Interpreting picture graphs / pictographs.

Let us learn about pictographs.
A pictograph is a visual display of data which uses pictures to represent data.

Or : A pictograph is a graph that uses symbols / pictures to represent data.

Look at the graph below.

Name	Mangoes
Sharif	
Victor	
Bernice	
Annex	

From the graph above,

Victor has 5 mangoes

Annex has 2 mangoes

Sharif has 3 mangoes

Bernice has 6 mangoes

Answer in pairs

a) Who has more mangoes?
b) Who has fewer mangoes?
c) How many mangoes does Bernice have?
d) How many mangoes do they have altogether?
e) If Sharif sells all the mangoes he has at sh. 500 each, how much money will he get?

Interpreting pictographs

Example I

Given that  represents 4 balls. How many balls are represented by  ?

1 symbol represents 4 balls.
3 symbols represent (3 x 4) balls
3 symbols represent 12 balls.

Example 2

If  represent 5 eggs,
how many eggs are shown below?

2 symbols represent 5 eggs

1 symbol represents $\frac{5}{2}$ eggs

6 symbols represent $\frac{5}{2}$ x 6 eggs

6 symbols represent (5 x 3) eggs

6 symbols represent 15 eggs

Example 3

Given that  = 27 dogs and  = 32 rabbits. How many animals are shown below?

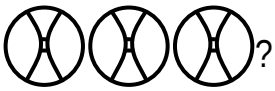
27 + 32 + 32 = 91 animals

Exercise

1. Given that  stands for 6 sweets. Find the number of sweets represented by:

   a) 

   b) 

2. If  stands for 14 balls. How many balls are represented by  ?

3. The graph below shows the number of pupils in five classes at Mpengere P/S. Use it to answer the question that follows.

P.1	P.2	P.3	P.4	P.5

   Find the total number of pupils in the five classes.

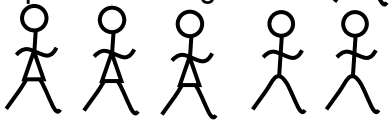
4. Given that  stands for 10 books. How many books are represented by

5. Find the number of cars represented by 

   if  stand for 8 cars.

6. Given that  represents 78 girls and  represents 65 boys in a school.

   The school has 

   Find the total number of pupils in the school.

7. If  stands for 20 apples which cost sh. 1,000 each, calculate the cost of the apples represented by

8. *The pictograph below represents the number of text books in different schools got from the ministry of education.*

School	Number of text books
Kimwa P/S	
Mayindo P/S	
Ndeku P/S	
Kakejje P/S	
Nsonzi P/S	

 = 40 textbooks

Questions

a) Which school got the greatest number of text books?

b) Which school got the least number of textbooks?

c) Which school got 200 textbooks?

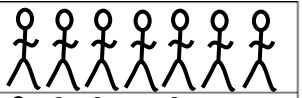
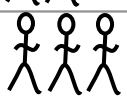
d) How many textbooks did Mayindo Primary School get?

e) Find the difference between the number of textbooks got by Kakejje Primary school and Ndeku Primary school.

f) How many textbooks did Nsonzi P/S and Kimwa P/S get altogether?

g) Calculate the total number of textbooks got by the five schools.

9. *The pictograph below shows how P.7 pupils in a certain school get to school.*

Walk	
Ride bicycles	
Use buses	
Use motor cycles	

Key:  = 5 pupils

Questions

a) How many pupils walk to school?

b) How many more pupils use bicycles than motorcycles?

c) Find the total number of pupils in the whole school.

10. *The picture graph below show balls given to different football clubs.*

VIPERS	
KCCA	
WAKISO GIANTS	
LWEZA F.C	

= 4 balls

Questions

a) Which club got the least number of balls?
b) How many balls did KCCA get?
c) How many more balls did Lweza FC get than Wakiso Giants?
d) How many balls were given to the given clubs altogether?

11. *The pictograph below shows the number of chicken in different villages in Bigasa sub-country.*

Buyembe	
Binyobiraya	
Buswege	
Gingo	
Bulenge	

Given that represents 150 chicken.

a) Which village has the least number of chicken?
b) Which village has the greatest number of chicken?
c) Find the number of chicken in Binyobirya.
d) How many chicken are in Buyembe and Gingo altogether?
e) Find the difference between the number of chicken in Buswege and Bulenge
f) Calculate the total number of chicken in the five villages.
g) If all the chicken in Buswege were sold at sh. 25,000. Find the amount of money that was collected.

12. Tr. Moses kept records of children who attended school throughout the week.
He used  to represent 45 children as shown in the table below.

Monday	
Tuesday	
Wednesday	
Thursday	
Friday	

Questions

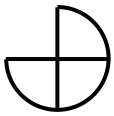
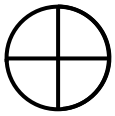
a) How many children were present on Monday?

b) On which day was the attendance lowest?

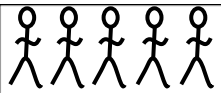
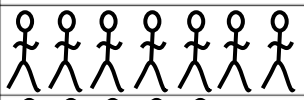
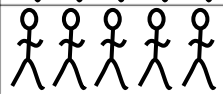
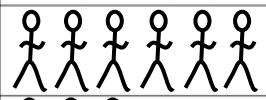
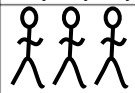
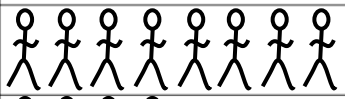
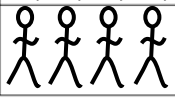
c) How many children attended on Friday?

d) Calculate the total attendance of the week.

e) How many more pupils attended on Wednesday than Thursday?

13. Given that  represents 1,800 people in certain district,
Find the number of people in another district represented by  ?

14. The pictograph below shows the number of pupils in different classes at Kitemi P/S
Use it to answer questions that follow.

P.1	
P.2	
P.3	
P.4	
P.5	
P.6	
P.7	

Given that, there are 180 pupils in P.6 and P.7 altogether.

Questions

a) Find the number of pupils in P.5.

b) Which class has the highest number of pupils?

c) How many more pupils are in P.2 than P.7?

d) Calculate the total number of pupils in the school.

15. Given that  = 8 cups. Jane bought a number of cups represented by the drawings below at sh 4500 per dozen. How much money did she spend on the cups?

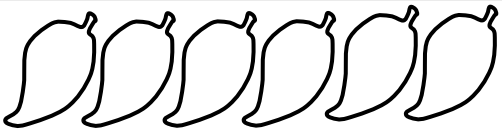
15. The graph below shows cars of different colours in the car park. Use it to answer questions that follow.

Black	
White	
Red	
Blue	
Brown	

Given that there are 20 white cars more than Red cars.

a) Find the number of Brown cars.
b) If each car is charged sh. 2500 as parking fee, how much money will be collected from all the cars?

16. The graph below shows mangoes picked by Jonathan throughout the week. He picked 12 less mangoes on Tuesday than Wednesday.

Monday	
Tuesday	
Wednesday	
Thursday	
Friday	

a) How many mangoes were picked on Friday?
b) How many more mangoes were picked on Monday than Thursday?
c) If he sold all the mangoes he picked on Wednesday at sh. 500 each. How much money did he collect altogether?

Drawing pictographs

Example 1

Given that  = 7 eggs. Draw pictures to represent 42 eggs.

42 ÷ 7 = 6 pictures

Example 2

If  stands for 20 balls. Draw such pictures to stand for 50 balls.

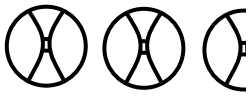
20 balls represent 1 symbol

1 ball represents $\frac{1}{20}$ symbol

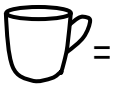
50 balls represent $\frac{1}{20}$ x 50 symbols

50 balls represent $\frac{5}{2}$ symbols

50 balls represent $2\frac{1}{2}$ symbols



Exercise

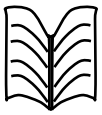
1. Given that  = 8 cups. Draw such pictures to represent 24 cups.

2. Draw pictures to represent 42 pupils if  represents 14 pupils.

3. Given that  = 4 eggs. Find the number of pictures of eggs that represent 16 eggs.

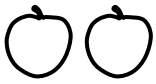
4. Given that  represents 14 oranges. Draw pictos to represent 28 oranges.

5. If  stands for 6 stools. Draw such picture to represent 9 stools.

6. If  stands for $3\frac{1}{4}$ dozens of books. Draw such symbols to represent 156 books.

7. There are 44 apples in a bag. Using  to represent $7\frac{1}{3}$ apples, draw such symbols to show the number of apples in the bag.

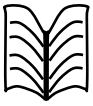
8. In a school, there are 540 pupils. If there are 360 girls in the school and  stands for 60 boys draw such symbols to represent the number of boys in the school.

9. Given that  = 8 mangoes and  = 12 oranges in the basket. The total number of fruits in the basket is 56. If there is  in the basket.

   Draw pictures to represent the number of mangoes.

10. The table below shows the number of books given to different pupils in P.7.
    Use it to answer questions that follow.

Edrine	David	Henry	Irene	Sam
45	30	20	40	35

    Using a scale of  to represent 5 books, draw a pictograph for the above information

11. P.4 pupils got balls as shown in the table below.

Name	Jane	Cate	Alex	Andrew
No. of balls	400	200	300	250

    Draw a picture graph showing the number of balls received by P.4 pupils.

    (Take  = 50 balls)

12. The table below shows the number of pupils in different primary schools in Nabigasa sub –county. Use it to answer questions that follow.

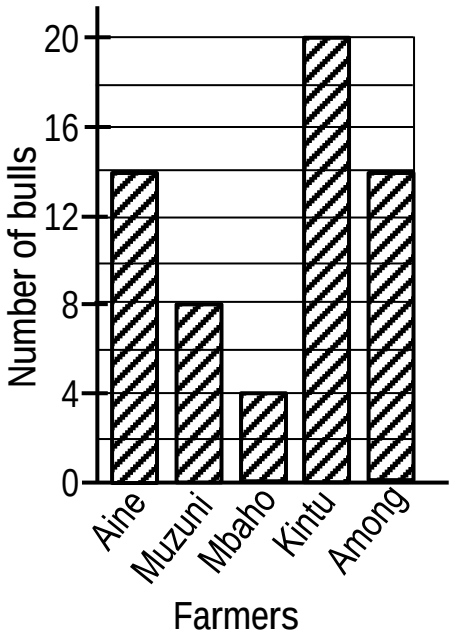
School	St Gabriel P/S	Kituntu P/S	Kibonzi P/S	Mother Care P/S
No. of pupils	1200	800	2000	100

    Using a scale  = 200 pupils, draw a pictograph to show the number of pupils.

Bar graph

Example 1

The bar graph below represents the number of bulls sold by different farmers throughout the year. Use it to answer questions that follow.



Questions

a) *What does the vertical scale show?*

The vertical scale shows the number of bulls sold by farmers

b) *Find the scale used on vertical axis*

4 ÷ 2 = 2 bulls

1 small square represents 2 bulls

c) *What does the horizontal axis show?*

Horizontal axis shows farmers

d) Who sold the least number of bulls?

Mbaho

e) *Who sold the highest number of bulls?*

Kintu

f) *Which farmers sold the same number of bulls?*

Aine and Among

g) *How many bulls did Aine sell?*

12+2 = 14 bulls

h) *How many more bulls did Kintu sell than Mbaho?*

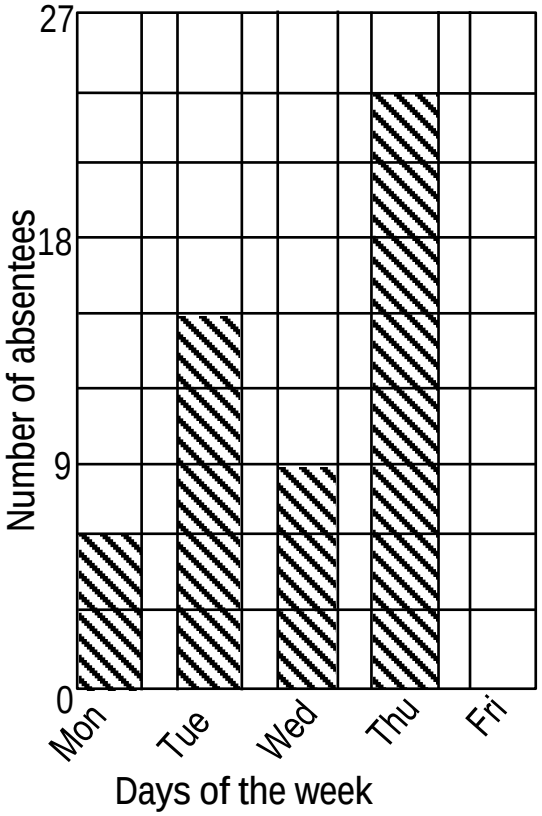
20 – 4 = 16 bulls

i) *How many bulls were sold altogether?*

14 + 8 + 4 + 20 + 14 = 60 bulls

Example 2

The graph below shows the number of absentees in a class of 36 pupils.



Questions

a) *Find the scale used on vertical axis.*
9 ÷ 3 = 3 absentees
1 small square represents 3 absentees

b) *How many pupils were absent on Thursday?*
18+6 = 24pupils

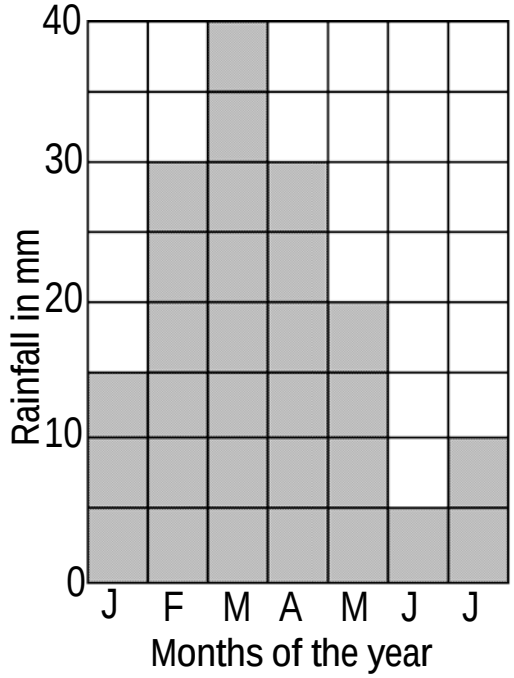
c) *Which day had the least attendance?*
Thursday

d) How many pupils were present on Monday?
36 – 6 = 30 pupils

e) *Find the total number of absentees throughout the week.*
6 + 15 + 9 + 24 = 54

Exercise

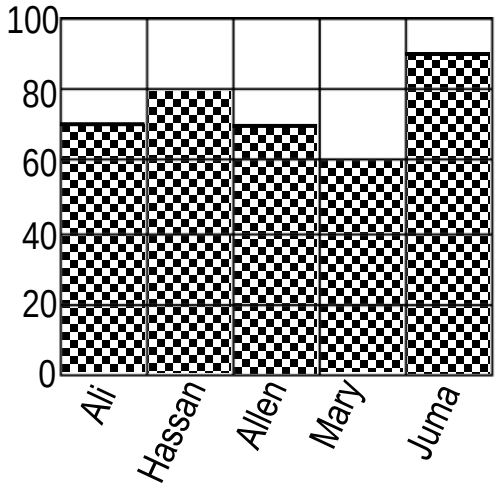
1. The graph below shows rainfall recorded at Kitaasa P/S. Use it to answer questions that follow.



Questions

a) What is the graph about?
b) What is the scale on vertical axis?
c) How much rainfall was recorded in January?
d) Which months had the same amount of rainfall recorded?
e) Find the difference between the highest and lowest rainfall recorded

2. The bar graph below shows marks scored by pupils of primary seven in Chicko P/S



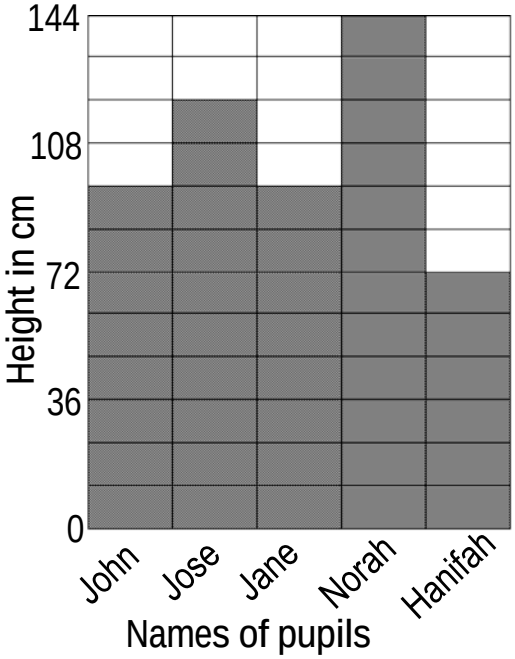
Questions

a) Who scored the least marks?

b) How many more marks did Juma score than Allan?

c) Calculate the total marks scored by the five pupils

3. The bar graph below shows the height of the children. Study it carefully and use it to answer questions that follow.



Questions

a) Who is the tallest pupil?

b) Who is as tall as Jane?

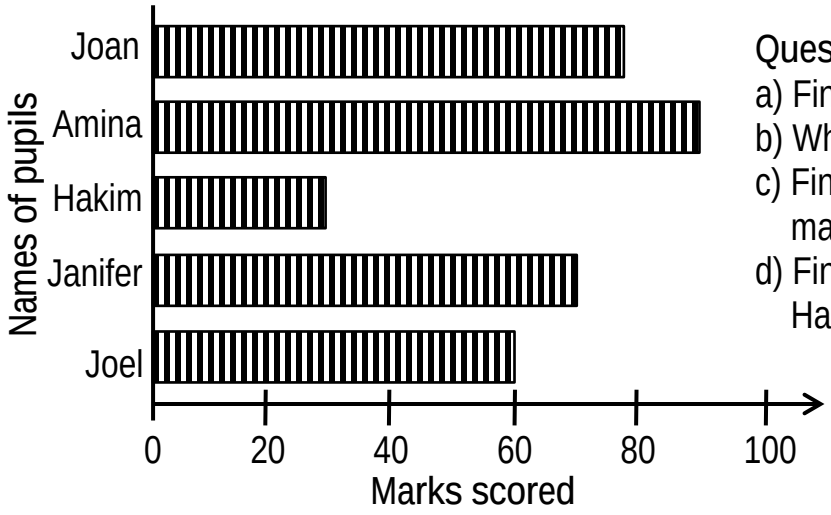
c) Find the scale on the vertical axis.

d) Who is 72 cm tall?

e) Find the difference between Jose's height and Hanifah's height.

f) Find in cm, the total height of the five pupils.

4. The graph below shows marks scored by P.7 pupils in End of February exams.



Questions

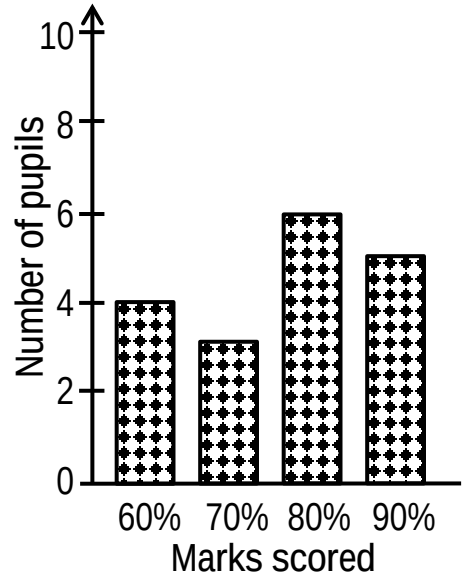
a) Find the scale used on vertical axis.

b) Who scored the highest marks?

c) Find the difference between the marks scored by Amina and Joel

d) Find the total marks scored by Hakim and Joan.

5. The graph below shows scores obtained by P.6 pupils in a test.



Questions

a) How many pupils did the test?

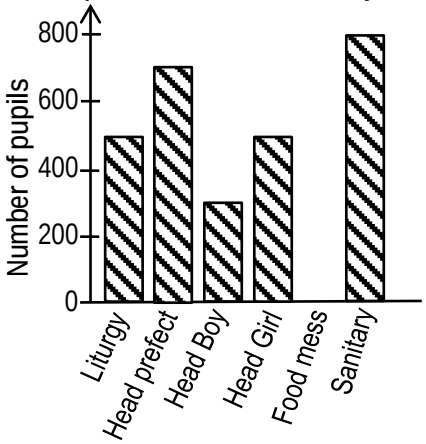
b) How many pupils scored 90%?

c) What percentage mark did most pupils score?

d) Which percentage mark did the least number of pupils score?

e) How many pupils scored above 70%?

6. Mbulire P/S has 800 pupils. The graph below shows the number of pupils who failed to turn up for elections. Study it carefully and use it to answer questions that follow.



Questions

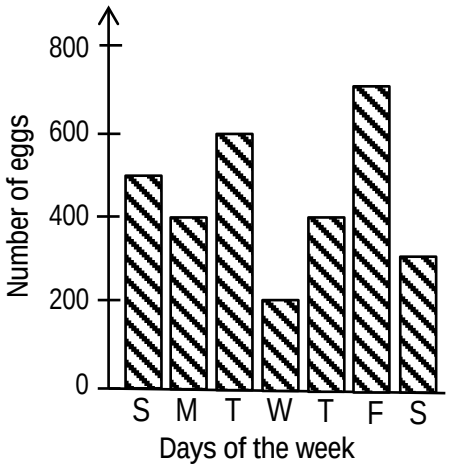
a) How many pupils participated in Head girl elections?

b) What kind of elections attracted all voters in the school to cast their votes?

c) How many pupils participated in Head prefect elections?

d) How many more voters participated in head boy elections and Head girl elections?

7. The bar graph below shows the number of eggs produced on Isingoma's farm in a week.



Questions

a) What does each square in the vertical axis show?

b) How many eggs were collected in the last 3 days?

c) On which day was the least number of eggs sold?

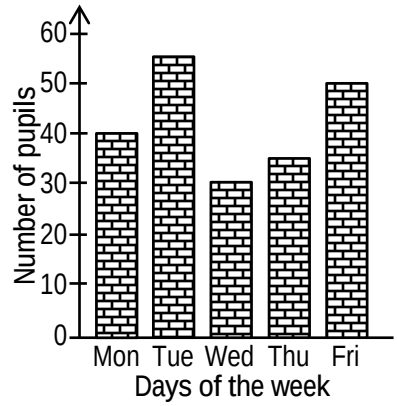
d) Which days had the same number of eggs collected?

e) How many eggs were collected throughout the week?

f) If Isingoma packs the eggs in trays of 30eggs, how many trays were obtained in the first three day?

g) How many eggs were collected throughout the week?

8. The graph below shows the attendance of P.7 pupils last week at Lukidi Primary School. Study the graph and use it to answer questions that follow.



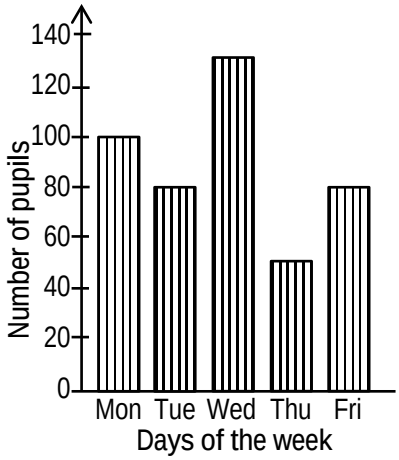
Questions

a) How many pupils were present on Tuesday?

b) Find the difference between the highest and the lowest attendance in the week.

c) How many pupils attended throughout the week?

9. The bar graph below shows the number of pupils who attended in a week. Use it to answer questions that follow.



a) What does the horizontal scale show?

b) What is the vertical scale?

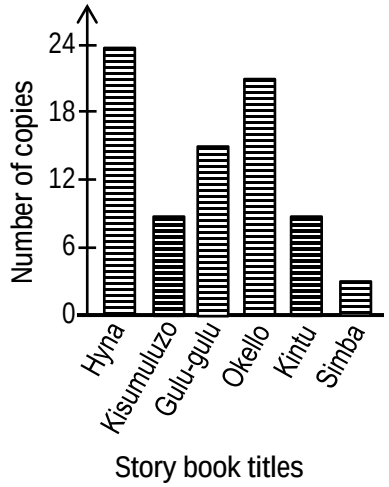
c) How many pupils attended class on Thursday?

d) Which day had the same attendance as Friday?

e) How many more pupils attended on Wednesday than on Monday?

f) If the class has 132 pupils. Find the total number of pupils who were absent throughout the week

10. The bar graph below shows the number of copies of story books sold by Praise bookshop. Use it to answer questions that follow.



Questions

a) Which story book was the biggest number?

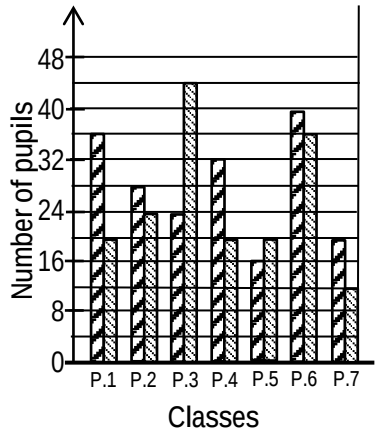
b) How many copies were sold altogether?

c) Which story book was bought by the least number of people?

d) How many Kisumuluzo story books were sold?

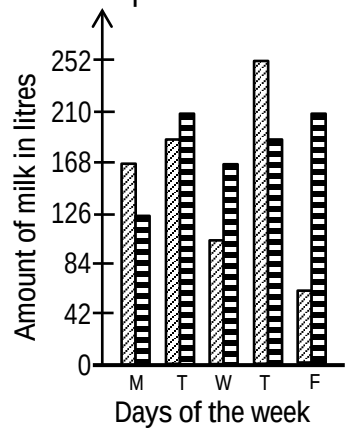
e) How many more copies of Okello's story books were sold than Kintu's story books?

11. The graph below shows the number of pupils in 7 classes in a certain school. Use it to answer questions that follow.



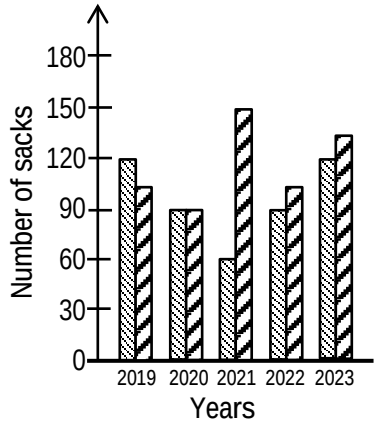
a) Which classes have more boys than girls?
b) What is the scale on vertical axis?
c) How many pupils are there in
   i) P.3?
   ii) P.5?
d) Which class has the highest number of pupils
e) Which class has the least number of girls?
f) Which classes have the same number of pupils?
g) How many more pupils are in P.3 than P.5?
h) Calculate the total number of pupils in the school.

