P.6/7 Maths. Lesson Notes ..

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:**

12.00

\- 4.00

8.00 or 8 hrs.

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

Step 3: **Total time = 8.00**

+ 3.00

11.00 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

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

The 24 hr/12 hr clock system diagram.

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
T = 3 hrs

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

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

S = 120kph
T = 45 min. = 45/60 hrs

D = S x T
= 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

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

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?

$T = \frac{D}{T}$ $= \frac{120km}{60kph}$ **= 2 hrs**	$T = \frac{D}{T}$ $\frac{120km}{40kph}$ **= 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?

$S = \frac{D}{T}$

$= \frac{210km}{3hrs}$

= **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.

Week IV: **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.

$72\text{kph} = \frac{72 \times 1000\text{m}}{1 \times 3600 \text{ sec}}$

$= \frac{20\text{m}}{1 \text{ sec.}}$

= **20m/sec.**

Example 2: Express 360km/hr as m/sec.
Change km to metres and hrs to seconds.
1km = 1000m , 1hr = 3600 sec.

$360\text{kph} = \frac{360 \times 1000\text{m}}{1 \times 3600 \text{ sec}}$

$= \frac{100 \text{ m}}{1 \text{ sec.}}$

= **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

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

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

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

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

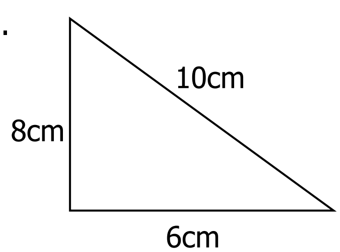
Practical work: Measuring perimeter of classroom objects in cm or m.

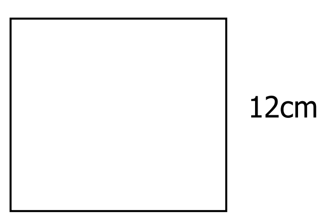
Recording the results in a table as the one shown below.

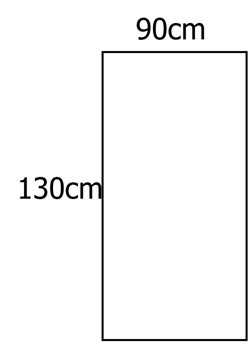
OBJECT	No. OF SIDES	PERIMETER (cm/m)

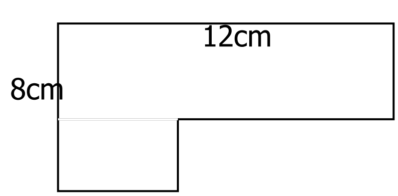
Calculating the perimeter of geometrical figures.

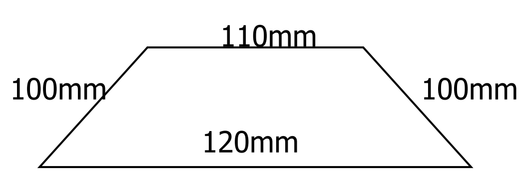
a).

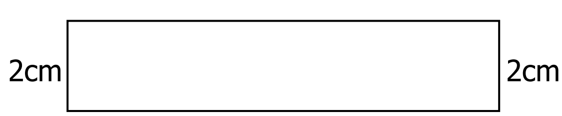


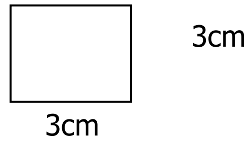








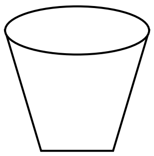


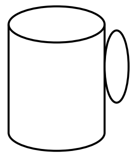


CIRCUMFERENCE.

Using stripes to measure circumference of round ends of objects.

E.g





KABOJJA JUNIOR SCHOOL PRIMARY SEVEN TERM ONE MTC LESSON NOTES 2011

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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 $^{22}/_{7}$

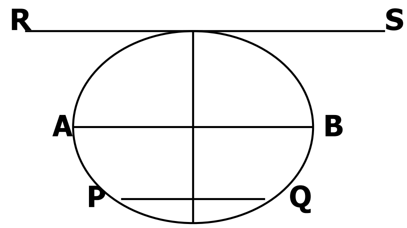
Explanation: If $\frac{C}{D} = \pi$, then

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

$$C = \mathbf{\pi D}$$

Calculating circumference using radius of diameter.

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



PQ = chord

RS = Tangent

ACB = diameter

AC = radius

CB = radius

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

C = 2 π r
= 2 x 3.14 x 5
= 10 x 3.14 cm
= **31.4cm**

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

C = 2 π r
= $2 \times \frac{22}{7} \times \frac{7}{2}$
= **22cm.**

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

C = 2 π r
= 2 x 3.14 x 3
= 6 x 3.14
= **9.42cm**.

Exercise:

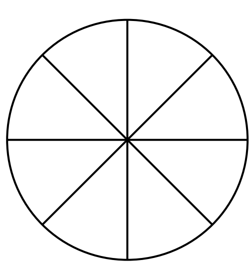
1. Find the circumference of a circle whose diameter is 5cm. (**Use π = 3.14**)
2. A circular plate has a diameter of 14cm, calculate its circumference. (Let $\pi = {}^{22}/_{7}$)
3. A circular bottom of a mug has a radius of 50mm. Find its circumference. (**Use π = 3.14**)
4. Find the circumference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

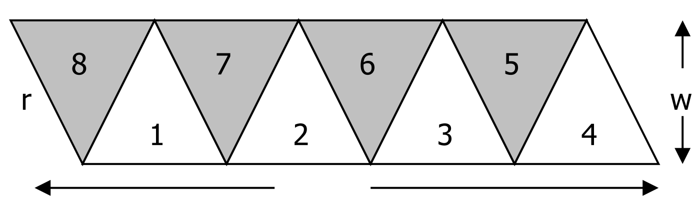
More practice exercises on page 328 MK 6.

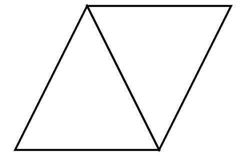
AREA OF CIRCLES/ QUADRANTS / SEMI-CIRCLES / VOLUME AREA OF A CYLINDER.

AREA OF A CIRCLE.

Practical work on finding area of a circle.

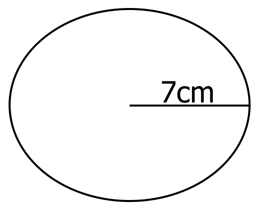






NOTE: **Length (l) = ½ C = ½ (2 π r)** $= \frac{2\pi r}{2} = \pi r$
Width (w) = radius (r)
Area of the rectangle formed = l x w
$= \pi r \times r$
πr^2
So area of a circle = πr^2

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



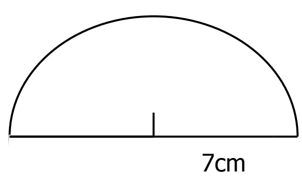
A = πr^2
$= {}^{22}/_{7} \times 7 \times 7\ cm^2$
$= 22 \times 7\ cm^2$
$=$ **$154cm^2$**.

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)**

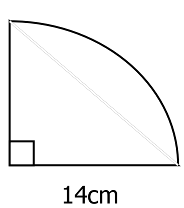


Area of semi-circle = $\frac{1}{2} \pi r^2$

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

$1.57 \times 10 \times 10\ cm^2$
$157cm^2$

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



$= \frac{1}{4} \times {}^{22}/_{7} \times 14 \times 14$
$= 11 \times 14\ cm^2$
$=$ **$154cm^2$**.

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

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

$= \frac{1}{8} \times \frac{22}{7} \times 28 \times 28 \text{ cm}^2$

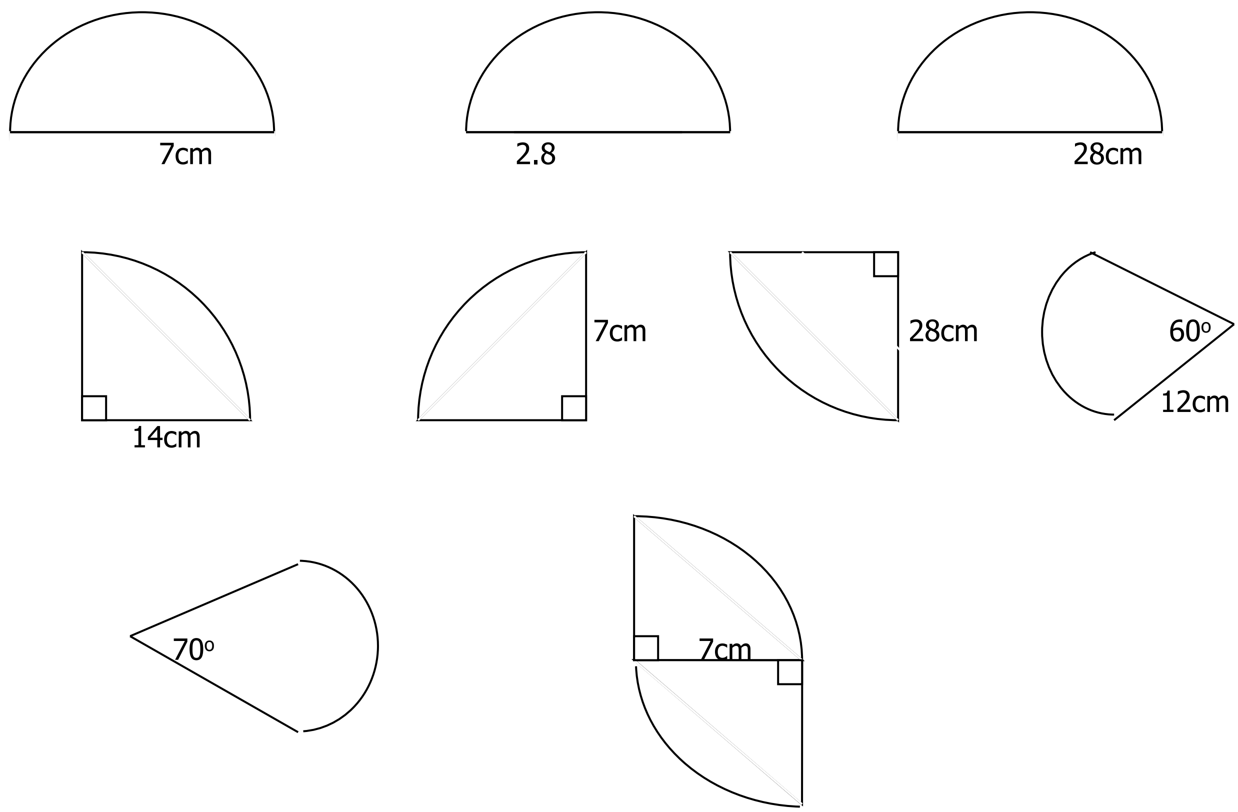
$= 11 \times 28 \text{ cm}^2$

$=$ **<u>308cm²</u>**.

$\frac{45}{360} = \frac{1}{8}$

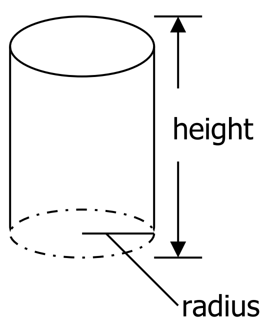
<u>Exercise.</u>

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



<u>VOLUME OF A CYLINDER.</u>

<u>Working:</u>

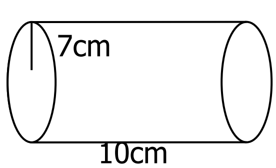


Volume = Area of cross section x height

$V = \pi r^2 \times h$

$V = \pi r^2 h$

<u>Example 1:</u> Find the volume of the cylinder below. (Take $\pi = \frac{22}{7}$)



$V = \pi r^2 h$

$V = \frac{22}{7} \times 7 \times 7 \times 10\text{cm}^3$

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

$V =$ **<u>1540cm³.</u>**

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

$V = \pi r^2 h$

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

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

$V = 5024 \times 11cm^3$

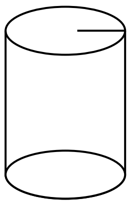
$V =$ **<u>552.64cm³</u>**

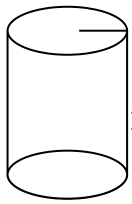
<u>sw</u>

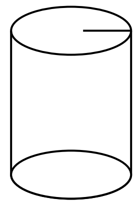
5024
x 11

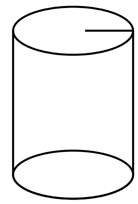
Exercise:

1. Find the volume of cylinders below. (**Take** π **=** $^{22}/_7$**)**

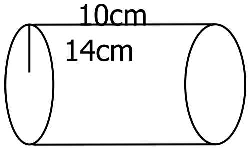


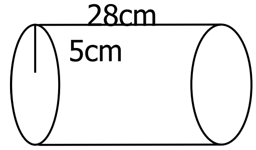


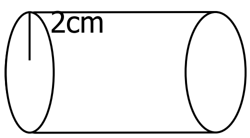


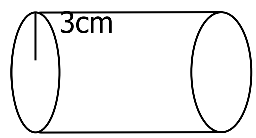


2.



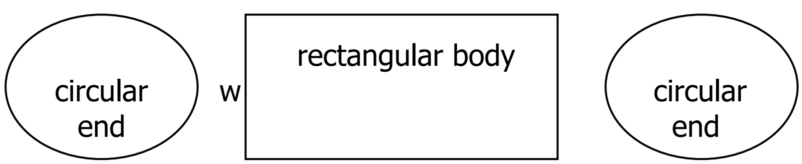






3. **Word problems (MK 7 Ppls Copy Pg 312)**

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



Note: **w (width) = 2** π r

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

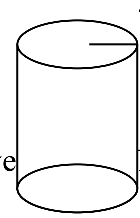
$= 2 \pi r h$

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

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

Example:

Find the tsa of a cylinder of radius 7cm and height 10cm. (**Let** $\pi = {}^{22}/_7$)



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

$2 \times {}^{22}/_7 \times 7 (7 + 10)cm^2$

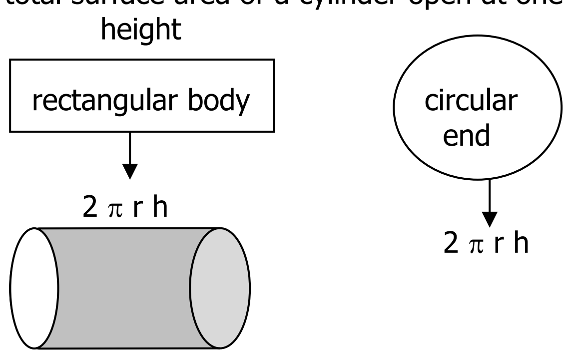
$2 \times 22\ (7 + 10)cm^2$

$44 \times 17cm^2$

TSA = <u>748cm²</u>.

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** $\pi r (r + 2h)$

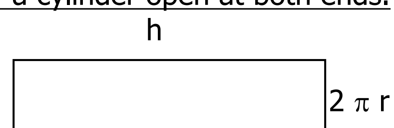
<u>Example:</u> Find the TSA of a cylinder of radius 7cm and height 8cm which is open at one end.

TSA = $\pi r (r + 2h)$
= $^{22}/_7 \times 7 (7 + 2 \times 8)$
= 22×23
= **<u>506cm²</u>**

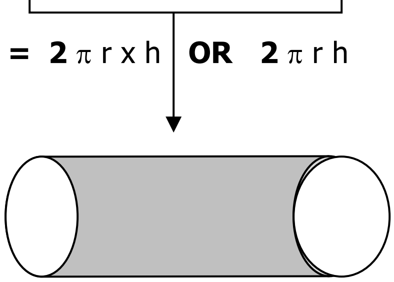
<u>Calculate the TSA of cylinders whose one end is open of the following radius and height.</u>

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>

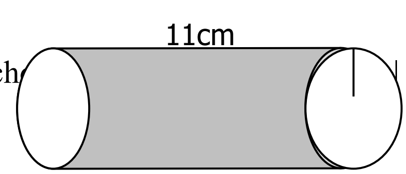


TSA = 2 $\pi r \times h$ **OR 2** $\pi r h$



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

TSA = 2 $\pi r h$
= $2 \times {}^{22}/_7 \times 7 \times 11$



7cm $= 2 \times 22 \times 11\ cm^2$

$= 44 \times 11\ cm^2$

$=$ **484cm²**

Calculate the TSA of a cylinder whose both ends are open with the following dimensions.

i. radius 7cm , height 9cm
ii. radius 20cm , height 10 ½ cm
iii. radius 8cm , height 10cm
iv. radius 2.1m , height 10cm
v. radius 14cm , height 10cm
vi. radius 3 ½ cm , height 5cm
vii. radius 4m , height 5m.
viii. radius 8cm , height 11cm.

