THE REPUBLIC OF UGANDA

Ministry of Education and Sports

HOME-STUDY LEARNING

PRIMARY 7

MATHEMATICS

August 2020

NCDC
NATIONAL CURRICULUM DEVELOPMENT CENTRE

Save the Children

UGANDA NATIONAL EXAMINATIONS BOARD

NCDC
NATIONAL CURRICULUM
DEVELOPMENT CENTRE

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This material has been developed as a home-study intervention for schools during the lockdown caused by the COVID-19 pandemic to support continuity of learning.

Therefore, this material is restricted from being reproduced for any commercial gains.

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FOREWORD

Following the Outbreak of the CoVID-19 Pandemic, Government of Uganda closed all schools and other educational institutions to minimize the spread of the coronavirus. This has affected more than 36,314 primary schools, 3129 secondary schools, 430,778 teachers and 12,777,390 learners.

The COVID-19 outbreak and subsequent closure of all has had drastically impacted on learning especially curriculum coverage, loss of interest in education and learner readiness in case schools open. This could result in massive rates of learner dropouts due to unwanted pregnancies and lack of school fees among others.

To mitigate the impact of the pandemic on the education system in Uganda, the Ministry of Education and Sports (MoES) constituted a Sector Response Taskforce (SRT) to strengthen the sector's preparedness and response measures. The SRT and National Curriculum Development Centre developed print Home- Study Materials, radio and television scripts for some selected subjects for all learners from Pre-Primary to Advanced level. The materials will enhance continued learning and learning for progression during this period of the lockdown, and will still be relevant when schools resume.

The materials focused on critical competences in all subjects in the curricula to enable the learners to achieve without the teachers' guidance. Therefore effort should be made for all learners to access and use these materials during the lockdown. Similarly, teachers are advised to get these materials in order to plan appropriately for further learning when schools resume, while parents/guardians need to ensure that their children access copies of these materials and use them appropriately.

I recognise the effort of National Curriculum Development Centre in responding to this emergency through appropriate guidance and the timely development of these home study materials. I recommend them for use by all learners during the lockdown.



Alex Kakooza

Permanent Secretary

Ministry of EDUCATION AND SPORTS

ACKNOWLEDGEMENTS

National Curriculum Development Centre (NCDC) would like to express its appreciation to all those who worked tirelessly towards the production of home-study materials for Pre-Primary, Primary and Secondary Levels of Education during the COVID-19 lockdown in Uganda.

The Centre appreciates the contribution from all those who guided the development of these materials to make sure they are of quality; Development partners - SESIL, Save the Children and UNICEF; all the Panel members of the various subjects; sister institutions - UNEB and DES for their valuable contributions.

NCDC takes the responsibility for any shortcomings that might be identified in this publication and welcomes suggestions for improvement. The comments and suggestions may be communicated to NCDC through P.O. Box 7002 Kampala or email admin@ncdc.go.ug or by visiting our website at http://ncdc.go.ug/node/13.



Grace K. Baguma
Director,
National Curriculum Development Centre

ABOUT THIS BOOKLET

Dear learner, welcome to this home-study material which has been prepared for you. The material covers content for term 1, II and III.

The content covered has been carefully written covering the different topics in the syllabus. This is an addition to what you had learnt before schools were closed due to outbreak of COVID-19. The content is arranged using simple steps for your understanding. The activities provided in each topic are organised in such a way that they will enable you to relate with your local environment.

The content is organised into lessons. Each lesson has activities and summary notes that help you to understand the concepts. Some lessons have projects that you need to carry out at home during this period. You are encouraged to work individually as you do the practical and interactive activities.

Feel free to try out all the activities in this material.

Enjoy learning

P.7 SELF STUDY MATERIAL

TERM TWO

TOPIC: FRACTIONS

Lesson 1: Expressing fractions as decimals and vice versa.

In this lesson you will:

- Express fractions as decimals.
- Express decimals as fractions.

You will need:

- A pen
- A book

Introduction:

Fractions are used in our daily life in many ways. Musicians use them to write music notes in the pieces they compose. In this lesson you will learn writing fractions as decimals and vice versa. Fractions are used in many ways, in telling time, each minute is a fraction of the hour, in baking, to know the fraction of each ingredient. Fractions and decimals both help in describing parts of a whole. The fractions are expressed as decimals by carrying out division of the ratio. The decimals are also expressed as fractions in terms of tenths, hundredths and thousandths.

Step 1: Look at these examples;

Write these as decimals;

1. $\frac{7}{10}$

$\frac{7}{10}$ This means 7 divide into 10 parts.

Method 1

$$10 \overline{)\ 7} \quad 0.7$$

$0 \times 10 = -\ 0$

70

$7 \times 10 = -\ 70$

00

Method 2

(a) Find the number you have to multiply by the denominator to make it 10, or 100 or any 1 followed by 0's.

In this case the number is 1

(b) Multiply the Numerator and denominator by that number.

$\frac{7 \times 1}{10 \times 1} = \frac{7}{10}$

(c) Then write down just the numerator, putting the decimal point in the correct place (One space from the right hand side for every zero in the denominator)

$\frac{7}{10} = 0.7$

2. Write $\frac{3}{20}$ as a decimal fraction.

(a) Find the number you have to multiply by the denominator to make it 10, or 100 or any 1 followed by 0's.

Multiples of 20; 20, 40, 60, 80, 100; Since 100 is the 5^{th} multiple of 20,

The number is 5

(b) Multiply the Numerator and denominator by that number.

$\frac{3 \times 5}{20 \times 5} = \frac{15}{100}$

(c) Then write down just the numerator, putting the decimal point in the correct place (One space from the right hand side for every zero in the denominator)

$\frac{15}{100}$ = 0.15

3. Write 0.125 as a common fraction.

0.125 has 3 places of decimals. So, to change it to a fraction you express it As $\frac{125}{1000}$.

And $\frac{125}{1000}$ should be reduced to its lowest form as shown below.

$\frac{125 \div 5}{1000 \div 5} = \frac{25 \div 5}{200 \div 5} = \frac{5 \div 5}{40 \div 5} = \frac{1}{8}$

Exercise

a) Write the following as decimals.

(i) $\frac{3}{5}$

(ii) $\frac{3}{4}$

(iii) $\frac{7}{10}$

(iv) $\frac{19}{20}$

b) Write the following as common fractions.

(i) 0.25

(ii) 0.2

(iii) 0.15

(iv) 0.45

Lesson 2: Writing fractions as recurring decimals and vice versa.

In this lesson you will:

- Write fractions as recurring decimals.
- Write recurring decimals as common fractions.

You will need:

- A pen
- A book

Introduction:

In the previous lesson you wrote fractions as decimals. In this lesson you will learn writing fractions which do not end their divisions as decimals and vice versa. To show the recurring digits, we put a dot on the recurring digits, a bar above all the recurring digits or 3 dots after the recurring digits. For example, 0.6, 0.6, 0.666...

Step 1:

Fractions which end their division are called terminating and those that do not end are known as repeating or recurring decimals.

Now study the examples below.

1. Write $\frac{2}{3}$ as a recurring decimal.

$$
\begin{array}{r|l}
 & 0.66 \\
\hline
3 & 2
\end{array}
$$

$0 \times 3 = -\ 0$

20

$3 \times 6 = -\ 18$

20

$3 \times 6 = -\ 18$

2

So, $\frac{2}{3}$ = 0.666...

2. Express 0.7272... as a common fraction.

Let x = 0.7272...

The recurring digits are two, covering hundredth. So, multiply by 100 throughout.