12. The graph below shows the amount of milk sold by the two farmers in 5 days. Use it to answer questions that follow.



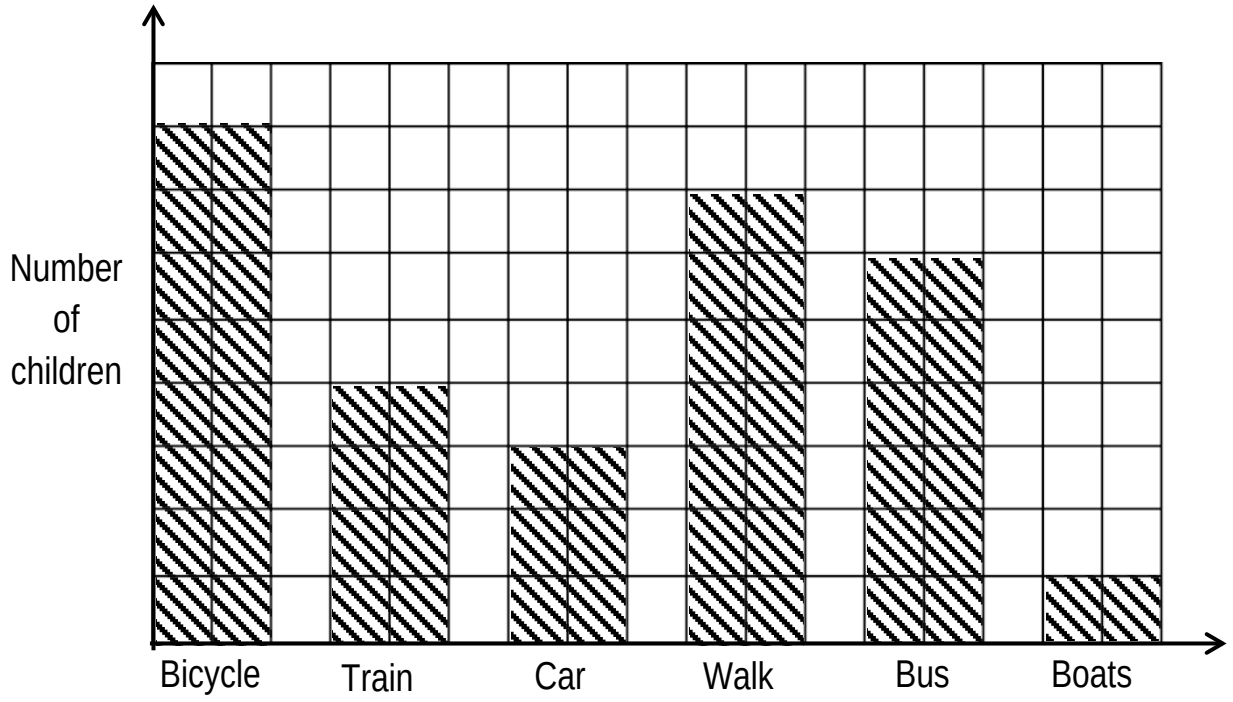
a) Who sold less milk on Tuesday?
b) Find in litres, the mount of milk sold by the two men on
   i) Thursday
   ii) Wednesday
c) On which day did Joseph sell 105 litres of milk?
d) What is the scale on vertical axis?
e) How much milk did Benjamin sell in the 5 days?
d) How many more litres did the two men sell on Thursday than on Wednesday?

13. The graph below shows the sacks of maize and beans produced by a farmer in different years. Use it to answer questions that follow.



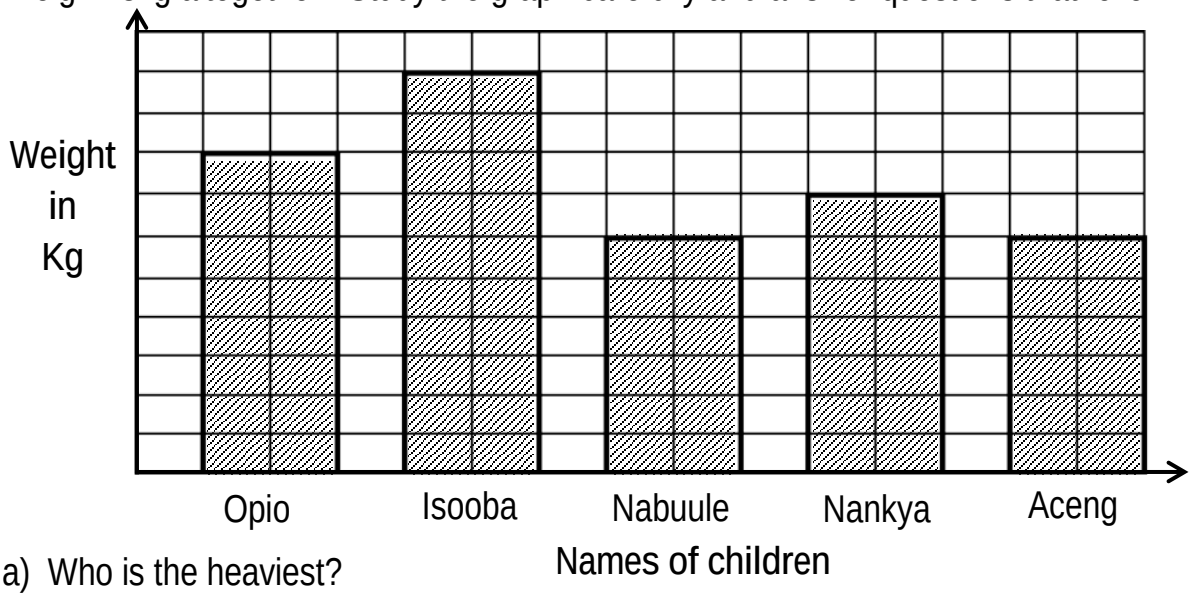
a) In which year was the crop production the same?
b) In which year was the quantity of beans produced more than maize produced?
c) In which years did he produce the same quantity of maize?
d) Find the number of sacks of beans the man produced in the 5 years.
e) What crops was produced most according to the graph?
f) How many more sacks of maize were produced in 2021 than 2020?
g) If he sold each of the sacks of maize produced in 2022 and 2023 at sh. 32,500, how much money did the farmer get altogether?

14. The graph shows how children travel to school. Use it to answer questions that follow.



a) If 210 children walk to school, find the scale on the vertical axis.
b) How many children ride bicycle to school?
c) Which means of transport is least used?
d) Find the number of children who use train.

16. The graph below shows the mass (in kg) of 5 children at Butiti P/S. Nankya and Aceng weigh 78kg altogether. Study the graph carefully and answer questions that follow.



a) Who is the heaviest?
b) Who is the lightest?
c) Name the two children who have the same mass.
d) What is the scale on vertical axis?
e) By how many kilograms is Nankya heavier than Nabuule?
f) Find the total mass of the five children.

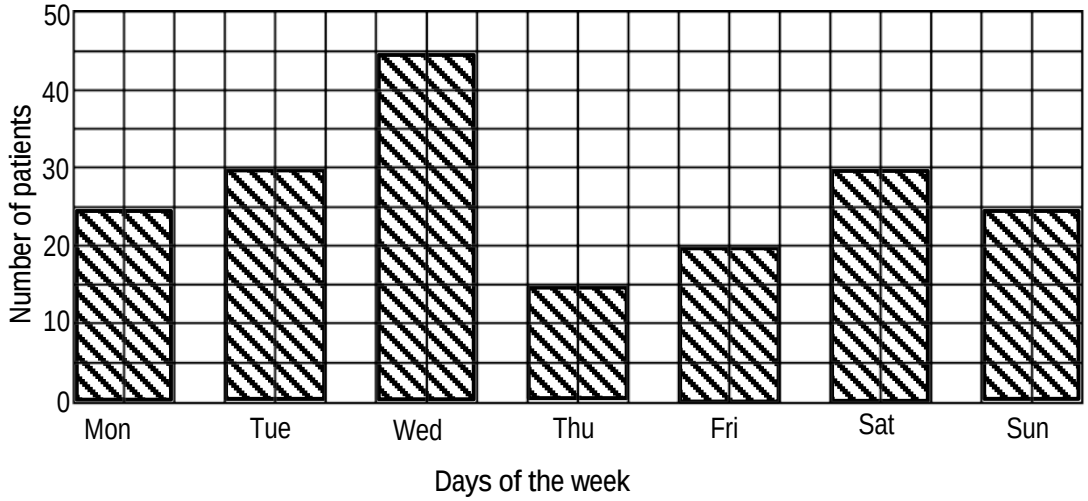
Drawing bar graphs.

Example 1

The following records were found at Kiryamenvu Clinic.

Days of the week	M	T	W	T	F	S	S
Number of patients	25	30	45	15	20	30	25

Draw a bar graph to represent the above information.

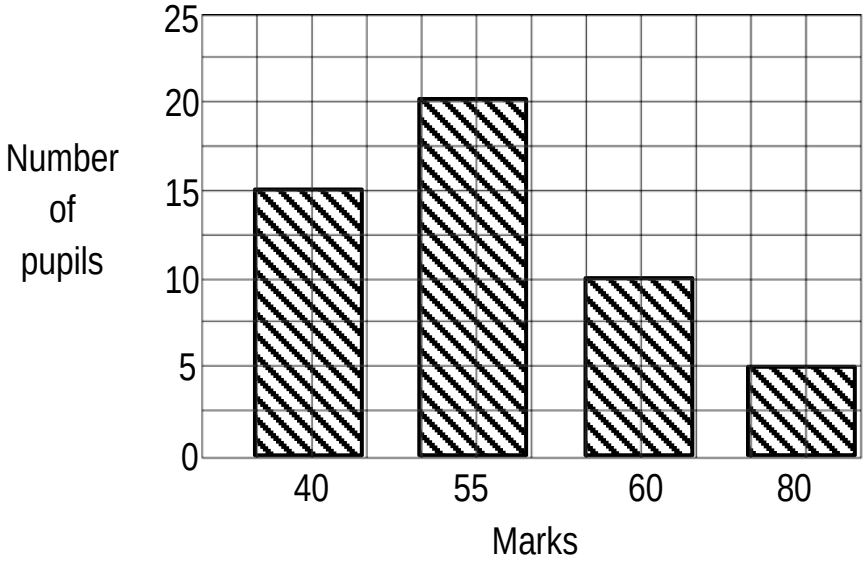


Examples 2

The table below shows marks scored by pupils in a test. Use it to answer the questions that follow.

Marks	40	55	60	80
Number of pupils	15	20	10	5

Draw a bar graph to represent the above information.



Exercise

1. The table below shows the ages of pupils in a class. Use it answer questions that follow

Age in years	12	10	8	6	4
Names of pupils	Cissy	Ali	Cate	Abby	Betty

a) Who is the youngest pupil?
b) Draw a bar graph to represent the above information.

2. The table below shows students of St. Sebastian SS who visited Wajjinja in a week.

Days of the week	M	T	W	T	F
Number of students	300	350	200	150	400

Draw a bar graph to show the above information.

3. Draw bar graphs for the data in the given tables.

a)

Days of the week	M	T	W	T	F
Number of pupils	60	40	50	40	30

b)

Number of pupils	80	80	100	75	60
Days of the week	M	T	W	T	F

C)

Days of the week	M	T	W	T	F	S	S
No. liters of milk	4	6	8	12	2	6	9

d)

Name	Amanga	Brian	Jailah	Alosh	Yawe
Marks scored	80	90	75	65	70

e)

Month	J	F	M	A	M	J
Number of trees	400	350	250	450	300	350

f)

Days	M	T	W	T	F	S
No. of sacks	40	35	50	35	40	45

g)

Farm animals	Cows	Rabbit	Goat	Sheep
Number of animals	12	18	15	9

h)

Capacity in litres	4	5	9	10	20
Number of tins	24	15	20	12	6

4. In a class, children were grouped according to the first letter of their surname as shown in the table below.

Surname	A - D	E - H	I - L	M - R	S - Z
Number of pupils	20	15	10	35	25

Draw a bar graph to show the above information.

5. The table below shows number of pupils in different age groups. Use it to answer the question that follow.

Age group	3-5	6-8	9-11	12-14	15- 17
Number of pupils	180	120	150	90	65

Draw a bar graph to represent the above information.

6. Draw bar graphs to show the given data in the tables.

a)

Children's age	1	2	3	4	5	6	7
Number of pupils	12	15	9	14	18	8	9

b)

Marks	50	60	70	80	90
Number of pupils	16	24	19	15	17

c)

Points scored	0	1	2	3	4	5
Number of players	6	4	9	12	7	15

d)

Number of families	18	14	20	12	6
Number of children	3	1	4	2	0

e)

Marks	60	80	90	70	50
Number of pupils	16	12	14	17	15

7. The table below shows the mass of maize in kg produced by a farmer in different years. Use it to answer questions that follow.

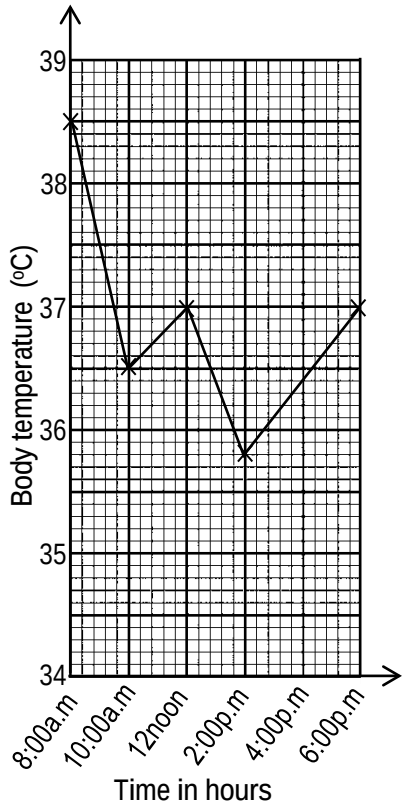
Year	2014	2015	2016	2017	2018
Quantity	3000	2500	5500	3500	6000

a) Draw a bar graph for the above information.
b) Find in kg, the total mass of maize produced in the 5 years.

Interpreting line graphs.

Example

The graph below shows the changes in temperature of a patient in a hospital recorded every after 2 hours. Use it to answer questions that follow.



a) *What was the highest temperature recorded?*

38.5°C

b) *What was the lowest temperature recorded?*

35.8°C

c) *What was the body temperature of the patient at 12:00 noon?*

37°C or 37.0°C

d) *Find the range in the recorded body temperature.*

Range = 38.5°C – 35.8°C
Range = 2.7°C

e) *At what times of the day was the recorded body temperature of the patient the same?*

12:00 noon and 6:00p.m.

f) *What is the scale on vertical axis?*

10 small squares = 1°C
1 small square = $\frac{1}{10}$ °C
1 small square = 0.1°C

g) *What is the scale on horizontal axis?*

5 small squares = 120 minutes
1 small square = $\frac{120}{5}$ minutes
1 small square = 24 minutes

h) *Use the graph to find the body temperature of the patient at;*

i) *9:00a.m* 37.5°C
ii) *3:00p.m* 36.1°C
iii) *4:00 p.m.* 36.9°C

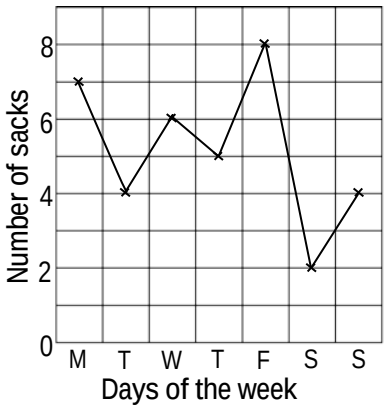
i) *At what time of the day was temperature of the patient*;

i) *35.8°C* At 2:00p.m
ii) *37.7°C* At 8:48a.m.

By Sseggayi Benjamin Kasuka

Exercise

1. The graph below shows the sacks of ground nuts sold by Kwewayo traders in a week. Study it and answer questions that follow.



a) What is the scale on the vertical axis?

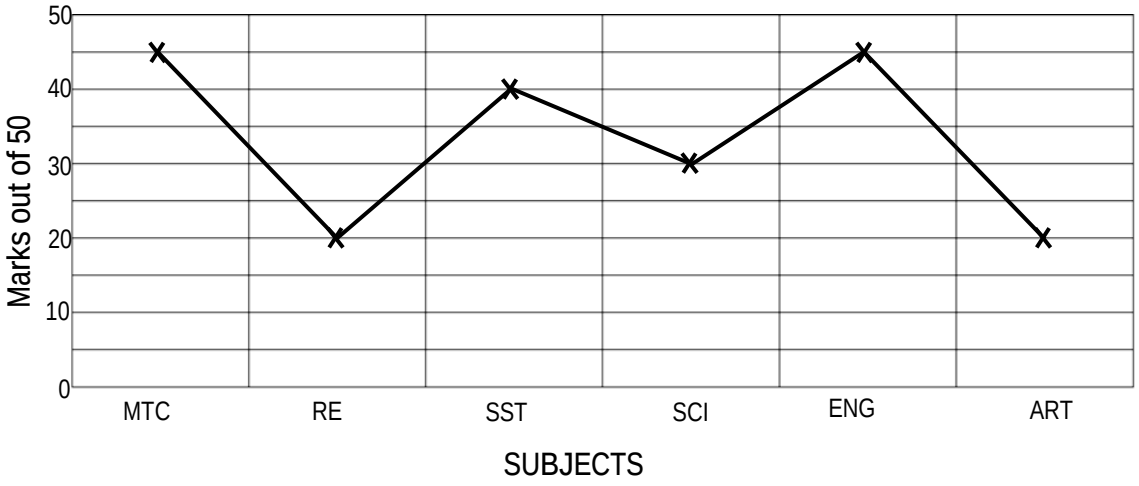
b) How many sacks of ground nuts were sold on Tuesday?

c) On what day did Kwewayo traders sell 6 sacks of groundnuts?

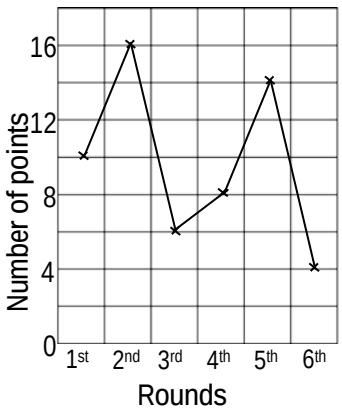
d) If the mass of each sack is 75kg, how many kilograms of ground nuts were sold that week?

e) Which day of the week had the same quantity of same ground nuts sold?

2. Draw a table for the information on the line graph below.



3. The graph below shows Alex's scores during a tournament. Study it and answer the questions that follow.



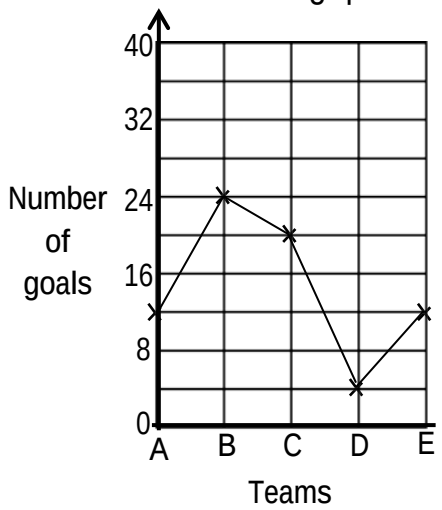
Questions

a) In which round did Alex score the lowest points?

b) What did Alex score in the fourth round?

c) What is the difference between the lowest and highest points?

4. The graph below shows the goals scored by different teams in a competition. Use it to answer the following questions.



a) How many goals were scored by team A?

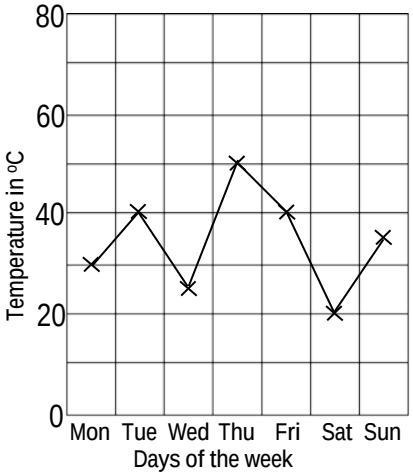
b) Which team scored the highest number of goals?

c) Which team scored the same number of goals?

d) Which team scored 20 points?

e) Find the total number of points scored by all teams.

5. The graph below shows the temperature of a place recorded for a week.



a) What was the highest temperature of the week?

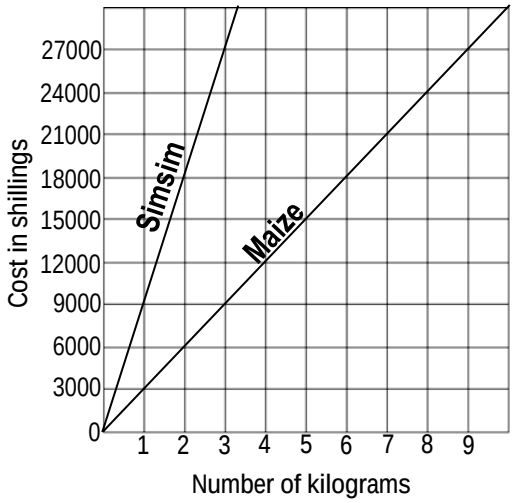
b) What was the lowest temperature of the week?

c) Which two days had the same temperature records?

d) By how many degrees was Thursday hotter than Monday?

e) Find the difference between the highest and the lowest temperature recorded.

6. The graph below shows the cost of maize and simsim in Uganda shillings. Use it to answer questions that follow.



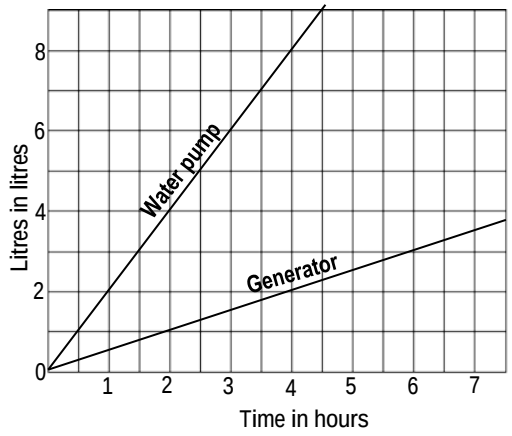
a) What is the cost of 1kg of simsim?

b) What is the cost of 1kg of maize?

c) How many kilograms of simsim can I buy with sh. 27,000?

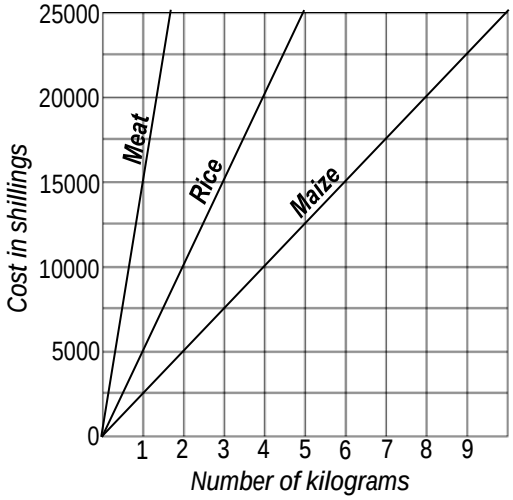
d) What is the cost of 8kg of maize?

7. The graph below shows litres of fuel consumed by a water pump and a generator. Use it to answer questions that follow.



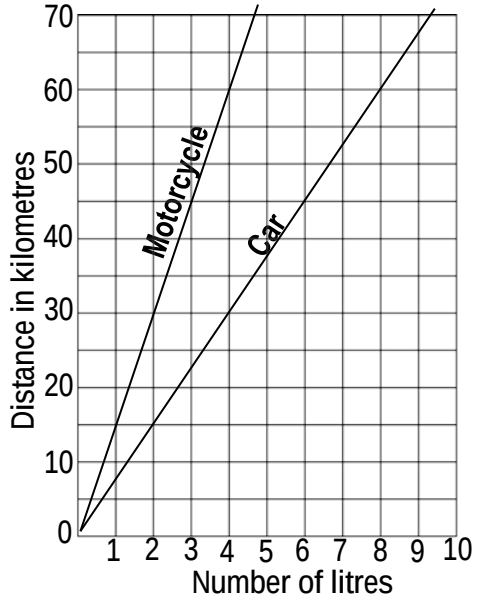
a) How much fuel does the generator consume in 1 hour?
b) How much fuel does the water pump consume in 1 hour?
c) How many litres of fuel does a water pump consume in 7 hours?
d) How long does a generator take to consume 3 litres?
e) If a litre of fuel costs sh. 5500, how much money is needed to run a water pump for $3\frac{1}{2}$ hours

8. The graph below shows the cost of maize flour, rice and meat use it to answer questions that follow.



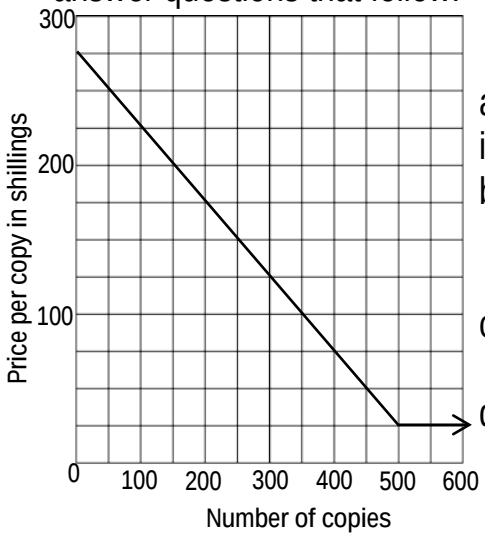
a) What is the cost of 1 kg of maize flour?
b) What is the cost of 3 kg of rice?
b) How many kilograms of meat would one buy with sh. 45,000?
c) How much money would a girl spend on $1\frac{1}{2}$kg of rice and 8kg of maize flour?
d) Mukisa bought $\frac{1}{2}$kg of meat, $\frac{1}{2}$kg of rice and $\frac{1}{2}$kg of maize flour. How much did he spend on all the items?

9. The graph below shows litres of petrol consumed by a motorcycle and a car through a certain distance. Use it to answer questions that follow.



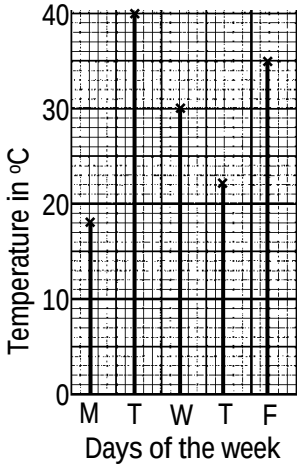
a) How many kilometres does the motorcycle travel on 4 litres of petrol?
b) What distance can the car cover on 6 litres of petrol?
c) How many litres of petrol does a car need to cover 40 kilometres?
d) How much more litres of petrol will the car consume than the motorcycle, if each cover 80km?
e) If a litre of petrol costs sh. 5200, how much money will the motorcycle need to cover a distance of 60 km?

10. The graph below shows the printing costs of report cards at Praise printers'. Use it to answer questions that follow.



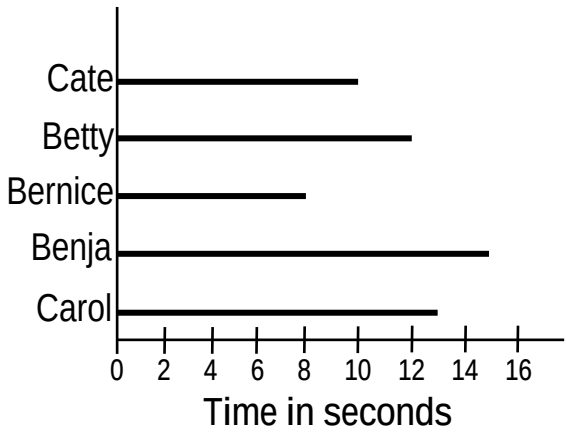
a) Calculate the amount of money John will pay per copy if he wants to produce 400 copies of report cards.
b) A school wants only 250 copies of report cards.
   i) What will be the cost of printing per copy?
   ii) How much money will it cost to print the 250 copies?
c) How much money will it cost a school to print 550 copies?
d) James had sh.15600, he wanted more than 500 copies. Find the number of copies of report cards he got.

11. The line graph below shows the temperature of a certain place recorded over a week. Study the graph and answer the questions that follow.



