation of the line B is **y= x+1**.

3.a) Line C on the graph above passes through the following points: (-2,-4) (,) (,) (,) (,) (,) (,)

c) Tabulate the coordinates. Study them with a friend and find the equation of line C

Use the lines on the graph to answer questions 4, 5, 6, 7 and 8

4. a) Find the coordinates through which line A passes.
b) Put them in a table.
c) Study them and give the equation (name) of the line.

5. a) Find the coordinates through which line B passes.
b) Put them in a table.
c) Study them and give the equation (name) of the line

6. a) Find the coordinates through which line C passes.
   b) Put them in a table.
   c) Study them and give the equation (name) of the line

7. a) Find the coordinates through which line D passes.
   b) Put them in a table.
   c) Study them and give the equation (name) of the line

8. a) Find the coordinates through which line E passes.
   b) Put them in a table.
   c) Study them and give the equation (name) of the line

USING THE EQUATION TO DRAW A LINE (GRAPH)

1. a) Draw a line for the equation y = x + 1.
   Use a table to find the coordinates of this line.

Working:
Y = x + 1.

y	**1**	**2**	**3**	**0**	**-1**	**-2**	**-3**
x	0	1	2	-1	-2	-3	- 4
y or(x+1)	1	2	3	0	-1	-2	-3

<u>side work</u>
X=0
y=x+1
y=0+1
y=1

b) Obtain the points ie (0,1) (1,2) (2,3) (-1,0) (,) (,) (,) Join the points and draw the line.

2. a) Draw a line for the equation y = x - 2.
   Use a table to find the coordinates of this line.
   b) List down these points .Join the points together and draw this line.

3. a) Draw a line for the equation y = x + 2.
   Use a table to find the coordinates of this line.
   b) List down these points .Join the points together and draw this line

4. a) Draw a line for the equation y = x -3.
   Use a table to find the coordinates of this line.
   b) List down these points .Join the points together and draw this line

5. a) Draw a line for the equation y = 2x .
   Use a table to find the coordinates of this line.
   b) List down these points .Join the points together and draw this line

6. a) Draw a line for the equation y = 2x-1.

Use a table to find the coordinates of this line.
b) List down these points .Join the points together and draw this line

7. a) Draw a line for the equation y = 3x-2.
Use a table to find the coordinates of this line.
b)List down these points .Join the points together and draw this line.

BEARING

1. Bearing deals with relationship of two places in terms of location.
2. We read bearing in degrees. We turn **clockwise** from the **North** line.
3. A review of major compass directions.

5. In which quarter do we find the following bearings/ angles?

a) 30^0 b) 60^0 c) 100^0 d) 170^0 e) 190^0

f) 250^0 g) 280^0 h) 300^0 i) 350^0 j) 355^0

TURNING FROM A POINT AT A GIVEN BEARING

Example: Move from town A at a bearing of 060^0
Use a sketch figure: Stand at A, face North turn clockwise through 060^0
Note: angle 060^0 is in the first quarter.

FINDING THE BEARING OF ONE PLACE FROM ANOTHER

6. From the diagrams shown find the bearing of K from M.

FINDING THE OPPOSITE BEARING

7. a) The bearing of town K from M is 060^0. Find the bearing of M from K?
Working:
Sketch the bearing of 060^0
Stand at M and show North direction
Turn clockwise through 060^0
Sketch:

The bearing/angle asked is: while standing at K and facing North, the clockwise angle through which you turn to see to see town M.

$180^0 + 060^0 = \mathbf{240^0}$ **or** $090^0 + 090^0 + 060^0 = \mathbf{240^0}$

b) Find the bearing of Y from X if the bearing of X from Y is 150^0
(use a sketch figure)

Work out the opposite bearing:

c) The bearing of A from B is 040^0. Find the bearing of B from A.
d) The bearing of Tom from Sara is 090^0. Find the bearing of Sara from Tom.
e) The bearing of D from E is130^0. Find the bearing of E from D.

f) The bearing of Fort from Gulu is160^0. Find the bearing of Gulu from Fort.
g) The bearing of Lala from Hala is 200^0. Find the bearing of Hala from Lala.
h) The bearing of Kaka from Baba is 260^0. Find the bearing of Baba from Kaka.
i) The bearing of Sen from Martha is 285^0. Find the bearing of Martha from Sen.
j) The bearing of Kato from Babirye is 275^0. Find the bearing of Babirye from Kato.
k) The bearing of Q from R is 145^0. Find the bearing of R from Q.
l) The bearing of P from L is 215^0. Find the bearing of L from P.
m) The bearing of A from B is020^0. Find the bearing of B from A.