$100 \times x = 0.7272 \times 100$

$100x = 72.72...$

- $\underline{x = 0.72...}$
- $99x = 72$

$\frac{99x}{99} = \frac{72}{99}$

$x = \frac{72 \div 9}{99 \div 9} = \frac{8}{11}$

$$x = \frac{8}{11}$$

Exercise

(a). Express the following as recurring decimals.

(i) $\frac{1}{6}$

(ii) $\frac{5}{9}$

(iii) $\frac{2}{11}$

(iv) $\frac{3}{7}$

(b). Write the following as common fractions.

(i) 0.222...

(ii) 0.555...

(iii) 0.3636...

(iv) 0.4545...

Lesson 3:Rounding off decimals up to hundred thousandths.

In this lesson you will:

- Read and write decimals
- Round off decimals.

You will need:

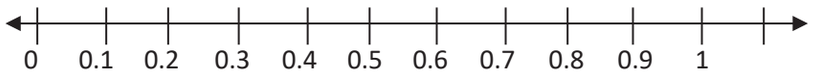
- A pen
- A book
- A ruler

Introduction:

We round off decimals to a certain number of decimal places. For example, to round off a number to the nearest tenths, look at the next place value to the right (the hundredths). Rounding off makes calculation easier to do and results easier to understand. From the point, the first place is tenths. The place value of decimals increase going on the left. In this lesson, we are going to learn rounding off decimals to a hundred thousandths.

Step 1: Draw a number line, Put 11 marks on it and number these marks from

0, 0.1, 0.2 --- 1.



Write down the decimals that are nearer to 0 and those that are nearer to 1.

Nearer to 0: 0.1, 0.2, 0.3, and 0.4

Nearer to 1: 0.5, 0.6, 0.7, 0.8, 0.9

Step 2: Now look at these examples.

1. Round off 3. 675 to nearest tenths

(a) Identify the digit in the tenths place value.

It is 6

(b) Look at the digit in the next place value to its right.

It is 7

(c) Since the digit is 7, we round up by adding 1 to the tenths place value digit.

$$\begin{array}{l} 3.\ 6\ 7\ 5 \\ +\ 1 \\ \hline 3.\ 7\ 0\ 0 \end{array} \cong 3.7$$

2. Round off 0.76342 to the nearest ten thousandths.

   The digit in the ten thousandths place is 4 and the digit on its right is 2. The digit being rounded remains the same if the digit on its right is 0, 1, 2, 3, or 4. It is rounded up if the digit to the right is 5, 6, 7, 8 or 9.

   0.7 6 3 4 2

   \+ 0 ↓

   0.7 6 3 4 0 ≅ 0.7634

3. Round off 3.352897 to the nearest hundred thousandths.

   The digit in the hundred thousandths is 9 and the one on its right is 7.

   7 is in the upper limit so we take 1 to the digit in the required place value.

   3. 3 5 2 8 9 7

   +1 ↓

   3. 3 5 2 9 0 0 ≅ 3.35290

Exercise

Round off:

(i) 0.462 to the nearest tenths.

(ii) 9.36675 to the nearest ten thousandths.

(iii) 0.004998 to the nearest hundred thousandths.

(iv) 6.367854 to the nearest hundred thousandths.

(v) 4.021136 to the nearest hundred thousandths.

Lesson 4: Application of Fractions.

In this lesson you will:

- Read and interpret problems involving fractions

- Solve problems Involving Fractions.

You will need:

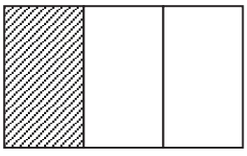
- A pen
- A Book
- A paper

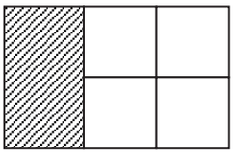
Introduction:

In primary six you dealt with the four operations on fractions. In this lesson you are going to apply these operations in solving word problems on fractions.

Step 1: Activity

Draw a rectangle, divide it into thirds vertically, shade $\frac{1}{3}$ and divide the unshaded parts into 2 halves. What fraction of the whole rectangle is one of the unshaded parts?



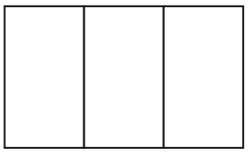


So, the fraction $\frac{1}{6}$

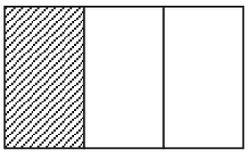
Step 2: Now study this example.

1. A cyclist covered $\frac{1}{3}$ of the journey for 15 minutes and rest of the journey for 20 minutes. What fraction of the journey did he cover in 20 minutes?

   (a) The journey is a whole cut into 3 parts as shown;



(b) If you shade 1 part covered in 15 minutes, you remain with 2 parts.



So, the fraction covered in 20 minutes is $\frac{2}{3}$

2. A man spends $\frac{1}{3}$ of his salary on fees, $\frac{1}{4}$ of the remainder on rent and saves the rest.

(i) What fraction does he save?

Fraction on fees is $\frac{1}{3}$

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

Fraction on rent = $\frac{1}{4}$ of the remainder

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

$$=\frac{1}{4}\times\frac{2}{3}\quad=\frac{2}{12}\quad=\frac{1}{6}$$

Total fraction spent on fees and rent $=\frac{1}{3}+\frac{1}{6}$

$$=\frac{2+1}{6}\qquad=\frac{3}{6}\quad=\frac{1}{2}$$

Fraction saved$=1-\frac{1}{2}$

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

(ii) If he saves Sh.60, 000, what was his salary?

If $\frac{1}{2}$ of his salary =Sh.60, 000, then

$=\frac{1}{2}x$ =Sh.60, 000

$2\times\frac{1}{2}x$=Sh.60, 000$\times$ 2

x=Sh.120, 000

So his salary is Sh.120, 000

Exercise

1. $\frac{1}{3}$ of the books were given to one school and $\frac{1}{2}$ of the remainder to another school. How many books were there if 140 books remained?

2. Peter sold $\frac{2}{3}$ of the birds and gave out $\frac{1}{3}$ of what was left. What fraction remained?

3. Moses was given Sh.30, 000 for a tour. He spent $\frac{1}{2}$ of it on transport, $\frac{1}{3}$ of the remainder on Lunch and the rest was for entries. How much money did he pay for Lunch?

4. Odongo paid off $\frac{3}{4}$ of his money to his sons and $\frac{1}{2}$ of what was left to the daughters. If he remained with Sh.40, 000, how much was paid to the daughters?

5. Out of Owuma's shirts in the case, $\frac{1}{3}$ are clean, $\frac{1}{4}$ of the remainder are torn and dirty. If he has 3 good clean shirts, how many shirts are in the case?

Lesson 5: More application on fractions

In this lesson you will:

- Read and interpret problems involving fractions
- Solve problems Involving application of Fractions.

You will need:

- A pen
- A book

Introduction:

In Primary six you added, multiplied and divided fractions. In this lesson you are going to use that knowledge in working out problems on application of fractions.

Step 1:

Now look at these examples

1. If the product of 2 members is $\frac{1}{3}$ and one of them is $\frac{2}{5}$, find the other number.

(a) We shall take the missing number to be y.