CONVERTING ARE TO HECTARE.

CONVERTING M² TO KM.

1 are = $100m^2$.

1 are	=	$100m^2$	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 = $0.5 \times 100m^2$
$= \frac{5}{10} \times 100m^2$
$=$ **50m²**

1. Change the following ares to m^2.
   i. 0.4 are ii. 1.2 are iii. 5 ½ are iv. 10 are
   v. 11 are vi. 110 are

2. Change the following m2 to are.
   i. $300m^2$ ii. $400m^2$ iii. $40m^2$ iv. $55m^2$
   v. $2500m^2$ vi. $3600m^2$ viii. $4900m^2$ ix $640m^2$

CONVERTING M² TO HECTARES.

1 ha = $10,000m^2$

$10,000m^2$	=	1 ha
100m		

Example : Convert 20,000m2 to hectares.

$10,000m^2$ = 1 hectare

$20,000m^2 = \frac{20,000}{10,000}$ ha

$= \underline{\mathbf{2\ ha.}}$

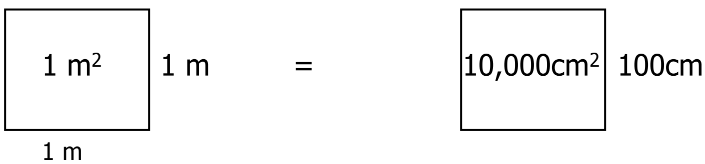
Exercise:

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.

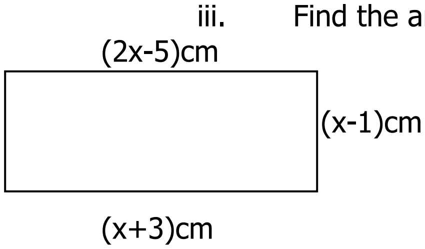
1. $3cm^2$ 2. $5m^2$ 3. $4m^2$ 4. $8.2m^2$ 5. 10.5^2

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

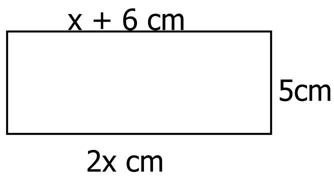
Width $= x - 1$
$8 - 1$
7cm

Therefore: Area of the rectangle = l x w

= 11 x 7 cm²

= <u>77cm²</u>

<u>Find the unknown, the width and the length and the area of the rectangles below.</u>

1.


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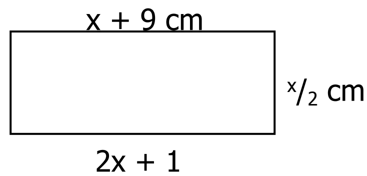
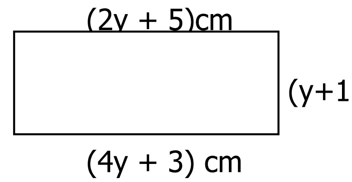
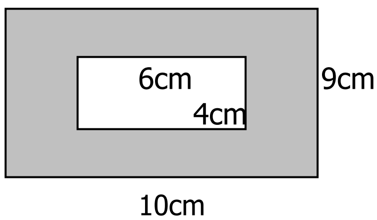




More practice exercises on page 335.

<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

$= 10 \times 9cm^2$

$= \underline{\mathbf{90cm^2}}$

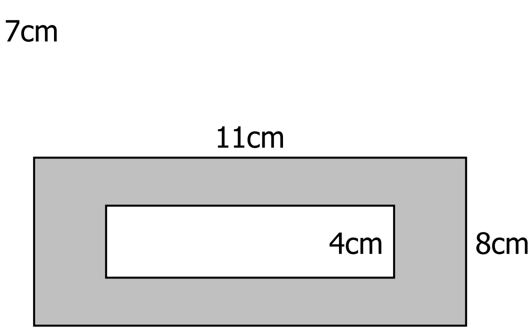
Area of the inner rectangle = 6 x 4cm²

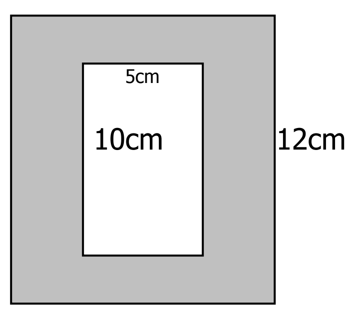
$= 24cm^2$

Area of the shaded part = 90 – 24 cm²

$= \underline{\mathbf{66cm^2}}$

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





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

Count Squares:

Area = 8sq. units

OR

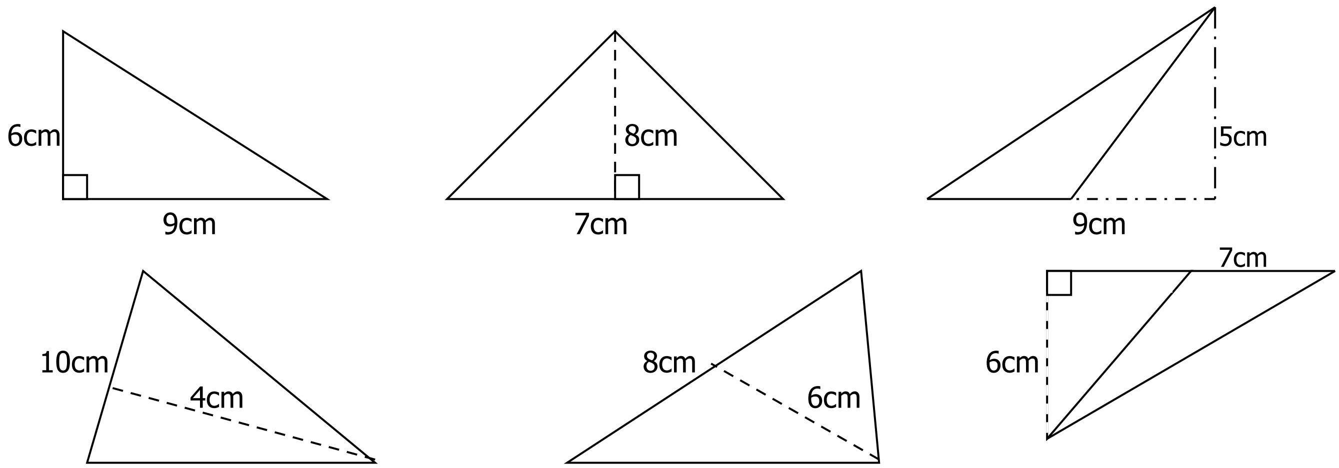
Area = ½ x b x h   base = 4cm

½ x 4 x 4   height= 4cm

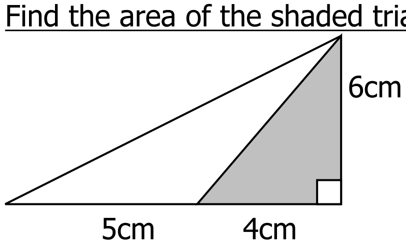
<u>8sq. units</u>

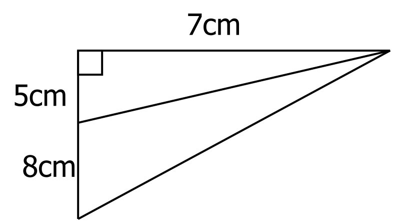
<u>Exercise:</u>   <u>Find the area of the triangle</u>.

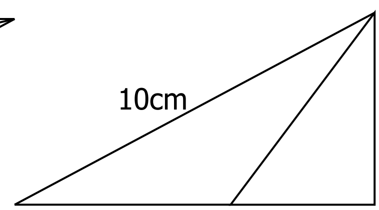
1.



2. <u>Find the area of the shaded triangles.</u>







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

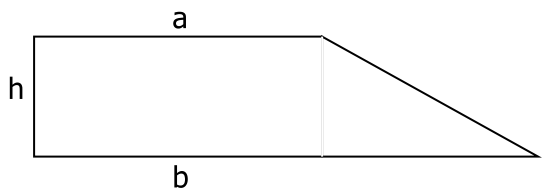
FINDING THE BASE OR HEIGHT.

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.

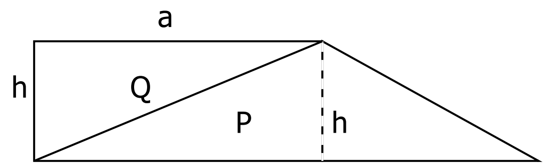
A trapezium has two of the two sides parallel.



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

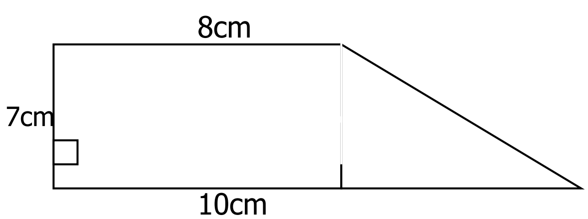
$= \frac{ah + bh}{2}$

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

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

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

Example: Find the area of the trapezium below:

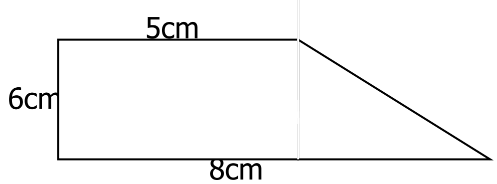


A = ½ h(a + b)
$= \frac{1}{2} \times 7 \text{ (b + 10)cm}^2$
$= \frac{1}{2} \times 7 \times 18\text{cm}$
$= \underline{\underline{\mathbf{63cm^2}}}$

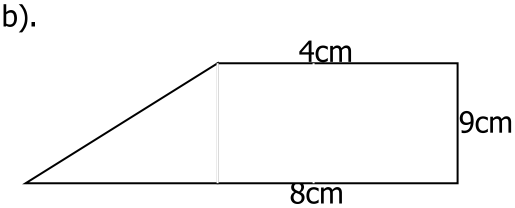
Exercise:

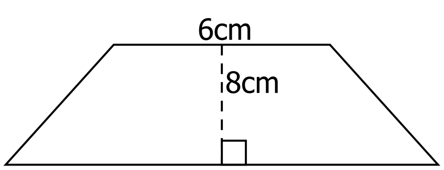
1. Find the area of the given figures.

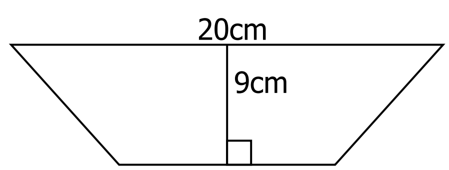
a)



b).



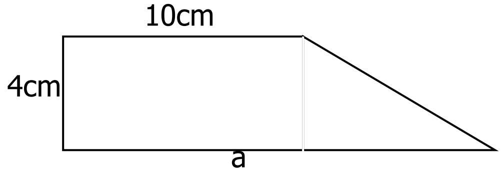




FINDING ONE SIDE OF A TRAPEZIUM.

Example:

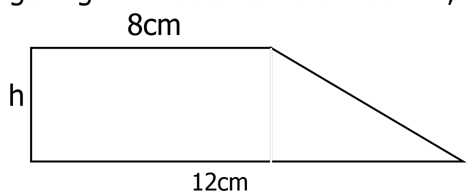
The area of a trapezium is $60cm^2$, the height is 4cm and one of the parallel sides is 10cm. Find the length of the second parallel side.



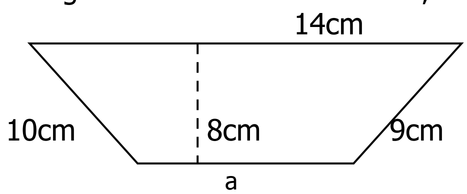
A = ½ h(a + b)
60 = ½ x 4(a + 10)
60 = 2(a + 10)
60 = 2a + 20
60 = 2a + 20 – 20
60 – 20 = 2a
40 = 2a
a = 20cm

Exercise.

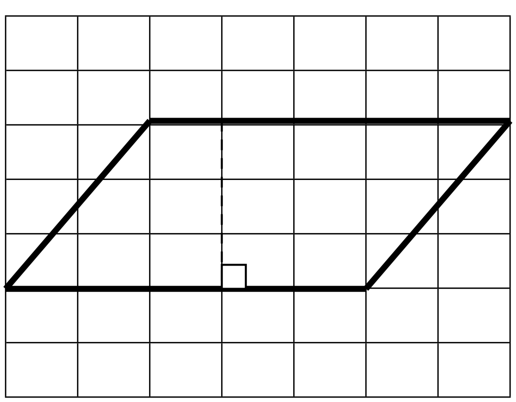
1. Find the second parallel side of a trapezium if the area is $56cm^2$, height 8cm and one of the parallel sides is 4cm.
2. The figure given has an area of $100cm^2$, find the value of h.



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.

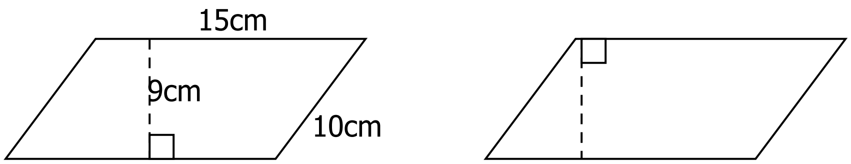


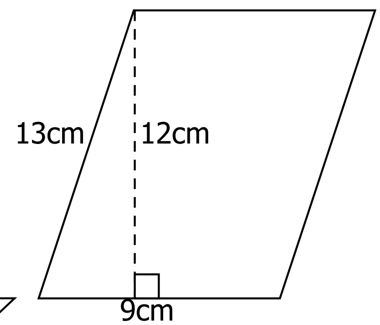
A = base x height
= 5 x 3
= <u>15sq. units.</u>

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

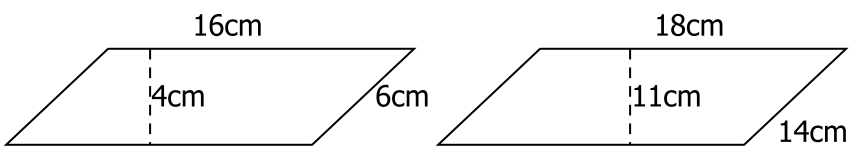
Exercise:

1. Find the area of the parallelograms shown.



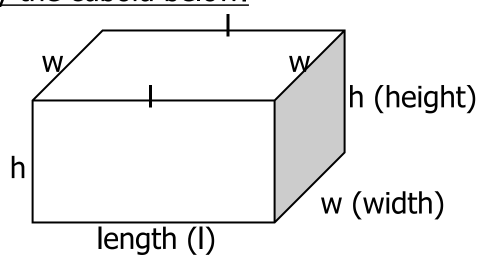


More practice work on page 347 MK 6

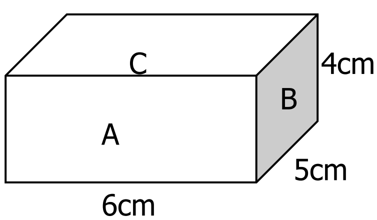


TOTAL SURFACE AREA OF A CUBOID.