Carefully fill in the missing information in the table below:

Towns	Bearing	Opposite bearing
a) K from M	020^0	------
b) Q from P	070^0	---------
c) A from B	138^0	---------
d) C from D	------	321^0
e) E from F	------	010^0
f) G from H	------	020^0
g) I from J	285^0	------
h) L from N	300^0	------

SCALE DRAWING

1. This is the construction of large figures on a piece of paper.
2. The large units are scaled down to fit on a piece of paper.
3. Example: If 1cm represents 10km, how many cm will represent 75km?
   1cm repr. 10km
   10km repr. 1cm
   1km repr. 1/10km.
   75km repr 1/10 x 75 cm
   7.5 cm

4. If 1cm represents 8km, how many cm will you need to represent:
   a) 24km b) 40km c) 48km d) 56km e) 64km
   f) 36km

5. If 1cm represents10km, what distance will be represented by 8cm?
   1cm repr. 10km
   8cm repr. (8x 10) km
   80km.

6. If 1cm represents 12km, what distance will be represented by :

a) 7cm b) 5.2cm c) 11 cm d) 12cm e) 4.5cm
f) 4.1cm?

INVOLVING SCALE DRAWING IN BEARINGS

A class discussion:

1. Example: Baba left town M and moved at a bearing of 090^{0} to town N which is which is 40km away. From town N Baba moved Southwards to town R which is 30km from N.
a) Draw a sketch figure showing Baba's journey
b)Using a scale of 1cm to represent 10km, draw an accurate figure representing Baba's journey.
c) Find the shortest distance between town M and R
d) Measure angle NRM using your protractor.
e) What is the bearing of M from R?
Sketch figure:

7. Lala left Kira traveling at a bearing of 060^{0} to town M which is 20km away. From M she moved Southwords for 28km to town R.
   a) Draw a sketch figure representing Lala's journey.
   b) Using 1cm to represent 4km, draw an accurate diagram of Lala's journey.
   c) Find the shortest distance between Kira and town R
   d) Find the bearing of Kira from R.

8. From KK beach Musa traveled at a bearing of 150^{0} for 50km to reach Lina town. From Lina town he moved 40km to the North to a town called Sese.
   a) Draw a sketch figure to represent this movement.
   b) Using 1cm to represent 5km draw an accurate diagram of this movement.
   c) Find the shortest distance between KK beach and Sese town.

9. The bearing Susi from Kaka is 200^{0} and the distance between them is 40km. On the other hand, the bearing of Rhona from Susi is 340^{0} and the distance between Rhona and Susi is also 40km.
   a) Draw a sketch figure showing the three positions.
   b) Using a scale of 1cm to represent 10km, draw an accurate diagram to represent the three towns.
   c) Find the shortest distance between Rhona and Kaka.
   d) Find the bearing of Kaka from Rhona.

10. The bearing of town A from town R is 225^{0} and the distance from town R to town A is 60km. On the other hand town Z is at a bearing of 195^{0} from town A. Town Z is 100km from A.
    a) Draw a sketch figure representing the three towns above.
    b) Using a scale of 1cm to represent 10km, draw an accurate diagram to represent the two towns.
    c) Calculate the shortest distance between town A and Z.
    d) Find the bearing of R from Z.

TOPIC : SETS II

REFERENCE: MK Standard Maths bk 6
: MK Standard Maths bk 7
: Understanding Maths bk 6
: Understanding Maths bk 7

ACTIVITIES: Grouping, Shading, Matching, etc….

1. What is a set?
   A set is a collection of well-defined objects.

Examples of sets

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

2. Types of sets

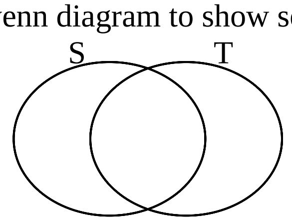
a) An empty set
b) Subset
c) Equivalent sets
d) Equal sets
e) Union sets
f) Intersection sets
g) Disjoint sets
h) Universal sets
i) Complement of sets
j) Non equivalent sets
k) Solution sets
l) None equivalent sets

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,b,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 that 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