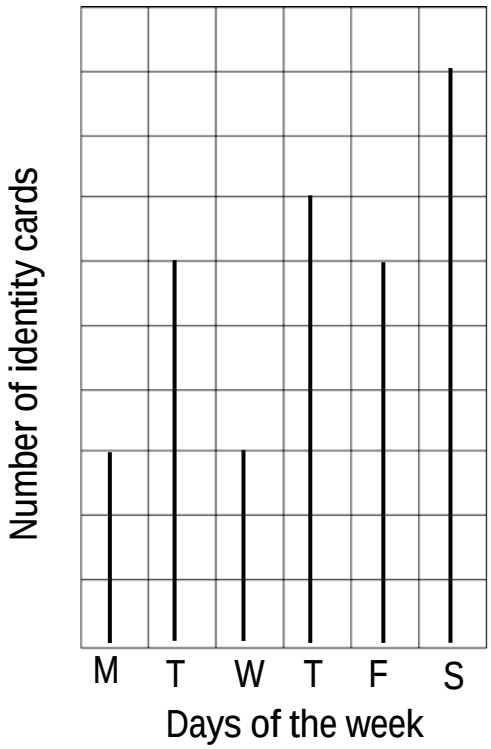
a) On which day was the highest temperature recorded?
b) What was the lowest temperature recorded?
c) What was the total temperature of the given days?
d) Find the difference between the temperature recorded on Tuesday and Thursday

12. The line graph below shows time taken by 5 athletes to complete a 100 metre race. Use it to answer questions that follow.



a) Who won the race?
b) How long did Betty take?
c) How much longer did Benja take than Bernice?
d) How long did Cate and Carol take altogether?
e) Who took the last position?

13. The graph below shows the number of identity cards issued at Kololo in a certain week. Use it to answer questions that follow.



If 240 more identify cards were issued on Saturday than on Wednesday,

a) What is the scale on vertical axis?

b) How many identity cards were given out on Tuesday?

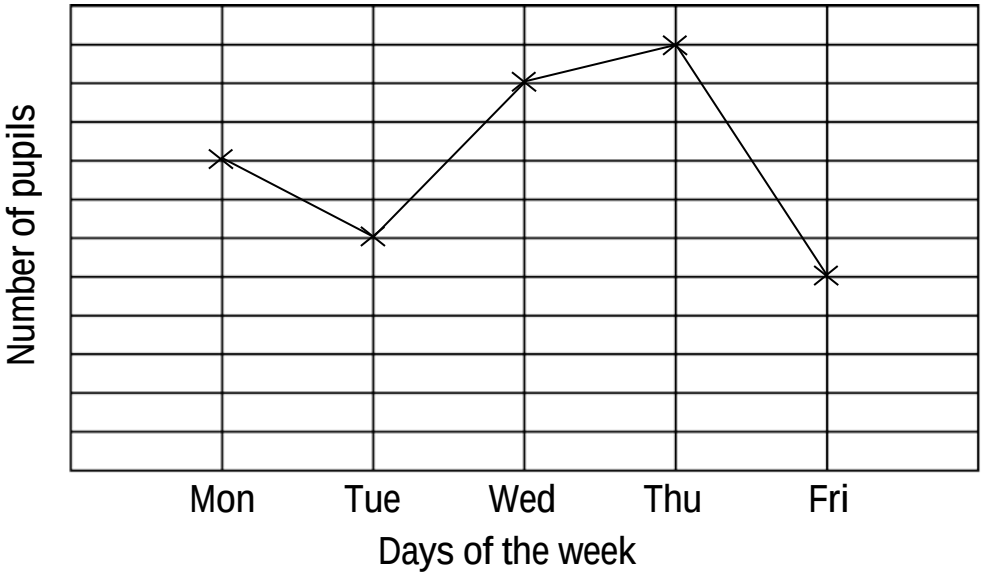
c) On which day was the greatest number of cards issued?

d) Find out the number of cards issued out on Wednesday and Friday

e) Which days had the same number of identity cards issued out?

f) Calculate the total number of cards given out on Monday, Thursday and Friday

14. The graph below represents the school's daily attendance for a week. Given that 1,000 pupils attended on Wednesday



a) Use the information on the graph to make a table showing the daily attendance.
b) On which day was the attendance 600?
c) How many pupils attended on Friday?
d) How many more pupils attended on Wednesday than Tuesday?

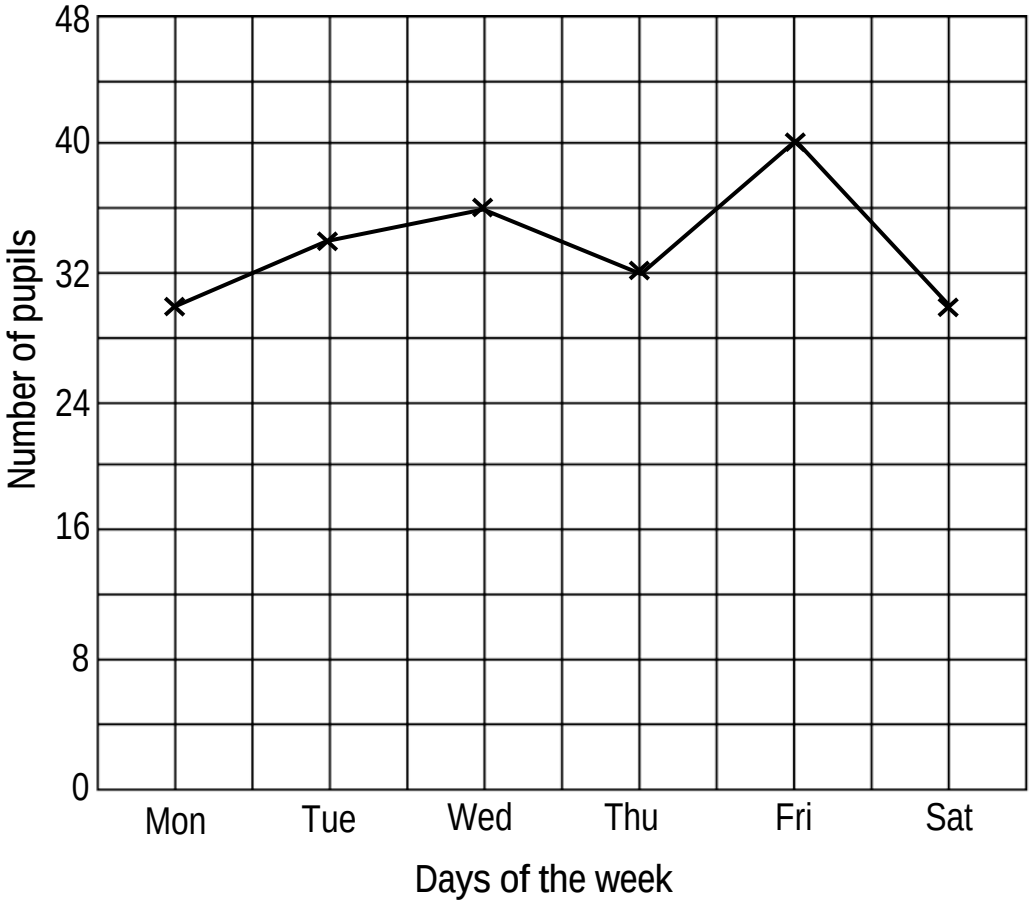
Drawing line graphs

Example

The table below represents the number of pupils who attended classes for a week in a boarding school.

Days of the week	Mon	Tue	wed	Thu	Fri	Sat
Number of pupils	30	34	36	32	40	30

Draw a line graph to represent the given information.



Exercise.

1. The below shows goals which were scored by a netball team during the tournament. study it and answer the question that follow.

Rounds	1st	2nd	3rd	4th
Number of goals	21	18	24	15

Draw a line graph to represent the above information.

2. The table below shows the marks scored by a P.7 pupil in a test. Use it to answer the following questions.

Subject	MATHS	ENG	SCIENCE	SST
Marks scored	100	70	80	90

Draw a line graph to represent the above information

3. The table below shows the temperature of a place recorded in a week. Use it to draw a line graph for the information.

Day of the week	M	T	W	T	F
Temperature (^oC)	21	24	18	21	15

4. The table below shows the temperature recorded on different days of a certain week. Use the information in the table to draw a line graph.

Days of the week	M	T	W	T	F	S	S
Temperature (^oC)	25^oC	20^0C	30^0C	15^0C	25^0C	10^0C	35^0C

5. The table below shows COVID–19 patients who reported at the hospital in six weeks. Use it to answer the questions that follow.

Week	1st	2nd	3rd	4th	5th	6th
Number of patients	30	50	25	40	30	65

a) Draw a line graph to represent the information above.
b) How many patients reported in the second week?
c) If each patient was paying sh. 150000, how much money was collected in the 4th week?

6. The table shows the time taken by some pupils to complete a 500 metre race. Use it to answer the questions that follow.

Name of pupil	Ali	Max	Azizi	Kato	Pato
Time in second	80	75	60	90	55

a) Draw a line graph to represent the information.
b) Who won the race?
c) How much longer did Kato take than Max?

7. The table below shows the number of sheep sold from Dirisa's farm. Draw a line graph to represent this information.

Month	J	F	M	A	M	J	J	A	S
Number of sheep	12	8	5	13	11	15	7	10	12

8. The table represents the number of geometry sets sold in Kaye's shop in 5 weeks. Use it to answer questions that follow.

Week	1st	2nd	3rd	4th	5th
Number of geometry sets	15	21	12	24	18

a) Draw a line graph to show the given information.
b) How many more geometry sets were sold in the 4th week than the 1st week?
c) If a geometry set was sold at sh. 3500, how much money was collected in the 2nd week?

9. Nabwire recorded the number of cars that passed by her home during the lock down as shown in the table below.

Colour of car	Red	Blue	White	Green	Others
Number of cars	30	18	27	15	36

Draw a line graph to show the given information.

10. The table below shows the rise and fall in temperature of a patient.

Temp ^{O}C	32^0C	35^0C	34^0C	40^0C	38^0C	36^0C
Time	10 :00a.m	11:00am	12:00noon	1: 00p.m	2: 00p.m	3:00p.m

11. The table below shows the temperature on mountain Elgon at different times of the days.

Time	12:00 midnight	3:00a.m	6:00a.m	9:00a.m	12:00noon	3:00p.m
Temp (^oC)	-15^0C	-18^0C	-12^0C	-6^0C	$+3^0C$	0^0C

a) Draw a line graph to represent the above information.
b) At what time of the day was the maximum temperature recorded?
c) At what time of the day was the lowest temperature recorded?
d) At what time of the day was the greatest increase in temperature recorded?
e) Find the difference between the highest and lowest temperatures recorded.

12. The table below shows the marks scored by 42 pupils in a test. Use it to answer questions that follow.

Marks	80	70	60	50	40
Number of pupils	12	3	y	0	9

a) Find the value of y.
b) Draw a line graph to represent the information.
c) What mark was scored by the most pupils in the class?
d) Find the number of pupils, who scored below 70 marks.

13. The table below represents how Mr. Muyindi spends his salary. Use it to answer questions that follow.

Item	Food	Rent	fees	Others	Saving
percentage	20%	15%	k	10%	15%

a) Find the value of k.
b) If he spends sh. 120,000 on fees, calculate his salary
c) Draw a line graph to represent the information above.

14. In a class of 72 pupils, $\frac{1}{6}$ of them like netball, $\frac{1}{4}$ like volley ball, $\frac{1}{3}$ of the remainder like Tennis and the rest like football.
a) Find the number of pupils who like football.
b) Draw a line graph to show the number of pupils and the games they like.

15. In our school, P.7 class is divided into three streams. 40% of the candidates are in stream A, 75% of the remaining pupils are in stream B and the rest are in stream C. there are 12 candidates in stream C.
a) Find the total number of candidates in P.7.
b) Draw a table to show the number of candidates in each stream.
c) Use the table to draw a line graph showing the number of candidates in the three streams.

16. The table below represents 125 guests who attended a birthday party.

Number of guests	15	20	30	25	y
Colour of the cloth	Pink	Green	Blue	Orange	Others

a) Find the value of y
b) Draw a line graph to show the above information.

17. The table below shows the number of visitors at Mermaid beach on a certain Sunday morning.

No. of visitors	50	75	60	60	70	65
Time	7:30	8:00	8:30	9:00	9:30	10:00

a) At what time of the day was the highest number of visitors received?
b) Find the total number of visitors received before 9:00 a.m.
c) Draw a line graph to represent the above information.

18. The table below shows the number of bicycles sold by a business woman in the first five months of last year.

Month	Jan	Feb	Mar	Apr	May
No. of bicycles	50	30	40	30	20

By the end of June, she had sold 220 bicycles altogether. Represent on a line graph, the number of bicycles, the business woman in the first 6 months.

TOPIC 6: DATA HANDLING

TALLY MARKS

Example 1

Use tally marks to represent the given numbers.

a) 13

$$13 = 5\overline{)13} \quad 2 \text{ rem } 3$$

$$-\ 10$$

$$03$$

13 = 𝍸 𝍸 |||

Note:
Divide by 5 to get groups of 5

b) 24

$$24 = 5\overline{)24} \quad 4 \text{ rem } 4$$

$$-\ 10$$

$$04$$

24 = 𝍸 𝍸 𝍸 𝍸 ||||

Example 2

Find the number represented by the following tally marks.

a) 𝍸 𝍸 𝍸 ||

5 + 5 + 5 + 2 = 17

Method 2

(3x5) + 2

15 + 2

17

Note:
Add or multiply to get the number

b) 𝍸 𝍸 𝍸 𝍸 𝍸 |||

5 + 5 + 5 + 5 + 5 + 3 = 28

Method 2

(5x5) + 3

25 + 3

28

Example 3

The teacher tallied the number of pupils who came late at school as shown below.

Days of the week	Tallies
Monday	𝍸 𝍸
Tuesday	𝍸 |||
Wednesday	𝍸
Thursday	𝍸
Friday	𝍸 𝍸 ||

Draw a table showing the number of pupils who came late throughout the week.

Days of the week	Mon	Tue	Wed	Thu	Fri
Number of pupils	10	8	5	5	12

Example 4

The ages in years of children in nursery section at Mpiso P/S were recorded as follows;

3, 4, 7, 3, 4, 3, 4, 5, 3, 4, 4, 4, 5, 5, 4, 5, 3, 6, 5, 3, 3, 3, 5, 6, 5, 5, 6, 3

a) Use tallies to record the information above.

Age	Tallies	Frequency
3	𝍸 ////	9
4	𝍸 //	7
5	𝍸 ///	8
6	///	3
7	/	1

b) How many children are 4 years old in nursery section?

7 pupils

c) What is the total number of children recorded?

9 + 7 + 8 + 3 + 1 = 28 pupils

Exercise

1. Find the number represented by the following tallies.
   a) ///
   b) ////
   c) 𝍸 //
   d) 𝍸
   e) 𝍸 𝍸 𝍸 𝍸 //
   f) 𝍸 𝍸
   g) 𝍸 𝍸 𝍸 /
   h) 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 ///
   i) 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 ///

2. Tr. Cosma recorded the number of pupils who attended evening preps on Saturday using tallies as shown below.

   𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 ///

   How many pupils attended evening preps?

3. The tally marks 𝍸 𝍸 𝍸 //// show the number of oranges which a fruit seller sold. If each orange was sold at sh. 500, how much money did she collect altogether?

4. The tally marks below represent the pupils who were present in class of 40 pupils.

   𝍸 𝍸 𝍸 𝍸 𝍸 ////

   How many pupils were absent that day?

5. A shop keeper tallied the number of dozens of books he had in the shop as shown below.

   𝍸 𝍸 𝍸 ///

   a) How many books were in shop?
   b) If he sold all the books at a rate of sh. 800 per book, how much money did he get?

6. Kanaabe recorded the number of motorcycles that he cleaned at his washing bay in a week.

Days of the week	Tallies
Monday	𝍸 𝍸 ///
Tuesday	𝍸 ////
Wednesday	𝍸 𝍸 𝍸 𝍸 //
Thursday	𝍸 𝍸 ////
Friday	𝍸 𝍸 𝍸 𝍸 𝍸

Draw a table for the above information.

7. A librarian recorded the number of books in the school library.

Subject	Tallies
Mathematics	𝍸 𝍸 𝍸 𝍸
Science	𝍸 ///
English	𝍸 𝍸 𝍸 𝍸 ////
Social studies	𝍸 𝍸 /
Religious Education	////

Draw a table to show the information above.

8. Use tally marks to represent the following numbers.

a) 8	e) 26	i) 47	m) 21
b) 4	f) 19	j) 35	n) 28
c) 13	g) 18	k) 67	o) 32
d) 20	h) 54	l) 14	p) 48

9. Kasirye counted 53 cars with digital number plates. Show this using tallies.

10. Lumala sold some pens at sh. 500 each. If he collected sh. 8500 altogether, draw tallies to represent the number of pens that was sold.

11. Out of 52 pupils in a class, 17 are below 10 years. Draw tallies showing the number of pupils who are above 10 years.

12. Goals scored by different teams were recorded as follows.

0, 6, 4, 5, 6, 6, 4, 6, 5, 4, 6, 6, 0, 6

Use tally marks to record the information.

13. Below are marks scored by pupils in a test.

70, 60, 30, 60, 70, 70, 80, 90, 30, 60, 80, 60, 70

a) Tabulate the marks using tallies.
b) How many pupils did the test?

14. Below are marks scored by P.7 pupils in a science test.
    70, 65, 60, 50, 60, 65, 55, 60, 75, 80, 65, 50, 65, 65, 50 and 65
    a) Tabulate the marks using tallies.
    b) Find the number of pupils who did the test.

15. A man rolled a dice 25 times and the results were recorded.
    6, 4, 3, 3, 2, 6, 1, 1, 1, 5, 4, 1, 6, 2, 3, 1, 1, 1, 6, 6, 2, 6, 1, 4, 5
    Use tallies to record the given information above.

16. The table below shows different types of fruits which were sold by Cate on Tuesday in Bukomansimbi farmers' market. She collected sh.19,800 altogether.
    a) Study and complete it correctly.

Type of fruits	Tallies	Unit cost	Amount
Mangoes	𝍸 ///	sh. 400	_____
Oranges	_____	sh. 300	sh. 3600
Apples	////	_____	sh. 4000
Pineapples	_____	sh. 1500	_____

    b) Find the total cost of 7apples and 8 pineapples.

FREQUENCY TABLE, MODE AND MODAL FREQUENCY

Example 1

The height of 9 pupils are; 102cm, 105cm, 102cm, 107cm,102cm,111cm,117cm , 105cm and 102cm.Draw a frequency table to represent the information.

Height in cm	102	105	107	111	117
Frequency	4	2	1	1	1

Note: From the table above,
the modal height is **102cm**
the modal frequency is **4 times**

Example 2

Below are marks scored by pupils in a mathematics test.
60, 75, 80, 75, 75, 50, 60, 75, 80, 60, 75, 90, 60, 75, 80, 60
Find the;

i) modal mark

Marks	50	60	75	80	90
Frequency	1	5	6	3	1

The modal mark is 75

ii) modal frequency.

Marks	50	60	75	80	90
Frequency	1	5	6	3	1

The modal frequency is 6 times

Exercise

1. Mushikhan kept the following record of rainfall in millimetres:
   6, 4, 3, 6, 5, 2, 3, 0, 3, 2, 3. Find the mode.

2. Mugenyi recorded the number of visitors who visited his home in January.
   9, 4, 8, 3, 4, 5, 2, 4, 8, 4, 3, 4
   a) Find the mode.
   b) Find the modal frequency.

3. The table below shows marks obtained by Shantel in end of term one exams.

Subject	ENG	SCI	MTC	SST
Marks	75%	90%	80%	75%

   Find the;
   i) modal mark
   ii) modal frequency

4. Use the table below to find the modal and modal frequency.

   a)

Days	Mon	Tue	Wed	Thu	Fri	Sat
Revising hours	8	7	8	8	6	7

   b)

Exam set	I	II	III	IV	V	VI	VII
Score	60%	40%	70%	40%	80%	55%	90%

   c)

Months	Jun	July	Aug	Sept	Oct	Nov	Dec
Sunny days	8	19	15	8	7	8	6

   d)

Class	P.1	P.2	P.3	P.4	P.5	P.6	P.7
Number of pupils	48	42	58	52	42	49	37

5. Below are marks scored by pupils in a series of tests:

   40, 60, 30, 40, 40, 50, 60, 40, 50, 60, 40, 50, 40, 30, 80, 50, 40

   a) Complete the table below.

Marks	Tally	Frequency	Total marks
30			
40			
50			
60			
80			

   b) Find;
   i) the modal score.
   ii) the modal frequency.

6. Given the following marks scored by P.6 pupils in a science test.

   65, 70, 60, 50, 60, 65, 55, 60, 75 and 80.

   a) Complete the table below.

Marks	Tally	Frequency	Total marks
50			
55			
60			
65			
70			
80			
75			

   b) Find the mode

   c) What was the modal frequency?

7. The following is the weight of P.7 pupils in a certain school.

40	34	40	38	45	38	40	45	38	40
40	45	52	52	40	40	38	38	40	52
38	40	45	40	40	38	45	40	38	40

   a) Use the given data to complete the table below.

Weight in Kg	Tally	Frequency	Total weight
34			
38			
40			
45			
52			

   b) Find the total number of pupils in the class.

   c) Find
      i) the mode
      ii) the modal frequency

8. Complete the tables below.

   a)

Marks	Tally	Frequency	Total marks
20	////	4	80
18	_____	3	____
15	~~////~~	____	75
_____	~~//// //~~	____	280
30	_____	6	____

   b)

Height in cm	Frequency	Total
80	_____	240
_____	5	450
120	2	_____
100	_____	300

9. Study the table below and use it to answer questions that follow.
   a) Complete the table above.

Scores	70	60	_____	30	75
Tallies	/	///	//	### /	_____
Total	70	_____	160	_____	225

   b) How many pupils did the test?
   c) Find the i) mode ii) modal frequency

10. The table below shows marks scored by 15 pupils in a class. Use it to answer questions that follow.

Marks	Tally	Frequency	Total marks
50	//	_____	100
_____	_____	_____	105
45	### /	_____	____
80	_____	_____	160
60	//	2	____

   a) Complete the table above.
   b) Find the; i) mode ii) modal frequency .
   c) How many pupils scored below 50 marks?

11. The table below shows the weight of pupils in a class of 20 pupils.

Weight in kg	45	40	38	44	50
Number of pupils	6	2	k	4	3

   a) Find the value of k
   b) Find i) modal weight in kg
      ii) modal frequency
      iii) total weight of pupils in the whole class.

12. The table below shows goals of team in a tournament. The total number of goals scored by all teams was 59.

Goals	0	4	5	y	7
Number of teams	1	2	1	3	4

   a) Find the value of y
   b) How many teams scored atleast 5 goals?
   c) Find i) the mode.
      ii) the modal frequency.

MEDIAN

This is the middle number or value when all values in a set of data are arranged in ascending or descending order..

e.g.

The median of 6, 8, 14, 20 and 25 is 14 as shown below.

~~6~~, ~~8~~, 14, ~~20~~, ~~25~~

The median is 14

Note: *When there is an even number of values, the median is the sum of the two middle numbers (**after arranging in ascending order**) divided by two*

e.g.

The median of 11, 7, 2, 5, 3, 13, 1 and 11 is 6 as shown in the solution below

~~1~~, ~~2~~, ~~3~~, (5, 7,) ~~11~~, ~~11~~, ~~13~~

$$\text{Median} = \frac{5+7}{2}$$

$$\text{Median} = \frac{12}{2}$$

Median = 6

Note: *Median can also refer to the number half way between two numbers.*

Example

The number half-way between 9 and 23 is 16 as shown in the solutions below.

Approach 1

$$\text{Median} = \frac{9 + 23}{2}$$

$$\text{Median} = \frac{32}{2}$$

Median = 16

So, 16 is half-way between 9 and 23.

Approach 2

~~9~~, ~~10~~, ~~11~~, ~~12~~, ~~13~~, ~~14~~, ~~15~~, 16, ~~17~~, ~~18~~, ~~19~~, ~~20~~, ~~21~~, ~~22~~, ~~23~~

The median is 16

►Learn more about median

Example 1

Joseph is the 10th from either side of the line. How many people are in the line?

(Position x 2) – 1
(10 x 2) – 1
20 – 1
19 people

(Position + Position) – 1
(10 + 10) – 1
20 – 1
19 people

Example 2

The median of two numbers is 23. If one of the numbers is 17, find the other number.

Approach 1

Let the other number be n.

1st no	2nd no.	Median
17	n	23

$$\frac{\text{Sum}}{2} = \text{Median}$$

$$\frac{17 + n}{2} = 23$$

$$2 \times \frac{17 + n}{2} = 23 \times 2$$

$$17 + n = 46$$

$$17 - 17 + n = 46 - 17$$

$$n = 29$$

The number is 29

Approach 2

2nd number = (Median x 2) – 1st number

2nd number = (23 x 2) – 17

2nd number = 46 – 17

2nd number = 29

The number is 29

Note : *To find the position of the median, we use a formula* $\frac{n+1}{2}$ *where n is the number of values*

Exercise

1. Find the median of the following
   a) 16, 11, 13, 15, 19
   b) 9, 18, 20, 17, 11, 14, 10
   c) 23, 9, 11, 18, 13, 26, 12, 21, 19
   d) 24, 28, 17, 23, 18, 20
   e) 7,15, 25, 8, 11,19, 13, 18
   f) 4, 8, 3,12, 6
   g) 23, 17, 11, 21, 19, 18, 13
   h) 104, 206, 420, 150, 200, 140
2. Find the median of the first six prime numbers.
3. The height in cm of pupils in a class is given; 130, 123, 146, 109, 112, 111, 130, 102. Find the median.
4. At a clinic, the age of each child is recorded as follows; 3, 1, 4, 5, 2, 5, 6. Find the median age of these children.
5. Find the median of 8, 5, 9, 2, 3, 6.
6. Find the mode, modal frequency and median of the following.
   a) 80, 90, 70, 90, 60, 30
   b) 20, 36, 28, 60, 30, 36
   c) 4, 0, 8, 7, 8, 4 ,5, 4
   d) 123, 119, 151, 123, 119

7. Find the number half-way between;
   a) 18 and 20
   b) 7 and 43
   c) 11 and 159
   d) 63 and 97
   e) 123 and 325
   f) 752 and 874
   g) 2023 and 2031
   h) 7777 and 9999

8. The table below shows marks scored by P.7 candidates.

Marks	60	70	64	90	95
Number of candidates	2	1	y	3	1

   If 12 candidates did the test.
   a) Find the value of y?
   b) What was the modal mark?
   c) How many pupils scored below the median mark?

9. Study the table below carefully and use it to answer questions that follow.

Marks	Tallies	Frequency	Total marks
80	//	2	_____
60	////	_____	_____
___	____	3	210
___	/	1	65

   a) Complete the table above.
   b) Find the;
      i) mode
      ii) modal frequency
      iii) median.

10. Find the median of $1\frac{1}{2}$ and $\frac{2}{3}$.

11. The median of four consecutive even numbers is 27. If the first number is h,
    a) Find the value of h.
    b) Find the actual numbers.

12. The median of four consecutive odd numbers is 34. The largest number is n.
    a) Find the value of n
    b) Find the product of the least and the largest numbers

13. The median of two numbers is 24. One of the numbers is 5. Find the other number.

14. $1\frac{1}{24}$ is halfway between k and $1\frac{1}{3}$. Find the value of k.

15. The numbers; m+1, 13, 3m-2, 4m-5, 19, 25 are arranged in ascending order. Their median is 14.
    a) Find the value of m
    b) Find;
       i) the mode
       ii) modal frequency
       iii) their sum.

16. Kibuule planted trees such that a mango tree was the twelfth from either side. How many trees were in the line?
17. In the traffic jam, my daughter could see a red car as the 27th from either side. How many cars were there altogether?
18. In a line of pupils, Jimmy was the 9th from one side and the 31st from the other side in the line. Find the total number of pupils in the line.