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 20cm²
= 60 + 48 + 40cm²
148
= <u>148cm².</u>

OR

Area of faces A = l x h = 6 x 4cm².
= 24 x 2 (there are two faces)
= 48cm²

Area of faces B = 2 x h = 5 x 4cm²

= 20 x 2 (there are two faces)

= $40cm^2$

Area of faces C = l x w = 6 x $5cm^2$

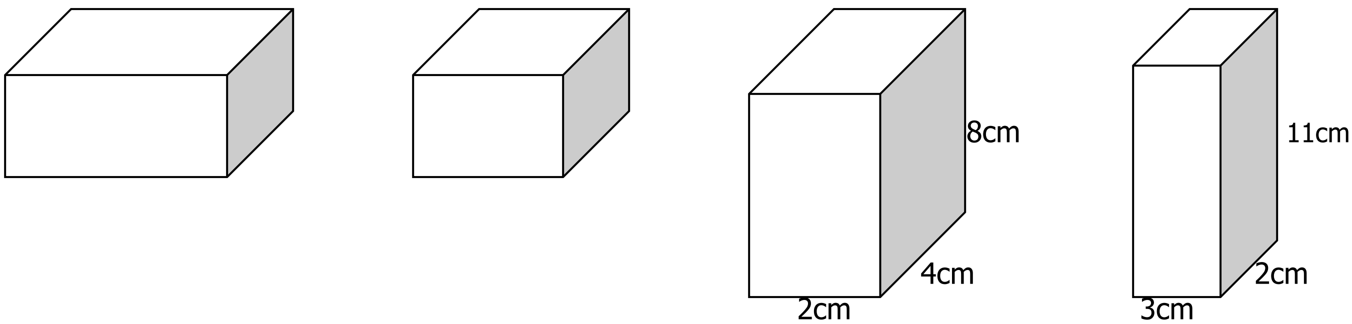
=30 x 2 (there are two faces)

= $60cm^2$

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 x s = s^2

Total surface area = 6 x s^2

= **$6s^2$**

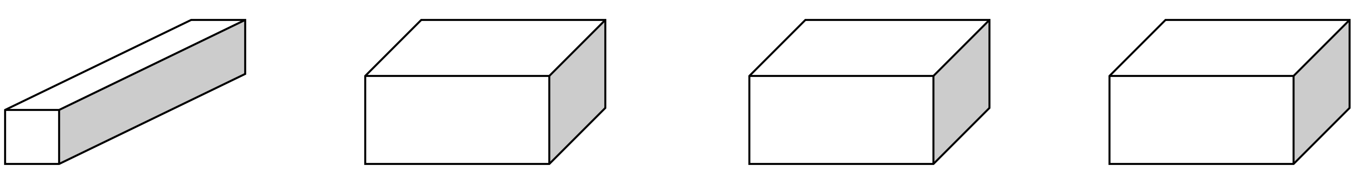
Exercise:

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

a). 5cm b). 6cm c). 7cm d). 8cm e). 10cm

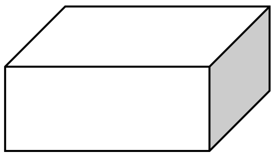
f). 11cm g). 14cm h). 12cm i). 3cm

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 = $6s^2$

$384 = 6s^2$

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

$64 = \sqrt{s^2}$

$8 = s$

s = **8cm**

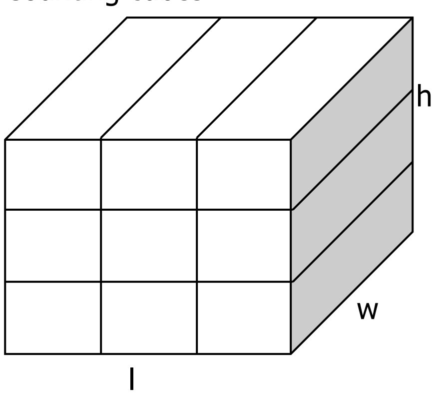
Each side = 8cm

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		

WEEK 9 - FINDING VOLUME OF A CUBE / CUBOID.

1. What is volume?
2. Counting cubes.



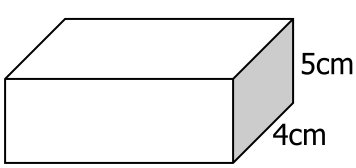
a). Find the number of cubes along the length.

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

11cm = **$220cm^2$**

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.

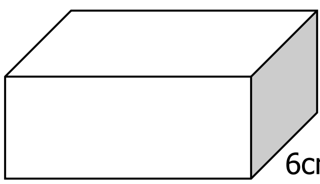
L x w x h = volume

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

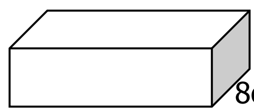
h = **5cm**

Exercise:

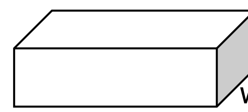
1. Find the missing side.



Volume = $120cm^3$



Volume = $168cm^3$

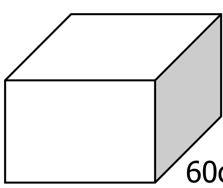


Volume = $420cm^3$

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.

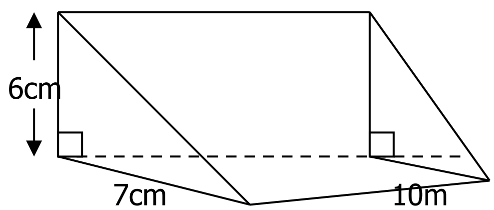
No.	Length (cm)	Width (cm)	Height (cm)
1.	40	60	80
2	70	30	50

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

3.	100	70	80	6.	60	70	120

Word problems on page 358 MK 6.

VOLUME OF A TRIANGULAR PRISM.

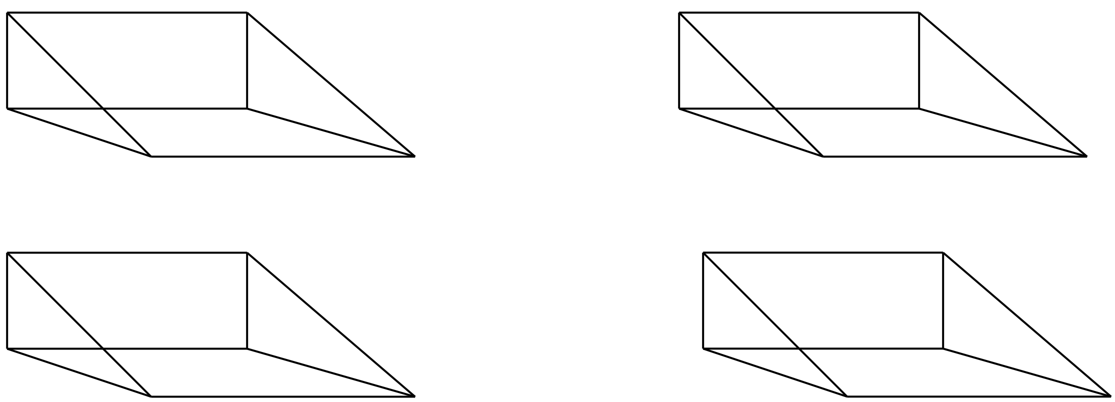


Volume = Area of the triangular face times the length.
= (1/2 x b x h) x l

Volume = (½ x b x h) x l
= (½ x 7 x 6) x 10cm³
= 21 x 10
= <u>210cm³</u>

Exercise:

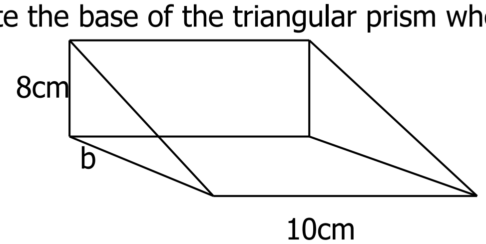
1. Find the volume of the prisms below.



FINDING THE UNKNOWN SIDE WHEN VOLUME IS GIVEN.

Example:

Calculate the base of the triangular prism whose volume is 240cm³, 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	180cm³
B	____	12cm	15cm	540cm³

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)

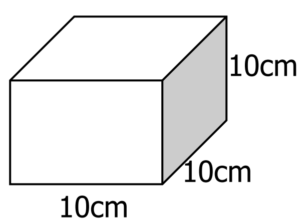
1. 3 litres 2. 4 ½ litres 3. 2 ¼ litres 4. 5 litres
5. 8 ½ litres 6. 13 litres 7. 8 ½ litres 8. 6 ½ litres

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.

Example II:
Change 3700cm2 to litres.

1000ml = 1 litre

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

= **2 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

WEEK 11 – 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^o

I Draw a line mark in it a point.

II At o draw an angle of 72o.

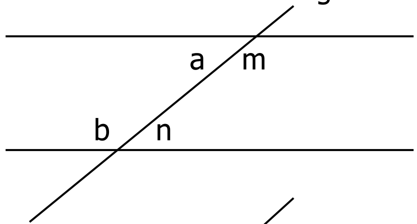
III Open your pair of compasses to a radius of 1.5cm. Use O as the centre of the circle.

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

6. Try: Construct a regular octagon.

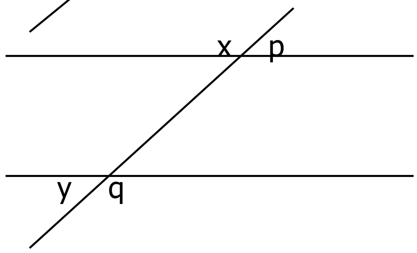
Angle properties of parallel lines.

1. Co-interior and co-exterior angles.



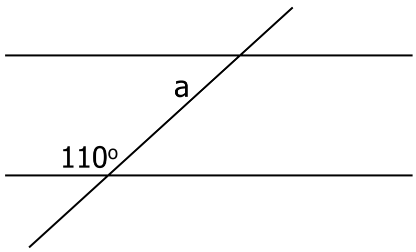
<a and <b are co-interior angles.
<a + <b = 180°

2.

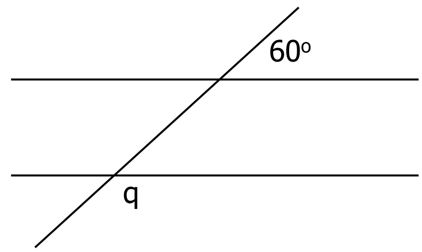


<x and <y are co-exterior angles
<x + <y = 180°

3. Find angle a.



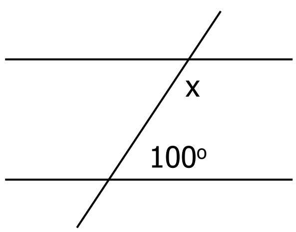
4. Find angle q.

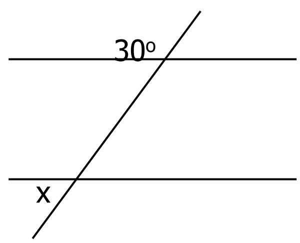


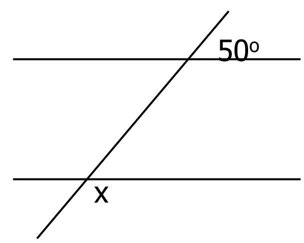
<u>Exercise:</u>

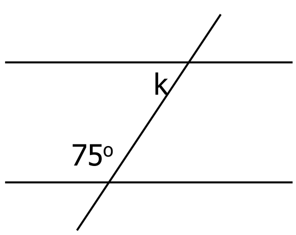
<u>Find the size of the marked angle.</u>

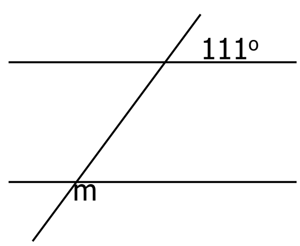
1.

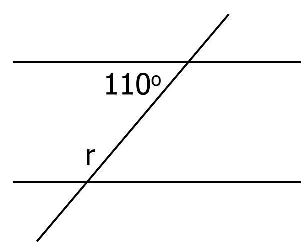


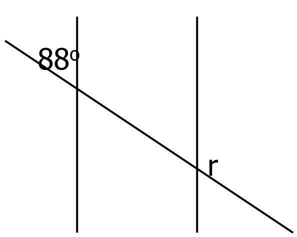


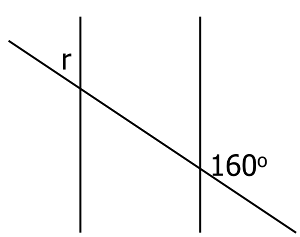




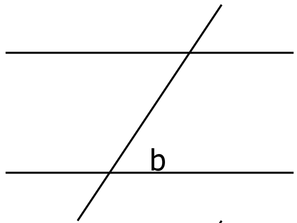




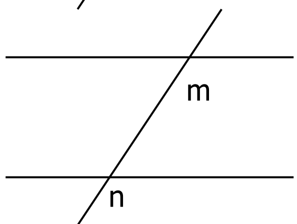




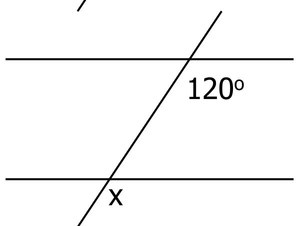
Corresponding angles.

1. 

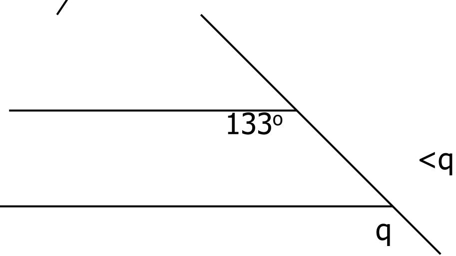
<a and <b are corresponding angles.
<a = <b

2. 

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

3. 

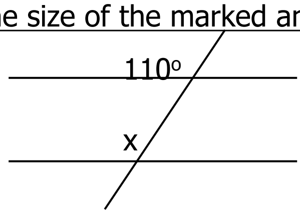
<x = 120° (Corresponding angles)

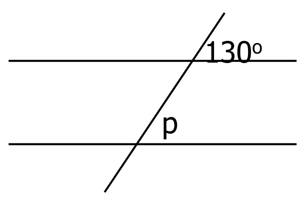
4. 

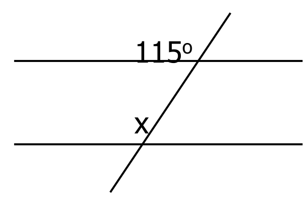
<q = 133° (Corresponding angles)

Exercise:

Find the size of the marked angles.

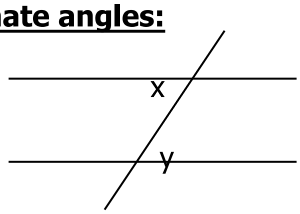
1. 

2. 

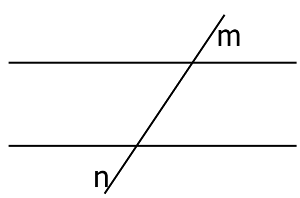
3. 

More practice work on page 270 MK 6.

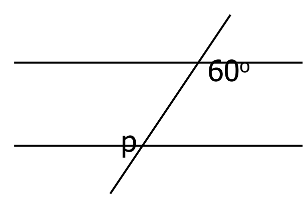
Alternate angles:



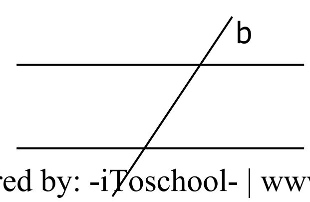
<x and <y are alternate interior angles.
<x = <y



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



Find <p
<p = 60°
(alternate interior)



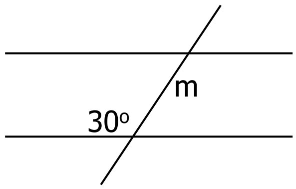
Find <b.
<b = 140° (alternate exterior)

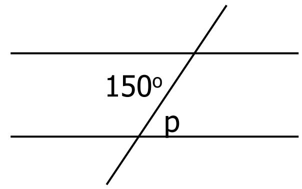
140^o

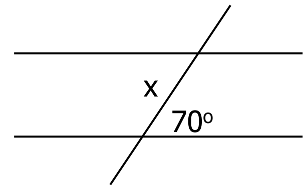
Exercise:

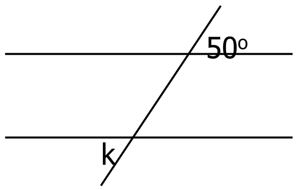
Find the size of the marked angles.