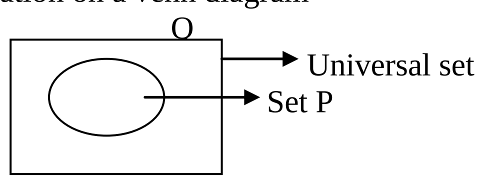
SUBTOPIC : UNIVERSAL SETS

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

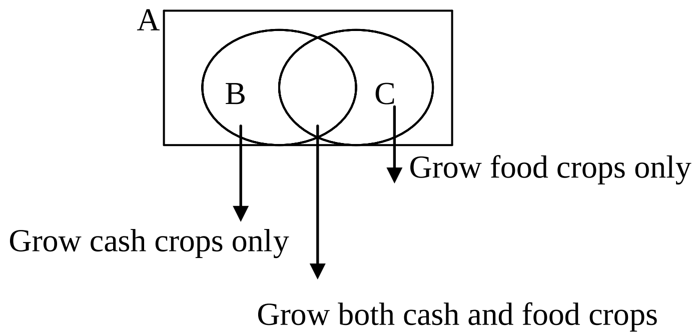
3. EXAMPLES OF UNIVERSAL SETS

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



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

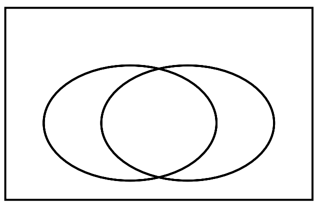
1. K = [all books in the library]
   L = [all mathematics books]

2. M = [all pupils in the class]
   P = [pupils who like maths]
   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

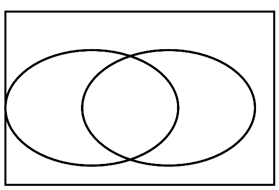
1. List all the elements of the sets shown on the venn diagram



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

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

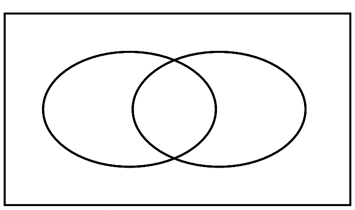
2.



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

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

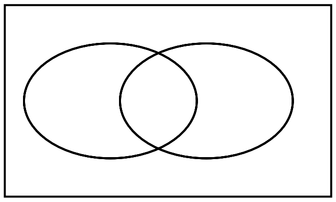
3.



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

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

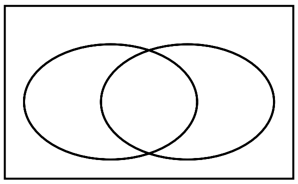
4.



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

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

5.



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

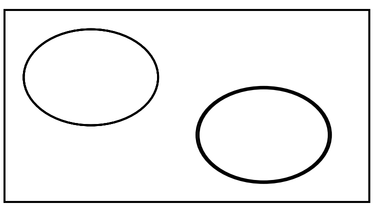
N= { 0,4,2,5,7} Q = { 3,6,2,5,7}

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]

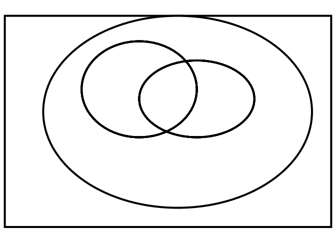
c) What is the complement of set M?
M = { 3,8,9,5,6,7}

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}

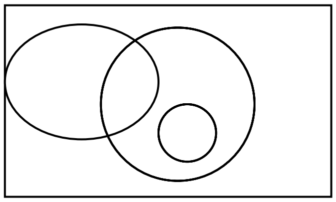
Trial



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

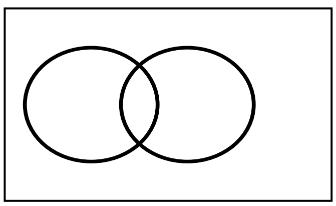
g) What is set (Q n R) complement

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.

SUBTOPIC : DIFFERENCES IN SETS

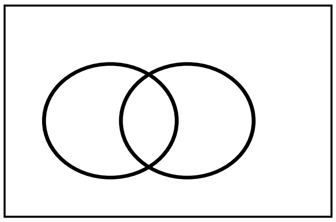
SUBTOPIC: SUBSETS

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

SUBTOPIC: SHOWING NUMBER OF MEMBERS

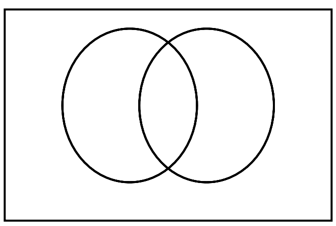
Example 1

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]

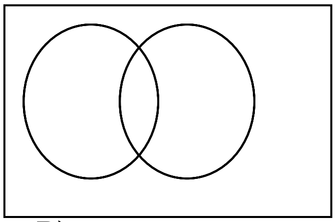
5. Set V = [jane,sarah,andrew,henry,marvin]
   Set D = [amos,josehp,deo,henry,andrew]

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)

TRAIL

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)

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 pupls passed Maths only?
   - iii. How many pupils passe 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 bot foods.