RANGE

This is the difference between the highest and lowest data point of the given dataset.
We follow the steps below to find range

- *Arrange the data values in ascending or descending order.*
- *Determine the highest and lowest value in the given data set.*
- *Finally find the difference between the highest and lowest data values.*
- *Range = Highest value - Lowest value*

Example 1

The marks scored by the pupils of P.7 are 45, 39, 55, 63, 49, 92 and 69. Find the range of the marks.

Arrange the given data in ascending order.
39, 45, 49, 63, 69, 92

Highest value = 92
Lowest value = 39
Range = Highest value - Lowest value
Range = 92 – 39
Range = 53

Example 2

Find the range of the first 10 multiples of 7.

M_7= 7, 14, 21, 28, 35, 42, 49, 56, 63, 70

Highest value = 70
Lowest value = 7
Range = Highest value – Lowest value
Range = 70 – 7
Range = 63

Example 3

The following numbers were arranged in descending order.

4a + 3, 3a, 2a – 3, a – 2

Find the range.

Highest value = 4a + 3
Lowest values = a – 2

Range = (4a + 3) – (a – 2)
Range = 4a + 3 – a + 2
Range = 4a – a + 3 + 2
Range = 3a + 5

Example 4

At a clinic, the age of each child is recorded. The first 10 children had their ages recorded as follows;
5, 3, 2, 3, 6, 8, 5, 5, 7, 4
Find the range.

Highest value = 8
Lowest value = 2
Range = 8 – 2
Range = 6 years

Exercise

1. Find the range of each of the following.
   a) 8,14,7,9,5,13
   b) 43,49,47,46,48
   c) 201,111,193,145,211,215
   d) 40cm, 39cm, 83cm ,16cm, 45cm
   e) 81kg, 49kg, 57kg, 82kg, 51kg
   f) 350ml, 257ml, 782ml, 581ml
2. The goals scored by netballers in different matches are 62, 39, 50, 89, 75, 100 and 29. Find the range.
3. Work out the range of 12, 21, 9, 45, 32, 40 and 18.
4. What is the range of 6, 2, 11, 14, 19 and 15.
5. Eddie, Benja, Bernice and Newton are 28, 27, 4, 6 years old respectively. Find the range of their ages.
6. The height of 7 children are 105cm, 108cm, 120cm, 102cm, 107cm, 108cm and 110cm. What is the range of the height of children.
7. Maria kept the following record of rainfall in millimetres: 40, 30, 60, 50, 20, 30, 17. Find the range.
8. A boy scored the following marks in Mathematics tests; 69, 75, 60, 78, 91, 82, and 59. Find the range.
9. Students got the following marks in a national mathematics contest: 34, 9, 5, 23, 12, 9. Find the range.
10. Find the range of the first 10 natural numbers.
11. Find the range of the first 12 multiples of 9.
13. Find the range of;
    a) The first 10 natural numbers.
    b) The first 8 prime numbers.
    c) The first 7 composite numbers.
    d) The first 11 square numbers.
    e) The first 6 even multiples of 3.
14. Two numbers; 2y – 1 and 3y – 3 are arranged in ascending order. Find the range of the numbers
15. Increase the range of 42 and 60 by 15
16. Round off to the nearest tens, the range of 6952 and 7297.

<u>More problems involving range</u>.

Example 1

The range of two numbers is 52. If the lowest value is 19. Find the highest value.

Highest value = Lowest value + Range
= 19 + 52
= 71

Example 2

The range of two numbers is 86. If the highest value is 102. Find the lowest value.

Lowest value = Highest value – Range
= 102 – 86
= 16

Example 3

The range of two numbers is 12. Their sum is 52. Find the highest number

Approach 1

Let the smaller number be y

Lowest value	Highest no.	Sum
y	y + 12	52

$y + y + 12 = 52$

$2y + 12 = 52$

$2y + 12 - 12 = 52 - 12$

$2y = 40$

$\frac{2y}{2} = \frac{40}{2}$

$y = 20$

Highest number

$y + 12$

$20 + 12$

32

Approach 2

Let the highest value be n

Lowest value	Highest value	Sum
n - 12	n	52

$n + n - 12 = 52$

$2n - 12 = 52$

$2n - 12 + 12 = 52 + 12$

$2n = 64$

$\frac{2n}{2} = \frac{64}{2}$

$n = 32$

The highest number is 32

Exercise

1. The range of numbers is 15. If the smallest number is 23, find the other number.
2. The range of numbers is 8. If the largest number is 52. Find the smallest number.
3. The range of the ages of pupils in the school is 12 years. If the oldest pupil is 15years, how old is the youngest pupil.
4. The range of marks scored by pupils in a test is 63. If the lowest mark was 29, find the highest score.
5. The range of integers is -6. The least integer is -5. Find the highest number.
6. The following numbers are arranged in ascending order: a – 2, 2a – 3, 3a, and 4a + 3. If their range is 14, find the value of a.
7. The range of 38 and 50 is 5p-3. Solve for p.
8. The range of two numbers is 10. Their sum is 70. Find the numbers.
9. Find the two numbers whose sum is 29 and difference is 5.
10. The range of three numbers is 8. Their sum is 7a. Find the largest number if their median is 27.
11. On Friday, the number of absentees in a class of 56 pupils was more than the number of pupils who were present. If their range was 16 pupils, how many pupils were present?
12. The range and sum of heights of 3 boys in P.7 is 38cm and 188cm respectively. If their median height is 60cm. Find the tallest boy.

MEAN

Mean is the average of the given data. It can be calculated by dividing the sum of the given data by the total number of values.

Example 1

Calculate the mean of 8, 7, 10, 0 and 5.

$$\text{Mean} = \frac{\text{Sum of data}}{\text{Number of data}}$$

$$\text{Mean} = \frac{8 + 7 + 10 + 0 + 5}{5}$$

$$\text{Mean} = \frac{30}{5}$$

$$\text{Mean} = 6$$

Example 2

A fruit seller sold the following number of apples in a period of four days; 72, 83, 97 and 76. Calculate the average number of apples the fruit seller sold in that period.

$$\text{Average} = \frac{\text{Sum of data}}{\text{Number of data}}$$

$$\text{Average} = \frac{72 + 83 + 97 + 76}{4}$$

$$\text{Average} = \frac{328}{4}$$

$$\text{Average} = 82 \text{ apples}$$

Example 3

Pupils scored marks in a test as shown in the table below.

Marks	55	80	70	90
Number of pupils	4	2	3	1

a) How many pupils did the test?

$4 + 2 + 3 + 1 = 10$ pupils

b) Calculate the mean score.

$$\text{Mean} = \frac{\text{Sum of data}}{\text{Number of data}}$$

$$\text{Mean} = \frac{(55x4) + (80x2) + (70x3) + (90x1)}{10}$$

$$\text{Mean} = \frac{220 + 160 + 210 + 90}{10}$$

$$\text{Mean} = \frac{680}{10}$$

$$\text{Mean} = 68$$

c) How many pupils scored above the average marks?

$2 + 3 + 1 = 6$ pupils

Example 4

A teacher recorded marks of P.7 pupils in a mathematics test as shown in the table below.

Marks	85	90	95	96
Tallies	//// //// //	/	////	///

Work out the average mark

$$\text{Average} = \frac{\text{Sum of data}}{\text{Number of data}}$$

$$\text{Average} = \frac{(85x12) + (90x1) + (95x4) + (96x3)}{12 + 1 + 4 + 3}$$

$$\text{Average} = \frac{1020 + 90 + 380 + 288}{20}$$

$$\text{Average} = \frac{1778 \div 2}{20 \div 2}$$

$$\text{Average} = \frac{889}{10}$$

$$\text{Average} = 88.9$$

Exercise

1. For each of the data sets, find the mean of numbers.
   a) 3, 5, 4, 7, 9, 5
   b) 11, 18, 11,13, 21,10, 9
   c) 8kg, 4kg, 1kg, 8kg, 3kg, 7kg, 9kg, 5kg
   d) 80cm ,75cm, 85cm, 60cm, 82cm, 75cm, 90cm
2. Here are the marks out of 50 scored by 5 pupils in a Mathematics test;
   40, 36, 30, 20, 44. Calculate the mean score.
3. Jacob scored the following marks in her homework exercises.
   2, 5, 7, 3, 8, 7, 4, 10, 3
   Find the mean mark.
4. The table below shows the number of books read by p.6 pupils at Babiito P/S

Name	Alex	Henry	Cate	Abu	James	Sam
Number of books read	7	4	2	4	0	1

   Calculate the mean.
5. The table below shows the number of bottles of soda sold by a shop keeper throughout the year.

Months	J	F	M	A	M	J	J	A	S	O	N	D
Bottles of soda sold	30	25	24	36	30	54	66	41	29	25	26	22

   Calculate the average bottles of soda sold that year.

6. Complete the tables below correctly and find the mean.

a)

Marks	Frequency	Total
60	_____	120
80	1	_____
_____	3	270
45	_____	180

b)

Marks	Tallies	Freq	Total
20	///	___	60
18	___	2	_____
15	___	___	75
_____	𝍸 /	___	270
40	//	___	180

c)

Age in years	Tallies	Number of pupils
10	___	6
11	////	___
12	𝍸 /	___
13	___	2
14	___	4
15	1	1

d)

Marks scored	Tallies	Total marks
3	____	12
____	𝍸 ////	45
6	____	84
8	𝍸 ///	_____
____	𝍸	75

7. A poultry farmer sold a number of eggs in three weeks as follows; 234, 132 and 102. Calculate the average number of eggs sold by that period.

8. The data below shows the marks scored by the P.7 pupils in a test marked out of 40. Use it to answer questions that follow.

20	25	24	30	25	25	35	30
30	25	35	35	20	30	30	28
20	25	30	24	26	26	25	35
35	28	24	28	30	35	28	30

a) How many pupils did the test?
b) Calculate the average marks.

9. Use the tables below to find mean.

a)

Marks	80	70	90	75
Number of pupils	2	3	1	4

b)

Marks	90	85	10	80
Number of pupils	2	4	1	3

c)

Height in cm	95	80	75	90
Number of pupils	2	3	4	1

d)

Goals scored	70	80	30	60	40	12
Number of netball teams	2	1	2	3	5	1

e)

Marks	30	50	45
Number of pupils	8	3	4

f)

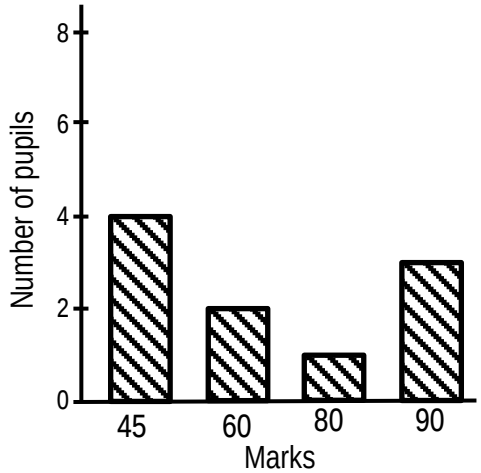
Marks	75	30	80	60	70
Number of pupils	3	1	3	2	1

10. The table below shows the number of children in different families in a certain village.

Number of families	15	2	8	6	9
Number of children	2	6	1	5	0

Calculate the mean number of children in that village.

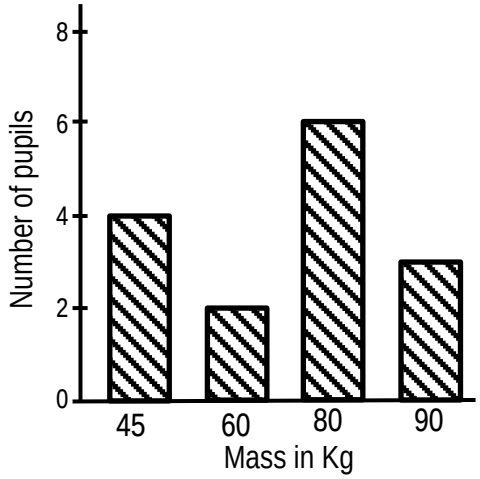
11. The graph below shows the marks scored by pupils in a test. Use it answer questions that follow.



a) How many pupils did the test?

b) Calculate the mean score.

12. The graph below shows the mass of pupils in P.5. Use it to answer questions that follow.



a) How many pupils are in the class?

b) Find in kilograms, the average mass of pupils.

More problems involving mean

$\text{Mean} = \frac{\text{Sum}}{\text{Number}}$

$\text{Sum} = \text{Mean} \times \text{Number}$

$\text{Number} = \frac{\text{Sum}}{\text{Mean}}$

Example 1

The average mass of 6 girls is 50kg. find their total mass.

Sum = Mean x Number
Sum = 50kg x 6
Sum = 300kg
Their total mass is 300kg

Example 2

The average mark obtained by pupils in a test was 62. If the total score was 930, how many pupils did the test?

$\text{Number} = \frac{\text{Sum}}{\text{Mean}}$

$\text{Number} = \frac{930}{62}$

$= 15$

15 pupils did the test

Example 3

The average of a, 7, 2a+3 and 6 is 7. Find the value of a.

Sum = Mean x Number
$a + 7 + (2a+3) + 6 = 7 \times 4$
$a + 2a + 3 + 7 + 6 = 28$
$3a + 16 = 28$
$3a + 16 - 16 = 28 - 16$
$\frac{3a}{3} = \frac{12}{3}$
$a = 4$

Example 4

The average age of 8 pupils is 12 years. If two pupils whose age is 10 years and 8 years leave the group, what is the average age of the remaining pupils?

Total age of 8 pupils → 8x12years = 96years
Total age of the 2 pupils → (10+8)yrs = 18years
Remaining pupils → 8 – 2 = 6pupils
Total age of 6 pupils → 96 – 18 = 78years
Average age of 6 pupils → $\frac{78}{6}$ = 13years

Example 5

Candidates did a test and scored marks as shown below.

Marks	80	45	k	50
No .of pupils	4	3	6	2

a) How many pupils did the test?
4 + 3 + 6 + 2 = 15 pupils

b) If the mean marks was 61. Find the value of k.

$$\frac{\text{sum}}{\text{number}} = \text{Mean}$$

$$\frac{(80x4) + (45x3) + (kx6) + (50x2)}{15} = 61$$

$$\frac{320 + 135 + 6k + 100}{15} = 61$$

$$\frac{320 + 135 + 100 + 6k}{15} = 61$$

$$\frac{555 + 6k}{15} = 61$$

$$15 \times \left(\frac{555 + 6k}{15}\right) = 61x15$$

$$555 + 6k = 915$$

$$555 - 555 + 6k = 915 - 555$$

$$6k = 360$$

$$\frac{6k}{6} = \frac{360}{6}$$

$$k = 60$$

Example 6

The table below shows goals scored by different teams in a tournament. Use it to answer the question that follows.

Goals scored	3	2	6	10	7
Number of teams	1	y	2	2	1

Find the value of y if the average number of goals scored was 5

$$\frac{\text{sum}}{\text{number}} = \text{Mean}$$

$$\frac{(3x1)+(2xy)+(6x2)+(10x2)+(7x1)}{1 + y + 2 + 2 + 1} = 5$$

$$\frac{3 + 2y + 12 + 20 + 7}{y + 1 + 2 + 2 + 1} = 5$$

$$\frac{2y + 42}{y + 6} = 5$$

$$(y+6) \times \left(\frac{2y + 42}{(y + 6)}\right) = 5(y + 6))$$

$$2y + 42 = 5y + 30$$

$$2y - 2y + 42 = 5y - 2y + 30$$

$$42 = 3y + 30$$

$$42 - 30 = 3y + 30 - 30$$

$$12 = 3y$$

$$\frac{12}{3} = \frac{3y}{3}$$

$$4 = y$$

$$y = 4$$

Exercise

1. The average mark scored by 8 pupils in a test was 75. What was the total score?
2. The average cost of 7 plates is sh. 2400. Find the total cost of the plates.
3. The average age of 9 boys is 15 years .What is their total age?
4. A box of soap weighs 15,000 grams . The average mass of bars of soap in the box is 600grams. Find the number of bars of soap in the box.
5. A box containing tins of milk weighs 3000grms. The mean weight of the tins in the box is 200grams. Calculate the number of tins of milk in the box.
6. Some boys shared a wire of length 910cm. if each boy got 13 metres on average, how many boys shared the wire?
7. The mean of 3, 9, m and 4 is 6. Find the value of m.

8. Find the value of the unknowns if the mean is;
   i) 9, 2, y+3, 4 and 3 is 5
   ii) 10, 7, 8, 20 and 2m+1 is 12
   iii) y+3, 0, y-1, 4 and 4 is 6
   iv) p+3, 6, 2p+1 and 3 is p+2
   v) w+1, 5 and w is 6
   vi) a, 3a, 7a, 4a and 0 is 6
   vii) 2, 9, 11, n, 14 and 18 is 11
   viii) k, k+1, 8, 7, 4, 2 and 6 is 10
   ix) 7, y, 9, 8 and 10 is 8
   x) x, 3x, 7x, 4x and 0 is 6

9. The average of $\frac{n+2}{4}$, $\frac{2n-2}{2}$ and $\frac{n+9}{3}$ is 4. Find the value of n.

10. The table below shows marks scored by pupils in a test. If the mean mark was 79, complete the table below.

Marks	Frequency	Total marks
_____	4	240
_____	_____	255
90	6	_____
_____	2	_____
Sum of marks		1185

11. The table below shows marks scored by P.7 candidates in a mock examination. Use it to answer the following question.

Marks	Tallies	Total marks
24	𝍸	___
___	𝍸 /	56
72	____	___
50	//	100
___	𝍸	180

If the mean mark was 35, complete the table above

12. The table below shows marks scored by pupils in a test. Use it to answer questions that follow.

Marks	80	83	90	y
Number of pupils	3	4	1	2

a) How many pupils did the test?
b) If the mean mark was 85. Solve for y.
c) How many pupils scored above the mean mark?

13. A survey was conducted by a group of P.7 candidates as part of environment awareness programme in which they collected the following data regarding to the number of goats in 20 families in their locality as shown in the table below.

Number goats	40	20	g	60	10	80
Number of families	5	3	2	n	6	2

a) Find the value of n.
b) Given that the average number of goats per family was 33, find the value of g.

14. On visitation day, P.7 candidates got money from their parents as shown in the table below.

Amount of money	sh. 2000	m	sh.3000
Number of pupils	6	4	5

If the mean was sh.2200, find the value of m.

15. Find the value of the unknowns in each of the given tables below. The mean is given in brackets.

a) (Mean = 17)

Number of pencils	12	20	k	14
Number of pupils	2	3	4	1

b) (Mean = 18)

Sacks of maize	8	15	a +7	20	29
Number of farmers	2	3	2	4	1

c) (Mean = 89)

Marks	90	2n	95	76	88
Number of pupils	8	3	5	1	4

d) (Mean = 83)

Marks	80	90	85	70
Number of pupils	3	h	4	1

e) (Mean = 13)

Age in years	15	13	20	11	12
Frequency	3	3	1	d	3

f) (Mean = 10)

Goals scored	15	9	8	6	12
Number of teams	2	6	3	y – 3	1

16. The table below shows the number of children in different homes in Maloko village. The average number of children is 3

Number of homes	16	12	8	4	20
Number of children	2	y	3	0	2

a) Find the value of y
b) How many families have more than 2 children?

17. The table below shows the number of sweets given to pupils in Top class at Kimenke Junior School. The average number of sweets given to pupils was 4. Use the table to answer the questions that follow.

Number of sweets	4	2	9
Number of pupils	30	d	20

a) Find the value of d
b) If 63 pupils were girls, find the number of boys who were given sweets

18. The table below shows the points scored by pupils in a spelling bee competition.

Points	85	75	r	90
Tallies	///	~~////~~	~~////~~ ////	///

If the mean number of points was 81. Find the value of r

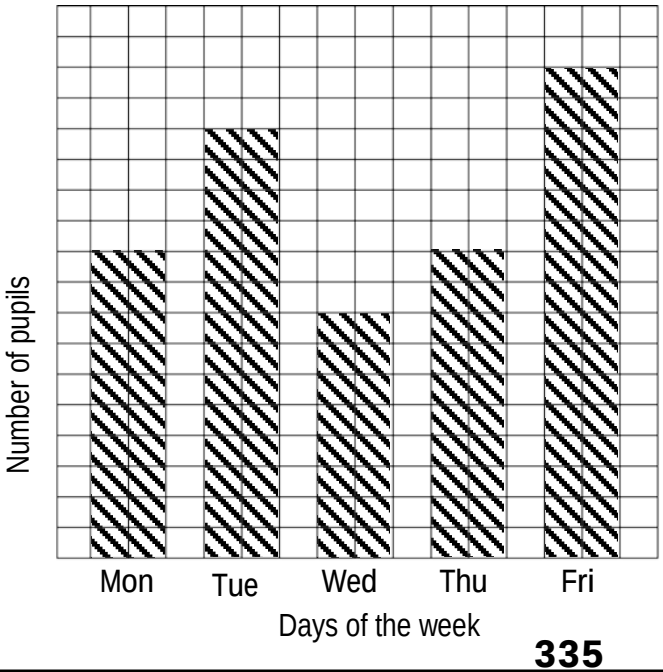
19. The mean of three consecutive even number is 24. Find the numbers.

20. The average of four consecutive odd number is 3a – 9. If the least number is a+18.
a) Find the value of a
b) Find the actual number

21. The average weight of 8 boys is 34kg. When their teacher joins them the average weight becomes 37kg. Find the weight of the teacher.

22. The average mass of 6 sacks of beans is 120kg. If one sack which weighs 100kg is removed, find the average mass of the remaining sacks.

23. The total weight of a certain number of pupils in a class is 100kg. Their average weight is 25kg. If another pupil of weight 35kg joins them, calculate the average of all the pupils.
24. The average age of 10 pupils is 14 years. If 2 pupils of 9 years and 11 years leave the group, find the average age of the remaining pupils.
25. The average mass of 4 boys is 45kg. When two other boys join the group the average mass becomes 40 kg. The fifth boy is 6kg heavier than the sixth boy. Find in kilograms, the mass of the fifth boy.
26. The average height of 7 boys is 140cm. When two boys leave the group, the total height of the remaining boys becomes 745cm. If one of the boys who left the group is 110cm tall, find the height of the other boy.
27. The mean age of 3 pupils is 11years. When some pupils whose average age is 14 yrs joins the group, the total age of all pupils becomes 117years. Find the average age of all pupils in the group.
28. The average age of 5 children is 12 years. If one boy whose age is 8 years leaves the group, what will be the average age of the remaining children?
29. The mean mark scored by six pupils in a test is 71. Four of them scored 68, 82, 64 and 79. What is the score of the sixth pupils if she scored 13 more marks than the fifth pupils?
30. A fruit seller sold the following number of oranges in six days; 38, 42, 38, 53, 35 and 40
    a) What is the modal number of oranges sold?
    b) Work out the range of the number of oranges sold.
    c) By the end of the seventh day, the average number of oranges sold was 43. How many oranges were sold on the seventh day?
31. Find the three numbers whose average is 28, range is 12 and median is 30.
32. The graph below shows the attendance of pupils throughout the week. The average attendance of the pupils in the first three days was 64. Study it carefully and use it to answer questions that follow.



a) Which days had the same attendance?
b) Which day had the least attendance?
c) Find the scale on vertical axis
d) How many pupils attended on Thursday?
e) How many more pupils attended on Tuesday than Wednesday?
f) If all pupils were present on Friday, find the total number of absentees throughout the week

PIE CHARTS

A pie chart is a circular representation of data. It is also known as a circle graph. It is called a pie chart because the sectors of the circles are just like slices of a pie.
The area within each sector represents the size of the data. The value of the central angle for each sector is determined by the formula $\left(\frac{\text{Given data}}{\text{Total of the data}} \times 360^{o}\right)$

There are three ways of representing data on pie charts.
* Using fraction of the total *Percentages *Degrees.
e.g.
The table below shows the number of pupils who play different games in a school of 240 pupils.

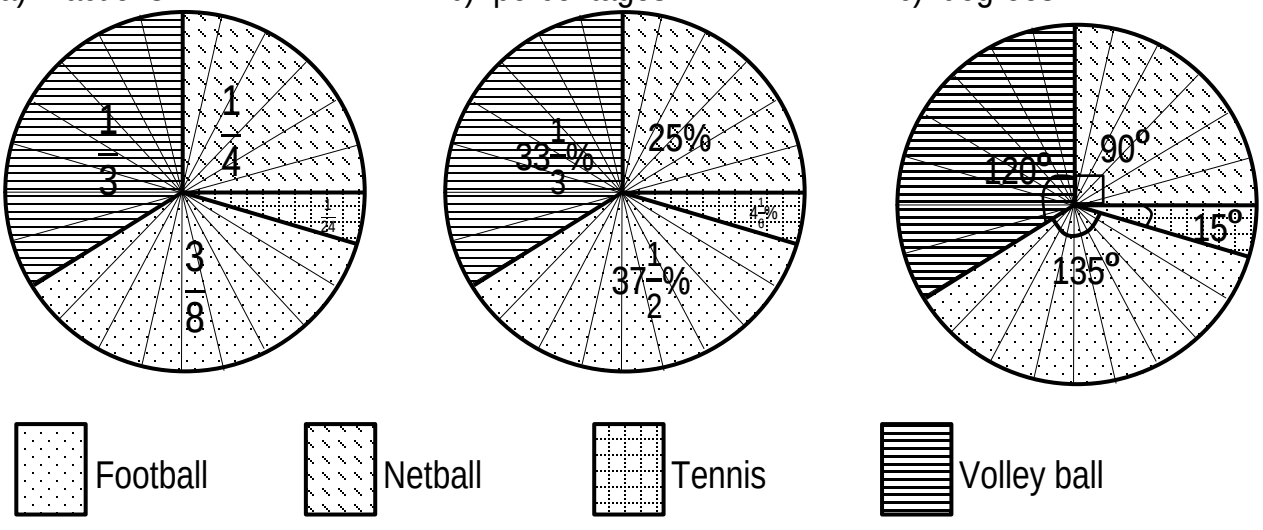
Games	football	Net ball	Tennis	Volley ball
Number of pupils	90	60	10	80

The above data can be expressed in terms of fractions, percentages or degrees as shown in the table below.

Game	Number of pupils	Fraction	Percentage	Degrees
Football	90	$\frac{90}{240} = \frac{3}{8}$	$\frac{3}{8} \times 100\% = 37\frac{1}{2}\%$	$\frac{3}{8} \times 360^{o} = 135^{o}$
Netball	60	$\frac{60}{240} = \frac{1}{4}$	$\frac{1}{4} \times 100\% = 25\%$	$\frac{1}{4} \times 360^{o} = 90^{o}$
Tennis	10	$\frac{10}{240} = \frac{1}{24}$	$\frac{1}{24} \times 100\% = 4\frac{1}{6}\%$	$\frac{1}{24} \times 360^{o} = 15^{o}$
Volleyball	80	$\frac{80}{240} = \frac{1}{3}$	$\frac{1}{3} \times 100\% = 33\frac{1}{3}\%$	$\frac{1}{3} \times 360^{o} = 120^{o}$
Total	240	1	100%	360^{o}

Each of the pie chart below represents the same information.

a) fractions b) percentages c) degrees

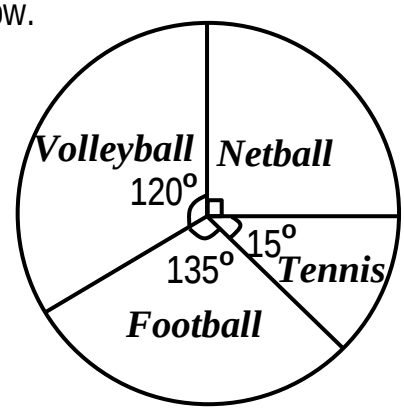


By Sseggayi Benjamin Kasuka

Interpreting data on pie charts

Example 1

The pie chart below represents different games played by pupils in a school of 240 pupils. Use it to answer questions that follow.



a) Find the number of pupils who play netball.