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

$\frac{2}{5}y = \frac{1}{3}$ *Find the LCM of 5 and 3 and multiply it on both sides.*

$\frac{2}{5}y \times 15 = \frac{1}{3} \times 15$

$\frac{30y}{5} = \frac{15}{3}$

$6y = 5$ ⟵ *divide both 5 sides by 6*

$\frac{6y}{6} = \frac{5}{6}$

$y = \frac{5}{6}$ The other number is $\frac{5}{6}$

2. It takes $\frac{1}{3}$ an hour to make a shirt. How many shirts will be made in $3\frac{1}{3}$ hours?

In 1 hour we have 3 thirds

In 3 hours we shall have 3× 3= 9 thirds

In $3\frac{1}{3}$ hours we have 9+1= 10 thirds

So, 10 shirts can be made in $3\frac{1}{3}$ hours.

Working (ii):

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

$$\frac{10}{3} \div \frac{1}{3}$$

$$\frac{10}{3} \times \frac{3}{1}$$

$\frac{30}{3}$ =10 shirts

3. Two taps are connected to a tank of water. Tap A takes 12 minutes to fill the tank and tap B takes 4 minutes to fill the same tank.

(a). How long will it take both taps to fill the tank?

Formula for both filling=$\frac{Product}{Sum}$

$\frac{12 \times 4}{12+4} = \frac{12 \times 4}{16} = \frac{48}{16}$ = 3 minutes

(b). Instead of filling, tap B draws out water, how long will it take to fill the tank?

Formula for filling and taking away=$\frac{Product}{Difference}$

$= \frac{12 \times 4}{12-4}$

$= \frac{12 \times 4}{8} = \frac{48}{8}$

= 6 minutes

Step 3: Now you can try these numbers.

1. If $\frac{2}{3}$ of a number is $5\frac{1}{3}$, what is the number?
2. A kilometer is about $\frac{5}{8}$ of a mile. How many km are in 20 miles?
3. The product of two numbers is $\frac{8}{15}$. If one of the numbers is $\frac{2}{3}$. Find the other number.
4. How many pieces of string $\frac{1}{4}$ metres long can be cut from 40 metres?
5. One tap fills a tank in 8 minutes and another in 4 minutes. How long will both take to fill the same tank?
6. Pipe A fills a barrel with water in 15 minutes and pipe B fills in 7 minutes. How long will it take to fill the barrel if both pipes are opened?

Lesson 6: Ratios and Proportions

In this lesson you will:

- Work out word problems on ratios
- Work out problems on direct proportion.

You will need:

- A pen
- A book

Introduction:

Direct proportions show the relationship between 2 variables when their ratio is equal to a constant value. The relationship between things, the things have to be related in way that if we double one, the other doubles as well. If we raise the quantity of one quantity the other raises as well. The relationship is, direct proportions appear regularly in our everyday lives. In this lesson, you will learn about direct proportions.

Step 1:

Now look at these examples.

1. 3 hens cost Sh.21, 000. What is the cost of 10 hens?
   3 hens cost Sh.21, 000
   1 hen costs $\frac{Sh.21,000}{3}$ =Sh.7000
   So, 10 hens will cost 10 ×Sh.70, 000

2. A car uses 3 litres to move a distance of 21km. How many litres will be needed to move 98km?
   On 3 litres it goes 21km
   Now on 1litre it will go 21km ÷ 3 litres= 7km.
   If it is to go 98km then number of litres needed will be 98 ÷ 7=14 litres
3. There are 120 pupils in a primary school. The ratio of boys to girls is 7: 5. How many boys are there?
   Total ratio of pupils =7+5 =12
   Number of boys as a fraction = $\frac{7}{12}$
   Number of boys = $\frac{7}{12}$ × 120 pupils in the whole class
   $\frac{7}{12}$ × 120 = $\frac{840}{12}$ = 70 boys

4. A can of hot porridge had a mixture of flour, milk and sugar in the ratio 5: 3: 2 respectively. If there were 6kg of milk used, how many kg were for sugar?

   Flour : Milk : Sugar

   5 : 3 : 2

   Number of parts (ratio) for milk = 3

   So 3 parts rep.6 kg

   1 part rep. $\frac{6\ kg}{3}$ =2 kg

   Number of parts for sugar =2

   1 part rep. 2 kg

   Therefore 2 parts for sugar = 2×2

   = 4 kg

Exercise

1. 2 mangoes cost Sh.2, 000. What is the cost of 9 mangoes?
2. A taxi uses 6 litres of petrol to cover 30km. How many litres will be needed to travel 100km?
3. A boy bought 5 books at Sh.5, 000. How many books can one get with Sh.20, 000?
4. If 3 people pay Sh.30, 000 for transport from Seeta to Kampala, how much will 14 people pay?
5. In a class of 30 pupils, the ratio of boys to girls is 2:3. How many girls are in this class?
6. A wheelbarrow carries a mixture of 80kg of sand, stone and cement in the ratio 9:7:4. How much sand is in the mixture?

Lesson 7: Inverse Proportion

In this lesson you will:

- Read and interpret problems involving fractions
- Solve problems Involving application of Fractions.

You will need:

- A pen
- A book

Introduction:

Inverse proportion occurs when one value increases and the other decreases. For example, more workers on a job would reduce the time to complete the task. Equations involving inverse proportions can be used to calculate other values. In this lesson you will learn about inverse proportion.

Step 1:

Now look at this example.

1. 2 men can dig a path in 50 minutes. How long will 5 men take?

   2 men take 50 minutes

   1 man takes (2×50) minutes ← *(we multiply)*

   So, 5 men will take $\frac{2\times50}{5}$ $=\frac{100}{5}$ = 20 minutes

2. 15 boys can do the work in 7 days. How many boys will finish the work in 3 days?

   Let the number of boys taking 3 days be m

   15 boys take 7 days

   1 boy takes (15×7) days ← *we multiply*

   m boys take 3 days

   So, $\frac{15\times 7}{m}$ =3

   $m\times\frac{15\times 7}{m}$=3 $\times m$ eliminate the fraction by multiplying m on both sides.

   15×7= 3× m

   105=3m

   $\frac{105}{3}=\frac{3m}{3}$

   35= m

   They will be 35 boys to do the work in 3 days.

Exercise:

1. 21 men take 6 hours to dig a garden. How long will 10 men take?
2. 12 girls can build a wall in 5 days. How many days will 8 girls take?
3. 21 men take 6 days to dig a pit. How long will 7 men take to do the same work?
4. 15 girls take 20 hours to mop the main hall. How many hours will 25 girls take?
5. It takes 24 women 3 days to clear a shamba. How long would it take 4 women to do the same job?

Lesson 8: Percentages

In this lesson you will:

- Calculates percentages
- Solve problems involving percentages

You will need:

- A pen
- A book

Introduction:

In your P.6 you learnt about percentages. Percentages are fractions with denominator 100. Percentages provide results in the form of parts per 100 that is usually more readily understandable and comparable than when the information is presented as real values. Percentages can be compared more easily than fractions. Therefore, percentages are very important in our daily life. In this lesson you will learn how to solve problems involving percentages in our daily life situations.

Step1:

Now look at this example.

1. If 30% of my goats are He goats and 63 are She goats. How many goats do I have?

He goats are 30%

She goats are (100- 30) % =70%

Remember, Number of She goats are 63

So 70% rep. 63 goats.

Now, 1% will rep. $\frac{63}{70}$

% for all the goats is 100%

Total number of goats will be = $\frac{63}{70} \times 100$

=$\frac{630}{70}$

=90 goats

Exercise

1. If 20% of my salary is spent on food, and I save Sh.10, 000. What is my salary?
2. If 30% of my daily income is spent on fees and I save Sh.21, 000. What is my Income?
3. After walking 20% of her journey, Jane still had 160 km to go. How long was the journey?
4. 60% of Okumu's land is used for cassava and the remaining 80 acres are used for coffee. How big is Okumu's land?
5. A cyclist rode 40% of her journey before she rested. She still had 12km to cover. How long was her journey?