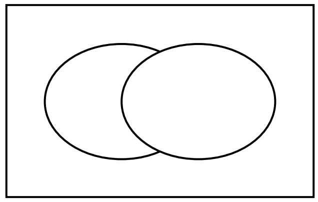
MORE APPLICATION OF SETS

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. Study the venn diagram. Given that n(   ) = 40



i. Find the value of x
ii. Find n(A)
iii. Find n(B)
iv. Find n(An B)

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.

Give more examples involving three venn diagrams. Reference Bk 7

TOPIC : NUMERATION SYSTEM AND PLACE VALUE

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

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

Thousand

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

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

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.

SUBTOPIC : PLACE VALUES OF DECIMALS

Example 1

3 . 2 6 7
thousands
hundredths
tenths
Tens
Ones

Example 2

1 2 3 . 6
Tenths
Ones
Tens
Hundreds

EXERCISE

1. 9.178
2. 12.94
3. 16.184
4. 7.216
5. 45.789

SUBTOPIC : VALUES OF DECIMALS

Example 1

9.65
6tenths = 6 x 1/10
= 6/10
= 0.6 Ans

Example 2

9.65
5 hunderdths = 5 x 1/100
= 5/100
= 0.05 Ans

EXERCISE

Give the values of the underlined numbers

1. 0.4
2. 9.83
3. 1.5
4. 42.9
5. 3.48
6. 0.684
7. 2.831
8. 3.79
9. 8.785
10. 0.785

SUBTOPIC: WRITING WHOLES AND DECIMALS IN FIGURES

Example 1

Thirty six and four tenths.
Thirty six = 36
Four tenths = 0.4
36.4 Ans

Example 2

Eighty-nine and one hundred four thousandths.
Eighty nine = 89
One hundred four thousandths = 0.104
89. 104 Ans

EXERCISE

1. Ninety four and eight thousandths.
2. Fifty four and one hundred twenty six thousandths.
3. Two hundred forty three and twenty nine thousandths.
4. Four hundred eighty nine and two hundredths.
5. One thousand seven hundred three and five thousandths.
6. Two hundred nineteen and forty eight thousandths.

7. Four hundred eighty six and ninety nine thousandths.
8. Seven hundred and seven thousandths.

SUBTOPIC : WRITING DECIMALS IN WORDS

Example 1

Write 4.8 in words
4 = Four
0.8 =eight tenths
4.8 = Four and eight tenths.

EXERCISE

1. 0.4
2. 3.04
3. 14.001
4. 8.125
5. 0.5
6. 6.07
7. 48.013
8. 6.085

SUBTOPIC : EXPANDED FORM OF NUMBERS

Using powers of ten.

Example 1

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

Example 2

45.2
45.2 =$(4x10^1)+(5x10^0)+(2x10^{-1})$

EXERCISE

1. 2678
2. 52.95
3. 412.77
4. 7697
5. 309.56

SUBTOPIC : EXPANDING USING VALUES

Example 1

575

ones

tens

hundreds

= (5x100)+(7x10)+(5x1)

= 500 + 70 + 5 Ans

Example 2

25.34

hundredths

tenths

ones

Tens

= (2x10)+(5x1)+(3x $^1/_{10}$)+(4x $^1/_{100}$)

= 20 + 5 + 0.3 + 0.04 Ans

EXERCISE

1. 457
2. 30.4
3. 58.7
4. 99.84
5. 304.5

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

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

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

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.

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

SUBTOPIC : ROUNDING OFF DECIMAL NUMBERS

Example 1

Round off to the nearest whole number 0.93

0.93
0
0.9
0.93 0.9

Example 2

Round off to the nearest whole number 1.8

1.8
1
2.0
1.8 2

Example 3

Round off 8.321 to the nearest hundredths

8.321
0
8.320
8. 321 8.32

EXERCISE

A Round off the following to the nearest whole number(ones)

1. 1.42
2. 2.36
3. 3.45
4. 3.54

B Round off the following to the nearest tenths

1. 1.32
2. 9.87
3. 5.49
4. 8.758

C Round off the following to the nearest hundredths

1. 12.623
2. 6.829

3. 3.452
4. 7.936

SUBTOPIC : BASES

1 Counting in groups is referred to as bases.
2 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.
3 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

4 Special letters used in bases
“ t’ = ten
“ e” = eleven
Those letters are in base twelve to avoid confusion
5 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
6 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.