$\frac{90}{360}$ x 240 = 60 pupils

b) Calculate the number of pupils who play volley ball and Tennis altogether.

$120^o + 15^o = 135^o$

$\frac{135}{360}$ x 240 = 90 pupils

c) How many more pupils play football than netball?

$135^o - 90^o = 45^o$

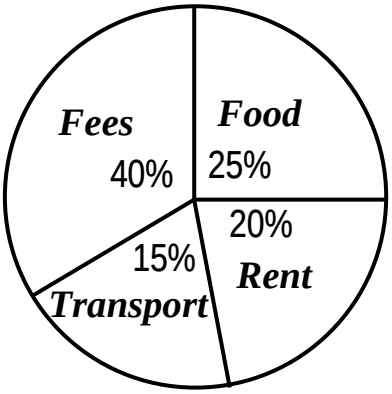
$\frac{45}{360}$ x 240 = 30 more pupils

d) Express as a percentage of total, the number of pupils who play net ball.

$\frac{90}{360}$ x 100% = 25%

Example 2

The pie chart below shows how Yiga spends his monthly salary of sh. 250,000/=. Use it to answer questions that follow.



a) How much money does he spend on fees?

$\frac{40}{100}$ x sh. 250,000 = sh. 100,000

b) How much less is spent on transport than food.

25% - 15% = 10%

$\frac{10}{100}$ x sh. 250,000 = sh. 25000

c) Calculate the amount of money spent on rent and food altogether.

20% + 25% = 45%

$\frac{45}{100}$ x sh. 250,000 = sh. 112,500

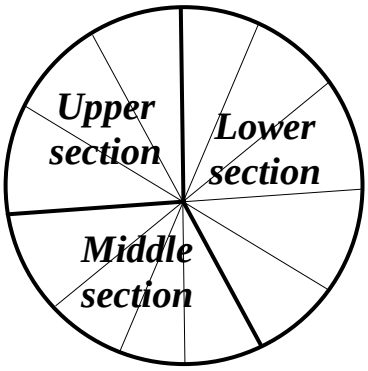
d) What fraction of his salary is spent on rent?

$20\% = \frac{20 \div 20}{100 \div 20}$

$= \frac{1}{5}$

Exercise

1. The pie chart below shows the number of pupils in different sections in a school of 480 pupils. Use it to answer questions that follow.

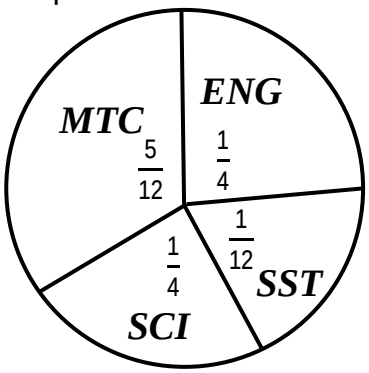


a) Find the number of pupils in middle section.

b) Express in lowest terms, the fraction of pupils in lower section.

c) How many more pupils are in middle section than upper section?

2. The pie chart below shows a total of 360 books in the school library.

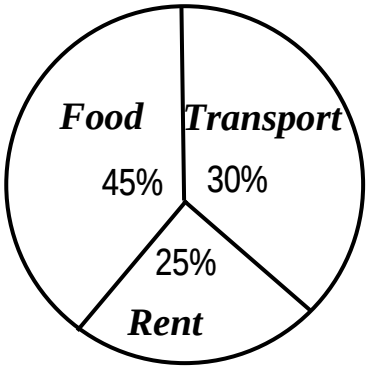


a) Find the angle sector for English.

b) How many mathematics books are in the library?

c) How many more science books than SST books are in the library?

3. Mr. Wangu spends his monthly salary as shown in the pie chart below.



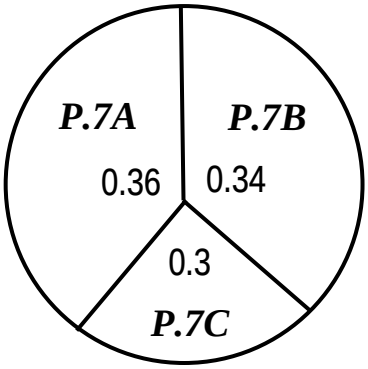
a) What fraction of the salary is spent on food?

b) If he earns sh. 240,000/= per month, how much money does he spend on rent?

c) How much less is spent on transport than food?

d) Calculate the amount of money Mr. Wangu spends on food and rent altogether

4. At Kasuku P/S 100 candidates were distributed in the three streams as show below.



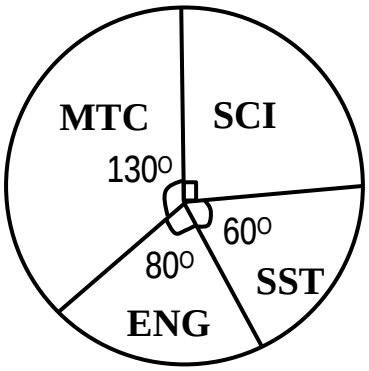
a) Find the number of pupils in P.7 C.

b) Find the percentage of pupils in P.7 A.

c) Calculate the difference between the number of pupils in P.7 A and P.7 B.

d) Find the angle sector for P.7 C.

5. A girl scored 180 marks in the four subjects as shown below.



a) What was her best done subject?

b) How many marks did she score in English?

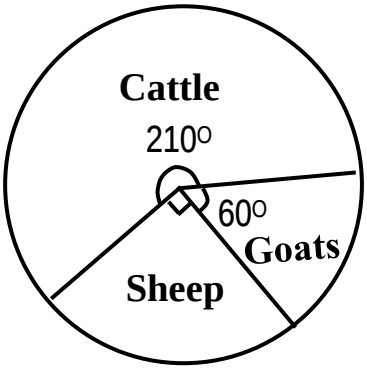
c) How many more marks did she score in Mathematics than science?

d) Express as a percentage of the total score, the marks scored in science.

e) Find the range of marks

f) How many marks did she score in English and SST altogether?

6. The pie chart below shows 1080 animals on Ninsima's farm. Use it to answer questions that follow.



a) Find the number of cattle on the farm

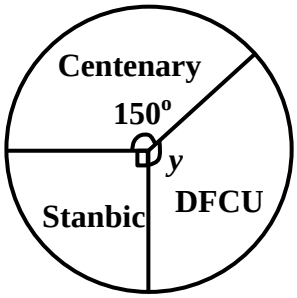
b) Express as a percentage of the total , the number of goats on the farm.

c) If a goat costs sh. 150,000 and a sheep costs sh. 160,000/=. How much more will Ninsima get from all the sheep than goats?

Interpreting pie charts involving unknowns

Example 1

The pie chart below shows the banks where 180 farmers save their money. Use it to answer questions that follow



a) Solve for y

$y + 90^o + 150^o = 360^o$

$y + 240^o = 360^o$

$y + 240^o - 240^o = 360^o - 240^o$

$y = 120^o$

b) How many farmers keep their money in Stanbic?

$\frac{90}{360} \times 180 = 45$ farmers

c) What percentage of farmers keep their money in centenary bank?

$\frac{150}{360} \times 100\% = 41\frac{2}{3}\%$

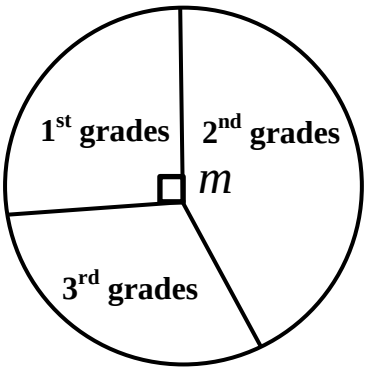
d) How many more farmers keep money in DFCU bank than Stanbic bank?

$120^o - 90^o = 30^o$

$\frac{30}{360} \times 180 = 15$ farmers

Example 2

The pie chart below shows the grades obtained by 60 pupils in a class. Use it to answer questions that follow.



a) If 20 pupils obtained 3rd grade, find the value of m.

$\frac{20}{60} \times 360^o = 120^o$

$m + 90^o + 120^o = 360^o$

$m + 210^o = 360^o$

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

$m = 150^o$

b) Find the number of pupils who got second grade.

$\frac{150}{360} \times 60 = 25$ pupils

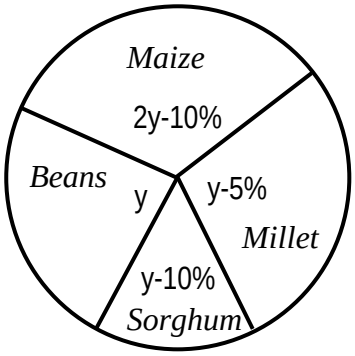
c) How many more pupils got third grade than second grade?

$120^o - 90^o = 30^o$

$\frac{30}{360} \times 60 = 5$ pupils

Example 3

The pie chart below shows the total production of crops on a farm. The total production is 54 tonnes per season.



Find in kilograms, the mass of millet produced in the season.

Value of y

$y + (2y-10)\% + (y-5)\% + (y-10)\% = 100\%$

$y + 2y + y + y - 10\% - 5\% - 10\% = 100\%$

$5y - 25\% = 100\%$

$5y - 25\% + 25\% = 100\% + 25\%$

$5y = 125\%$

$\frac{5y}{5} = \frac{125\%}{5}$

$y = 25\%$

Total production in kg

$54 \times 1000kg = 54000kg$

Millet produced

$(y-5)\% = (25 - 5)\%$

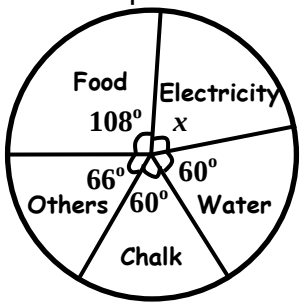
$= 20\%$

$\frac{20}{100} \times 54000kg$

$10800kg$

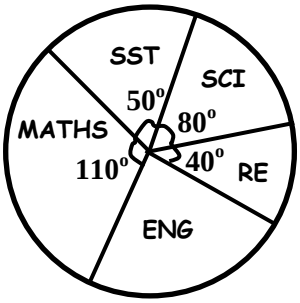
Exercise.

1. The pie chart below shows how a school spends sh. 1440,000 in a week. Use it to answer questions that follow.



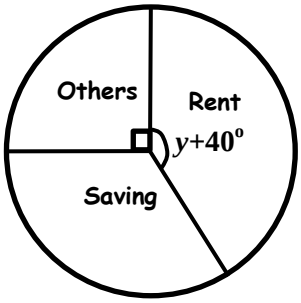
a) Find the value of x
b) How much money is spent on water?
c) How much more is spent on food than electricity?

2. The pie chart below shows different subjects liked by 648 pupils of Eden P/S



a) How many pupils like English?
b) Find the number of pupils who like Mathematics and science altogether.
c) Express as a percentage, the total number of pupils who like science and R.E

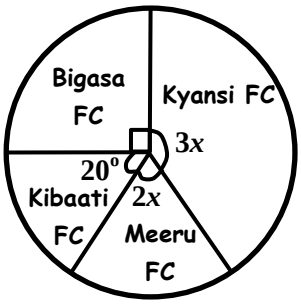
3. The circle graph below shows a man's expenditure and saving of his monthly salary of sh. 108,000. Use it to answer questions that follow.



a) If he saves sh. 36000, find the value of y in degrees.

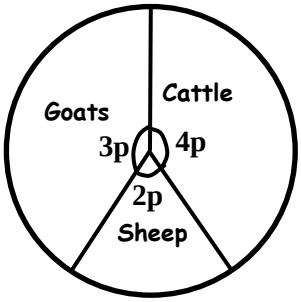
b) How much money does he spend on rent?

4. Ndiwalana donated sh. 5,400,000 to the best four teams in the tournament. The graph below shows how the amount of money was distributed.



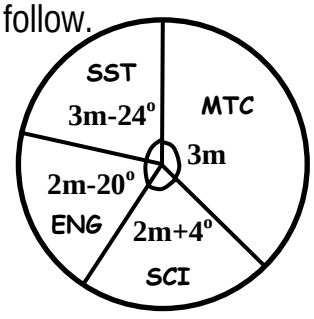
a) How much money did Meeru FC get?
b) How much more did Kyansi FC get than Bigasa FC
c) What percentage went to Meeru FC and Kibaati FC altogether?

5. The pie chart below shows 270 animals kept on my farm. Use it to answer questions that follow.



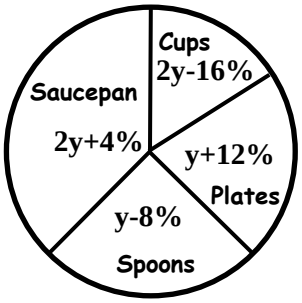
a) Find the number of sheep on my farm.
b) If I sell each got at sh. 120,000, how much money will I get?
c) How many more cattle than goats are on my farm?

6. The pie chart below shows 180 books in a book shop. Use it to answer questions that follow.



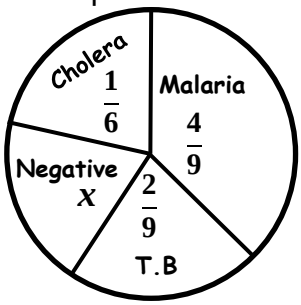
a) How many more MTC books than Science are in the bookshop?
b) If each book is sold at sh. 20,000, how much money will be got after selling all SST books and science books?

7. The graph below shows how Sserudigo spent his money on kitchen items. Use it to answer questions that follow.



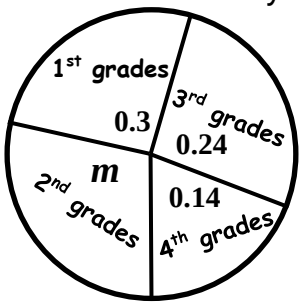
a) Find the value of y.
b) If he spent sh. 15,000/= altogether, how much money did he spend on plates?
c) Given that a cup cost sh. 600. Find the number of cups Sserudigo bought.
d) Express the sector for saucepan in degrees.

8. On a certain day, 108 people went for medical checkup in a nearby clinic. The results were represented on a pie chart as shown below.



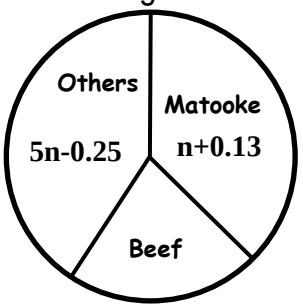
a) Find the value of x
b) Find the number of malaria victims.
c) Calculate the percentage of people who were suffering from cholera.
d) Find the number of people who were positive

9. The circle graph below shows the grades obtained by candidates in Kagando Primary school in P.L.E last year.



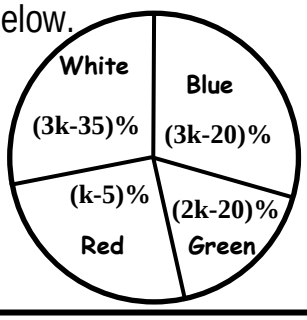
a) Find the value of m
b) If 50 candidates sat for PLE, find the number of third grades.
c) Express as a percentage of the total, the number of second grades
d) Express the sector of first grades in degrees.

10. Jane was given sh. 40,000 for her birthday and spent it as shown in the pie chart below



a) If she spent sh. 16000 on beef, find the decimal fraction represented by n.
b) How much money was spent on others?
c) How much more was spent on Beef than Matooke?

11. In the interschool competitions which took place in Yumbe, 60 schools participated. Mr. Dalil recorded the colour of uniforms of different schools as shown on the chart below.

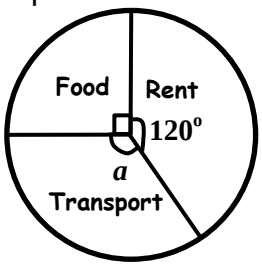


a) Find the value of k in degrees.
b) How many schools had blue uniforms?
c) What is the probability that a school with a red uniform won the competitions?

More about pie charts

Example 1

The pie chart below shows how Tr. Cate spends her monthly income. Use it to answer questions that follow.



a) If she spends sh. 90,000 on transport, find her monthly salary.

Value of a

$a + 120^o + 90^o = 360^o$

$a + 210^o = 360^o$

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

$a = 150^o$

Monthly salary

150^o represent sh. 90,000

1^o represents $\frac{\text{sh. } 90{,}000}{150}$

1^o represents sh. 600

360^o represent sh. 600 x 360

360^o represent sh. 216,000

Her monthly salary is sh. 216,000

b) How much more is spent on rent than on food?

$120^o - 90^o = 30^o$

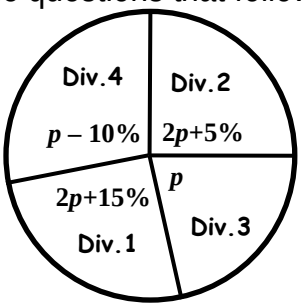
$\frac{30}{360}$ x sh. 216,000 = sh. 18,000

c) Express as a percentage of the total, the amount of money spent on rent.

$\frac{120}{360} \times 100\% = 33\frac{1}{3}\%$

Example 2

The pie chart below represents the performance of P.7 candidates in the mock examinations. Study it carefully and use it to answer the questions that follow.



a) Given that 24 more candidates passed in Div. 3 than Div. 4, how many candidates sat for the examinations?

Value of p

2p+15% + p + 2p+5% + p-10% = 100%

2p+p+2p+p+15%+5%-10% = 100%

6p + 10% = 100%

6p + 10% - 10 % = 100% - 10%

6p = 90%

$\frac{6p}{6} = \frac{90\%}{6}$

p = 15%

Difference in percentage

p – (p – 10%)

15% - (15% - 10%)

15% - 5%

10%

Let the total number of candidates be y

10% of y = 24

$\frac{10}{100}$ x y = 24

$10 \times \frac{y}{10} = 24 \times 10$

y = 240

240 candidates sat for the examination

b) How many candidates passed in division 2?

2p + 5%

(2x15%) + 5%

30% + 5%

35%

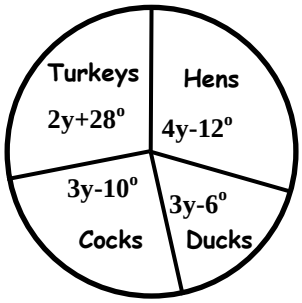
35% of 240

$\frac{35}{100}$ x 240

84 candidates

Example 3

The pie chart below represents different types of poultry on a farm. Given that the number of cocks on the farm is less than the number of hens. Find the number of turkeys.



Value of y

$2y+28^o+3y-10^o+3y-6^o+4y-12^o = 360^o$

$2y+3y+3y+4y+28^o-10^o-6^o-12^o = 360^o$

$12y + 28^o - 28^o = 360^o$

$\frac{12y}{12} = \frac{360^o}{12}$

$y = 30^o$

Difference

$(4y - 12^o) - (3y - 10^o)$

$(4x30^o - 12^o) - (3x30^o - 10^o)$

$(120^o - 12^o) - (90^o - 10^o)$

$108^o - 80^o$

28^o

Angle sector for turkeys

$2y + 28^o$

$2x30^o + 28^o$

$60^o + 28^o$

88^o

Number of turkeys

28^o represent 14

1^o represents $\frac{14}{28}$

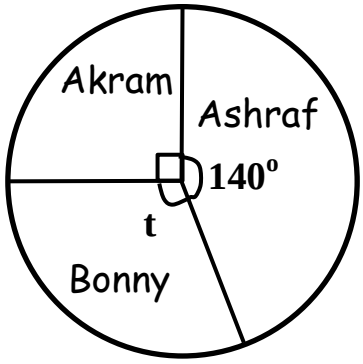
88^o represent $\frac{14}{28}$ x 88

88^o represent 44

There are 44 turkeys on the farm

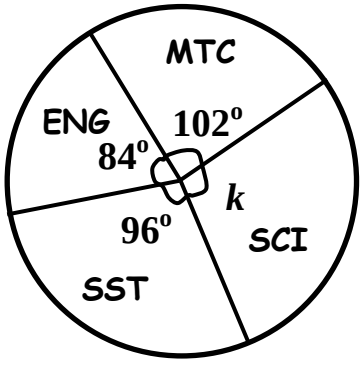
Exercise

1. The age of each of the three men Akram, Bonny and Ashraf is represented on the pie chart below.



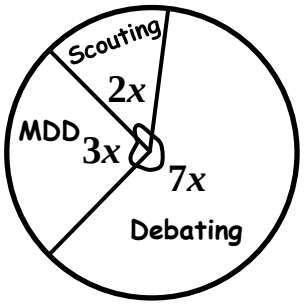
a) Find the value of t
b) If Bonny is 26 years old. Find their total age.
c) Express Akram's age as a percentage of their total age.
d) How old will Ashraf be in 9 years' time?

2. The pie chart below shows the performance of a boy in end of term exams. Use it to answer questions that follow.



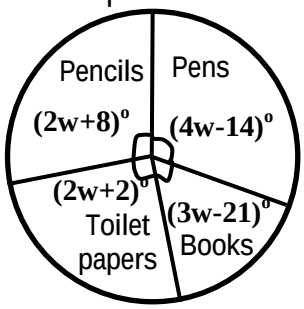
a) Find the value of k
b) If he got 85 marks in mathematics, calculate his total score.
c) Work out the range of marks
d) Express in simplest form of the fraction in social studies.

3. The pie chart below shows how P.7 pupils are distributed in various clubs in Butiti P/S. Use it to answer questions that follow.



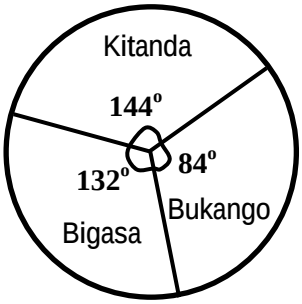
a) There are 105 pupils in debating club. Find the total number of pupils in class.
b) Express the number of pupils in MDD as a percentage of the Whole class.
c) How many more pupils are in a debating club than counting club?

4. The pie chart below shows scholastic materials found in Praise Stationer's. Use it to answer questions that follow.



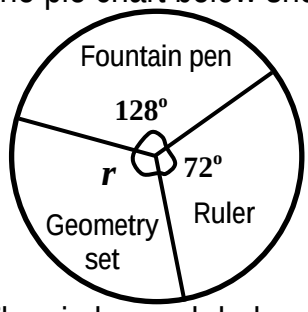
a) Find the value of w in degrees.
b) Calculate the number of pens if there are 14 dozens of books.
c) Express the number of toilet papers as a percentage of the total number of items.

5. The pie chart below shows how PDM funds was distributed in different sub-counties in Bukomansimbi district. Use it to answer questions that follow.



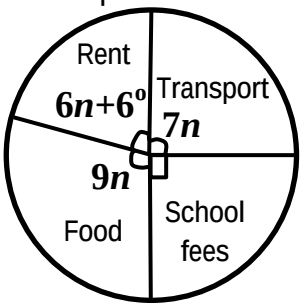
a) If Kitanda got 24 million shillings more than Bigasa. How much money was given to the three sub-counties altogether?
b) How much money did Bukango sub-country get?

6. The pie chart below shows the cost of 3 items. Use it to answer questions that follow.



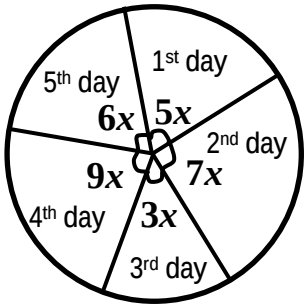
a) Find the value of r.
b) If a geometry set costs sh. 1600 more than a fountain pen, find the total cost of the 3 items.
c) How much money will I pay for 5 rulers.?

7. The circle graph below shows how Nabanja spends her monthly income. Use it to answer questions that follow



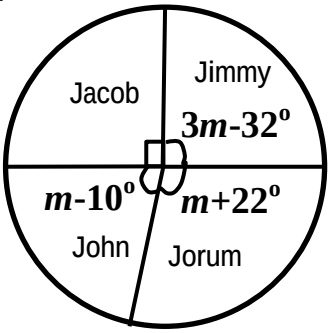
a) If she spends sh. 63600 more on transport than on rent, find her monthly income.
b) How much money does she spend on rent?
c) How much money does she spend on food and school fees altogether?

8. The circle graph below shows the number of tomatoes picked by Amos in 5 days. Use it to answer questions that follow.



a) Find the value of x in degrees.
b) If he picked 16 tomatoes on the 1st day less than the 4th day. Find the total number of tomatoes picked in the 5 days?
c) By the end of the 6th day, the average number of picked tomatoes was 30 tomatoes. Calculate the number of tomatoes picked on the 6th day.

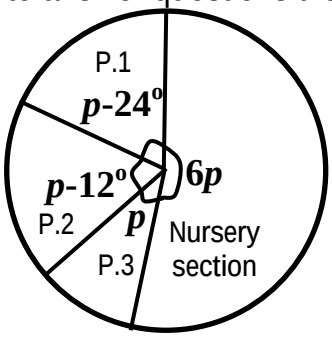
9. The graph below shows the amount of money shared by P.5 pupils. Use it to answer questions that follow.



a) If Jimmy and Jorum got sh. 111,000 altogether, how much money did Jacob get?

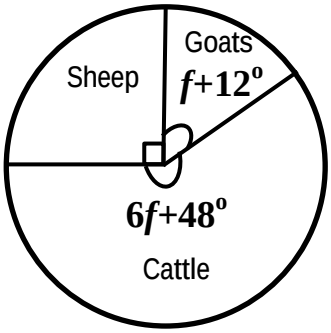
b) How much more did Jorum get than John?

10. The pie chart below shows the number of pupils in Kyakamunya Infants School. Use it to answer questions that follow.



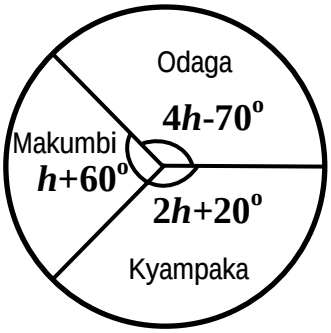
a) The average number of pupils in P.1, P.2 and P.3 is 64, find the value of p in degrees.
b) Find the number of pupils in Nursery section.

11. The pie chart below represents the number of animals reared on Nimuntu's farm. Study the pie chart and use it to answer questions that follow.



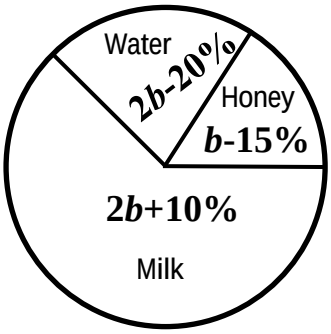
a) Find the value of f
b) Given that there are 93 more cattle than goats, calculate the total number of animals on the farm.
c) Express the number of sheep as a percentage of the total number of animals on the farm.
d) If Nimuntu sells off all the goats at sh. 120000 each, calculate the amount of money he will get altogether.

12. The pie chart below shows the number of wheel barrows shared by three farmers. Use it to answer questions that follow.



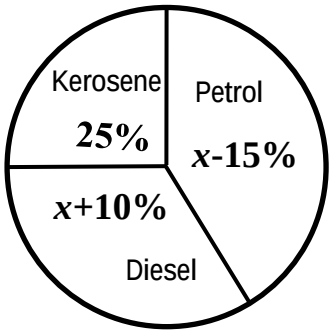
a) If Makumbii got 10 wheel barrows less than Odaga, find the total number of wheel barrows shared.
b) Calculate Kyampaka's share.
b) How many wheel barrows did Makumbi and Odaga get altogether?

13. The pie chart below shows how Nsabohurira mixed water, milk and honey to make tea. Use it to answer questions that follow.



a) Find the value of b
b) If 12 litres of milk was used, how much tea was prepared?
c) Express the sector for water in degrees.
d) How much more water than honey was used?