Lesson 9: Percentage Increase and Decrease

In this lesson you will:

- Calculates percentage increase and decrease.
- Work out problems on percentage Increase and Decrease.

You will need:

- A pen
- A book

Introduction:

In the previous, you learnt how to calculate remaining percentages and quantities of percentages. In this lesson you will learn how to calculate percentage increase and percentage decrease. We calculate percentage increase or decrease by getting the difference between the two quantities as you compare the New and Original quantity; we divide the increase or decrease by the original and multiply the answer by 100.

Step 1: Now look at these examples.

1. The number of eggs was increased from 16 to 20. Find the percentage increase.

   (*a*) Work out the increase;

   Increase = 20 – 16 = 4

   (b) Divide the increase by the original number

   $\frac{4}{16}$

   (c) Multiply the answer by 100

   $\frac{4}{16} \times 100$

   So, Percentage increase = 25%

2. When 240 is decreased, it becomes 192. Calculate the percentage decrease.

   (*a*) Work out the decrease;

   Increase = 240 – 192 = 48

   (b) Divide the increase by the original number

   $\frac{48}{240}$

(c) Multiply the answer by 100

$\frac{48}{240} \times 100$

So, Percentage increase = 20%

Exercise

1. When 200 is increased, it becomes 280. By what percent has it been increased?
2. By what percentage will sh. 16000 be decreased to sh.14800?
3. Moses priced his bicycle at sh. 200,000. Ali paid sh.240,000. Find Moses' percentage profit.
4. Lubega's salary was sh.100,000 it was reduced to sh.85,000. Find the percentage decrease in his salary.

Lesson 10: Finding the original number after Increase or Decrease

In this lesson you will:

- Read and comprehend word problems.
- Calculate the original number after percentage increase or decrease

You will need:

- A pen
- A book

Introduction:

In your previous lesson you looked at percentage increase and decrease. In this lesson you will learn about finding the number that has been increased or decreased.

Step 1:Activity.

The number of Corona nurses increased by 60 nurses to 130. How many nurses were there before?

130 – 60 = 70

So, there were 70 nurses before.

Step 2: Now look at these examples.

1. After increasing tins of sanitizers by 20%, our village had 240 tins. How many tins were there before?

   New percentage = (100+ 20) % =120%

   New number of tins =240

   New percent represents new number of tins

   120% rep. 240 tins

   1% will rep. $\frac{240}{120}$ = 2 tins

   Old percentage =100%

   1% rep. 2 tins

   Now 100% will be =100 × 2

   = 200 tins

2. Due to supply of government Masks, Musa's sale of masks dropped by 40% to 60 masks per day. How many Masks was he selling before each day?

   New percentage = (100 -40) %= 60%

   New figure of Masks = 60 Masks

   New percent represents new number of Masks

   60% rep. 60 Masks

   1% rep. $\frac{60}{60}$ = 1 Mask

   Original % =100%

   1% rep. 1 mask

   100% will rep. 100 × 1 =100 Masks

   Exercise

   1. What amount when increased by 10% becomes Sh.8800?
   2. What number when increased by 20% becomes 96?
   3. What number when decreased by 20% becomes 3200?

4. After decreasing the price of a radio by 30%, it was priced at Sh. 49, 000. What was the price before the decrease?
5. After donating some bags of Posho to Covid 19 victims, Sarah's store had a decrease in the bags of posho by 15%. How many bags of posho were in the store before, if there are now 8500 bags?

TOPIC: INTEGERS

Lesson 1: Application of Integers.

In this lesson you will:

- Read word problems.
- Solve word problems on application of Integers.

You will need:

- A book
- A pen

Introduction:

Why learn Integers? We use Integers in our daily life. Reading our body temperatures on a Thermometer, Banks and credit societies frequently use negatives to mean debts and positives to refer to credits.

In this lesson you will learn how to solve problems involving application of Integers in our daily life.

Step 1: Activity.

You are on the second step of a ladder, you climb 4 steps up, then 2 steps down and lastly 3 steps up. On what step are you?

(i). You are at step 2 that means you are at +2.

(ii). When you climb 4 steps up you are moving in positive, so +4.

(iii). 2 steps down means you are moving negatives, so -2.

(iv). Lastly 3 steps up is again a move of +3.

(v). So you are at +2++4+-2++3.

(vi). Add the positives together and negative comes last

2+4+3-2

9-2=7 *So you are at Step 7*

Step 2: Now look at these examples.

1. Odongo had a debt of sh. 20,000. He received sh.50,000 from selling his masks. How much money did he have after paying off his debt?

   (i). Odongo's debt is now-sh. 20,000

   His sale from the masks gave him +sh. 50,000

   (ii). Add Odongo's debt to money got from his sale on masks

   -sh. 20,000+ sh. 50,000

   (iii). Re-write the statement beginning with the Positive

   Sh. 50,000 – Sh.20,000

   =Sh. 30,000

   So Odongo remained with Sh. 30,000.

: Exercise:

1. Suubi borrowed sh.3000 from her friend. Her father gave her sh. 5000. If she pays the debt, how much money will she be left with?
2. The train leaves at 8:00a.m. Sarah arrives 15 minutes earlier at the station. The train left 30 minutes later. How long did Sarah wait at the station?
3. Tom made 60 bricks in one day. 8 bricks got damaged by rain and 5 got broken. How many good bricks was he left with?
4. The price of a pineapple is sh.2000. If the price increases by sh.500 and later drops by 300. What is the price of the pineapple?

5. Jonathan won 60 points, then another 20 points, but lost 31 points and another 40 points. What was his final score?

Lesson 2: Addition and Subtraction of finites.

In this lesson you will:

- Add numbers in finite 5 and 7.
- Subtract numbers in finite 5 and 7.

You will need:

- A pencil
- A pen
- A book
- Counters like sticks, stones

Introduction:

In primary six you added and subtracted numbers in bases and you identified digits used in each base. In this lesson you will learn adding and subtracting numbers in finites system similar to bases.

Step 1: Activity:

Draw a clock face of 12 hour clock system and write on the numbers 1 to 12. If the clock is reading 7:00 am now, what time will it read after 8 hours?

(i). Move from 7 clockwise step by step until you have moved the 8 steps.

(ii). You realize that when you reach 12 on the clock face, the numbers go back to 1 and after your move you realize that you are at 3.

So the time will be 3:00 pm.

Step 2: Now look at these examples.

1. Add: 3+ 4= ——— (finite 5)

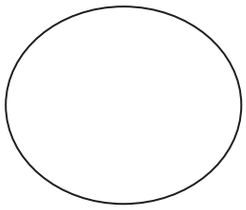
   Digits used in finite 5 are 0, 1, 2, 3, and 4.

   To add 3+4

   (i).Identify 3 from the clock face

   (ii). Move from 3 four steps clockwise.

   (iii). You are now at 2 .So our answer for 3+4= 2(finite 5)



2. 3+ 4 = ——— (finite 5)

   (i). get the sum of the given numbers.

   3+4= 7

   (ii). Divide 7 by 5

$$\begin{array}{r} 1 \\ 5 \overline{)\ 7} \\ \underline{-5} \\ \text{Rem}\quad 2 \end{array}$$

   (iii). you get 1 rem 2

   3+4= 2(finite5) (Finite is a system of remainder) so our 2 which is the remainder is the answer.