1.





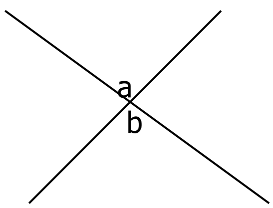




More practice work on page 271 MK 6.

Vertically opposite angles:

Vertically opposite angles are equal.



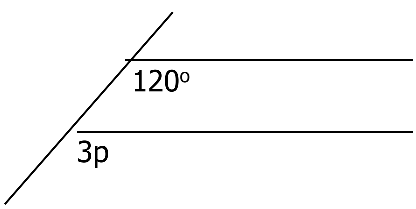
<a and <b are vertically opposite angles.

<a = <b

MIXED PROBLEMS

Finding the unknown in corresponding or alternate angles:

Example 1: Find the value of p.

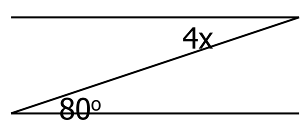


$3p = 120^o$

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

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

Example 1: Find the value of x.

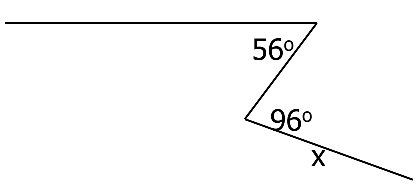


$4x = 80^o$ (alternate angle)

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

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

Example 3:

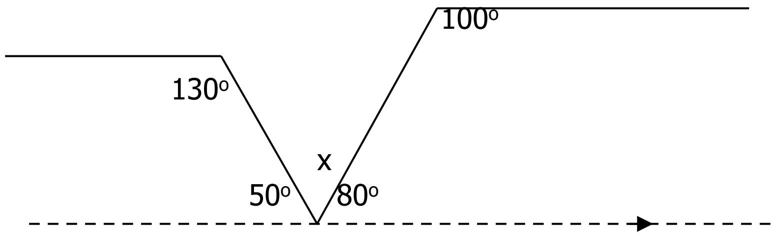


$x + 56^o = 96^o$

$x - 56 + 56 = 96^o - 56^o$

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

Example 4:

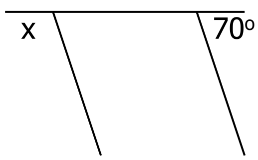


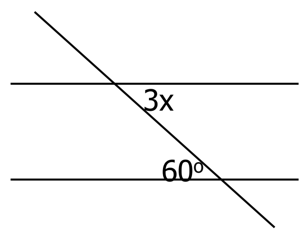
$x + 50 + 80 = 180o$

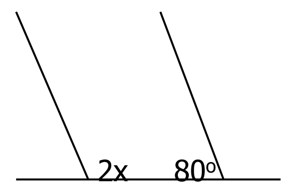
$x + 130 - 130 = 180 - 130$

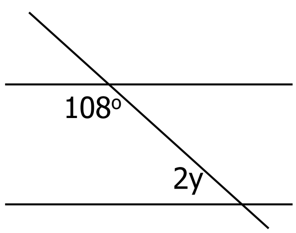
$x =$ **50^{o}**

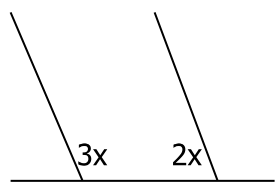
Exercise:

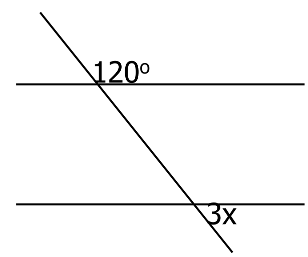


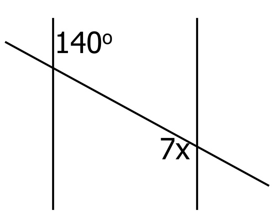


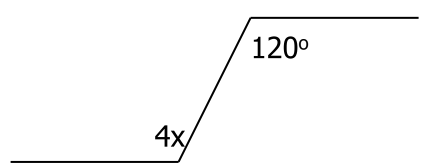


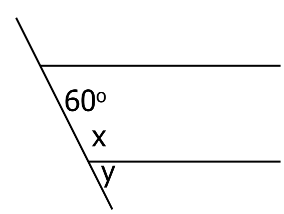


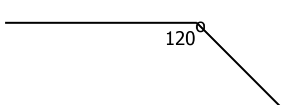


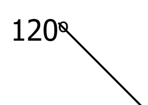


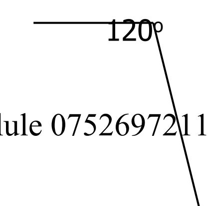


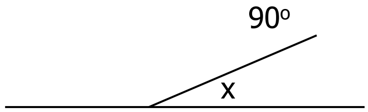


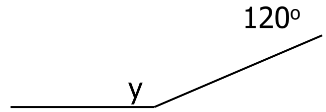


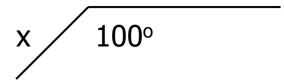












NUMBER FACTS AND SEQUENCES DIVISIBILITY BY 2, 3, 4 and 5.

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 ÷ 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.

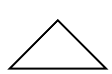
1.	0	2.	6	3.	36	4.	1	5.	7
6.	356	7.	2	8.	18	9.	244	10.	3
11.	19	12.	10000						

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

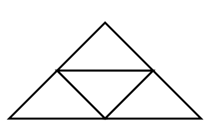
a). Write down multiples of 5 less than 60. M_5 = { }
b). Underline only those numbers that are divisible by 5:- 142, 345, 700, 1196, 752, 850, 1190
c). List the missing multiples of 5:- {170, ___, 180, ___, 190, ___, 200, ___, 210, ___, 220}

TRIANGULAR NUMBERS - TRIANGULAR PATTERNS

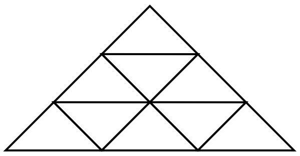
1



1 + 2 = 3



1 + 2 + 3 = 6



1 + 2 + 3 + 4 = 10

Using triangular patterns given the next 3 triangular numbers.

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

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

Example:

What is the sum of the first 7 counting numbers?

List of numbers.

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

= 6 + 9 + 13

= 15 + 13

= **28.**

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

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

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

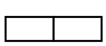
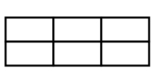
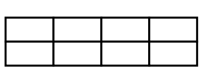
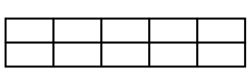
$=$ **28 (Is the sum)**

Exercise:

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

Week 12: 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 = 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 1st number be: (x)
2nd number be: (x+2)
3rd number be: (x+4)

Form an equation and solve for x:

x + (x +2) + (x + 4) = 24
3x + 6 = 24
3x + 6 – 6 = 24 – 6

$$\frac{3x}{3} = \frac{18}{3}$$

x = **6 Answer**

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

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

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

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

p = 5
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 ÷ (1) = 10 10 ÷ (2) = 5 10 ÷ (5) = 2 10 ÷ (10) =1

Example: What are the factors of 24?

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

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

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

Exercise: List all factors of the following:

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

Find the common factors of:

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

Week 13: PRIME FACTORISATION

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

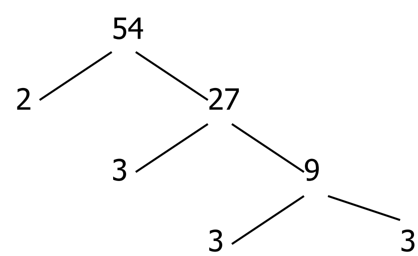
Example 1: Find the prime factors of 54.

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

Ladder Method

2	54
3	27
3	9
3	3
	1

Factor tree method



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

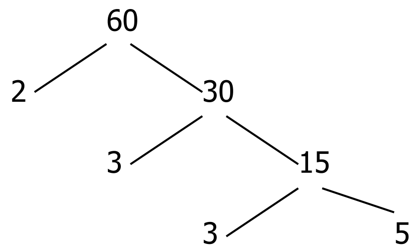
Set notation/subscript method or Power form/multiplication method

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 x 2 x p x 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.

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5. $PF_{100} = 22 \times k$, 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.

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

$= 4 \times 4$

$=$ **16**

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

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

$= 49 \times 7$

$=$ **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

$32 = 2 \times 2 \times 2 \times 2 \times 2 = 2^5$

Write 64 in powers of 4

4	64
4	16
4	4
	1

$64 = 4 \times 4 \times 4 = 4^3$

Exercise: Work out: Express

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

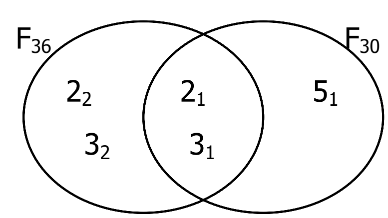
Finding the unknown, say **$7^x = 49$.**

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



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

Represent the prime factors of the following pairs of numbers.

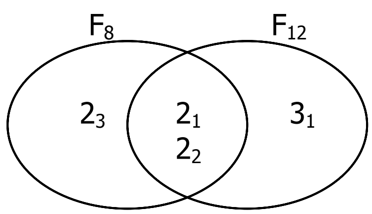
1. 24 and 30
2. 30 and 48
3. 48 and 60
4. 18 and 40
5. 15 and 20
6. 36 and 54.

FINDING THE GCF AND LCM.

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

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

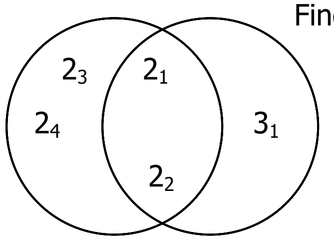
$F_8 = \{2_1, 2_2, 2_3\}$ **$F_{12} = \{2_1, 2_2, 3_1\}$**



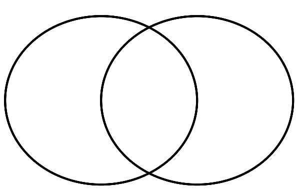
a). GCF = 2 x 2 (Intersection)
= **4 Answer**

b). LCM = 2 x 2 x 2 x 3 = **24 Answer**
(common product)

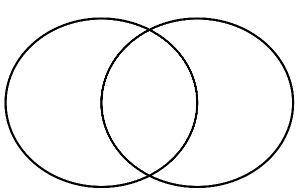
Exercise: Study the venn diagrams and answer the questions that follow.

1. 

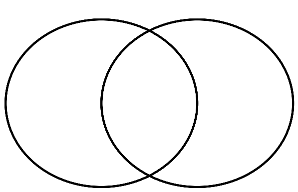
Find; a). $F_{16} \cap F_{12}$ b). GCF of 16 and 12
c). $F_{16} \cup F_{12}$ d). LCM of 16 and 12

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. 

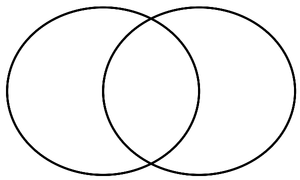
Find; a). F30 ∩ F50 b). GCF of 30 and 50
c). F30 ∪ F50 d). LCM of 30 and 50.

4. 

Find; a). F24 ∩ F108 b). GCF of 24 and 108
c). F24 ∪ F108 d). LCM of 24 and 108

FINDING THE UNKNOWN IN VENN DIAGAMS.

Example 1: 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 = **24 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 = 108 Answer

c). GCF = 2 x 2 x 3

= 4 x 3 =

= **12 Answer**

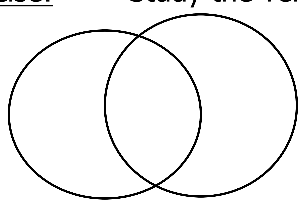
d). LCM = 2 x 2 x 2 x 3 x 3 x 3

8 x 27 =

216 Answer

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

1.

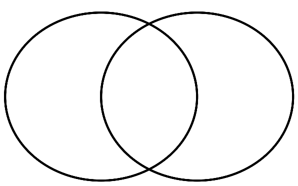


a). Find the value of; i. x ii. y

b). Find the GCF of x and y.

c). Find the LCM of x and y.

2.

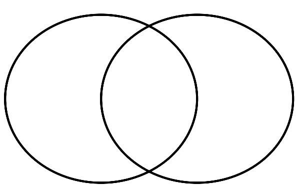


a). Find the value of; i. x ii. y

b). Find the GCF of 12 and 18.

c). Find the LCM of 12 and 18.

3.

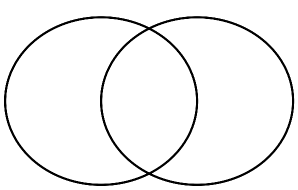


a). Find the value of; i. x ii. y

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.

FRACTIONS:

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

= **0.333**

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)

(ii) - (i)

100y – y = 21.212121 – 0.212121

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

$y = ^7/_{33}$

0.212121 = $^7/_{33}$

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

= **2.33**

90k = 21

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

k = $^7/_{30}$

** = 0.2333 = $^{\mathbf{7}}/_{\mathbf{30}}$

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 – Term 2014.

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. 824536 + 6789

5. 23456 + 3145

6. 634582 + 98672

7. Word problems on Pg 55 Mk 6.

Subtraction

Example 1:

```
  120186
-  20123
  100063
```

Example 2:

```
  5233186
- 1345102
  3888084
```

Work out:

1. 245163 - 43178

2. 7583614 - 5893138

3. 543325 - 28476

4. 2184149 - 436248

5. 345248 - 23132

6. 675423 - 153216

7. **Word problems involving subtraction – MK 6, Pg 58**

Multiplication (A 3 digit number by a 2 digit number).

Example 1:

```
    143
  x  18
   1144
 + 1430
```

Example 2:

```
     1324
   x  132
     2648
    39720
 + 132400
```

Work out.

1.a) 1345 x 12

b) 1445 x 135

c) 1675 x 263

d) 2453 x 527

e) 1438 x 13

f) 2463 x 183

g) 3456 x 214

h) 1634 x 356

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). Addition

3 + (8 + 9) = (3 + 8) + 9

3 + 17 = 11 + 9

20 = 20

b). Multiplication

(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

Example: (4 x 5) + (4 x 6)

Put 4 outside the baskets (It's a common factor)

4 (5 + 6)

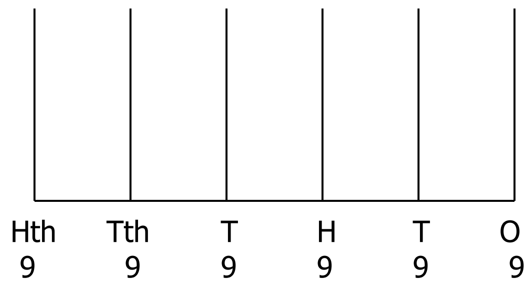
4 x 11 = **44 Answer**

Using distributive property, work out the following.

Numeration System

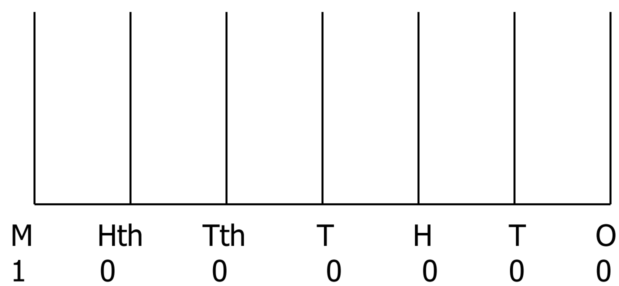
Millions

a). Show 999999 on an abacus



b).
```
   9 9 9 9 9 9
+            1
--------------
 1,0 0 0,0 0 0
--------------
```

c). Show 1,000,000 on an abacus.