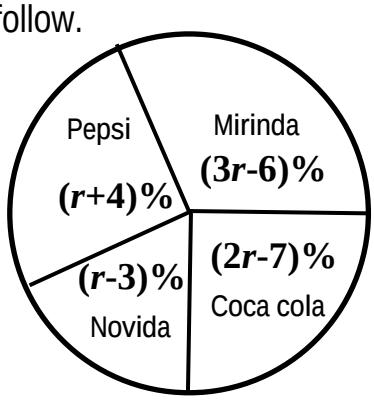
14. One day, the amount of fuel sold at Bam Petrol Station in Bukoba was represented on the chart. Use it to answer questions that follow.



a) If 60 more litres of petrol were sold than diesel, find in litres, the amount of fuel sold that day.

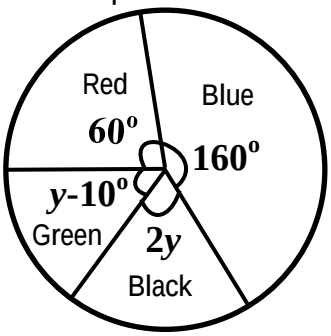
b) A litre of kerosene was sold at sh. 4400. How much money was collected on kerosene?

15. The pie chart below shows the percentage through which different types of soda were served to guests who attended a birthday. Use it to answer the questions that follow.



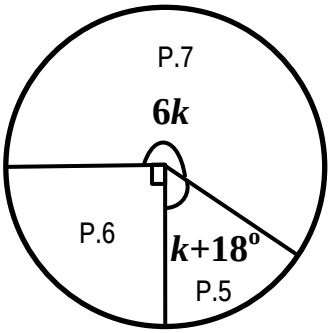
a) Solve for r.
b) Given that 58 bottles of Mirinda were served more than Pepsi and Novida. Calculate the total number of bottles of soda served to the guests.
c) If each guest took 2 bottles of soda, how many guests took coca cola?
d) A bottle of soda costs sh. 1000, how much more was spent on Mirinda than Novida?

16. In a shop, a pen costs shs.800. Muwanika bought pens of different colours from the same shop as shown in the pie chart below.



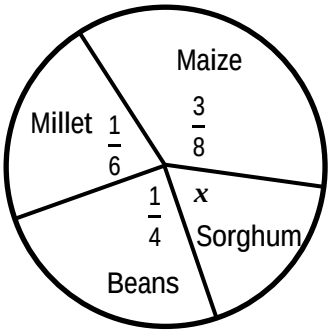
a) Find the value of y in degrees.
b) If he spent sh. 14400 on blue pens than black pens, how many pens did he buy altogether?
c) How much money did he spend on green pens?

17. The pie chart below shows the number of trees planted by upper primary classes at Muliro P/S. Use it to answer questions that follow.



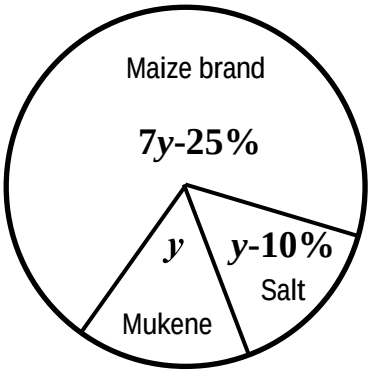
a) If P.5 planted 42 trees less than P.7 and P.6, find the number of trees planted altogether.
b) Find the number of trees planted by p.7
c) Given that a group of 3 pupils planted one tree. Find the number of pupils in P.6.

18. The pie chart below shows the number of farmers who grow different types of crops in a certain village. Use it to answer questions that follow.



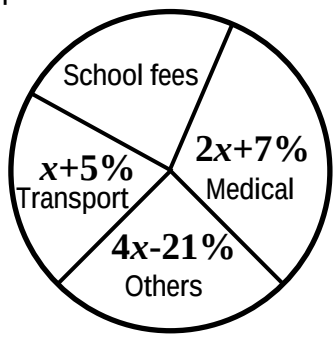
a) Find the value of x in degrees.
b) Given that 55 farmers grow beans and sorghum altogether, find the number of famers who grow maize
c) What percentage of farmers grow beans?

19. The pie chart below shows the materials which were mixed to form animal feeds. Use it to answer questions that follow.



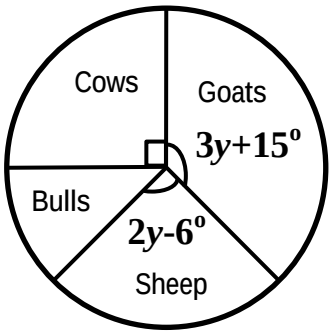
a) Find the value of y in degrees.
b) Given that 780 kilograms of mukene less than maize brand were used, find in kilograms the mass of animals feeds made.
c) If the animal feeds were packed in 50kg sacks and sold at sh. 125,000 per sack, how much money was collected altogether?

20. The pie chart below shows how Wangi spends his monthly salary. He spends a quarter of it on school fees. Study the pie chart carefully and use it to answer questions that follow.



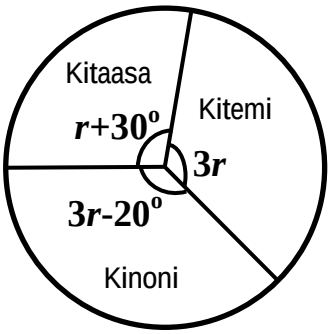
a) Find the value of x
b) Given that Wangi spends sh. 240,000 more on school fees than on transport, find his salary.

21. The pie chart below represents the number of animals on Biswanka's farm. The percentage of bulls on the farm is 10%. Study the pie chart and use it to answer questions that follow.



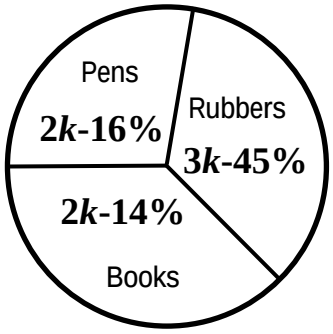
a) Find the value of y in degrees.
b) Given that there are 33 more goats than sheep, find the total number of animals on the farm.
c) Calculate the number of bulls.

22. The pie chart below shows the population of three villages; Kitemi, Kitaasa and Kinoni.



Given that the population of Kitaasa is 1080, find the population of;
i) Kitemi
ii) Kinoni

23. The cost of one dozen of each of the item; books, pens and rubbers is shown on the pie chart below.



a) Find the value of k in degrees
b) A boy paid sh. 2500 for 5 rubbers, find the cost of;
   i) 1 dozen of pens.
   ii) 1 book
   iii) 1 gross of pens

Drawing pie charts.

Steps taken to draw pie chart

- Find the angle sector / central angle for each item. (Angle sector = $\frac{\text{Given data}}{\text{Total data}}$)
- Draw a circle of an appropriate or given radius
- Draw a vertical radius anywhere inside the circle
- Choose the largest angle. Draw a sector for angle and radius should be in the clockwise direction to the vertical radius.
- Draw other sectors representing other values in the clockwise direction.
- Label the sectors by angles and type of item.

Example I

440 pupils at Kiwata Primary School like different games as shown below.

Football – 99	Volley ball – 132	Net ball – 88	Basketball – 55	Tennis – 66

Using a circle of radius 3cm, draw an accurate pie chart to represent the above information.

Football

$\frac{99}{440} \times 360^o = 81^o$

Volleyball

$\frac{132}{440} \times 360^o = 108^o$

Netball

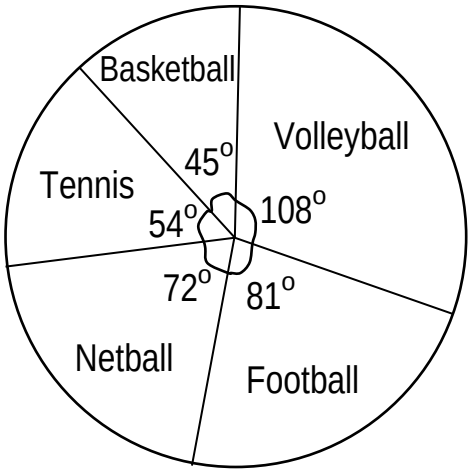
$\frac{88}{440} \times 360^o = 72^o$

Basketball

$\frac{55}{440} \times 360^o = 45^o$

Tennis

$\frac{66}{440} \times 360^o = 54^o$



Example 2

A woman spends her income as follows, $\frac{4}{10}$ for food, $\frac{3}{10}$ for school fees, $\frac{2}{10}$ for transport and saves the rest.

a) What fraction does she save?

$\frac{4}{10} + \frac{3}{10} + \frac{2}{10} = \frac{9}{10}$

Saving

$\frac{10}{10} - \frac{9}{10} = \frac{1}{10}$

b) Draw a pie chart to represent the above information.

Food

$\frac{4}{10} \times 360^o = 144^o$

School fees

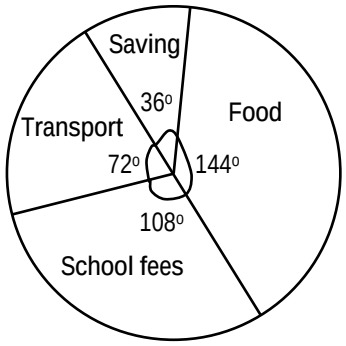
$\frac{3}{10} \times 360^o = 108^o$

Transport

$\frac{2}{10} \times 360^o = 72^o$

Saving

$\frac{1}{10} \times 360^o = 36^o$



Example 3

The table below shows the percentage of animals on Mr. Kisolo's farm.

Animal	Cows	Bulls	Goats	Sheep
Percentage	x	10%	30%	20%

Using a circle of diameter 9cm, draw an accurate pie chart to represent the above information.

Value of x

$x + 10\% + 30\% + 20\% = 100\%$

$x + 60\% = 100\%$

$x + 60\% - 60\% = 100\% - 60\%$

$x = 40\%$

Cows

$\frac{40}{100} \times 360^o = 144^o$

Goats

$\frac{30}{100} \times 360^o = 108^o$

Bulls

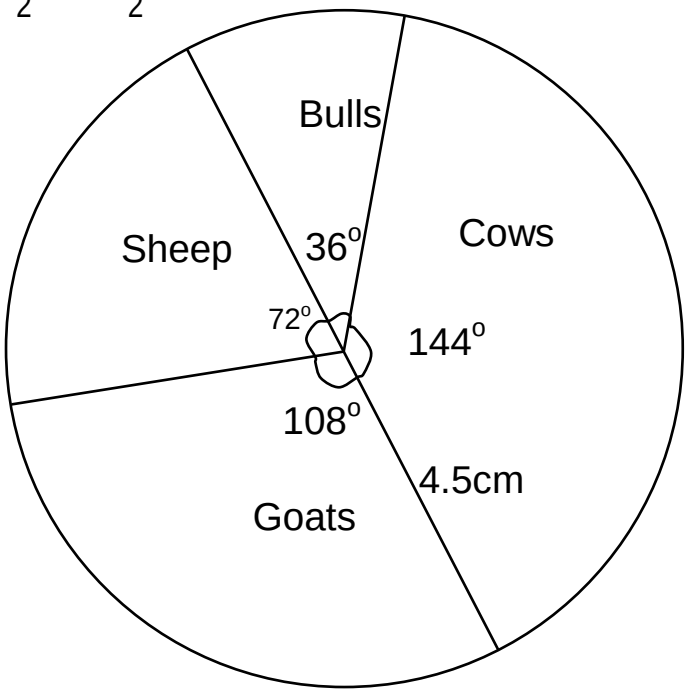
$\frac{10}{100} \times 360^o = 36^o$

Sheep

$\frac{20}{100} \times 360^o = 72^o$

Radius

$\frac{9}{2}$cm = $4\frac{1}{2}$cm or 4.5cm



Exercise

1. The table below shows subject liked by P.7 pupils at Nserester P/S. Use it to answer questions that follow.

Subject	Science	English	Mathematics	Social studies
Number of pupils	18	24	48	30

   a) How many pupils are in that class?
   b) Find the angle sector for each subject.
   c) Draw a pie chart of radius 3.5cm to represent the above information.

2. There are 9 hens, 5 cocks, 12 chicks, 8 ducks and 6 turkeys on a poultry farm. Draw a pie chart of radius 4cm to represent the above information.

3. There are 180 farmers in a village. Of these, 40 grow beans, 10 grow cassava, 50 grow millet and the rest grow maize.
   a) Find the number of farmers who grow maize.
   b) Draw a pie chart of diameter 6cm to represent the above to information.

4. Draw a pie chart to represent the performance of pupils in P.L.E as shown in the table below.

Division	DIV 1	DIV 2	DIV 3	DIV 4
Percentage	30%	55%	10%	x

5. 30% of the pupils in a class like meat, 40% like chicken, 25% like ground nuts and the rest like cabbages. Draw a pie chart to represent the data.

6. Richard divided up his plot of land for growing the following crops; Maize 40%, Sorghum 20%, Beans 15% and potato on the remaining part.
Represent this information on a pie chart.

7. Allan spent 70% of his salary on rent, 50% of the remainder on food and saved the rest. Use the above information to draw a pie chart.

8. 10% of the books in the school library are for R.E, 30% are for English, 60% of the remaining books are for Science and the rest are for Mathematics. Draw an accurate pie chart for the above information (Use diameter = 6cm)

9. Study the table below.

Men	Women	Children
(2p- 7) %	(2p- 2)%	(3p -3)%

   a) Find the value of p
   b) Draw an accurate pie chart to represent the above information.

10. In Primary Seven class, $\frac{5}{18}$ of the pupils are twelve years, $\frac{1}{3}$ are thirteen years, $\frac{2}{9}$ are fourteen years and $\frac{1}{6}$ are fifteen years. Use the given data to draw a pie chart representing each age group.

11. X, Y and Z contributed to start a company. X paid $\frac{5}{10}$ of the cost, Y contributed $\frac{3}{10}$ and the rest by Z. Draw an accurate pie chart for the given information

12. Johnson ate $\frac{2}{5}$ of the pancake and Rajab ate $\frac{1}{3}$ of the pancake. The rest was eaten by Annet. Draw a pie chart to represent the above information.

13. A man spent $\frac{4}{9}$ of his salary on fees, $\frac{1}{3}$ on rent, $\frac{1}{6}$ on other expenses and saved the rest. Draw an accurate pie chart to represent the above information. (Use radius = 3.5 cm)

14. A farmer planted his land as follows:

    coffee $\frac{2}{5}$ of the land

    Maize $\frac{1}{3}$ of the land

    Beans $\frac{1}{5}$ of the land and cassava of the remainder

    Draw a pie chart to represent this information.

15. A woman spends $\frac{1}{4}$ of her salary on food, $\frac{1}{3}$ on clothing, $\frac{1}{6}$ on fees, $\frac{1}{12}$ on transport and saves the rest.
    a) What fraction does she save?
    b) Draw a pie chart to represent the above information.

16. A man spends $\frac{1}{3}$ of his salary on food, $\frac{1}{9}$ on clothing, $\frac{1}{8}$ on rent, $\frac{1}{6}$ on Medical and banks the rest.
    a) What fraction of the salary is banked?
    d) Draw an accurate pie chart to represent the above information.

17. A man spent $\frac{1}{6}$ of his money on transport and $\frac{1}{4}$ of the remainder on rent and saved the rest.
    a) What fraction is;
        i) Spent on rent?
        ii) Saved?
    b) Draw a pie chart to represent the above information

18. A woman spent $\frac{1}{4}$ of her salary on food and $\frac{1}{3}$ of the reminder on drinks. She was left with 16000.
    a) How much money did she have at first?
    b) Draw a pie chart to represent the above information

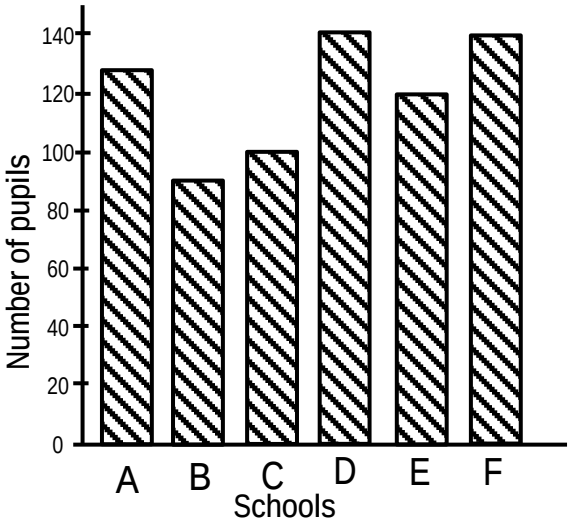
19. On a farm, $\frac{2}{3}$ of the animals are white, $\frac{1}{4}$ are black and the rest are brown.
    a) What fraction of animals is brown?
    b) Draw a pie chart for the above information.

20. In class, $\frac{1}{3}$ of the pupils are below 8 years $\frac{2}{5}$ of the remainder are between 8years and 10 years, the rest of the pupils are above 10 years
    a) Find the fraction of pupils above 10 years
    b) Draw a pie chart to represent the above information.

21. Bujingo spent $\frac{1}{3}$ of his salary on food, $\frac{2}{5}$ on school fees, $\frac{3}{4}$ of the remainder on rent and saved the rest.
    a) What fraction did he save?
    b) Draw an accurate pie chart to represent the above information.

22. A girl did $\frac{1}{4}$ of her holiday package in the first week, $\frac{1}{3}$ in the second week, $\frac{2}{5}$ of the remainder in the third week and completed the remaining 8 questions in the 4th weeks.
    a) How many questions were given to her in the holiday package?
    b) Using a circle of diameter 7cm, draw an accurate pie chart to represent the above information

23. The bar graph below shows the number of pupils from different schools who registered for Masaka district mock last year.



    a) What percentage of pupils did school B register?

    b) Use the information on the graph to draw an accurate pie chart

25. Shadia, Shakirah and Shamim shared some money. Shadia got $\frac{2}{3}$ of the share, Shakirah $\frac{3}{8}$ of what Shadia got and Shamim got the remaining amount.
    a) What fraction did Shamim get?
    b) Draw a pie chart to represent the information.

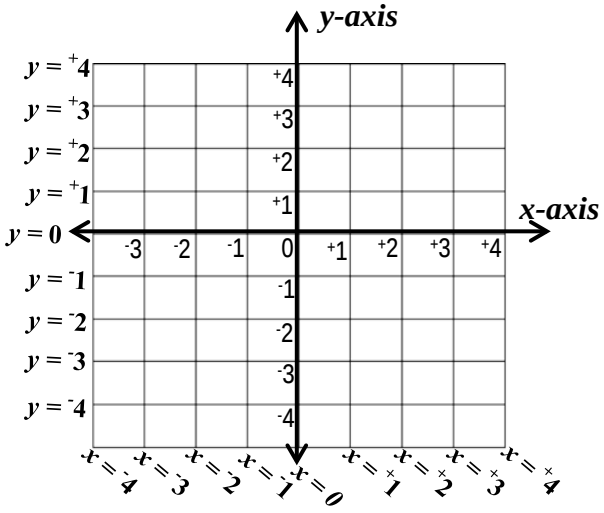
26. Shafic, Anord and Kisakye weigh 60kg, 40kg and 50kg respectively. When Bernice joins them, the average weight becomes 45kg. Draw an accurate pie chart to represent the above information.

27. In our village, farmers grow maize, millet, beans and cassava. The number of farmers who grow maize is 300 and this a third of the total number of farmers in our village. A quarter of the farmers grow cassava, 180 farmers grow millet while the rest of the farmers grow beans.
    (a) Find the number of farmers who grow beans.
    (b) Draw an accurate pie chart to represent the above information.

CO-ORDINATE GRAPHS

A co-ordinate is any integer that tells us the position of a point on a line basing on the principle axes; x and y. When reading the coordinates of any point on a grid, you start reading from the x–axis and end with y–axis in the order of (x, y)

Naming lines on the grid



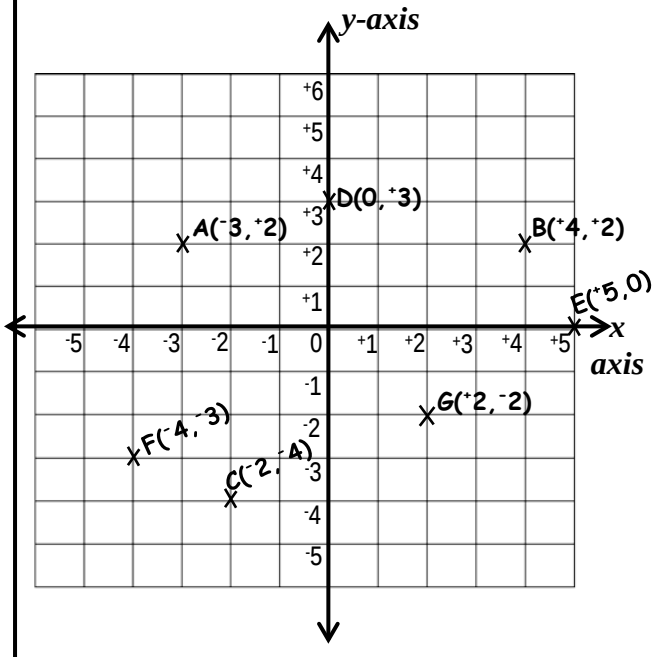
- x line is named according to the point they cross the x–axis.

- y lines are named according to the point they cross the y–axis.

Plotting co-ordinates

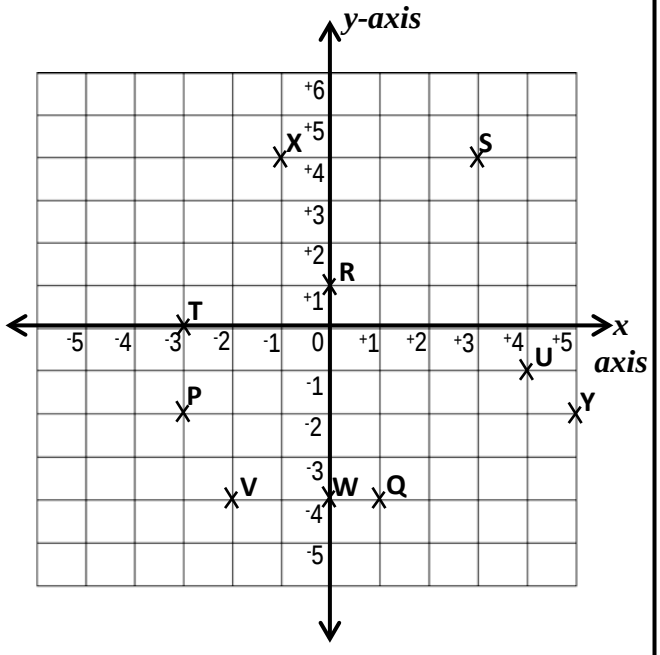
Example 1

On the grid below, plot points; A(-3,+2), B(+4,+2), C(-4,-4), D(0,+3), E(+5,0), F(-4,-3), G(+2,-2)



Example 2

Use the graph below to name the co-ordinate for the given points.



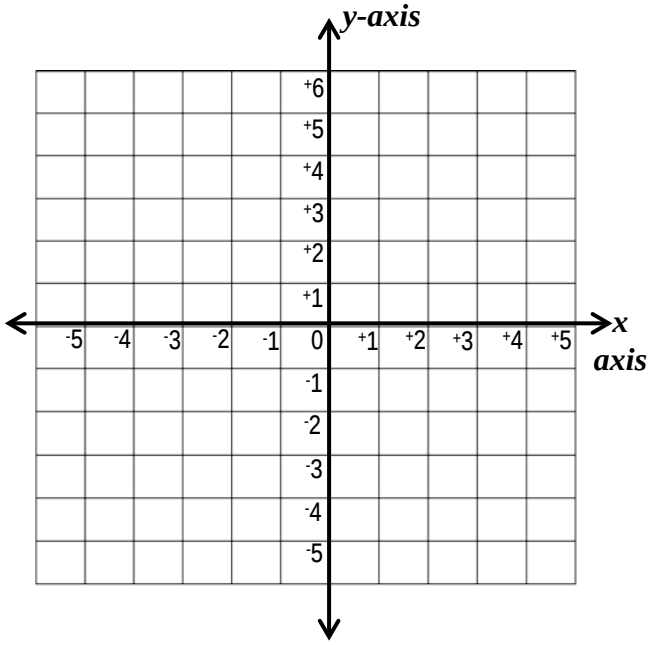
P(-3,-2) Q(-4,+1) R(0,+1) S(+3,+4) T(-3,0)

U(+4,-1) V(-2,-4) W(0,-4) X(-1,+4) Y(+5,-2)

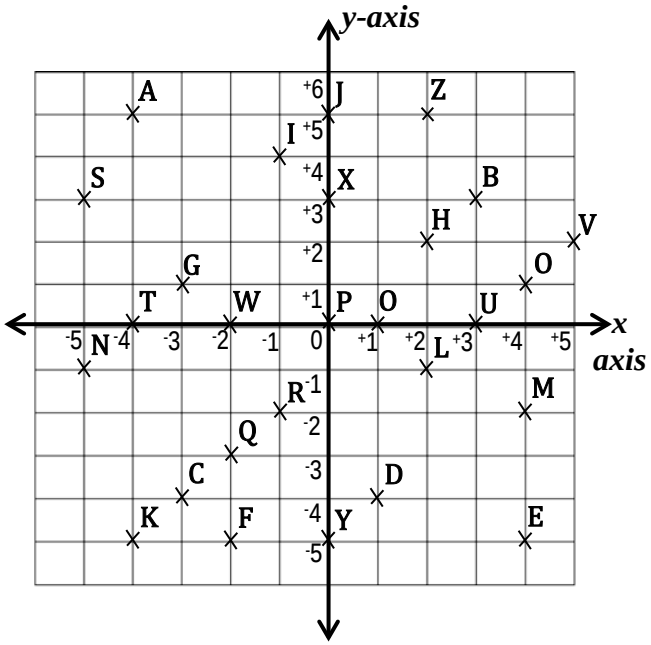
Exercise

1. Plot the following points on the graph below.

A(-3,-2), B(0,4), C(-2,5), E(-1,-1), F(0,-2), G(3,2), H(5,-1), I(0,4), J(0,-2), K(-4,2), L(-2,-5), M(0 -5), N(3,0), O(1,-4), P(-2,-3), Q(-4,-3)



2. Write the co- ordinates of points



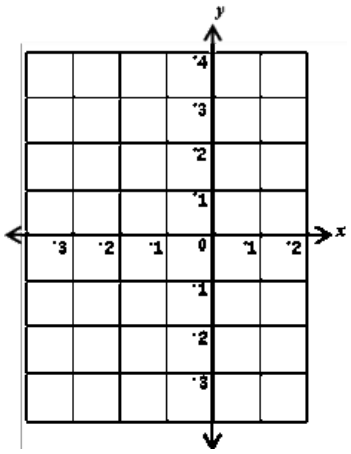
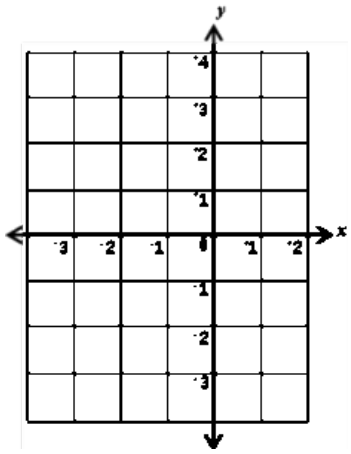
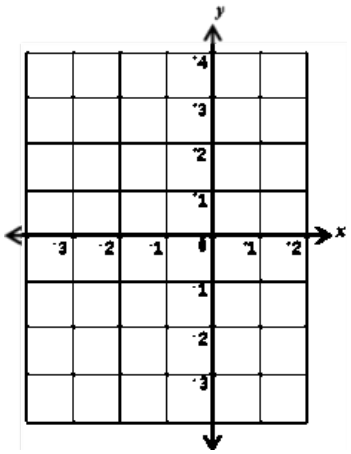
A	G	M	S	Y
B	H	N	T	Z
C	I	O	U	
D	J	P	V	
E	K	Q	W	
F	L	R	X	