3. Subtract:1-5=-----(finite 7)

   5 cannot be subtracted from 1 directly so,

   (i). Add 7 to one = 7+1 which is 8

   (ii). Subtract 5 from 8 = 8-5=3

   (iii). Now 1-5=3(finite 7)

Step 3: Exercise:

(*a*). Add the following.

(i). 5+3= ——(finite 7)

(ii). 4+4= —— (finite 5)

(iii). 6+5= —— (finite 7)

(b). Subtract the following.

(i). 2-4= ———(finite 5)

(ii).1-6= —— (finite 7)

(iii). 1 -4= —— (finite 5)

Multiplication of finites

In this lesson you will:

- Multiply numbers in finites
- Divide numbers
- Write down remainders

You will need:

- A pen
- A book
- Counters e.g. sticks, stones
- A pencil

Introduction:

In your previous lesson you learnt about addition and subtraction of finites, in this lesson you will learn about Multiplication of finites.

Step 1: Activity:

- ✓ Get a pencil and draw a circle on a piece of paper.
- ✓ Mark 5 equal spaces on its circumference and label them 0 to 4.
- ✓ Move from 0, two steps clockwise four times. At what number do you stop?

<u>Step 2:</u> Now look at these examples.

1. 3x5= ____(finite7)

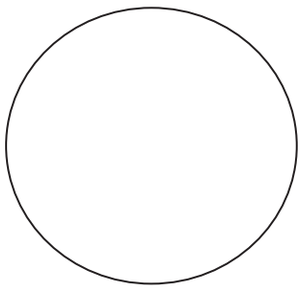
   (i)Find the product of 3x5=15.

   (ii)Divide 15 by the finite.15÷7=2 rem.1

   (iii)Write the remainder as the answer

   3x5= 1(finite7).

   2 .2x3 =____(mod5)



2x3 means 2 sets of threes so on the clock face move from 0 to 3 then move the second set of threes from 3.Where are we? We are at 1.

So, 2 x 3=1(mod5).

Exercise

1. 2×2= _____ (finite 5)
2. 6×3= _____ (finite 7)
3. 5×4= _____ (finite 7)
4. 3×6= _____ (finite 5)
5. 2(3×3)= _____ (finite 5)
6. 4(3×2)= _____ (finite 7)
7. 4(3×2)= _____ (finite 5)

Lesson 4: Application of finites.

✓ Time

In this lesson you will:

- Solve problems Involving application of finites.
- Interpret word problems.

You will need:

- A pen
- A book

Introduction:

When one is asked the day of the week he was born, it is not easy to tell that day, application of finites helps us to tell when certain events happened or will happen. In this lesson you will learn to calculate time of any date in the past or future.

Step 1: Activity.

Write down the days of the week from Monday to Sunday in a horizontal form. Write numbers 1 for Monday, 2 for Tuesday and continue in that order.

Which day has number 6? The day is a Saturday.

Step 2: Now look at these examples.

(i). Today is a Wednesday. What day of the week will it be 45 days from now?

M	T	W	Th	F	Sat	Sun
1	2	3	4	5	6	0

Wednesday has figure 3

45 days are ahead of us. So, you write (3+45)

3+ 45=_____ —— (finite 7) ← *(7 days in a week)*

3+45=48

Now divide 48 by 7 to get its equivalent in finite 7

48÷ 7=6 rem 6

Our rem. 6 is matching with the day Saturday, so the day will be a Saturday.

(ii).If it is June now, what month of the year was it 33 months ago?

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	2	3	4	5	6	7	8	9	10	11	0

June has figure 6

33 months ago is time behind us, so you write (6-33)

6-33= ——(finite 12*)* *(12 months in a year)*

Divide 33 by 12 and subtract the remainder from 6. (equivalent of 33 in finite 12)

6-(33÷12) = —— (finite 12)

6-(2 rem 9) = —— (finite 12)

6-9= ——(finite 12)

Add 12 to 6 and subtract 9

(6+12)-9= —— (finite 12)

18-9=9(finite 12)

= Sep (finite 12)

The month was September.

Exercise.

1. If today is a Tuesday. What day of the week will it be 90 days from now?
2. If today is a Saturday, on what day of the week will it be 87 days from now?
3. My grandfather died 100 days ago. If today is a Tuesday, on what day of the week did he die?
4. Next term will begin 68 days after the covid 19. If today is a Friday, on what day of the week will it begin?
5. If it is July now, what month of the year will it be after 72 years from now?
6. Peter was born 87 months ago. If we are in June now, what month was he born?
7. Peter knew about corona virus 56 months ago. If this October now, in what month did Peter first know about the virus?

Lesson 5: More application of Finite system

✓ Reminders

In this lesson you will:

- Solve problems on application of finites
- List down equivalences of digits of given finites

You will need:

- A pen
- A book

Introduction:

In the previous lesson you learnt about application of finites on time (days and months). In this lesson you will learn more on application of finites by finding common number in given finites equivalences.

Step 1: Activity.

Get a piece of paper and list down the multiples of 3 and 7. Write down their lowest common multiple.

Multiples of 3 are 3, 6, 9, 12, 15, 18, 21, 24, 27, 30 33, 36, 39, 42, 45, 48, 51, 54, 57…

Multiples of 7 are 7, 14, 21, 28, 35, 42, 49, 51, 58 …

The Lowest Common Multiple of 3 and 7 is 51.

Step 2: Now look at this example.

1. Maria sells mangoes in a market. When she groups them into 4s, 3 mangoes remain, when she groups them into 6s, 3 mangoes remain and when she groups them into 7s, 2 mangoes remain. Find the least number of mangoes Maria had.

   When grouping objects, the number of objects in each complete group is the finite and the remainder is the number in that finite.

To get the common number of mangoes, in each grouping you add the finite to the remainder continuously until you come to common number.

Rem	finite	Sum
3	Finite 4	3,7,11,15,19,23,27,31,35,39,43,47,51
3	Finite 6	3,9,15,21,27,33,39,45,51,57
2	Finite 7	2,9,16,23,30,37,44,51,58

The common number in 3 (finite4), 3(finite6) and 2(finite7) is 51.

Therefore, Maria had 51 mangoes.

Exercise.

1. What is the least number of oranges when divided by 4 boys, 3 oranges remain, when divided by 8 boys, 7 oranges remain.
2. A man had tomatoes, when he put them in heaps of 6, 5 tomatoes remained and when he put them in heaps of 7, 6 remained. How many tomatoes did he have?
3. The Ministry of Health grouped the corona virus victims as follows: When put in groups of 4, 2 people remained, when put in groups of 5, 2 people remained and when grouped in 6, 4 people remained. How many victims were there?

   Find the least number that when divided by 9, 7 remain. When divided by 8, 4 remain and by 3, 1 remains.

TOPIC: DATA HANDLING

LESSON 1: pie charts

In this lesson you will:-

- Read and interpret information
- Use the information to draw pie-charts
- Learn that the size of each segment represents the segment's proportion to the whole set of data

You will need:-

A pencil, pair of compasses, ruler and a protractor. (Geometry set)

Introduction:

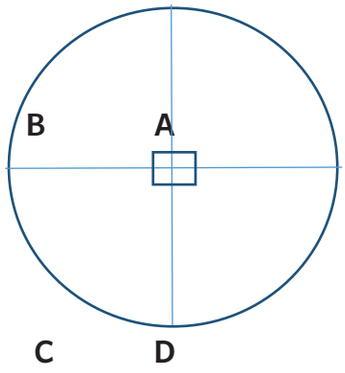
Each of us has a favourite drink if given chance to choose for example Mirinda Pineapple, Mirinda Apple, Mirinda Fruity, Novida or a Fanta. In your previous classes, this information could be put on bar graphs but for our lesson today, we are going to present it in a circle graph called Pie chart. **Pie charts are** useful for displaying data that **is** classified into categories. Each category / slice represents a portion of the whole pie. Pie charts (or circle graphs) are used to represent data as portions (or segments) of a whole.