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

- 8 → ones
- 4 → tens
- 7 → hundreds
- 2 → 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). 19362

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

6 → Tenths

4 → 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

8 → hundredths

7 → tenths

6 → 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 Answer

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

```
 +     0
 2 9 . 9 7
```

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 $= 2 \times 5 + 3 \times 1$
$= 10 + 3$
$=$ **13_{ten}**

3	13	Rem
3	4	1
	1	1

111_{three}

Exercise:

Change from base five to base three.

1. 44_{five} 2. 124_{five} 3. 134_{five} 4. 324_{five} 5. 224_{five}
6. 111_{five}

Change from base three to base five.

Example 1: 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 = **$\underline{17}_{ten}$**

5	17	Rem
	3	→ 2

= **$\underline{32_{five}}$**

Change to base five.

1. 222_{three} 2. 112_{three} 3. 221_{three} 4. 122_{three} 5. 121_{three}

Finding the unknown base.

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

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 x 10 + 3 x 1 = 3 x x + 5 x 1

20 + 3 = 3x + 5

23 – 5 = 3x + 5 – 5

18 = 3x

3 3

6 = x

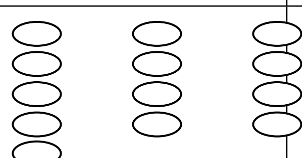
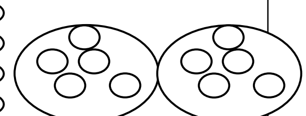
x = **<u>6 Answer (The base is 6).</u>**

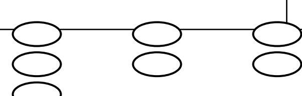
Find the unknown base.

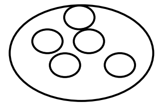
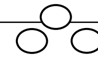
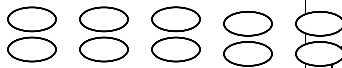
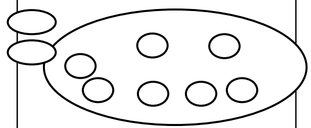
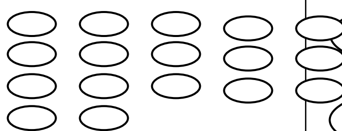
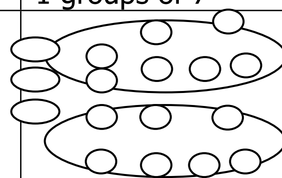
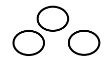
1. 102four = 24p 2. 44p = 35nine 3. 46t = 42ten 4. 112three = 22x

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

<u>FINITE SYSTEM</u>

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

<u>From the table above:</u>

a). 11 in finite 5 is 1 b). 10 in finite 7 is 3 c). 7 in finite 5 is 2.

<u>Find the possible remainder after grouping.</u>

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

<u>Addition in finite 5 using clock faces.</u>

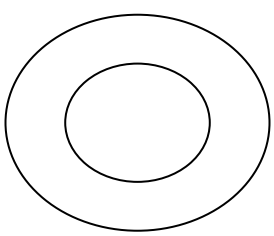
<u>Example 1:</u> Add: 3 + 4 = ___ (Finite 5)

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)

<u>Using a clock face add:</u>

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.

Example 2: 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

∵ **He will return in October.**

Example 3: 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.

Work out: Page 253 MK 6 / Pg 219 Under Mtc Bk 6

SCIENTIFIC NOTATION/STANDARD FORM

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: 2, 3, 4, 6, 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?

Mean = $\frac{\text{Sum of items}}{\text{No. of items}} = \frac{2 + 4 + 7 + 2 + 8 + 1}{6} = \frac{24}{6}$ = **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 x A = $\frac{S}{N}$ x 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
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 = $\frac{\text{Sum}}{\text{Number}}$ = $\frac{(50 \times 2) + (40 \times 1) + (30 \times 3) + (70 \times 1)}{2 + 1 + 3 + 1}$**

= $\frac{100 + 40 + 90 + 70}{7}$ = $\frac{300}{7}$ = $42\,{}^{6}/_{7}$ 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

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.

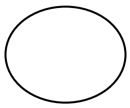
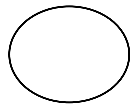
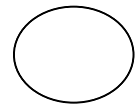
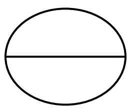
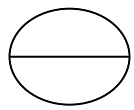
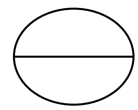
c). What figure is formed?

Activity: **Chn will draw graphs with guidance of the teacher. They will f ollow the order (x, y).**

Join the points.

Name the figure formed – Ref.: MK 7 Pg)

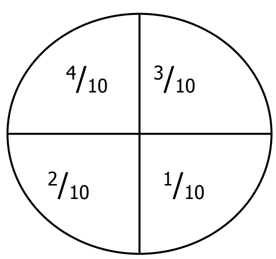
PIE CHARTS

Fraction	Percentage	Revolutions in degrees
		
1 whole	100%	1 complete run 360°
		
½ whole	½ of 100% 50%	½ pf run ½ of 360 = 180°
¼ whole	¼ of 100% 25%	¼ of run ¼ of 360 = 90°

WHEN DATA IS IN FRACTIONS.

Example: The pie chart below shows how Kato spent 30,000/=.

a). Find the sector angle for each item. b). How much was spent on each item?



a).

Item	Fraction	Method	Sector Angle
Rent	$^4/_{10}$	$(^4/_{10} \times 360)^o$	
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

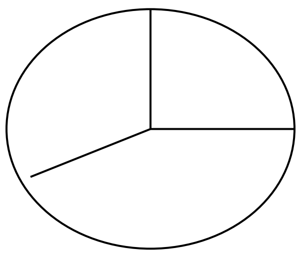
(1/10 x 30,000) = 1 x 3000 = 3,000

(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?)**

$x + 210^o = 360^o - 210^o$

$x + 210^o - 210^o = 360^o - 210^o$

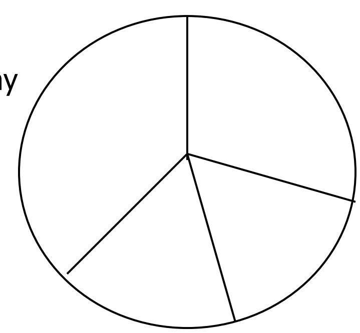
x = **150^o Answer**

b).

Item	Sector ∠	Fraction	Method	Amount
Food	150^o	$^{150}/_{360}$	$^{150}/_{360}$ x 120,000	
Rent	90^o	$^{90}/_{360}$	$^{90}/_{360}$ x 120,000	
Trans	120^o	$^{120}/_{360}$	$^{120}/_{360}$ x 120,000	

Work to do: MK 6 Pg 181 / Und. Mtc Pg 138

A PIE GIVEN IN PERCENTAGES.



The pie chart shows 240 pupils who passed 4 papers. How many pupils passed in each subject?

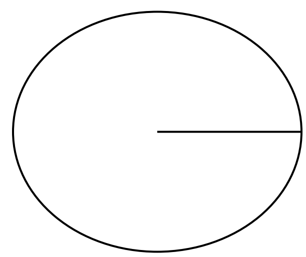
Subject	Percentage	Number
Maths.	$^{40}/_{100}$	$^{40}/_{100}$ x 240 =
English	$^{25}/_{100}$	$^{25}/_{100}$ x 240 =
SST	$^{15}/_{100}$	$^{15}/_{100}$ x 240 =
Science	$^{20}/_{100}$	$^{20}/_{100}$ x 240 =

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	¼ x 360^o	90^o
Rent	$^{1}/_{3}$ x 360^o	120^o
Others	$^{5}/_{12}$ x 360^o	150^o



Then use your protractor.

Work to do: MK 6 Pg 186

PROBABILITY (Chances)

1. What's probability?
2. Obvious chances:

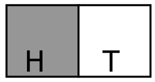
Examples:
a). That chance that mama who is pregnant will give birth to a human being.
b). If today is Monday, the chance that tomorrow will be Tuesday.

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?



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?

Probability = $\frac{n(\text{chances asked})}{n(\text{total chances})}$

P = $\frac{n(CA)}{n(TC)}$

= $^4/_6$ Reduce

= **$^2/_3$ Answer**

TC = {1,2,3,4,5,6}
n(TC) = 6
F6 = {1,2,3,6}
CA = {1,2,3,6}
n(CA) = 4

Example 2: If a dice is tossed once, what is the probability than an even number will show up?

P = $\frac{n(CA)}{n(TC)}$

= $^3/_6$

= **½ Answer**

TC = {1,2,3,4,5,6}
n(TC) = 6
CA = {2,4,6}
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) <u>Proper fractions</u>

These are fractions whose numerator is smaller than the denominator.

e.g $\frac{1}{2}$, $\frac{3}{4}$, $^{5}/_{6}$

b) <u>Improper fractions</u>

These are fractions whose numerator is bigger than the denominator.

e.g. $^{5}/_{4}$, $^{3}/_{2}$, $^{19}/_{5}$

c) <u>Mixed fractions</u>

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

<u>Example I</u>

Express $^{9}/_{5}$ as a mixed fraction.

$9 \div 5 = 1$ remainder 4

$= \mathbf{1^{4}/_{5}}$

<u>Example II</u>

Express $^{30}/_{7}$ as a mixed fraction.

$30 \div 7 = 4$ remainder 2

$= \mathbf{4^{2}/_{7}}$

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. $^{2}/_{7}$

<u>EXPRESSING MIXED FRACTIONS IMPROPER FRACTIONS.</u>

<u>Example I</u>

Express $4^{2}/_{3}$ as an improper fraction

$$4^{2}/_{3} = \frac{W \times D + N}{D}$$

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

<u>Example II</u>

Express $5^{1}/_{4}$ as an improper fraction.

$$5^{1}/_{4} = \frac{W \times D + N}{D}$$

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

$= \frac{12 + 2}{3}$ $\qquad\qquad$ $= \frac{20 + 1}{4}$

$= {}^{14}/_{3}$ $\qquad\qquad$ $= {}^{21}/_{4}$

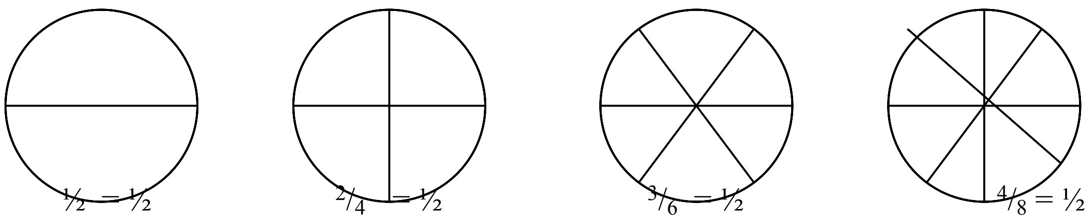
EXERCISEC 2

Express each of these fractions as improper fractions.

1. $1\frac{1}{2}$
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

Write four fractions equivalent to ½.

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

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

Example II

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

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

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

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

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

$= \frac{1}{2}$

Example II

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

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

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

CF = {1,2}

GCF = 2

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

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

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)**

$^1/_{\not 3}$ x $\not{12}^2$ $^1/_{\not 2}$, x $\not{12}^6$ $^1/_4$ x $\not{12}^3$

1 x 2 = 2 1 x 6 = 6 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)**

$^7/_{\not{12}}$ x $\not{24}^2$ $^3/_8$, x $\not{24}^3$ $^5/_8$ x $\not{24}^3$

7 x 2 = 14 3 x 3 = 9 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)**

= (4 ÷4 x 1) + (4 ÷2 x 1)

= 1 x 1 + 2 x 1

4

= $\frac{3}{4}$

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)*

$= 1^5/_{24}$

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 + $^2/_5$

= 10 $^2/_5$

Example III

Add: 5 $^3/_7$+ 12

= 5 + 12 + $^3/_7$ **(First add the wholes alone)**

= 17 + $^3/_7$

= **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**

= $7^3/_6$

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)**

= 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

½ + $^2/_5$ **LCM of 2 and 5 = 10**

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

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

The tank was filled with $^9/_{10}$

Example II

Abdel had 1½ cakes. Jane had $2^3/_4$ cakes and Rose had ¾ of a cake. How many cakes did they have altogether?

Abdel + Rose + Jane

$1^1/_2 + {}^3/_4 + +2^3/_4$ **(Change to improper)**

$= \frac{3}{2} + \frac{3}{4} + \frac{11}{4}$ **(LCM of 2 and 4 = 4)**

$= \frac{6 + 3 + 11}{4}$

$= \frac{20}{4}$ (**reduce the fraction to its simplest terms**)

= **5 cakes.**

EXERCISE C 9

1. $\frac{2}{3}$ 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 $\frac{1}{9}$ wall on Monday and $\frac{4}{9}$ on Tuesday. What fraction of the house was painted on Monday?
3. In a school library, $\frac{5}{15}$ of the books are mathematics, $\frac{1}{6}$ of the books are English and $\frac{1}{3}$ 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. $\frac{2}{3}$ of the day is spent on classroom activities, $\frac{3}{12}$ on music and $\frac{1}{8}$ on games. Express these as one fraction.

SUBTRACTION OF FRACTIONS

Example I

½ – $\frac{1}{3}$. 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**

$= \frac{56 - 25}{20}$

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

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

EXERCISE C 10

1. $^{4}/_{5} - {}^{1}/_{5}$
2. $1^{1}/_{10} - {}^{1}/_{2}$
3. $3 - {}^{1}/_{2}$
4. $3^{1}/_{5} - 1^{1}/_{10}$
5. $3^{3}/_{4} - 1^{1}/_{4}$
6. $2^{3}/_{8} - 1^{1}/_{8}$

WORD PROBLEMS INVOLVING SUBTRACTION OF FRACTIONS

Example I

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

Given – drunk

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

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

$= {}^{3}/_{12}$. **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 ¼ – 2 ½

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

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

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

= **2 ¾ litres of water remained**.

ADDITION AND SUBTRACTION OF FRACTIONS

Example I

½ + $^{1}/_{3}$ – ¼ **LCM of 2, 3 and 4 = 12**

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

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

Example II

Work out:

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

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

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

= $\underline{\mathbf{^{7}/_{12}}}$.

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

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

$= \frac{12 \div 6}{18 \div 6} = \frac{2}{3}$

= $\underline{\mathbf{^{2}/_{3}}}$

Example III

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

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

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

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

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

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

$= \frac{66 \div 6}{12 \div 6} = \frac{11}{2}$

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

$= \underline{\mathbf{5\frac{1}{2}}}$

EXERCISE C 11

1. $^{5}/_{4} + {}^{1}/_{5} - {}^{1}/_{2}$
2. $^{2}/_{3} - {}^{5}/_{6} + {}^{3}/_{4}$
3. $1^{1}/_{2} + 2^{1}/_{3} - {}^{1}/_{4}$
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

$^{1}/_{4} \times 3$ **Make 3 a fraction.**

$= {}^{1}/_{4} \times {}^{3}/_{1}$

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

$= \underline{\mathbf{^{3}/_{4}}}$

Example II

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

$= {}^{2}/_{3} \times {}^{21}/_{1}$

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

$= \underline{2 \times 7}$

1 x 1

= **14**

Example III

½ of 16 **'of' means multiplication**

= ½ x 16 **make 16 a fraction**

= ½ x $^{16}/_{1}$

= 1 x ~~16~~^{8} / $_{1}$~~2~~ x 1

= 1 x 8 / 1 x 1

= **8**

Example IV

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

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

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

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

= 7 x ~~27~~^{9} / $_{1}$~~3~~ x 1

= 7 x 9 / 1 x 1

= **63**

EXERCISE C 12

Multiply:

1. $^{1}/_{3}$ x 3
2. $^{2}/_{3}$ of 15
3. $2^{2}/_{5}$ of 20
4. $^{1}/_{10}$ x $^{2}/_{9}$
5. $^{2}/_{5}$ x 10
6. $1^{5}/_{7}$ of 21
7. $^{1}/_{2}$ x ¼
8. $^{1}/_{8}$ x $^{1}/_{5}$

WORD PROBLEMS INVOLVING MULTIPLICATION OF FRACTIONS

Example I

What is ¼ of 1 hour?