3. Draw a co-ordinate graph and plot the following points

i) X(-3,0)
ii) Y(-5, -4)
iii) W (+3,-2)
iv) Z(+1,+5)
v) V(0,+2)
iv) U(+4,-1)
vii) T(-3,-2)
vii) S(+4,-5)
ix) R(0,-4)

4. Show the following lines on the given graphs.

a) y = -3 b) y = 0 c) x = +2

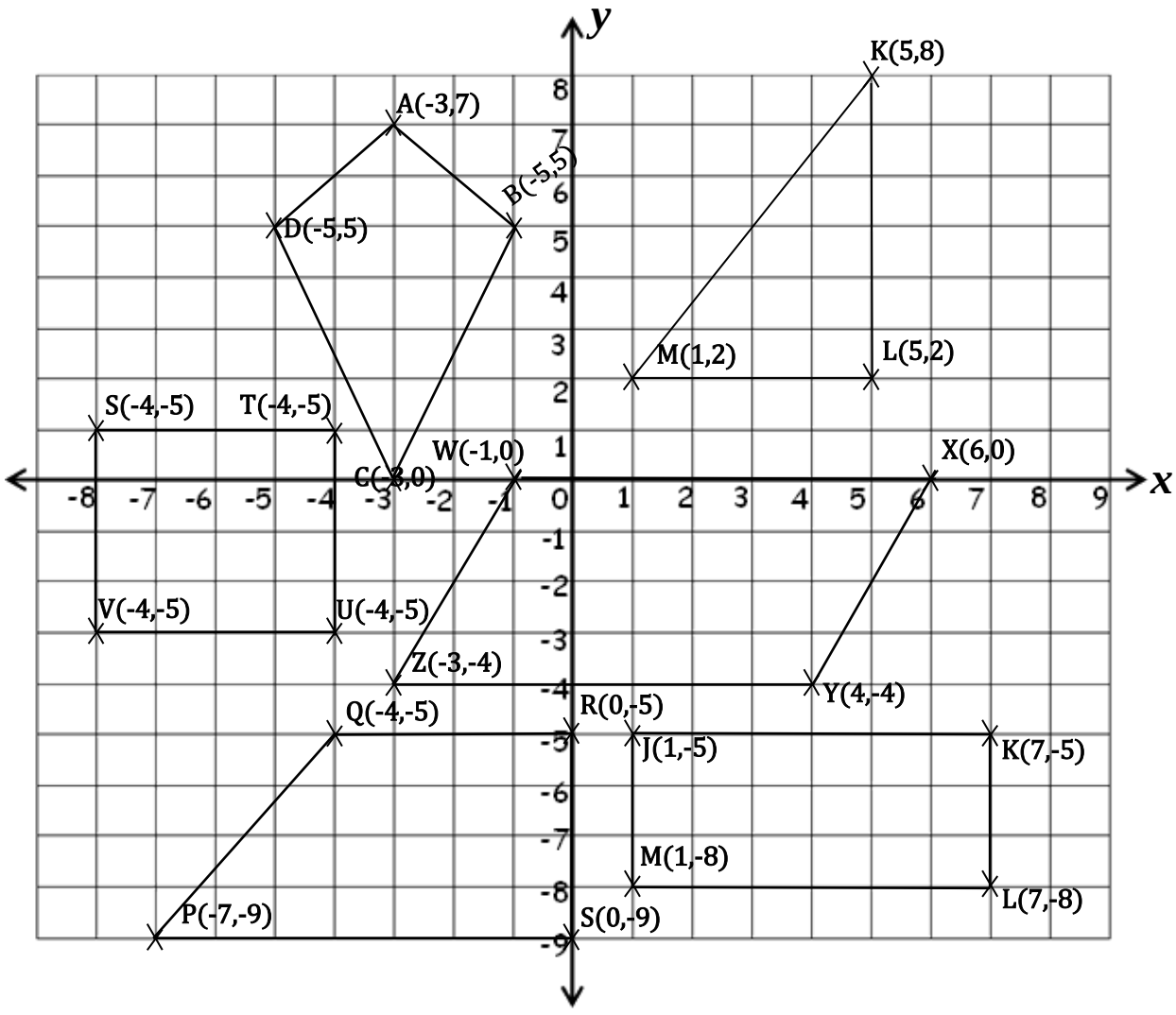




Formation of geometric shapes by plotting

Examples

Plot the following points, join the points to form geometric shapes and name the geometric shapes formed.

a) K(5,8), L(5,2) and M(1,2)
b) J(1,-5), K(7,-5) L(7,-8) and M(1,-8)
c) S(-8,1) T(-4,1) , U(-4,-3) and V(-8,- 3)
d) A(-3,7) B(-1,5), C(0,-3) and D(-5,5)
e) P(-7,-9), Q(-4,-5) R(0,-5) and S(0,-9)
f) W(-1,0), X(6,0) Y(4,-4) and Z(-3,-4)



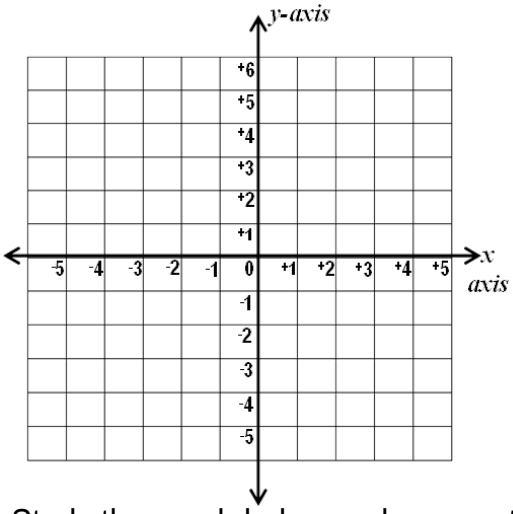
Exercise.

1a) Draw different co-ordinate graphs and plot the following points.

i) P(3,5), Q(3,-1) R(-4,-3)
ii) A(0,4) , B(3,4) C(3,0), D(0,0)
iii) W (0,0) X(3,0) y (3,5), z(0,5)
iv) K(-2,+3) , l(+ 1,+3), M(+2,0), N(-1,0)
v) P(-2,+1), A(-4,-1), R(4,+2), T(0,+2)

b) Join the points to form geometric shapes.
c) Name the geometric figures formed

2a) On the grid below,

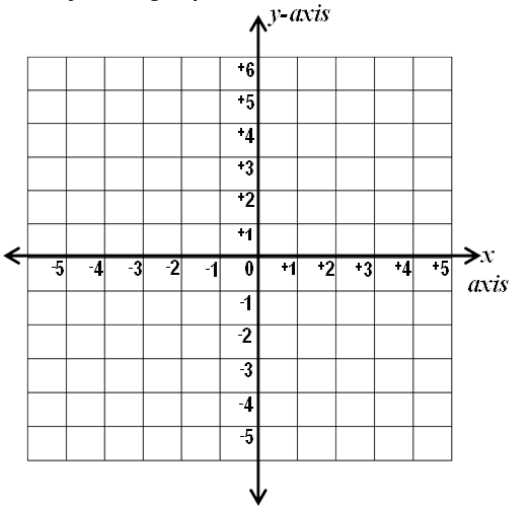


i) Plot points P(0,5), Q(-2,0), R (0,-3) and S(2,0)

ii) Join P to Q, Q to R, R to S and S to P.

b) Name the polygon formed.

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



a) Plot the points.
   i) E(-4,3)
   ii) F(0,3)
   iii) G (2,-3)
   iv) H(-4,-1)

b) Join the points E to F, F to G, G to H and H to E

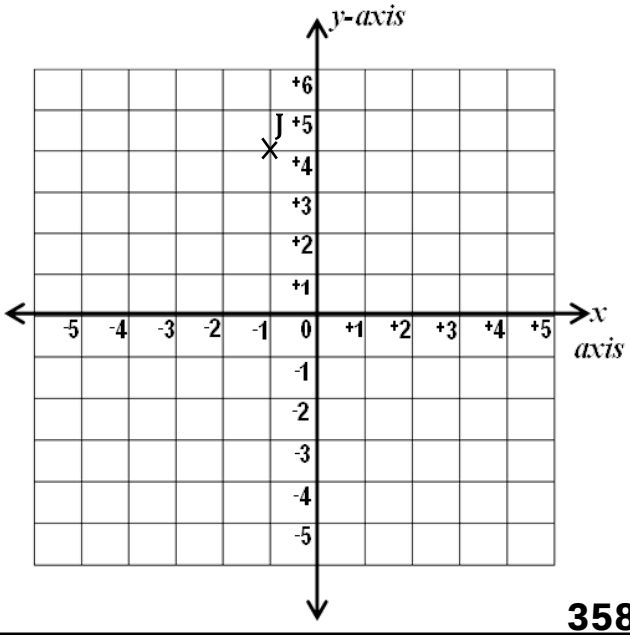
c) Name the quadrilateral formed.

4 a) Draw a coordinate graph and plot the points S(-2,-3), T(+5,-3), U(-2,-1) and V(+1,-1)

b) Join S to T, T to V , U to V and U to S. Name the Quadrilateral formed.

5. Study the co-ordinate graph below and use it to answer the questions that follow.

.



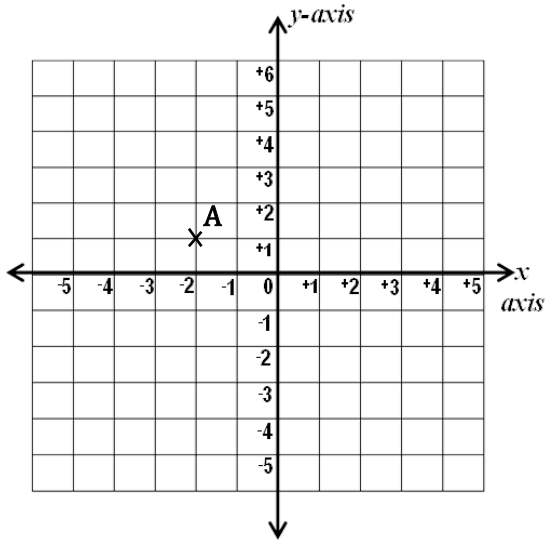
a) Write the coordinates of point J

b) Plot points K(+2,+2) and L(-1,-4) on the grid .

c) Join points J to K and K to L

d) Locate point M on the graph, join it to J and L such that JKLM is a kite.

6. Study the co-ordinate graph below and use it to answer questions that follow.



a) Write the co-ordinates of point A

b) Plot points B(4,1) and C (2,-2)

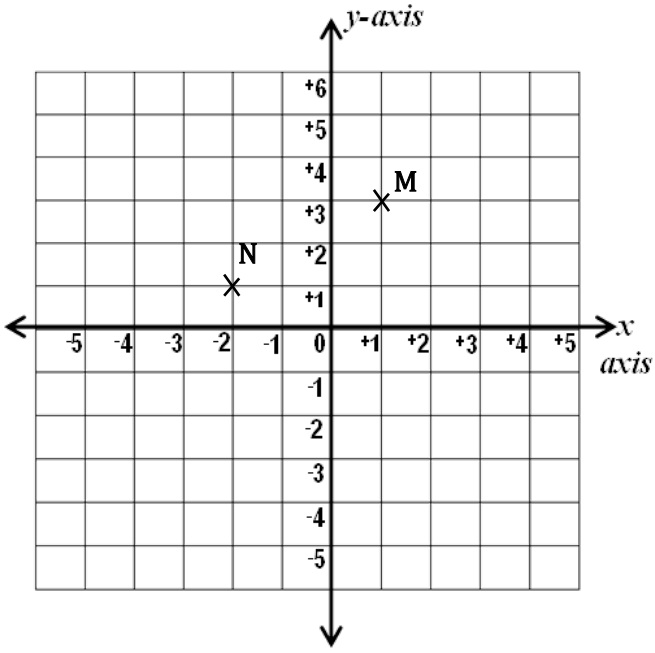
c) Join points A to B, and B to C.

d) Locate point D, join it to A and C such that ABCD is a parallelogram.

e) Write the co-ordinates of point D

7. a) Draw a 7 by 7 co-ordinate grid and plot the following points: A(0,-2), B(-4,+1), C(+2,+4) , D(-1,+4) and E(-3,+1)
   b) Name the polygon formed after joining A to C, C to D, D to B, B to F and F to A.

8. Study the co-ordinate graph below and use it to answer questions that follow.



a) Write the co-ordinates of points
   i) M
   ii) N

b) Plot point O(1,-4) and join point O to N.

c) Locate point P, join it to M and O such that MNOP is a kite.

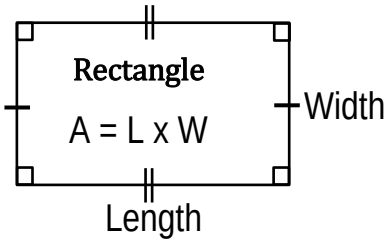
d) Write the co-ordinates of point P.

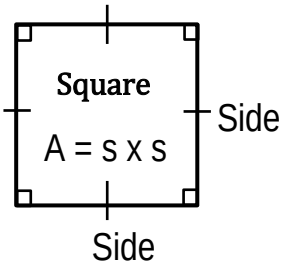
9. a) Draw a 12 by 12 co-ordinate grid and plot the following points: A(-4,5), B(2,5), C(5,-1), D(-1,-1)
   b) What is the figure formed after joining points?
   c) On the same graph plot points: E(-6,0), F(-3,0), G(-3,-2), H(2,-2), I(2,-4), J(-6,-4)
   d) Join the points: E to E, E to G, G to H, H to I, I to J then name the figure formed.

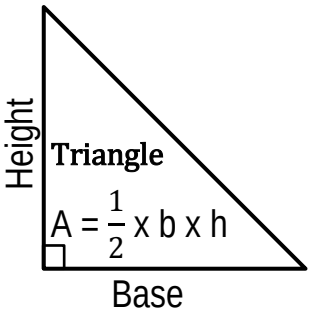
10. a) Draw a coordinate grid and plot the following points: P(-2,4), Q(1,4), R(4,1), S(-5,1)
    b) What special name is given to the figure formed after joining points: P to Q, Q to R, R to S and S to P

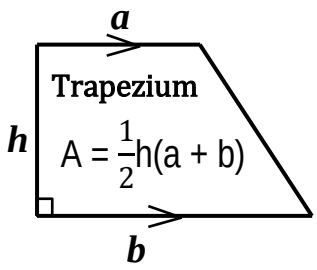
Finding area of the plotted figures

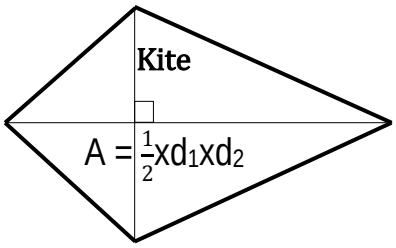
Study the figures below.

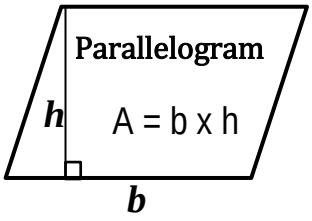






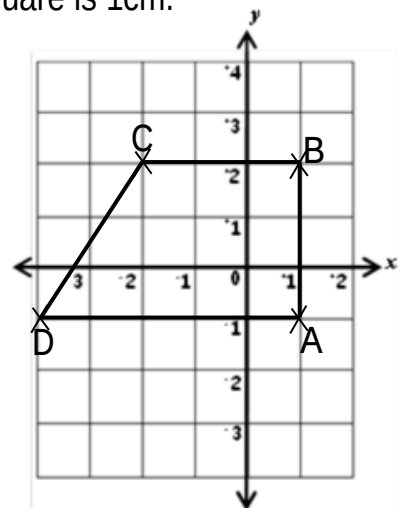






Example 1

Find the area of figure ABCD on the graph below, if the side of each small square is 1cm.



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

$A = \frac{1}{2}$ x 3cm(3cm + 5cm)

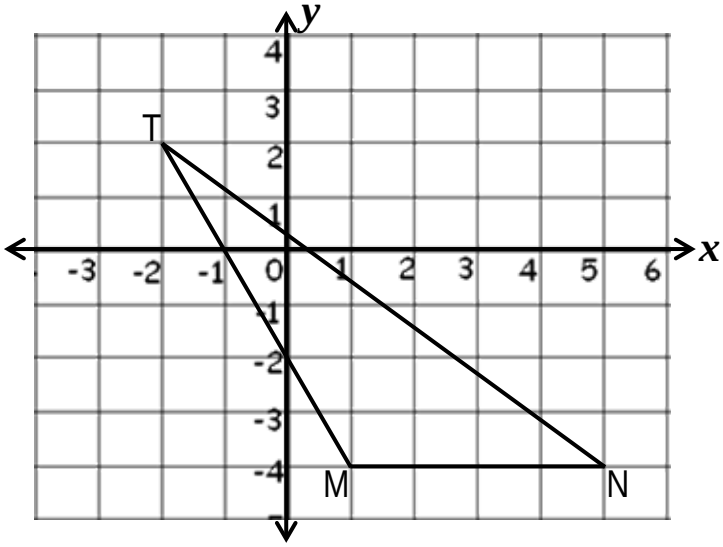
$A = \frac{1}{2}$ x 3cm x 8cm

A = 3cm x 4cm

$A = 12cm^2$

Example 2

Study the graph below carefully and use it to answer questions that follow.



a) Write the co- ordinate of points M, T and N

i) M(1,-4) ii) T(-2,2) iii) N(5,-4)

b) Find the area of the figure MTN

$A = \frac{1}{2}$ x b x h

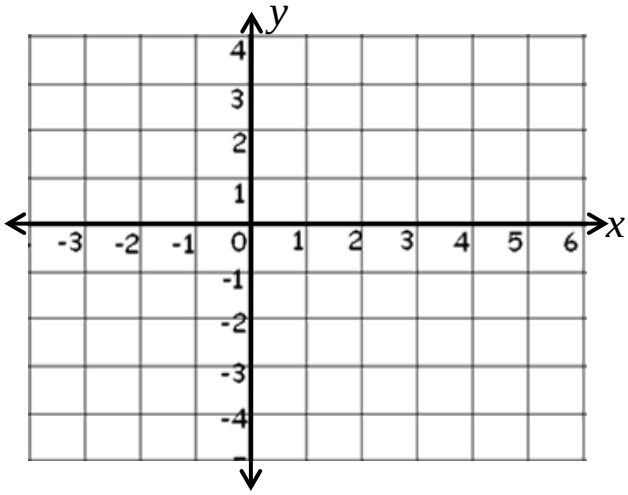
$A = \frac{1}{2}$ x 4units x 6units

A = 2units x 6units

A = 12 square units

Exercise

1. a) On the graph below, plot points W(0,3), X(3,1), Y(0,5) and Z(-3,1).



b) Join W to X, X to Y, Y to Z and Z to W.

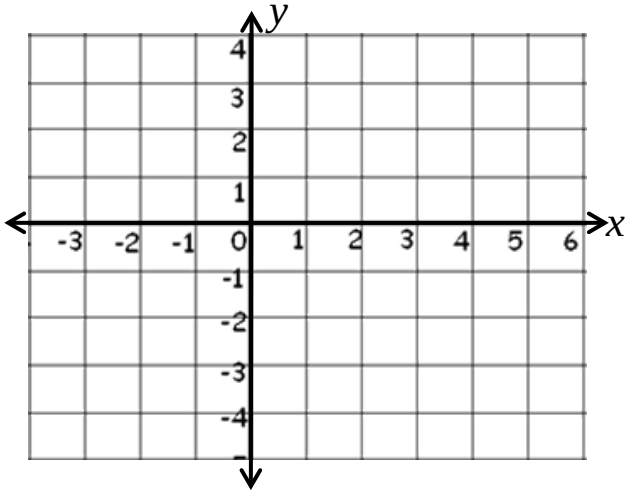
c) Name the geometric shape formed.

d) Calculate the area of the figure formed (1 square = 1cm)

2. On different graphs, plot the given points, join the points to the given points, join the points to form geometric shapes and find their area.

i) A(0,0), B(6,0), C(6,-2) and D(0,-2)
ii) A (1,1), B(5,1) and C(0,5)
iii) Y(9,4), M(9,9), N(4,9) and W(4,4)
iv) L(-8,5), K(-3,5), W(-3,-2) and T(-8,+2)
v) B(-5,0), D (-8,-4), E(-1,-4) and Z(-1,6)
vi) P(3,0), Q(1,-3), R(3,-8) and S(5,-3)

3 a) Plot these points on the graph below: K(-3,2), L(2,2), M(2,-2), N(-3,-2).

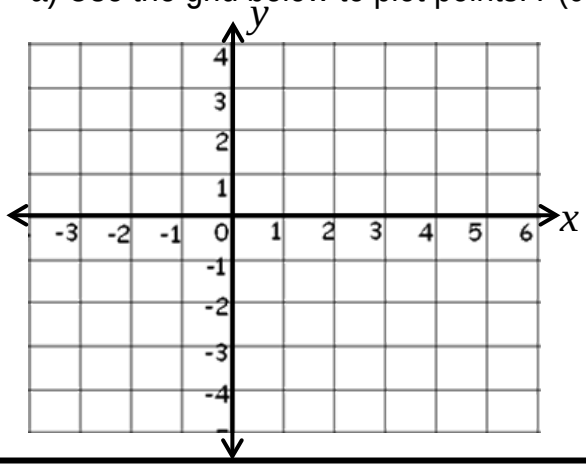


b) Join points K to L, L to M, M to N and N to K.

c) Name the figure formed.

d) Find the area of the figure formed (1square = 1cm)

3 a) Use the grid below to plot points: P(0,3), Q(2,-2), R(-2,-2)

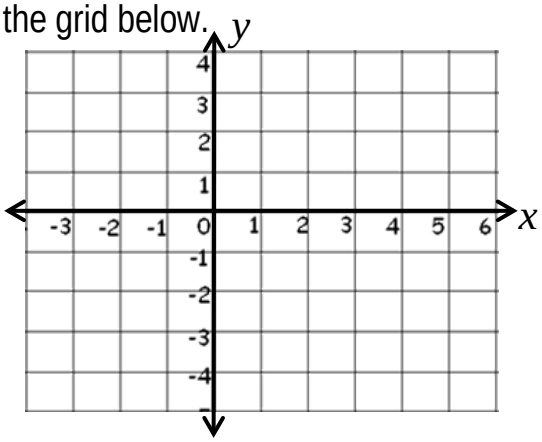


b) Join P to Q, Q to R and R to P.

c) Name the figure formed

d) Find the area of the figure formed.

4. On the grid below.



a) Plot points:
B (-2,-1), C(3,-1), D(6,-4) and E(-2,-4)

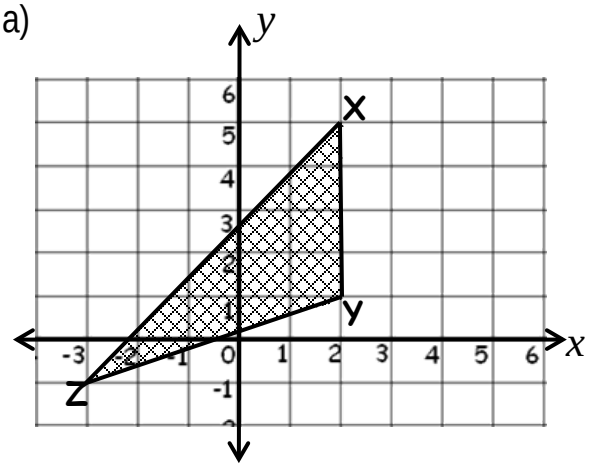
b) Join B to C, C to D, D to E then E to B.

c) Name the figure formed.

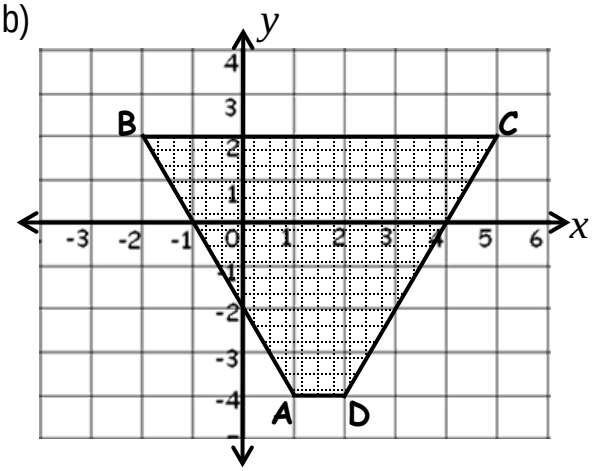
d) Calculate the area of the figure formed.
(1square = 1cm)

5. Find the area of the figures plotted on the graphs below. (1 square = 1 cm)

a)

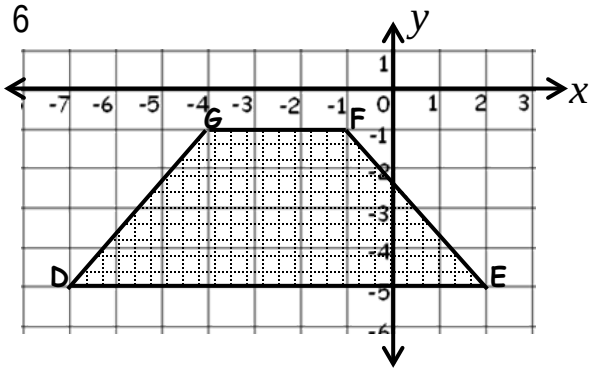


b)

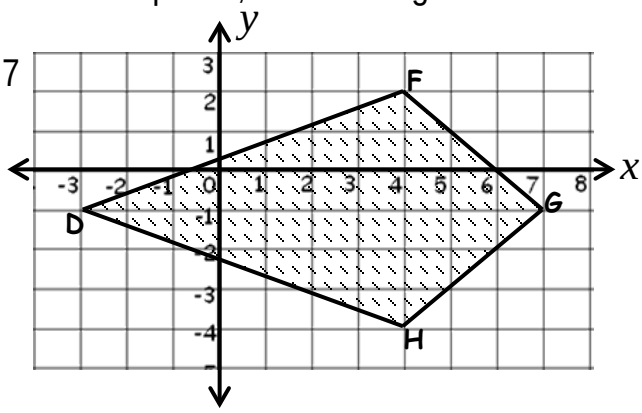


For each of the given questions, write coordinates of points, name the figures and find the area. (1 square = 1cm)

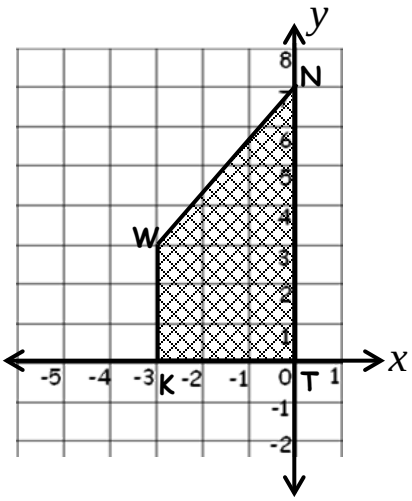
6



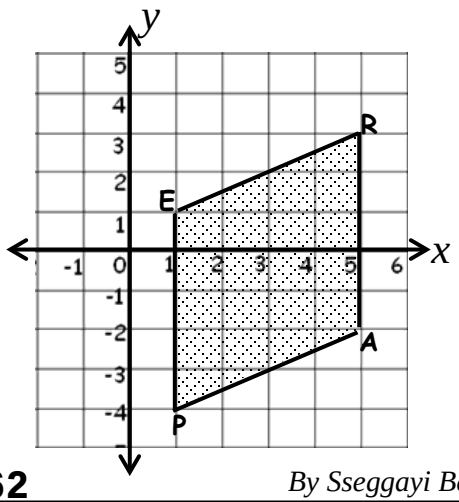
7



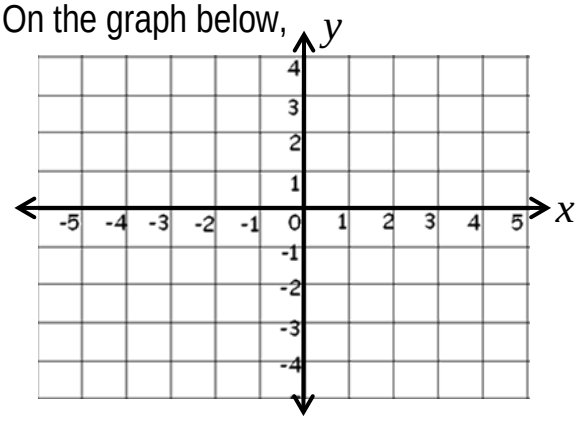
8



9



10. On the graph below,



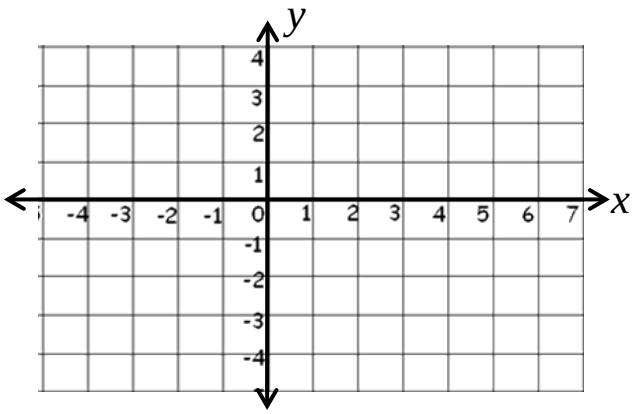
a) Plot points A(-5,4) and C(-1,1)

b) Join A to C to form a diagonal of rectangle ABCD.

c) Locate points B and D, Join B to A, B to C, D to A and D to C.

d) Find the area of the rectangle formed.