Activity

- Using a pair of compasses draw a circle
- Draw two diameters in your circle bisecting (crossing) each other (remember a diameter goes through the centre.
- Measure each of the centre angles (angles formed by the crossing lines using a protractor.
- Work out the sum of all these angles measured. Note that if a pie chart is divided equally each portion is the same. Each portion in this measures 90 °
- You notice that the sum is 360°. Therefore, the angle sum of a circle graph is 360°
- This can also be represented as a percentage of the pie chart. All portions therefore will add up to 100%. Each portion in this case will be 25%

Solution

A+B+C+D = 90 °+90+ °90 °+90 °= 360



Step 2:

Example 1: Let us try this example, 120 pupils of P.7 were asked to choose their best subjects. This is how they grouped up, 30 pupils chose mathematics, 24 social studies, 48 science and 18 English. Use the information above to draw an accurate pie-chart.

Solution:

Put the information on a table like below

Subjects liked by P7 Class

Mathematics	Social studies	Science	English
30	24	48	18

Change the marks to degrees

You need to express each group as a fraction of 360° like this;

$$Mathematics;\ \frac{30}{120} \times 360^o = 90^o$$

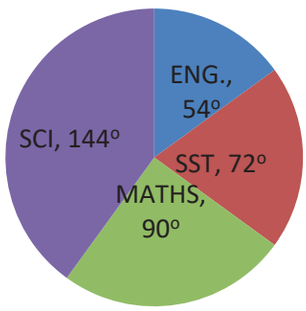
$$Social\ studies;\ \frac{24}{120} \times 360^o = 72^o$$

$$Science; \qquad \frac{48}{120} \times 360^o = 144^o$$

$$English; \qquad \frac{18}{120} \times 360^o = 54^o$$

Draw a pie-chart with the help of your pair of compasses and a pencil.

Then use your protractor to measure accurately the above angles for each sector. It will look like in the pie chart below



2. Sarah spends her monthly salary as follows; Car expense 15%, food 20%, others 10% saving 15% and fees x%

a) Find the value of x.

Solution

15 + 20 + 10 + 15 + x = 100

60 + x -60 = 100 - 60

x = 60%

b) Draw a pie-chart to show the information above.

Solution.

i) Car expense

$\frac{15}{100}$ x 360° = 54°

ii) food

$\frac{20}{100}$ x 360° = 72°

iii) others

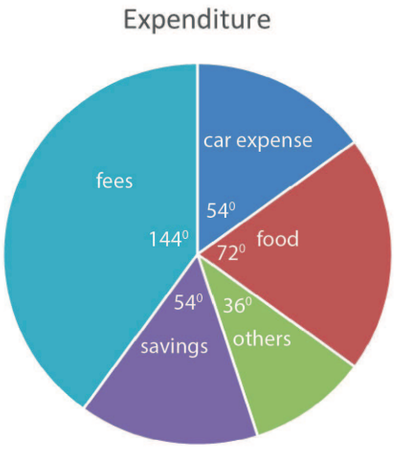
$\frac{10}{100}$ x 360° = 36°

iv) savings

$\frac{15}{100}$ x 360° = 54°

v) fees

$\frac{40}{100}$ x 360° = 144°



Exercise:

1) Irene divided up her piece of land for the following crops:

Maize 40%, Beans 15%,Potatoes 20% and Bananas on the remaining piece of land. Represent this information on a pie-chart.

2) Mukiibi spent 70% of his salary on rent, 50% of the remainder on others, he was left with 3000/-. Draw a pie-chart using the above information.

LESSON 2:- Interpretation of pie-charts

In this lesson you will:

- Interprète information on *a* Pie - chart
- Work out problems using pie charts

You will need:-

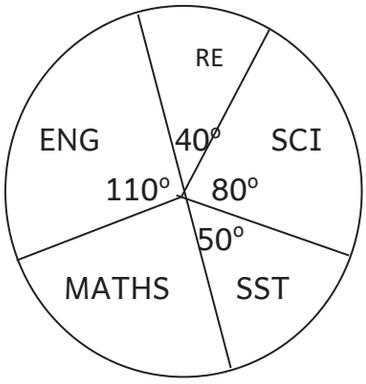
- Set ruler, pencil, circular objects and *a* pair of compasses.

Introduction:-

In your previous lesson, you learnt how to draw pie-charts. Today, we are going to learn interpretation of information on pie-charts and we answer questions from them. This will give you more practice in summarizing large data. A pie-chart can show information in fractions, percentages or degrees. The sum of all fractional parts in *a* pie-chart is 1. The sum of all percentage parts in *a* pie-chart is 100.The sum of all degrees of *a* pie-chart is 360°.You then need to study carefully each pie-chart and observe which form has been presented i.e. whether fractions, percentages or degrees.

Step 1:- Example;

The pie-chart below shows different subjects chosen by 324 pupils of Mango Primary School.



i) How many degrees represent maths?

Solution

Let y represent the angle for maths.

But, the sum of all angles in a pie-chart (centre angle) is 360°

Then,

$y° + 50° + 80° + 40° + 110° = 360°$

$y + 280° = 360°$

$y + 280° - 280° = 360° - 80°$

$y = 80°$

Therefore; Maths is represented by 80°

ii) How many pupils chose SST?

Solution

You pick the angle sector for SST out of the angle sum times the total number of pupils in this school.

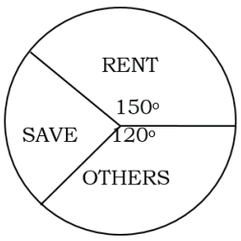
$$\frac{50^o}{360^o} \times 324$$

You reduce this to the simple form and you finally get 45.

There fore, 45 pupils chose SST.

Exercise:

Try this work on your own, but its okay if you have a friend to work with.



The pie-chart shows a man's expenditure and savings, if he earns 108,000/=

i) How much does he save?
ii) How much does he spend on rent?
iii) How much does he spend on others than he saves?

LESSON 3: Solving problems on a pie-chart.

You will;

- Study given information carefully
- Answer questions from pie-charts correctly.

You will need;

- Circular objects
- A pair of compasses
- A ruler
- A pencil

Introduction

Information on a pie-chart can also be represented in algebraic form either as degrees or percentages. In this case, knowledge of algebra is very helpful.

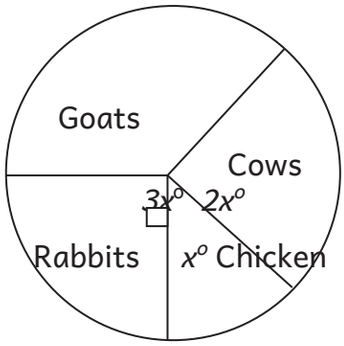
Step 1:-

You need to identify values given for each sectors either as degrees or as percentages.

You then need to find the values of the unknowns as presented on the pie-chart and proceed with other tasks.

Step 2:

For example;



Opio rears the following animals on his farm (a) If he rears 40 chicken on his farm, how many animals does he have altogether?

(b) How many goats are on his farm?