= ¼ of 1 hour

= ¼ of 60 minutes

= ¼ x 60

= ¼ x $^{60}/_{1}$.

= 1 x ~~60~~^{15} / $_{1}$4 x 1

= 1 x 15

= **15 minutes.**

Example II

A mathematics book contains 200 pages. A pupil reads $^3/_5$ of the book. How many pages did the pupil read?

A pupil read $^3/_5$ of 200 pages.

$= {}^3/_5$ of 200 pages

$= {}^3/_5 \times {}^{200}/_1$

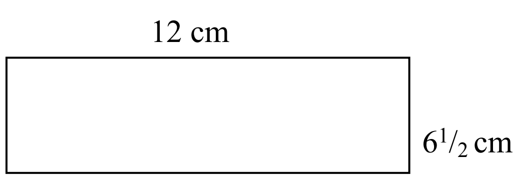
$= \frac{3 \times \cancel{200}^{40}}{{}_1\cancel{5} \times 1}$ pages

$= \frac{3 \times 40}{1 \times 1}$ 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.



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 $\frac{1}{4} = {}^4/_1$

   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 = $^{5}/_{3}$.

<u>∴The reciprocal of $^{3}/_{5}$ is $^{5}/_{3}$</u>.

EXERCISE C 14

A. ***Calculate the reciprocal of each of the following***.

1. ½
2. $^{5}/_{3}$.
3. $^{5}/_{3}$.
4. 7
5. 23
6. 14
7. 3$^{1}/_{8}$.
8. 4$^{7}/_{12}$.
9.

B. ***Find the product of the given number and its reciprocal***.

1. 5
2. $^{3}/_{8}$.
3. 3 ½
4. 10
5. $^{4}/_{9}$.

DIVISION OF FRACTIONS

Example I

Divide $^{1}/_{5}$ ÷ 4 **Make 4 a fraction**

$= {}^{1}/_{5} \div {}^{4}/_{1}$. **Change (÷) to (x) then reciprocal of $^{4}/_{1} = {}^{1}/_{4}$.**

$= {}^{1}/_{5} \times \frac{1}{4}$

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

$= \underline{\mathbf{{}^{1}/_{20}}}$.

Example II

$\frac{1}{2} \div \frac{1}{4}$ **Change (÷) to (x) then reciprocal of $^{1}/_{4} = {}^{4}/_{1}$.**

$= \frac{1}{2} \times {}^{4}/_{1}$.

$= \frac{1 \times 4^{2}}{{}_{1}\not{2} \times 1}$

= 1 x 2

= **2**

EXERCISE C 15

1. $^{1}/_{6} \div 4$
2. $^{1}/_{3} \div 2$
3. $^{2}/_{3} \div 4$
4. $^{3}/_{7} \div 3$
5. $^{4}/_{20} \div {}^{1}/_{4}$
6. $^{5}/_{8}$ of the bread was shared among 16 children. How much bread was given out?

EXPRESSING FRACTIONS AS FRACTIONS DECIMAL.

NOTE:

a) $^{1}/_{1}$. = 1 (***The denominator has no zero, so gives no decimal place***)

b) $^{1}/_{10}$. = 0.1 (***The denominator has 1 zero, so gives 1 decimal place***)

c) $^{1}/_{100}$. = 0.01 (***The denominator has 2 zeros, so gives 2 decimal places***)

Example I

a) Write 25 as a decimal number.

$= {}^{25}/_{1}$. = **25.** (***No zero, no decimal place***)

b) Write $^{25}/_{10}$.as a decimal fraction.

$= {}^{25}/_{10}$. = **2.5** (***1 zero, 1 decimal place***)

c) Write $^{25}/_{100}$. as a decimal fraction.

= $^{25}/_{100}$. = **0.25** (***2 zeros, 2 decimal places***)

NB: The zero before the decimal point is used to keep the place of whole numbers.

Example II

Express $3^{1}/_{10}$. as a decimal number.

First change to improper fraction.

$3^{1}/_{10}$. $= \frac{(10 \times 3) + 1}{10}$

= $^{31}/_{10}$.

= **3.1** (***1 zero, 1 decimal place***)

Example III

Express $7^{5}/_{100}$. as a decimal fraction

First change to improper fraction.

$7^{5}/_{100}$. $= \frac{100 \times 7 + 5}{100}$

= $^{705}/_{100}$.

= **7.05** (**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

NOTE.:

a) 1 decimal place gives 1 zero on the denominator. Eg 0.5 = $^{5}/_{10}$.

b) 2 decimal places give 1 zeros on the denominator. Eg 0.05 = $^{5}/_{100}$.

Example I

Express 6.9 as a common fraction.

6.9 = $^{69}/_{10}$. (**1 decimal place gives 1 zero on the denominator**.)

= $^{69}/_{10}$. **Change to mixed fraction**.

= **$6^{9}/_{10}$**.

Example II

Express 3.05 as a common fraction.

3.05 = $^{305}/_{100}$. (**2 decimal places give 1 zeros on the denominator**.)

= $^{305}/_{100}$. (**Change to mixed fraction**)

$= 3^5/_{100}$. **(Reduce $^5/_{100}$ to give $^1/_{20}$.)**

$= \underline{\mathbf{3^1/_{20}}}$.

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 $= \frac{1}{10} \times 100 = \mathbf{10}$ (1st)

$= \frac{11}{10} \times 100 = \mathbf{110}$ (2nd)

$= \frac{11}{100} \times 100 = \mathbf{11}$ (3rd)

From smallest = 0.1, 0.11, 1.1.

Example II

Arrange from the smallest: 0.22, 0.2, 1.2

Change to common fractions. $= {}^{22}/_{100}, {}^2/_{10}, {}^{12}/_{10}$.

The biggest denominator is the LCM. = 100

Multiply each fraction by the LCM $= \frac{22}{100} \times 100 = \mathbf{22}$ (2nd)

$= \frac{2}{10} \times 100 = \mathbf{20}$ (3rd)

$= \frac{12}{10} \times 100 = \mathbf{120}$ (1st)

From biggest = 1.2, 0.22, 0.2.

Example III

Which is less than the other? 0.2 or 0.1 (Use < or > correctly)

0.2 0.1

Change to common fractions. = $^{2}/_{10}$, $^{1}/_{10}$

The biggest denominator is the LCM. = 10

Multiply each fraction by the LCM $= \frac{2 \times 10}{10} = 2$

$= \frac{1 \times 10}{10} = 1$

$\therefore$ **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
    8 . 02
 + 36 . 48
   59 . 40
```

Example II

Add: 0 . 45 + 13 . 2 + 52 . 00

{**Arrange vertically and put the decimal point in line**}

```
    0 . 45
   13 . 2
 + 52 . 00
   65 . 65
```

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

```
    97 . 40
+   13 . 69
    83 . 71
```

Example II

63 – 19 . 78

Arrange vertically and put the decimal points in line