11. On the graph below.

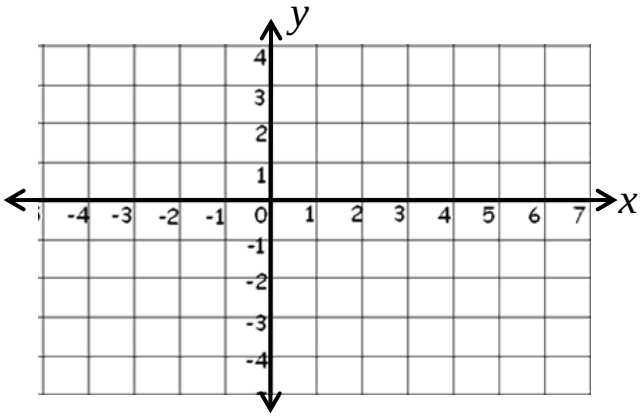


.

a) Plot points A(-3,-4) and B(6,-4)

b) Locate points C and D, Join B to C, C to D and D to A such that ABCD is a rectangle whose area is 24 square units

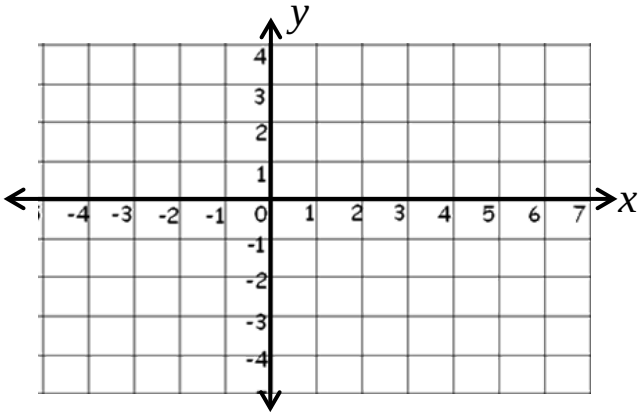
12. On the graph below.



a) Plot points T(-3,-1), U(1,1) and V(4,-1)

b) Locate point S on the graph, join it to T and V such that STUV is a kite whose area is 14 square units.

13. The vertices of a square K, T, R and S are (1,5), (4,2), (1,-1) and (-2,2) respectively.

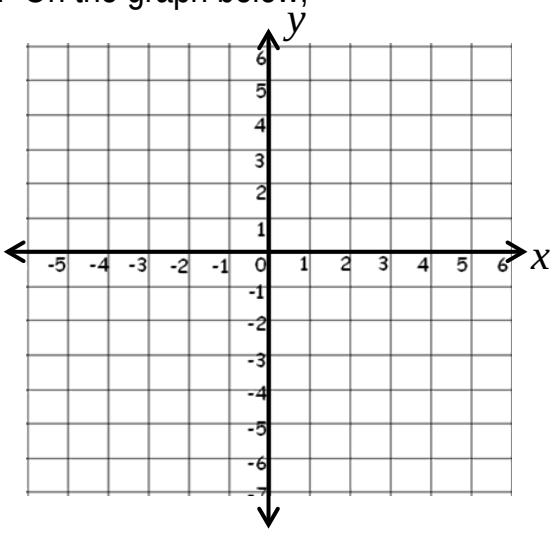


a) On the graph below, plot points K,T,R and S.

b) Draw diagonals KR and ST, write the coordinates of the intersection of the diagonals

c) Find the area of the square KTRS (1Square = 1cm)

14. On the graph below,



a) Plot points; S(5,0), T(5,-3), U(-1,-3), V(-1,0), A(0,-5), B(5,-5)

b) Join points T to U, U to V, V to S, S to B, B to A and A to S to meet TU at x.

c) Find the area of the plotted figure SBAXUV.

Graphs of ordered pairs of coordinates.

Example 1

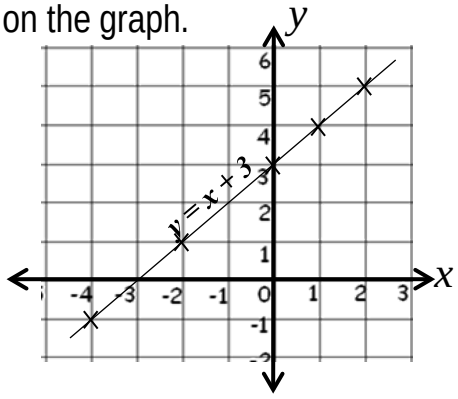
Given that $y = x + 3$

a) Complete the table below.

x	-4	-2	0	1	2
y	-1	1	3	4	5

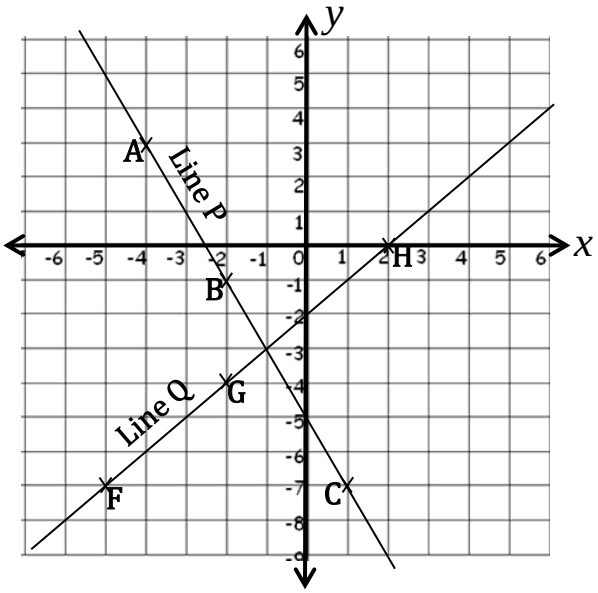
y = x + 3 y = -4 + 3 y = -1	y = x + 3 y = -2 + 3 y = 1	y = x + 3 3 = x + 3 3-3 = x +3-3 0 = x x = 0	y = x + 3 y = 1 + 3 y = 4	y = x + 3 5 = x + 3 5-3 = x +3-3 2 = x x = 2

b) Plot the points and draw the line on the graph.



Example 2

Study the graph below and use it to answer questions that follow.



a) Complete the tables below.

Line P

	A	B	C
x	-4	-2	1
y	3	-1	-7

Line Q

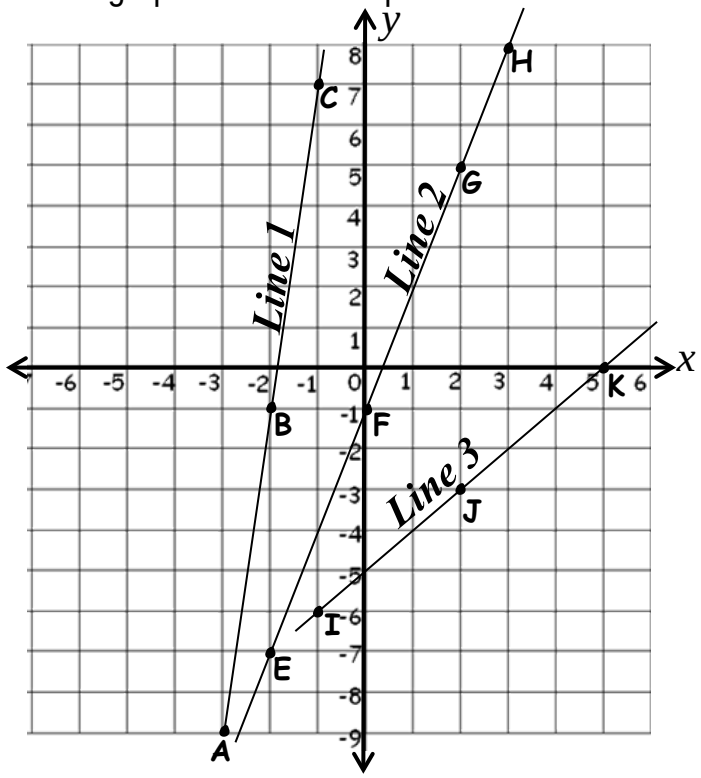
	F	G	H
x	-5	-2	2
y	-7	-4	0

b) Write the coordinates of the point where the two lines meet.

(-1,3)

Exercise

1. Use the graph below to complete the tables.



Line 1

	A	B	C
x	____	____	____
y	____	____	____

Line 2

	E	F	G	H
x	____	____	____	____
y	____	____	____	____

Line 3

	I	J	K
x	____	____	____
y	____	____	____

2. Use the equations to complete the tables.

a) y = x + 1

x	-2	-1	_	_	6
y	_	_	3	5	_

b) y = x – 2

x	0	_	_	5	7
y	_	-1	2	_	_

c) y = 2x + 1

x	-1	0	_	_	6
y	_	_	5	7	_

d) y = 2x

x	-1	_	1	3
y	_	0	_	_

e) y = 3x – 7

x	0	2	_	_
y	_	_	3	5

f) x = y – 4

x	_	2	1	_
y	3	_	_	0

g) y = 3x – 5

x	4	_	$\frac{1}{3}$	_	3
y	_	-2	_	-8	_

h) y = x – 2

x	-2	_	1	_	4
y	_	-2	_	0	_

i) x = y+1

x	-4	_	-1	_	3
y	_	0	_	-2	_

j) x = 2y+1

x	9	_	_	1
y	_	3	1	_

k) $x = \frac{y+1}{3}$

x	_	-1	2	_	_
y	-7	_	_	2	8

l) $x = \frac{y+3}{2}$

x	_	0	_	3	_
y	-1	_	5	_	7

3. Given that set of co-ordinates of x is {-2, -1, 0, 1, 2} calculate the corresponding co-ordinates using y=3x-1

4. Given points Q(-3,-1) and R(2,4). Complete the table below.

	Q	R
x		
y		

5. The co- ordinates of a line are (-2, -3), (-1,-1), (1,3), (4,9) respectively.
   i) Draw a 15 by 15 coordinate graph.
   ii) Plot the point and draw the line on the graph below.

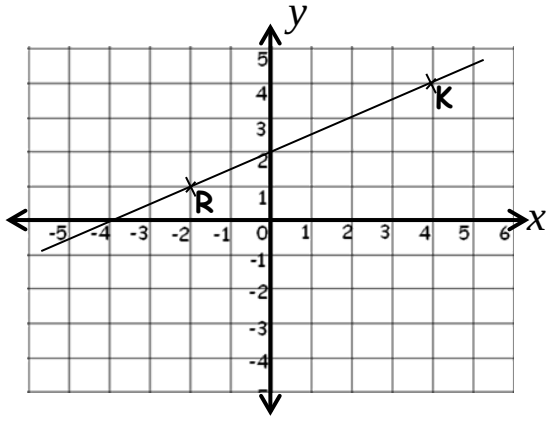
6. Given that y = x+3.
   a) Complete the table below.

x	_	-1	_	2
y	0	_	3	_

   b) Plot the points and draw the line on a graph.

7. Given points P(a, -4), Q(0, b) R(1, c) and S(d, 1). If $y = x - 2$,
   a) Find the value of a, b, c and d.
   b) Plot the points and draw the line on a graph.

8. Study the graph below and use it to answer questions that follow.

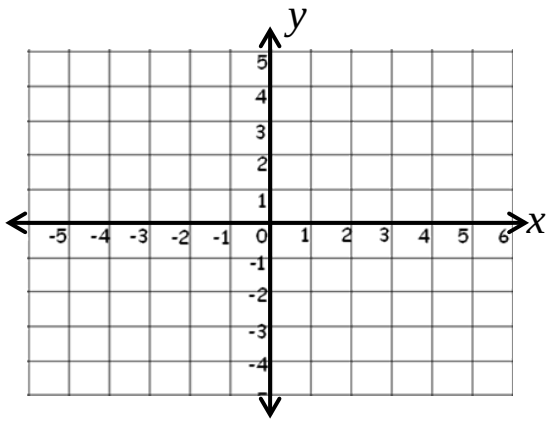


a) Write co-ordinates of points R and K

b) Plot points A(-1,4) and B(3,-4).

c) Join point A to point B. Write the co-ordinates of the point where the two lines intersect.

9. The vertices of a rhombus A, B, C, D are (0,3), (5,3), (2,-2), (-3,-2) respectively.



a) Plot the points on the graph drawn

b) Draw the diagonals BD and AC.

c) Find the area of the rhombus if 1square = 1cm

PROBABILITY

►The probability of an event is the likelihood that event will happen.

Probability can be expressed in the following ways;
* Certain - an event will happen without doubt.
* Likely - the probability of one event is higher than the probability of another events
* Equal probability - the chance of each event happening is the same.
* Unlikely - One event is less likely to happen than the other
* Impossible - there is no chance of an event happening.

►Probability is a branch of mathematics which deals with the study of chances.
So many events happen in this world by chance. eg raining, passing exams, escaping an accident, playing cards, winning a football match, sports betting etc.

►Probability is calculated by dividing the number of desired chances by the total chances.

$$\text{Probability} = \frac{\text{Number of desired chances}}{\text{Number of total chances}}$$

$$\text{Probability} = \frac{n(DC)}{n(TC)}$$

Example 1

In a box, there are 8 red pens and 7 blue pens. What is the probability of picking a red pen from the box?

Total number of pens
8+7 = 15pens

$$\text{Probability} = \frac{n(DC)}{n(TC)}$$

$$\text{Probability} = \frac{8}{15}$$

Example 2

A die is rolled once, what is the probability of getting a prime number?

Total chances = {1, 2, 3, 4, 5, 6}
n(TC) = 6

Desired chances = {2, 3, 5}
n(DC) = 3

$$\text{Probability} = \frac{n(DC)}{n(TC)}$$

$$\text{Probability} = \frac{3}{6}$$

Example 3

A coin is tossed once, what is the probability of getting a tail on top?

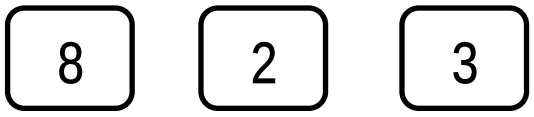
Total chances = {H, T}
n(TC) = 2
Desired chances = {T}
n(DC) = 1

$$\text{Probability} = \frac{n(DC)}{n(TC)}$$

$$\text{Probability} = \frac{1}{2}$$

Exercise

1. A basket contains 4 raw mangoes and 11 ripe mangoes. What is the probability of picking a ripe mango?
2. In a bag, there are 7 oranges and 6 tomatoes. What is the probability of picking a tomato from the bag?
3. There are 12 pens in the bag, 4 of them are red and the rest are blue. What is the probability of picking a blue pen?
4. Out of 25 balls in the bag, 6 are red, 7 are blue and the rest are white. What is the probability of picking a white ball from the bag?
5. A coin is tossed once, what is the probability of getting;
   i) a head on top?
   ii) a tail on top?
6. Kivumbi rolled a die once, what is the probability that the following types of numbers appeared on top;
   i) an even number?
   ii) a counting number less than 4?
   iii) a prime number?
   iv) a multiple of 3?
   v) a composite number?
   vi) a triangular number?
   vii) a square number?
   viii) a cube number?
7. In class of 46 pupils, 14 are girls and the rest are boys. What is the probability that a pupil selected at random is a boy?
8. Find the probability that P.7 candidates will sit for PLE on a day starting with letter "T"
9. Adrian wrote digit on cards as shown below.

   a) Write all possible 3-digit numbers that can be formed using the above digits
   b) If a 3-digit number is picked at random, find the probability that it is a prime number.
10. A basket contains 7 rotten eggs and 9 good ones, if the eggs in the basket are mixed, What is the probability of picking a rotten egg from the basket?
11. Kyuma will have a birth day party next week, find the probability that the party will take place on a day that starts with letter "S"
12. Cards labeled 1 to 5 are folded, put in a basin and mixed up. What is the probability of picking a card with a triangular number?
13. I will go to town next month. What is the probability that I will go on the month of the year starting with letter "J"

More problems involving probability

Example 1

The total number of blue and black pens in the box is 50. If the probability of picking a blue pen is $\frac{3}{5}$, find the number of black pens in the box.

Approach 1

Number of pens

$\frac{3}{5} \times 50 = 30 \text{pens}$

Number of black pens

$50 - 30 = 20$ black pens

Approach 2

$\frac{5}{5} - \frac{3}{5} = \frac{2}{5}$

Number of black pens

$\frac{2}{5} \times 50 = 20 \text{pens}$

Example 2

The probability that John will fail the examination is $\frac{2}{7}$. What is the probability that he will not fail?

$$\frac{7}{7} - \frac{2}{7} = \frac{7-2}{7}$$
$$= \frac{5}{7}$$

Exercise

1. The fraction of boys in a school is $\frac{3}{7}$. Find the probability of selecting a girl to be a head prefect?
2. The probability that Kamasu will pass his examination is $\frac{2}{3}$. What is the probability that he will fail his examination?
3. In a bag, there are mangoes and oranges. The probability of picking an orange from the bag is $\frac{8}{15}$. Find the probability of picking a mango.
4. The probability that Buddu FC will win the match is 0.8. What is the probability that it will lose?
5. The probability that Robert will win the elections is 0.85. Find the probability that he will lose.
6. The probability of eating chicken at a party is 0.4 .What is the probability of not eating chicken?
7. The probability of our school team winning a game is $\frac{4}{5}$. If it plays 15 games, how many teams is our school team expected to win ?
8. In a car park there are 51 cars. The probability that a car picked at random from the park is white in colour is $\frac{2}{3}$. Find the number of cars which are white in colour in the car park.

9. In a school of 312 pupils, the probability of picking a boy at random to lead the national anthem is $\frac{1}{6}$. Find the number of boys in the school.
10. There are 30 eggs in a tray. Some are good and others are bad. The probability of picking a good egg is $\frac{3}{5}$. Find the number of;
    i) good eggs
    ii) bad eggs
11. In a class of 48 pupils, the probability of picking a pupil who eats meat is $\frac{5}{8}$. Find the number of pupils who do not eat meat in the class.
12. A bus left Kampala with 60 passengers going to Arua, Koboko and Yumbe. The probability of picking a passenger going to Koboko was $\frac{1}{10}$.
    a) What was the probability of picking a passenger **not** going to Koboko?
    b) If 18 passengers stopped in Arua, find the number of passengers who reached Yumbe.
13. A taxi left Kampala for Kyotera via Masaka with 14 passengers, some passengers were going to Masaka which is 120km away and the rest were going to Kyotera. The probability of picking a passenger going to Kyotera was $\frac{4}{7}$.
    a) How many passengers stopped in Masaka?
    b) If sh.125 was charged per kilometer, how much money did the passengers who stopped in Masaka pay altogether?
    c) Given that the passengers who reached Kyotera paid sh. 20,000 each at the same rate. How far is Kyotera from Masaka?
14. The probability of picking a mathematic text book from a school library is 0.7. If there are 210 textbooks altogether, find the number of mathematic books.
15. The probability of eating matooke in a term of 75 days is 0.24. How many days will matooke not be eaten in the term?

Problems involving finding the total number of chances

Example 1

There are 36 girls in a class. The probability of picking a girl from the class is $\frac{3}{5}$.
Find the total number of pupils in the class.

Approach 1

Let the total number of pupils be y

$\frac{3}{5}$. x y = 36

$\frac{5}{3}$ x $\frac{3y}{5}$.= 36 x $\frac{5}{3}$

y = 60 pupils

Approach 2

3 parts represent 36 pupils

1 part represents $\frac{36}{3}$ pupils

5 parts represent ($\frac{36}{3}$ x 5) pupils

5 parts represent 60 pupils

Approach 3

Probability = $\frac{n(DC)}{n(TC)}$

$\frac{3}{5} = \frac{36}{\square}$

36 ÷ 3 = 12

12 x 5 = 60

There are 60 pupils

Example 2

There are 54 rotten mangoes in the basket. The probability of picking a good mango is $\frac{1}{3}$. Find the number of mangoes in the basket.

Approach 1

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

Let the total number of mangoes be m

$\frac{2}{3}$. x m = 54

$\frac{3}{2}$ x $\frac{2m}{3}$.= 54 x $\frac{3}{2}$

m = 81 mangoes

There are 81 mangoes in the basket

Approach 2

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

Probability = $\frac{n(DC)}{n(TC)}$

$\frac{2}{3} = \frac{54}{\square}$

54 ÷ 2 = 27

27 x 3 = 81

There are 81 mangoes in the basket

Exercise

1. There are 30 white piece of chalk in a box. The probability of picking a piece of white chalk at random from the box is $\frac{1}{5}$. Find the total number of piece of chalk in the box.
2. The probability of picking a goat at random from Kaweesi's farm is $\frac{1}{6}$. If there are 50 goats on the farm, find the total number of animals on the farm.
3. The probability of picking a ripe orange from a bag is $\frac{2}{5}$. If there are 12 ripe oranges, find the total number of oranges in the bag.
4. There are 48 smart phones in a shop. The probability of picking a smartphone randomly from the shop is $\frac{3}{4}$. Find the total number of phones in the shop.
5. In a class there are 40 girls. The probability of picking a girl randomly from the class is $\frac{4}{7}$.
   a) Find the total number of pupils in the class.
   b) Calculate the number of boys.
6. In the car park there are 120 cars that are not made from Japan. The probability that a car made from Japan picked at random from the car park is $\frac{5}{8}$.
   a) Find the probability that a car picked at random from the car park is not made from Japan.
   b) Find the total number of cars in the car park.

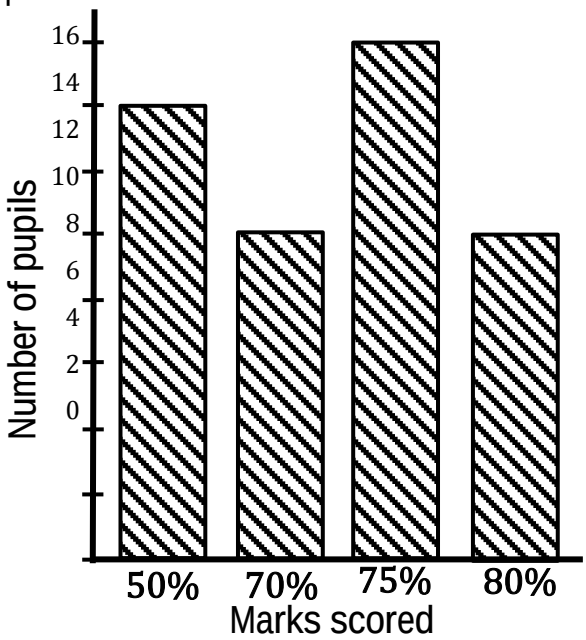
7. In a class, there are 36 pupils who like Mathematics. The probability that a pupil picked at random from the class does not like mathematics is $\frac{1}{7}$.
   a) Find the probability that a pupil picked at random from the class likes mathematics.
   b) Find the total number of pupils in the class.
   c) Find the number of pupils who do not like mathematics in the class.
8. There are 270 members of the 11th parliament (2021 – 2026) from Eastern Uganda. The probability that a member of parliament picked at random the house who is not from Eastern Uganda is $\frac{4}{9}$.
   a) Find the probability that a member of parliament picked at random is from Eastern Uganda.
   b) Find the total number of members in the 11th parliament (2021-2026).
   c) Calculate the number of members in the 11th parliament (2021-2026) who are not from Eastern Uganda.
9. The probability of picking a hen from a poultry house is $\frac{6}{7}$. There are 12 cocks in the same poultry house and the rest are hens. Find the number of hens in that poultry house.
10. Mugaati bought similar 3 loaves of bread. When he put all the slices of bread in a bucket, he found out that 16 slices were spoilt. The probability that a good slice of bread was picked at random from the bucket was $\frac{7}{9}$. Find the number of slices of bread in each loaf.
11. There are Catholics and Muslims in a school. The probability that a Muslim is picked at random from the school is $\frac{7}{10}$. There are 312 more Muslims than Catholics.
    Find the
    i) total number of pupils in the school.
    ii) Number of Catholics.
12. The probability of picking an orange from a basket is $\frac{2}{9}$ and the number of oranges in the basket is 45 less than the number of mangoes.
    a) Calculate the
       i) total number of fruits in the basket.
       ii) number of oranges.
    b) If all mangoes are sold at sh. 500, how much money will be collected altogether?
13. The Probability that a cow is picked at random from the farm is $\frac{1}{5}$ more than the probability that a bull is picked at random from the same farm. There are 32 bulls on the farm.
    a) Find the total number of cattle on the farm.
    b) If the average mass of cows on the farm is 120kg, find in kilograms the total mass of cows.

14. Blue pens and 10 red pens were put in a box such that the probability of picking a red pen randomly from the box is $\frac{3}{7}$ less than the probability of picking a blue pen.
    a) Find the total number of pens in the box.
    b) If the blue pens are sold at sh. 21000 altogether, find the cost of each blue pen.

15. The mean weight of all boys in a class is 30kg, when their teacher whose weight is 69kg joins the group, the mean mass becomes 33kg.
    a) Find the number of boys in the class.
    b) Given that the fraction of girls in the class is $\frac{1}{9}$ more than the fraction of boys.
    Calculate the;
    i) total number of pupils in the class
    ii) number of girls.

16. The average age of all female students in an institute is 18 years. When 3 female students whose mean age is 36 years leave the institute, the average age of the remaining female students became 17years.
    a) Find the total number of female students in the institute.
    b) If the probability of picking a male student from the remaining students in the institute is $\frac{7}{10}$, find the number of male students in the institute.

17. The bar graph below shows the performance of P.7 pupils in a test. Use it to answer questions that follow.



    a) How many pupils did the test?

    b) Find the probability of picking a pupil at random who scored above the average mark.

18. The school library has 3 shelves of books with 200 books on each shelf. Shelf 1 has 30% of math books. Shelf 2 has 80% not math books. Shelf 3 has 40% math books. If a student randomly selects a book from that shelf, what is the probability that the book is a math book?