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

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

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

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

SUBTOPIC : ADDITION OF BASES

Example 1

Add 111two 110two

$$\begin{array}{r} 111\text{two} \\ +\ 110\text{two} \\ \hline 1101\text{two} \end{array}$$

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

SUBTOPIC ; SUBTRACTION OF BASES

Example 1

53six – 45six

$$\begin{array}{r} 53\text{six} \\ -\ 45\text{six} \\ \hline 4\text{six} \end{array}$$

EXERCISE

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

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

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

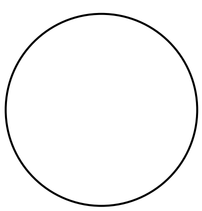
1. Finite system is a way of finding remainders.
2. Finite system can also be called modular (mod) or clock arithmetic or remainder.
3. We have two types of clockfaces.
   a) Daily activity teller
   b) Special time teller

SUBTOPIC: ADDITION OF FINITES

Addition using a dial

Example 1

Add: 4 + 6 = --------(finite 5)



EXERCISE

1. 4 + 4 = --------(finite 5)
2. 6 + 5 = -------(finite7)
3. 10 + 8 = ------(finite 12)

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

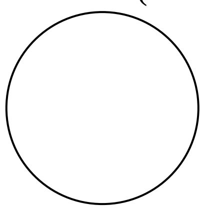
1. 3+2 = x (finite 5)
2. 3 + 4= x (finite 7)
3. 2 + 3 + 4 = x (finite 5)
4. 3 + 3 = y (finite5)
5. 6 + 8 = y (finite 12)
6. 1+ 2 + 5 = y (finite 7)

SUBTOPIC : SUBTRACTION

Using a dial

EXAMPLE 1

Subtract 2 – 4 = ----(finite 5)



2– 4 = 3 (finite 5)

EXERCISE

1. 3 – 5 = -----(finite 7)
2. 2 – 3 = ----(finite 4)
3. 4 – 7 = -----(finite 11)

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)

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)

SUBTOPIC : MULTIPLICATION OF FINITES

Example 1

4 x 5 = -----(finite 7)

20 = -----(finite 7)

20 : 7 = 2 rem 6 (finte 7)

4 x 5 = 6 (finite 7)

Example 2

3 x 4 = x (finite 12)

12 = x (finite 12)

x = 12 (finite 12)

Example 1

5 : 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)

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)

2 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)

SUBTOPIC; DIVISION IN FINITE SYSTEM

In the idea of finite system

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?

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)

4 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?

SUBTOPIC ; APPLICATION OF FINITE 12

12 hr-clock

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 wiil 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

SUBTOPIC : MONTHS OF THE YEAR FINITE 12

Example 1

1. It is july now,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 rem 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

OPERATION OF NUMBERS

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.

ADDITION OF NUMBERS

When adding, always start with ones and group where necessary towards larger place values.

Example 1

```
  11345
+  1678
  13023
```

EXERCISE

Pupils are give to do an exercise in addition involving large numbers in their books. Teacher should stress maintaining place values.

WORD PROBLEMS IN ADDITION

Example 2

What is the sum of 52132 and 93452

```
  52132
+ 93452
```

EXERCISE

Learners are given to do an exercise on word problems involving addition in their books.

SUBTRACTION OF NUMBERS

EXAMPLE 1

```
  248163
+  43178
  201985
```

EXERCISE

Learners do the exercise in their books.

WORD PROBLEMS IN SUBTRACTION

EXAMPLE 1

What is the difference between 924568 and 295877?

```
   924568
 + 295877
   628691
```

EXERCISE 2

Learners do the exercise in their books.

MULTIPLICATION OF NUMBERS

EXAMPLE 1

```
    1345
    X 12
   2690
+  1345
  16140
```

EXERCISE

Learners do the exercise in their books.

WORD PROBLEMS IN MULTIPLICATION

EXAMPLE 1

A bus carries 84 passengers each trip. How many passengers will it carry if it makes eighty trips?

84 x 18 = 1512 or 1 trip = 84 passengers

80 trips =(84 x 80) passengers.

= 1512 passengers.

EXERCISE

Learners will do the exercise in their books for practice.

DIVISION OF NUMBERS

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

m m+1 m+2

$m+m+1+m+2 = 45$

$3m+3-3 = 45-3$

$\frac{3m}{3} = \frac{42}{3}$

m = 14

1st **14**

2nd m+1

14+1 = **15**

3rd m+2

14+2

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

$n+n+2+n+4 = 57$

$3n+6-6 = 57-6$

$\frac{3n}{3} = \frac{51}{3}$

n = 17

1st = **17**

2nd = n+2

= 17+2

= **19**

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

$p+p+2+p+4 = 78$

$3p+6-6 = 78-6$

$\frac{3p}{3} = \frac{72}{3}$

p = **24**

1st **= 24**

2nd = 24+2

26

3rd = 24+4

= **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.