(c) If he sells all rabbits on his farm, at a cost of sh.15000 for each, how much will he earn altogether?

Solution

a) First find the value of x

$$x^o + 2x^o + 3x^o + 90^o = 360^o$$
$$6x^o + 90^o = 360^o$$
$$6x^o + 90^o - 90^o = 360^o - 90^o$$
$$6x = 270^o$$
$$x = 45^o$$

Then, let the total number of animals on his farm be m

$$\frac{45^o}{360^o} \times m = 40$$
$$\frac{1}{8}\, m = 40$$
$$8 \times \frac{1}{8} m = 40 \times 8$$
$$m = 320$$

He has 320 animals altogether.

b) Goats are represented with $3x^o$

But $x^o = 45^o$

Then, $3x^o$ = 3 x 45

= 135°

$$\frac{135}{360} \times 320$$

= 120 goats

c) Rabbits = 90°

$$Then;\ \frac{90}{360} \times 320$$

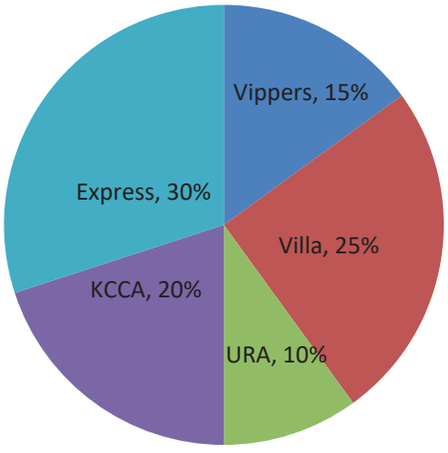
= 80 rabbits

1 rabbit cost 15000/=

80 rabbits will cost 80 x 15000 = 1,200,000/=

Exercise: Try out the following numbers.

1) The pie-chart shows the 4200 supporters who attended a football match at Mandela Stadium between Express F.C and Villa F.C.



i) How many supporters were there for Express?

ii) How many more supports were there for Villa F.C than Vipers F.C?

iii) Change the sector for KCCA supporters to degrees.

LESSON 4:- Naming points on a coordinate graph

In this lesson you will:-

1. Identify the order of points on a grid.
2. Name given points on the grid.

You will need;

A book, pen, pencil and ruler.

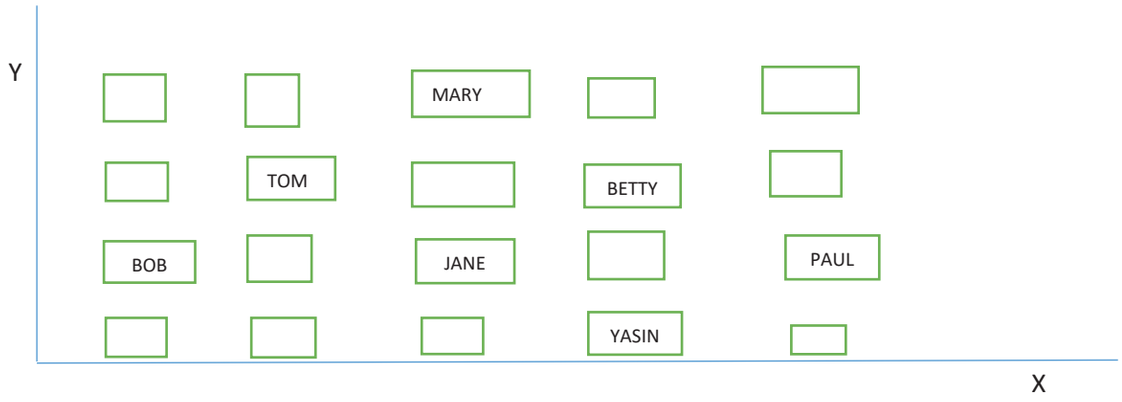
Introduction; In your previous lesson you learnt the X-axis and Y-axis while drawing travel graphs. In this lesson today, you're going to learn a coordinate graph.

A coordinate 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 or graph, you start reading from the X-axis and end with the Y-axis in the order of (X, Y).

Step 1:- Let us use a seating plan of a p.7 class with 30 pupils. Considering the rows and the columns, we can locate the position of each pupil.

ROWS

(Y axis)



From the seating plan above,

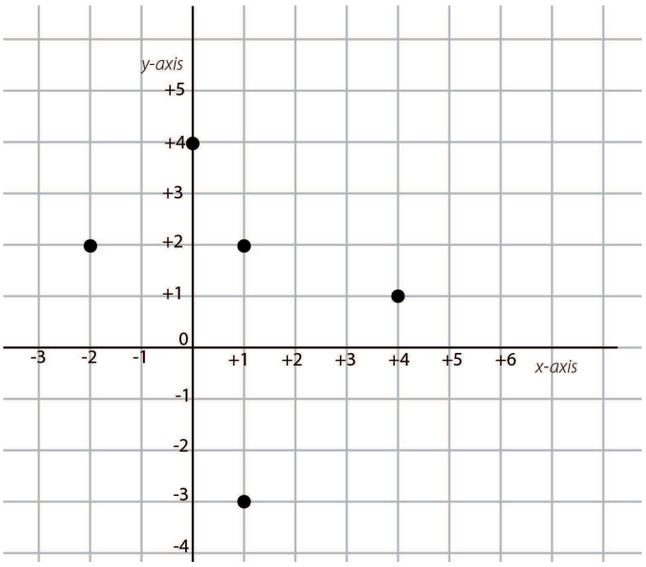
Bob sits on column 1 row 2 (1, 2)

Mary sits on column 3 row 4 (3, 4)

Yasin sits on column 4 row 1 (4, 1)

We can also read points on a coordinate graph in a similar way but in this case we shall also have negative points.

For example, Name points A – E on the grid below.

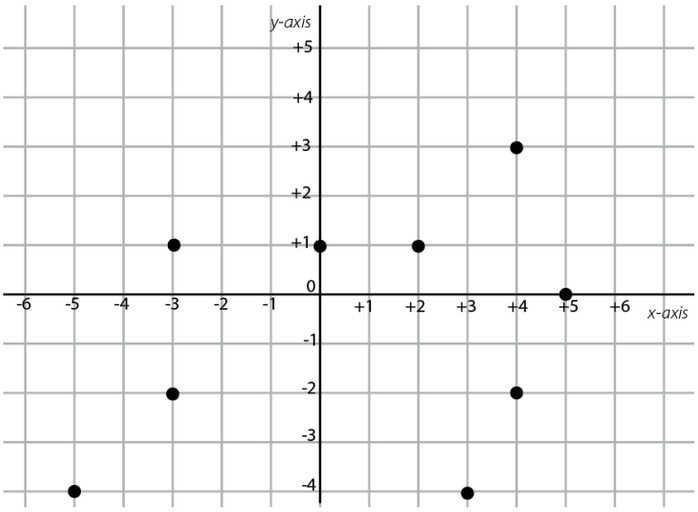


To locate point A, you read off its coordinate along the x-axis first (0) and then the y-axis (4) (0, 4)

Point B along the x-axis is at -2 and along the y-axis it is at +2 (-2, 2)

Step 2:- Exercise.

Using the grid below, name the points A – J in the order (X, Y).



LESSON 5:- Plotting points on a grid.

In this lesson, you will;-

1. Identify the X and Y coordinates correctly.
2. Plot the given points on the grid.

You will need;-

Pen, pencil and a book.