```
    63 . 00
+   19 . 78
    43 . 22
```

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**)

= 13 . 75

+ <u>91 . 25</u>

105. 00 **(Then subtract)**

\- <u>27. 00</u>

78. 00

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

$\frac{10x}{10} = 40$

$\frac{X}{10} \times 10 = 40 \times 10$

X = 400

If 10% of the number = 40.

1% of the number $= \frac{40}{10}$

100% $= \frac{40}{10} \times 100$

$= 40 \times 10$

$= \mathbf{400}$

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

If 20% of the number = 35.

1% of the number = $\frac{35}{}$

100% of the number = $\frac{35}{} \times 100$

$\frac{10}{2} \times \frac{2}{10} = 35 \times \frac{10}{2}$ 20

x = 35 x 5   = 35 x 5

x = 175 Answer   **= 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% of 200 = $\frac{120}{100} \times 200$

= 12 x 20

= Sh. 240

First find the increment.

= $\frac{20}{}$ x 200 = 2 x 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%) of 300 = $\frac{90}{100} \times 300$

= 90 x 3

= **270 Answer.**

($\frac{10}{100}$ x 300) = 10 x 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 = ($\frac{25}{}$ x $\frac{1}{}$)

12 ½ % as a fraction.

= $\frac{25}{}$ x $\frac{1}{}$

$= \frac{25}{200} = \frac{1}{8}$

$= (\frac{8}{8} - \frac{1}{8})$ of 800

$= \frac{7}{8} \times 800$

$= 7 \times 100$

$=$ **700 Answer**

The decrease $= (\frac{1}{8} \times 800$

$= 100$

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.

Percentage profit = $\frac{\textbf{Profit}}{\textbf{Cost price}}$ **x 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?

Percentage loss = $\frac{\textbf{Loss}}{\textbf{Cost price}}$ **x 100**

$= \frac{3000}{35,000} \times 100 = \frac{3 \times 100}{35} = \frac{60}{7}$ **$8\,^4/_7$ %**

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

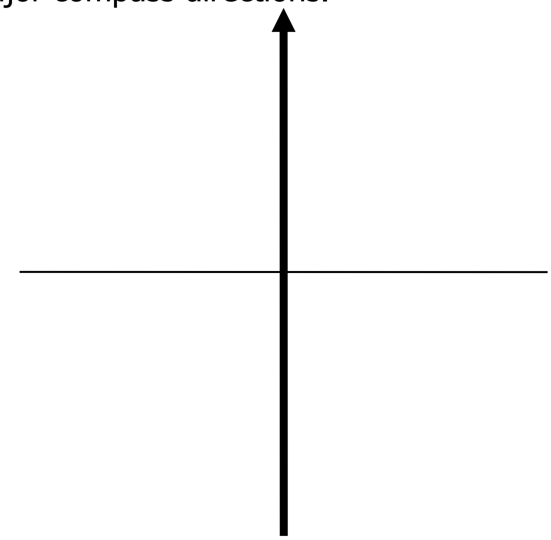
6. a) Draw a line for the equation y = 2x-1.
Use a table to find the coordinates of this line.
b) List down these points .Join the points together and draw this line

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

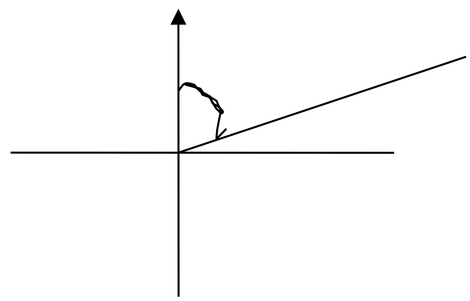
TURNING FROM A POINT AT A GIVEN BEARING

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.

Diagram:



6. a) From B move at a bearing of 045^0
   b) From C move at a bearing of 120^0
   c) From D move at a bearing of 150^0
   d) From E move at a bearing of 060^0
   e) From F move at a bearing of 280^0
   f) From G move at a bearing of 300^0
   g) From H move at a bearing of 320^0
   h) From I move at a bearing of 015^0
   i) From J move at a bearing of 020^0
   j) From Entebbe move at a bearing of 305^0

FINDING THE BEARING OF ONE PLACE FROM ANOTHER

6. From the diagrams shown find the bearing of K from M.

   a)

b)

c)

d)

e)

f)

g)

h)

i)

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} = **240 ^{0}** **or** 090 ^{0} + 090 ^{0} + 060 ^{0} = **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.

kkkended

jurisdiction

TOPIC : SETS II

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: 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.

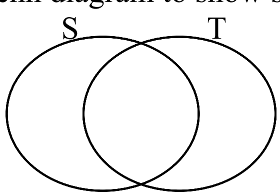
2. Types of sets

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

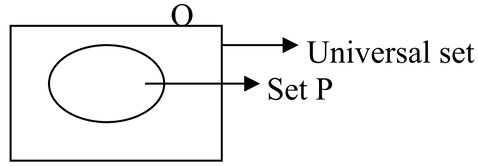
2. The symbol for universal set is

3. EXAMPLES OF UNIVERSAL SETS

a) Domestic animals
{ cats, goats, cows, dogs, sheep}
b) Vegetables
{ cabbage, letters, lettuce, sukuma}
Clothes

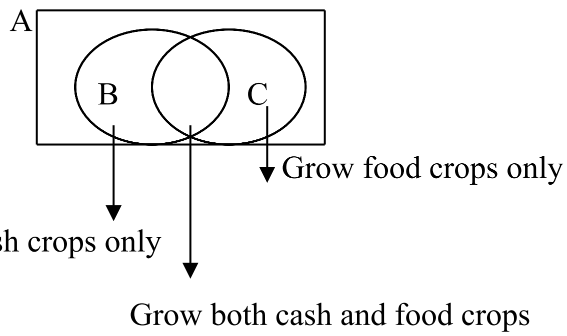
{ skirt, trouser, short}

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

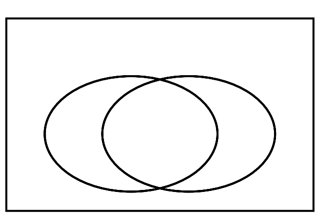
1. K = [all books in the library]
L = [all mathematics books]

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

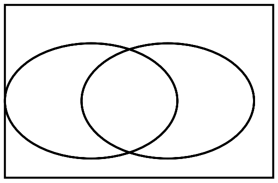
1. List all the elements of the sets shown on the venn diagram



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

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

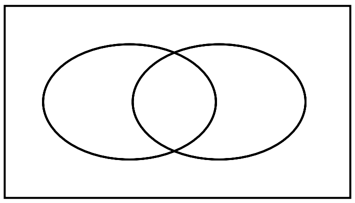
2.



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

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

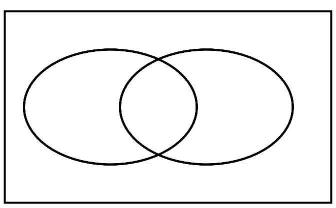
3.



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

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

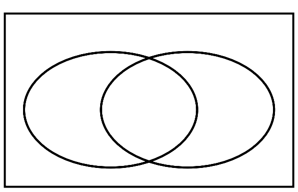
4.



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

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

5.



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

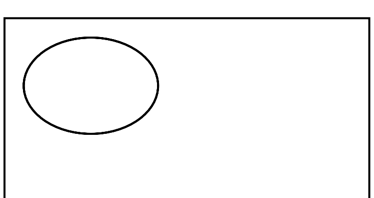
N= { 0,4,2,5,7} Q = { 3,6,2,5,7}

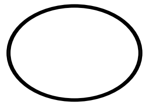
SUBTOPIC : COMPLEMENTS OF SETS

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

EXAMPLE

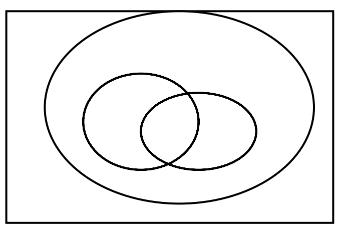
1.





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}

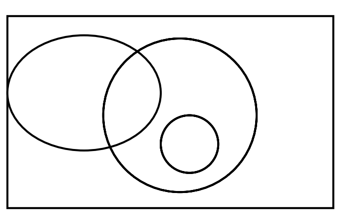
Trial



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

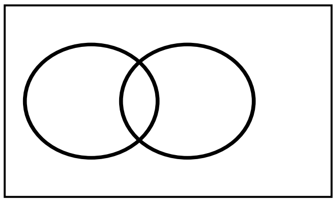
1.



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

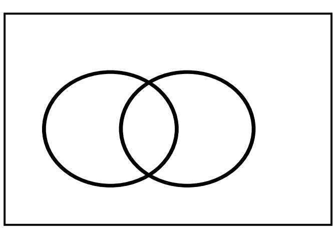
SUBTOPIC: SUBSETS

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

SUBTOPIC: SHOWING NUMBER OF MEMBERS

Example 1

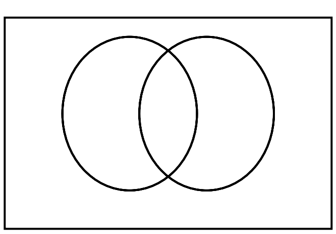
Given that set A = [factors of 18]
B = [factors of 24]
A = [1,2,3,6,9,18]
B = [1,2,3,4,6,8,12,24]
Fill in the venn diagram to show sets A and B



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]

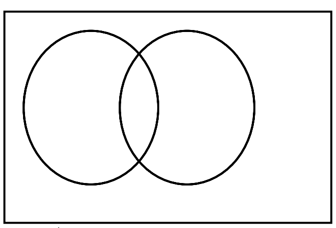
5. Set V = [jane,sarah,andrew,henry,marvin]
   Set D = [amos,josehp,deo,henry,andrew]

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

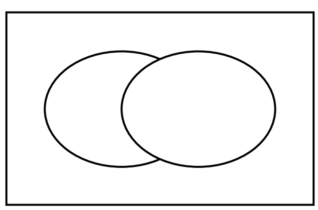
i. Show this information on a venn diagram.
ii. How many pupils eat meat only?
iii. What is the number of pupils who eat beans only?
iv. How many pupils eat only one type of food?
v. Find the number of pupils who eat bot foods.

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 upil 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
6 → Ones
5 → Tens
4 → Hundreds
2 → Thousand

Example 2

Values of each digit

3 2 4 5 6
6 → ones = 6x1 = 6
5 → tens = 5x10 = 50
4 → hundreds = 4x100 = 400
2 → thousands = 2x1000 = 2000
3 → 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

$2678 = 2.678 \times 10^3$

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

111two
\+ 110two
1101two

EXERCISE

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

SUBTOPIC ; SUBTRACTION OF BASES

Example 1

53six – 45six

53six
\- 45six
4six

EXERCISE

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

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

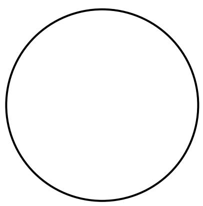
1. Finite system is a way of finding remainders.
2. Finite system can also be called modular (mod) or clock arithmetic or remainder.
3. We have two types of clockfaces.
   a) Daily activity teller
   b) Special time teller

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

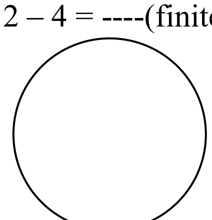
1. 3+2 = x (finite 5)
2. 3 + 4= x (finite 7)
3. 2 + 3 + 4 = x (finite 5)
4. 3 + 3 = y (finite5)
5. 6 + 8 = y (finite 12)
6. 1+ 2 + 5 = y (finite 7)

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

TOPIC : INTEGERS

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

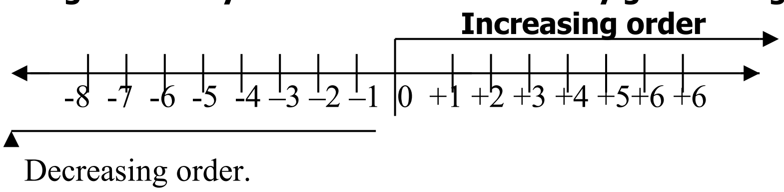
METHODS : Discussion
: Question and answer
: Observation
:

ACTIVITIES : Doing the exercise.
: Answering questions.
: Drawing the number lines.

Integers are a set of numbers, which lie on a number line and include both positives and negative numbers. Positive and Negative numbers are called **DIRECTED** numbers because the sign used indicates which direction to go from zero. Zero is neither a positive nor a negative.

ORDER OF INTEGERS

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



EXERCISE:

COMPARING INTEGERS

Supply the correct sign,>, <,or =

1 -33------------ -38   2: 0------------- -200   3: -20---------- 20   4: -1000--------5

6: +35------------- 35 etc

NB If the two signs are next to Each other or near one another it means multiply them.

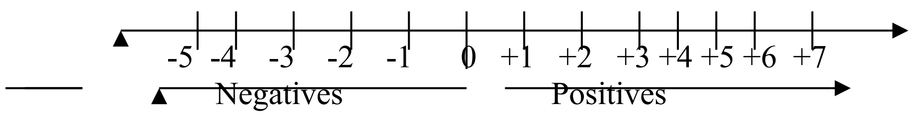
Example $-4 - {}^{-}5 = -4+5$
$= 1$

ii If the signs are not next to each other, the same sign means put the same sign and add the numbers. Example -3-6 = -9. But if the signs are different it means write the sign of the bigger number.

Example: i -5 +7 = 2,   ii +6 –14 = -8

THE NUMBER LINE

It is a straight line in which positive and negative numbers can be represented. The numbers to the right of zero are positive integers while those to the left of zero are
Negative integers.



ADDITION OF INTEGERS

(a) Your face is your positive and your back is your negative
(b) The addition operation means face the direction of the arrow
(c) Always start facing the positive direction from the zero

NB Let the teacher demonstrate using the ground number line. More examples should be given to the pupils to practice on the ground number line and on the chalkboard.

Exercise: Let the pupils work out the following using the number line

1: +6 +4 =   ii -3 +7 =   iii -5 +4 =   iv 3+ -3 =
v 1+-7 =   vi 5+3 =   vii -4+9 =   viii -2+-4 =

SUBTRACTION OF INTEGERS:

I Subtraction means turn and move to the required direction.
2 Always start by facing the positive direction.

NB Subtraction of integers is the same as adding the opposite of the second integer to

First integer. Example: 5-⁻3

5+ ⁺3

(i) Positive means forward movement
(ii) Negative means backward movement
(iii) Subtraction means turn
(iv) Addition means continue

A ground number line should be used to illustrate the operation of the signs

Exercise: Let pupils do the following using the number line

1: 4-2	2 -7+⁺8
3: 11-⁻4	5: -2-⁻2
4:-3-⁻6	6: 3-⁺9

Let pupils do more exercise understanding mathematics book 7 pages 91-93

TABLE OF INTEGERS

+VE X +VE = +VE	+VE ÷ +VE =+VE
+VE X –VE = -VE	+VE ÷ -VE = -VE
-VE X –VE = +VE	-VE ÷ -VE = =VE

MULTIPLICATION OF INTEGERS:

Multiplication is regarded as repeated addition
Show 3X2 on the number line
3X2 means make a movement of 3 steps of 2spaces starting from zero
The teacher should guide the pupils to multiply integers using ground number line
Pupils should be allowed and be given more time to practice multiplying integers on the number line after which they should do the given exercise in their books

Let pupils do exercise 13:3 no 1 a,c,h,m.

Exercise:13:4nos. 1,2,5,6,8. Understanding maths book 7 pages 200-201.

***DIVISION OF INTEGERS*:** Division is regarded as repeated subtraction

I +25 ÷ +5 =+5	2: +24 ÷ -3 = -8
3: -36 ÷ -9 = +4	4: -18 ÷ 6 = -3

Let pupils do exercise 13:6 MK 2000 page 203 numbers: 1,3c,5b,6a,9a,11c,12a,13c.
Pupils should be encouraged to show all the working clearly.

APPLICATION OF INTEGERS

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

Solution: BC =-ve = 35-⁻17
AD = +ve = 35 +17
= **52 years**

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

Solution: $= 100 - {}^-3$

$= 100+3$

$=$ **$\underline{103^0C}$**

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.

$= 35 - {}^-15$

$= 35+15$

$\underline{= \quad 50 minutes}$

4 Moses put ice at -25^0C into a kettle and boiled it to 100^0C.He waited till the temperature dropped by 50^0C.

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

Solution: $= 100^0C - {}^-15^0C$

$= 100+15$

$=$ **$\underline{115^0C}$**

b: What was the difference in temperature between ice and the water which Moses drank?

Solution: $= 50^0C - {}^-15^0C$

$= 50 +15$

$=$ **$\underline{65^0C}$**

5: Lucy runs a race in a time of 5seconds less than 5 minutes . Achom runs it in 2 seconds more than Lucy.What is Ahom's time for the race?

Solution Lucy: 5.00

- 05

4:55

4minutes 55seconds

Achom: 4: 55

\+ 0: 02

4: 57 **<u>4 minutes 57 seconds</u>**

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

a) How much debt had she in all?

Solution: Debt = -ve

200,000/= x4 =800,000/=

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

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

Solution: 2000,000-800,000

<u>1200,000/= remained</u>

The normal body temperature of a human being is 370C.Before treatment a malaria

Patient had a 4^0C increase and after the treatment ,the temperature reduced by 2^0C.

Find the body temperature of the patient after treatment.

Solution 37^0C+4^0C
= 41^0C
After treatment = 41^0C –2^0C
= **39^0C**

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

Solution Number of steps climbed is 3X4 =12
Number of steps slipped down = 4
= 12 – 4
= **8 steps from the ground**

Alternatively the teacher should demonstrate the whole on the ground or chalkboard

Exercise: let pupils do exercise 19:8 MK:2000 Revised edition page 363
Numbers: 1,2,3,5,6,10,15,16,and17.

TOPIC: ALGEBRA

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

METHODS : Discussion
: Question and answer
: Observation
:

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

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

HOW TO SIMPLIFY EXPRESSIONS WITH MANY TERMS

Example 1: Simplify: 3a –8a +5a +9a –2a

Solution: First group all the terms with positive signs
3a +5a +9a –8a –2a.

= 17a –10a

= 7a

This method is called grouping positives and negative terms

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

$ab^2 + 3ab^2 - 5ab^2$

$4ab^2 - 5ab^2$

$\mathbf{-ab^2}$

b 6ab –2ab – 3ab

6ab – 5ab

ab

Let pupils do Exercise 23:9 MK2000 new edition page 406

Numbers 1,2,3,5,7,9,10,14, and 15.

Collection of like terms

NB A term without a sign is a positive term. A sign before the term is the **term for that term**

Examples:

i -m + 2p +5m –8p –m

-m +-m +5m –8p +2p

-2m +5m –6p

3m –6p

ii 3xy –5ac +4xy +6ac

3xy +4xy –5ac +6ac

7xy +6ac –5ac

7xy +ac

iii 4a +6b –9a +2b

4a –9a +6b +2b

-5a +8b

iv 8w –5k –11w +4k

8w –11w -5k + 4k

-3w -k

Let pupils do exercise 23:10 MK 2000 new edition page 408 numbers

1,2,3,4,7,8,9,15,and16

Removing brackets

Expressions which involve brackets must have terms inside the Brackets simplified first, then collect the like terms

Example $3(2x + 4x)$

$= 6x + 12x$

$= \underline{18x}$

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

Example: $2(3y + 6p)$

$\underline{6y + 12p}$

Positive sign before the brackets

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

Examples $5(3m + 2a)$

$\underline{\mathbf{15m+10a}}$

(b) $-(5-n)$

$\mathbf{-5 + n}$

(c) $-3(4a - 6y)$

$\underline{\mathbf{-12a + 18y}}$

(d) $-x(-2x + 3y)$

$\underline{\mathbf{2x^2 - 3xy}}$

(e) $-13(x+4) - 21(1-x)$

$-13x - 52 - 21 + 21x$

$-13x + 21x - 52 - 21$

$\underline{\mathbf{8x - 73}}$

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

$a^2 + ab - ab - b^2$

$\underline{\mathbf{a^2 - b^2}}$

Let pupils do exercise 23:12 MK 2000 pupils book page 410 numbers 1,3,4,7,12,and 14 also Exercise 23:13 MK 2000 page 410 numbers 1 ,a,b,c,d,e,h,Iandj

Subtraction of expressions

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

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

Example i Subtract 12x from –8x

$(-8x) - (12x)$

$-8x - 12x$

$\underline{\mathbf{-20x}}$

ii Subtract: 2m-3w from 4m +w

$(4m+w) - (2m-3w)$

$4m + w - 2m + 3w$

$4m - 2m + w + 3w$

$\underline{\mathbf{2m+4w}}$

iii Subtract: 2x +y from 3x +2y

Subtract: 2(x+3)from 3(x+1)

(3x+2y) –(2x+y)
3x +2y –2x+y
3x –2x +2y +y
x +3y

3(x+1) –2(x+3)
3x +3 –2x -6
3x-2x +3-6
x –3

Thrice the difference between x and 7: 3(x-7)
Let the pupils do exercise 23:13 MK 2000 page 410 new edition
Numbers 2 a,b,c,d,e
1 Let the term to be subtracted from be given any unknown,which is not in the terms mentioned.
2 Put the terms in brackets
4 Let the terms you have give given be left alone on one side by making them positive. Example:
I) What must be subtracted from 3x+2y to give x +3y?

Solution

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

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

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

iv What must be added to ½ to get ¾

Solution Let the number added be p

$$P + \frac{1}{2} = \frac{3}{4}$$

$$P + \frac{1}{2} - \frac{1}{2} = \frac{3}{4} - \frac{1}{2}$$

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

$$P = \frac{1}{4}$$

Exercise: Let pupils do Exercise below
1: **W**hat must be subtracted from ¾ to get 1/3 ?
2 What must be subtracted from 3x + y to get x + y?
3 What must be added to x to get 2x – 5?
4 What must be added to –m to get 3m- 6?

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

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

Examples: Given that a =3, b =4 and c = 5

Evaluate:
3(5+4)
3(7)
3x7
21 Ans

a(b^2 – c)
3 (4^2 – 5)
3 (4x4 –5)
3(16 – 5)
3x11
33 Ans

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

(a) 4(a + b)
4(5 + 10)
4 x15
= 60 Ans

(b) -3(a + 3c)
-3(5+ 3x6)
-3 (5 + 18)
-3 x23
= -69 Ans

(c) d(b- 6)
½ (10 –6)
½ (4)
½ x 4
= 2 Ans

(d) ad(b – c)
5 x ½(10 – 6)
5 x ½ x4
5 x 2
= 10 Ans

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

Solution 3x – y = 3(a+2b) – (2a-b)
3a + 6b - 2a + b
3a –2a +6b +b
a + 7b

(2x+y) = 2(a+2b) +(2a – b)
= 2a +4b +2a -b
= 2a+2a+4b-b
= **4a +3b**

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

a) 3(b-2c)
3(6y-2x2z)
3(6y –4z)
18y –12z

b) -a(b+c)
-3x(6y+2z)
(-3x x 6y) + (-3x x 2z)
-18xy – 6xy

Exercise:

Let pupils do the following exercise.

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

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

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

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

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

Let pupils do exercise 23:14 on MK 2000 revised edition page 411 numbers

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

Removing brackets involving fractions:

i) $^1/_3$(3a+9b)

= $^1/_3$ x 3a + 1/3 x 9b (cancelled, 3)

= **a+3b**

ii ½(4a + 6ab) – $^2/_3$ (9a –12ab)

$\frac{4a + 6ab}{2} - \frac{18a + 24ab}{3}$ (cancelled to 2a, 3ab, 6a, 8ab)

2a+3ab –6a +8ab

2a-6a +3ab+8ab

-4a +11ab

iii $\frac{2}{7}(42b - 14a)$

6b 2a

$\frac{2 \times 42b - 2 \times 14a}{7}$ = **12b – 4a**

Let the pupils do Exercise 23:15 MK 2000 page 412 numbers 1,3,5,7,10,12,15.
EERCISE : 23:18 MK2000 revised edition page 415 numbers 1,5,8,10,14,and 16.

FRACTIONAL TERMS:

In fractional terms ,any term without a denominator is assumed to have the denominator as 1.

Example: $a + \frac{a}{5}$

$5xa + \frac{a}{5} \times 5$

$\frac{5a + a}{1}$

= **6a**

ii $\frac{x}{2} + \frac{x}{3}$

$6 \times \frac{x}{2} + \frac{x}{3} \times 6$ LCM = 6

$\frac{3x + 2x}{6}$

$\frac{\mathbf{5x}}{\mathbf{6}}$

iii) $p + \frac{p}{3}$

$\frac{3Xp}{1} + \frac{p}{3}$ LCM =3

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

iv) $\frac{b}{4} - \frac{b}{3}$ LCM =12

3 4

$\frac{\frac{b}{4} \times 12 - \frac{b}{3} \times 12}{\mathbf{12}}$

$\frac{3b - 4b}{12}$

$\frac{\mathbf{-b}}{\mathbf{12}}$

v) $\frac{x+1}{2} + \frac{x-2}{3}$ Lcm =6

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

3x + 3 + 2x – 4

3x + 2x +3 –4

$\frac{\mathbf{5x -1}}{\mathbf{5}\ 6}$

vi) $\frac{2n+3}{3} - \frac{2n-5}{4}$ Lcm = 12

$\frac{12(2n+3)}{3} - \frac{12(2n-5)}{4}$

$\frac{4(2n + 3) - 3(2n - 5)}{12}$

$\frac{8n + 12 - 6n + 15}{12}$

$\frac{8n - 6n + 12 + 15}{12}$

$\frac{\mathbf{2n +27}}{\mathbf{12}}$

$\frac{5x+4}{2} - \frac{2x-8}{5}$ Lcm =10

$10\frac{(5x+4)}{2} - 10\frac{(2x-8)}{5}$

$\frac{5(5x+4) - 2(2x-8)}{10}$

$\frac{25x + 20 - 4x + 16}{10}$ $\frac{25x - 4x - 4 + 16}{10}$

$\frac{\mathbf{21x + 36}}{\mathbf{10}}$

Let the teacher give more examples on various fractions

Give pupils the following exercise to do

Exercise 23;17 MK2000 revised edition page 415 numbers 1,4,6,8,12,15.

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

Example: Solve: I) y +4 = 6
Y+4 –4 = 6 –4
Y = **2**

ii) p – 7 = 12
p –7 +7 = 12 +7
p = **19**

iii) 4m = 36
$\frac{4m}{4} = \frac{36}{4}$
m = 9

iv) $\frac{x}{6} = 5$
$\frac{6x}{6}$ = **5x6**
x = 30

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

$\frac{6(3y+3)}{3} + 2x6 = \frac{6(2y+12)}{2}$
6y +6 + 12 = 6y +36
6y + 18 – 18 = 6y +36 –18
6y –6y = 18
= **18**

iv) 4p = 48
$\frac{4p}{4} = \frac{48}{4}$
p = 12

Let pupils do revision exercise 8 on page 423 MK2000
Nos. A 1 ,4 7 10
B 2, 5 ,7, 10.
C 1. 6, 9 , 10

EQUATIONS INVOLVING BRACKETS

NB: before any equation of this nature can be solved ,brackets must be removed first

Examples: 2(m+2) = 12
2m + 4 = 12
2m + 4 – 4 = 12 –4
$\frac{2m}{2} = \frac{8}{2}$
m = 4

ii 3(p + 4) = 36
3p + 12 = 36
3p +12 –12 = 36 - 12
$\frac{3p}{3} = \frac{24}{3}$
p = 8

ii) 4(x – 5) = 16
4x – 20 +20 = 16+20
3 $\frac{4x}{4} = \frac{36}{4}$
x = 9

iv) 6(4y –3) = 6
24y – 18+18 = 6 + 18
$\frac{24y}{24} = \frac{24}{24}$
y = 1

$3m^2 = 12$
4 $\frac{3m^2}{3} = \frac{12}{3}$
$\sqrt{m^2} = \sqrt{4}$
m = 4

vi) 4p2 = 100
$\frac{4p2}{4} = \frac{100}{4}$
√ p2 = √25
p = 5

Let pupils do Exercise 23:29 MK2000 revised edition numbers
A 1,4 8. B: 1,5,8. C : 2,3,4,5,6,7,8.

EQUATIONS WITH FRACTIONAL COEFFICIENTS:

Examples: I) ½ t = 6 ii) $4^1/3$p + 2 = 15

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

t = 12

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

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

p = 3

iii) $0.4m + 0.5 = 2.1$

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

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

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

m = 4

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

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

$3p - 2p = 21$

p = 21

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

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

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

5

x = 0

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

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

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

y = 3

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

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

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

m = 10

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

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

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

r = 14

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

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

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

n = 24

Exercise: Let pupils do exercise 23: 34 MK2000 page 405 numbers
1 to 10
2 Let them also do exercise 23:30 MK2000 numbers page 1,4,5,7,8,912
3 Exercise 23:33 MK2000 page 425 numbers A: 1,5,7,8 B:1, 4, 8.

APPLICATION OF ALGEBRA :

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

Solution: **L**et the number be p

$P + 4 = 10$

$P + 4 - 4 = 10 - 4$

P = 6

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

Solution: Let the number be y

$\frac{Y \times 2}{3} = 10$

$3 \times \frac{2y}{3} = 10 \times 3$

$\frac{2y}{2} = \frac{30}{2}$

y = 15

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

Solution: Let the cost of a goat be p:

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

Goat Sheep

P p +6000**/=**

P+p+6000 = 70,000=

2p +6000-6000 = 70,000 –6000

$\frac{2p}{2} = \frac{64,0000}{2}$

p = 32000=

Goat =32000/=

Sheep p + 6000

32000 +6000 =38,000/=

Solution Let the cost of a pen be n

Pen book

n 2xn

n+2n = 600

$\frac{3n}{3} = \frac{600}{3}$

n = 200/=

Pen =200/=

Book 2x200

400/=

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

Solution: Let the age of Abbo be y years

Alice **Abbo**

Y y – 4

Y+y –4 = 24

2y – 4 +4 = 24 +4

$\frac{2y}{2} = \frac{28}{2}$

y = 14

Alice **= 14 years**

Abbo = 2-y

= 14 -4

Abbo =10 years

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

Solution: Peter Moses

Y+5 y

Y+y+5 = 49

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

Moses is 22 years

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

P +2p =150.000=

$\frac{3p}{3} = \frac{150,000}{3}$

Ball =50,000

Boots = 2x 50,000

100,0000/=

8: A mother bought 8 exercise books at shs.(x-150) each and two mathematical sets at . (x+100).each .If she spent shs.5300.altogether.How much did she spend on:

a) books? b) sets.

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

8x - 1200 + 2x +200 = 5300

8x+2x – 1200 + 200 = 5300

10x - 1000 +1000 = 5300 + 1000.

$\frac{10x}{10} = \frac{6300}{10}$

x = 630

Books 8(630 –150)

8 x 480

3840/=

Sets 2(630 + 100)

2 x 730

1460/=

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

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

9y + 9 +24 = 8y + 48

9y + 33 = 8y +48 – 33

9y –8y = 15

y = 15

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

Solution: Joyce Alice Betty

P 2p 3x2p = 72000=

P+2p+6p = 72000=

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

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

16000= Betty =3x16000

= 48,000=

Exercise:

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

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

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

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

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

iii) Exercise 23: 47 MK 2000 pages 430 – 431 nos 2,3,4,5,6,.

Formation of equations about time to come.

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

Solution: let the sons present age be n

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

What will be their ages then?

Solution: son n+10 Father n+30

10 +10 **10 +30**

20 years **40 years**

The should give more examples related to given information

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

Solution: **Anne** **Peter**

Now m -15 m **Peter = 25years now**

15 years time (m –15+5) = 2x 1/2(m+5)

2(m –10) = m+5

2m –20 +20 = m+5 +20 Anne = m -15

2m – m = 25 25 - 15

m = 25 = 10years

What will be their ages then? Anne 25 –10
15years

Peter = m +5
25 +5
30 years

3:A son is 20 years younger than the mother.In 10 years time the son will be half the age of the mother . Calculate their present ages.Solution Let the mother's age be y

	Son	mother	
now	y-20	y	
10yrs time	(y-20+10)	= ½(y+10)	= 2y – y = 30
	2x(y-10)	= 2x1/2(y+10)	y = 30
	2y –20+20	= y +10 +20	= **mother =30 years**

= Son y-20
30 – 20 = **10years**

c) What will their ages be then?

Solution Mother y+10
30 +10
40 years

son : y-20+10
30 –20 +10
10+10
20 years

Let the teacher give more examples of the related exercise.

Exercise

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

Let the daughter's age be n

	Daughter	mother
(Now)	N	n+14
8 yrs time	2 (n+8)	= (n+14+8)
	2n +16	= n+22
	2n +16-16	= n+22-16
	n	= 6
	Son	**= 6years**
	Mother n+14	
	6+14	**=20years**

Their ages then:
son n+8
6+8 = **14year**s
mother n+14+8
6+14+8
28 years

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

Solution: Let Rose's age be p

	Rose	Susan
Now	p	p-3
2yr's time	(p+2)	(p-3+2)

p+2+p-3+2 =51
p+p+2+2-3 =51
2p+1-1 = 51-1
2p/2 = 50/2
p = 25

Rose =25 year

Susan p-3
25-3
22 years

Their ages then

Rose:
p+2
25 +2
27 years

Susan
p-3+2
25-3+2
22+2
24 years

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

Let the son's age be x

	Son		father
now	X		3x
10yr's time	2(n+10)	=	½(3n+10)
	2n +20	=	2x1/2(3n+10)
	2n +20-20	=	3n +10-20
	2n-3n	=	-10
	-n	=	-10
	-1	=	-1
	n	**=**	**10**

Son = 10 years **Father 3x10**
30 years

Their ages then

son	**Father**
n+10	3x10 +10
10 +10	30+10
20 years	**40 years**

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

Solution: Let John's age be y

	John		**Peter**
Now	**Y**		**y+20**
Ago	**2(y-15)**	**=**	**(y+20-15)**
	2y –30	**=**	**y+5**
	2y –30+30	**=**	**y+5+30**
	2y –y	**=**	**y+35**
	y	**=**	**35**

John: **35 years**

Peter **y+20** **35+20** **55 yeas**

Their ages ago

John	**y+20-15**
y-15	**35+20-15**
35-15	**55-15**
20 years	**40 years**

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

Solution: Let Musa's age be **m**

	Annet		**Musa**
Now	**m-20**		**m**
Ago	**2 (m-20-10)**	**=**	**½(m-10)**

2(m-30) = ½X2(m-10)
2m-60+60 = m-10 +60
2m-m = 50
m =50

Musa 50 yrs
Annet (m-20)
50-20
30years

How old were they then?

Musa	**Annet**
m-10	**m-30**
50-10	**50 - 30**
40 years	**20 yers**

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

Finding time to come given different ages or measurements:

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

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

	Mary		**Aisha**
	10 years		**30 years**
Time to come	**(10+t)2**	**=**	**2x½(30+t)**
	20+2t	**=**	**30+t**
	20-20 +2t	**=**	**30-20 +t**

t = 10year's

$2t - t = 10$

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

Solution: Let time to come be p

	Daughter		mother		
Now	**3 years**		**21 years**	**9-9+3p**	**=21-9+p**
Time to come	**3(3+p)**	**=**	**(21+p)**	**3p-p**	**=12**
	9+3p	**=**	**21+p**	**2p**	**= 12**
				2	**2**
				p	**6 6years time**

What will be their ages then?

Daughter 3+p **Mother 21+p**

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

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

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

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

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

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

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

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

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:

1^{st}	2^{nd}	3^{rd}	1^{st} **14**
m	m+1	m+2	2^{nd} m+1
m+m+1+m+2	= 45		14+1 = **15**

3m+3 -3 = 45 –3

3m = 42   3rd m+2

3 = 3   14+2

m = 14   16

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

Solution: i: List down the order of numbers.{ **1**,2,**3**,4,**5,**6,**7**,8.9,10,**11,**12, ,**13, --}**

ii: Identify the numbers in the order (sequence)

iii: Find the number of spaces between the numbers, you will find out there are two spaces between the consecutive numbers.

Let the numbers be: 1st 2nd 3rd

n: n+2 n+4   1st = **17**

n+n+2+n+4 = 57

3n+6-6 = 57-6   2nd = n+2

3n = 51   = 17+2

3 = 3   = **19**

n = 17   3rd = 17+4 = 21

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

Example 3:` The sum of 3 consecutive even numbers is 78.Find the numbers.

Solution : Use the steps as in the consecutive odd numbers.

1st 2nd 3rd

p p+2 p+4   1st **= 24**

p+p+2+p+4 = 78

3p+6-6 = 78 – 6   2nd = 24+2

3p = 72   **26**

3 = 3   3rd = 24+4

p = **24**   = **28**

Exercise:

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

2: The sum of 3 consecutive odd number is 95

a) Find the numbers .
b) Calculate the median
c) Work out their mean
d) What is the product of the 1st and the last numbers.

3: The sum of 4 consecutive odd numbers is 88 .

a) Calculate the range of the numbers .
b) Calculate their median.
c) Work out the mean.

The mean of consecutive numbers.

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

a) Work out the numbers .
d) Calculate the range of the numbers.
e) What is their median.

Solution: Let the consecutive numbers be y   1st **= 14**

1st 2nd 3rd

y y+2 y+4 = 16   2nd = 14+2

3x(y+y+2+y+4) = 16x3   **16**
3   1
3n+6+-6 = 48 –6   3rd = 14+4
3n = 42   **= 18**
3   3   Range = 18 – 14 =4
n = 14   **Median = 14, 16,18**
= 16

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

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

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

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

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

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

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

INEQUALITIES AND SOLUTION SETS:

1 An inequality is a mathematical statement which states that two sides are not

equal.
Symbols used. $<$ ---------- Less than

$>$ -----------Greater than

$\leq$ ------------- Less than and equal to

$\geq$ ------------- Greater and equal to.

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

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

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

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

Exercise:

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

1: 12-------------------3

2: 101 cm--------------- 1m

3: 6x------------------3x+4x

4: ½ ----------------------1/3

5: 0.001----------------0.1

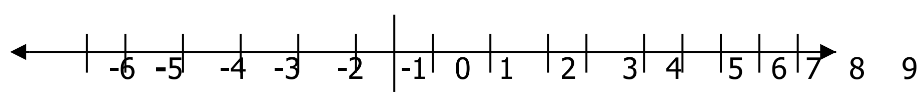
6: 124gms----------------- 1kg.

7: 1 litre----------------500mls.

8: 1 fourscore-------------1 gross

Representation of sets on a number line.

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



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

Example ii If $5 > y > -2$. Find the solution set.
NB: It must be made clear that in all questions involving solution sets number
Lines must be drawn.

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

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

Solution:

Solution set x : x = { 6,5,4,3,2,1,-1,-2,-,3,-4.} it is a finite set.

Example iv: Write a mathematical statement represented on the number line

a)

Solution set: $^-2 \le x < 5$

b)

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

c)

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

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

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

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

Write the mathematical statement represented on the number line.

vi)

vii)

ix)

NB: It must be noted that the circled on the number line is included in the solution set.

Ref: Primary mathematics for Uganda revision and practice by G. Wambuzi page 36-37.

4: Solving inequalities and finding solution sets .

Example I

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

X – 4 + 4 > 3 +4

X > 7

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

Example ii

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

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

3y + 8 –8 < 44 -8

$\frac{3y}{3} < \frac{36}{3}$

<u>Y < 12.</u>

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

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

4- 6t < 16

4- 4- 6t < 16 – 4

$\frac{-6t}{-6} \ \cancel{<} \ \frac{12}{-6}$

t > $^-$2

Solution set

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

NB It must be noted that an inequality is divided

by a negative sign, the inequality sign changes. ie < to >, ≤ to ≥

5: Example: iv Solve and find the solution set.

$-3x + 1 \le 13.$

$-3x + 1 - 1 \le 13 - 3$

$\frac{-3x}{-3} \ge \frac{12}{-3}$

$x \ge -4$

Solution set:

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

6: Example v Solve and find the solution set

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

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

$16 - 3y < 64$

$16 - 16 - 3y < 64 - 16$

$\frac{-3y}{-3} > \frac{48}{-3}$

y > -!6

Solution set

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

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

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

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

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

Solution: $\frac{16}{4} > \frac{4x}{4} > \frac{4}{4}$

4 > x > 1

Solution set:

x : x = { 3,2}

8: Solve and find the solution set 13 ≥ 3x +1 ≥ 7

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

♦ $\frac{12}{3} \ge \frac{3x}{3} \ge \frac{6}{3}$

4 ≥ x ≥ 2

Solution set:

x:x = {4,3,2,}