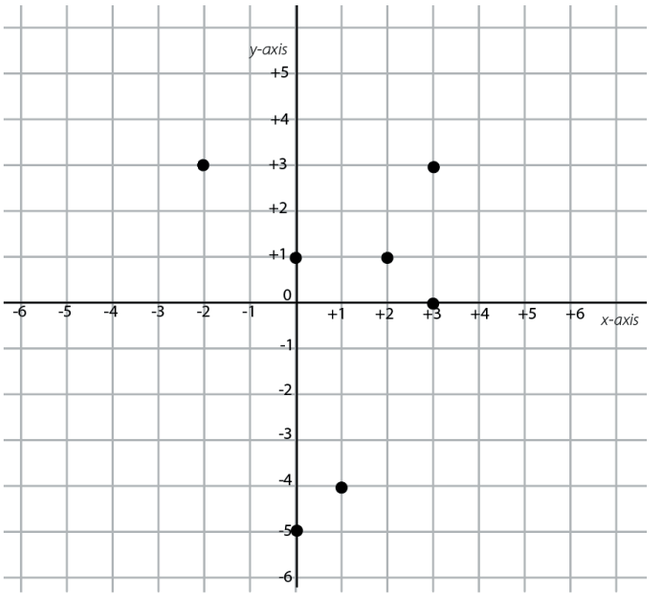
Introduction:-

In your previous lesson you learnt how to name points from a grid. In our lesson today, you're going to plot different points on a grid.

To plot any point on the grid, you begin with coordinates on the X-axis and then the Y-axis.

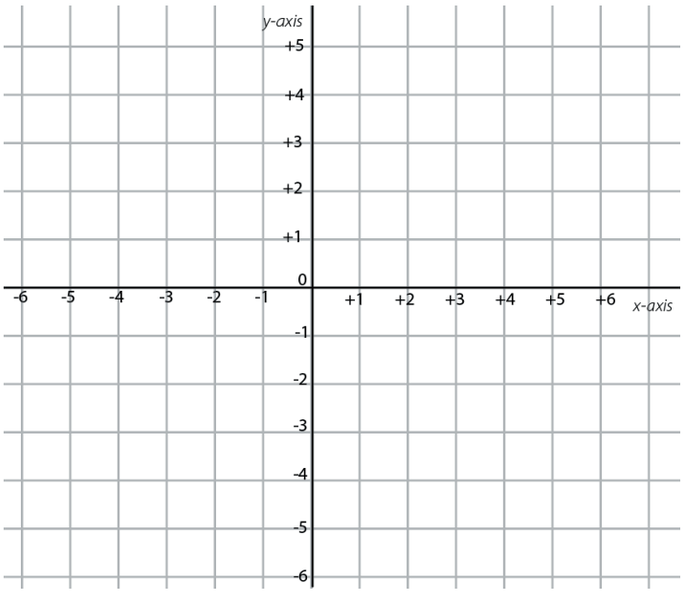
Step 1:- Example, show the following points on the grid.

K(-2, 3) L(2, 1) M(0, -5) N(3, 0) 0(1, -4) P(3, 3) Q(-4, -3)



Step 2:- Exercise. Now that you have seen how to plot points on the grid, try out this work on your own.

Show the following points on the grid below.



A(-2, -3) , B(0, 4) , C(-2, 5) , D(-4, 0) , E(-1, -1) , F(0, -2) , G(2, 2) , H(5, -1) , I(0, 4) , J(-1, 0) , K(-4, 3) , L(-3, 5)

LESSON 6:- Finding area of figures formed on a grid.

In this lesson you will:-

1. Plot given points correctly.
2. Join given points correctly to form geometric shapes.
3. Find area of shapes formed.

You will need:-

Book, pen, pencil and a ruler.

Introduction;-

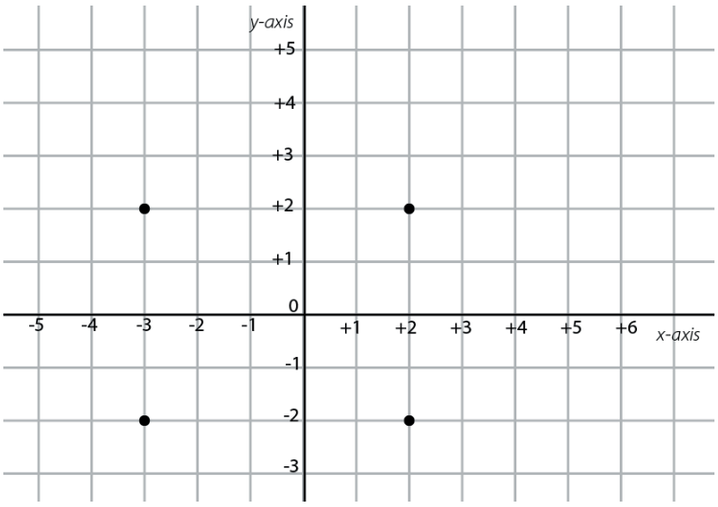
In your previous lesson, you learnt how to plot points on the grid. Today you're going to plot and join points to form a geometric shape.

You will also learn how to find area of the shapes formed.

Step 1:- Example.

Plot these points

A (-3, 2), B (2, 2), C (2, -2), D (-3, -2)



Join points A to B, B to C, C to D and D to A.

Name the figure formed.

The figure formed is a rectangle.

Find the area of the figure formed.

In this case, you can count all the small squares covered by the shape and this will be the area of the figure formed.

When you count the small squares you get 20 square units.

But you can also use the formula for finding area of a rectangle by multiplying units along the length by those along the width.

Length 5 units, width 4 units.

Area of a rectangle = Length X Width

= 5 X 4

= 20 square units

Exercise

Use the grid below to show these points

1. A(0, 3) B(2, -2) C(-2, -2)

a) Join points A to B, B to C, and C to A

b) Name the figure formed.

c) Find the area of the figure formed.

2. P(-2, -1) , Q(3, -1) ,R(6, -4) and S(-2, -4)

   a) Join points P to Q, Q to R, R to S and S to P

   b) Name the figure formed.

   c) Find the area of the figure formed.

LESSON 7: Travel graphs

In this lesson you will;

- Study given information and determine the scale used on both axis.
- Use given information to draw travel graphs correctly.

You will need;

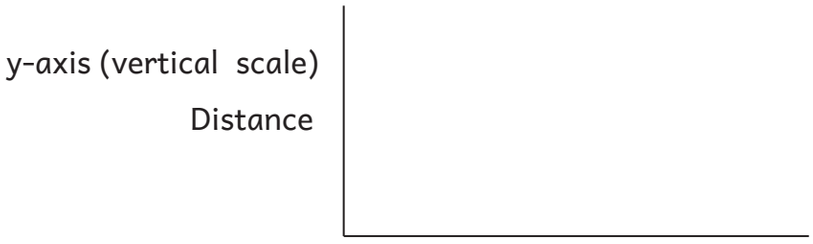
Ruler, pen, pencil and a book.

Introduction:

In your previous class, you learnt about speed, distance and time. In this lesson, we are going to put this information on a graph. This kind of graph is a travel graph.

Travel graphs are important because they help us sketch distances covered and time taken by any traveler.

- When drawing a travel graph, you must note the following;
  a) the title of the graph
  b) the scale on both axis i.e. the y-axis or vertical scale and the x-axis or the horizontal scale should be suitable.



- Information given should be put in a table and transferred to the graph.

Step1: Example; Mary left Bushenyi at 7:30a.m. and travelled for 3 ½ hours at a speed of 60km/hr.
Draw a graph for her journey.

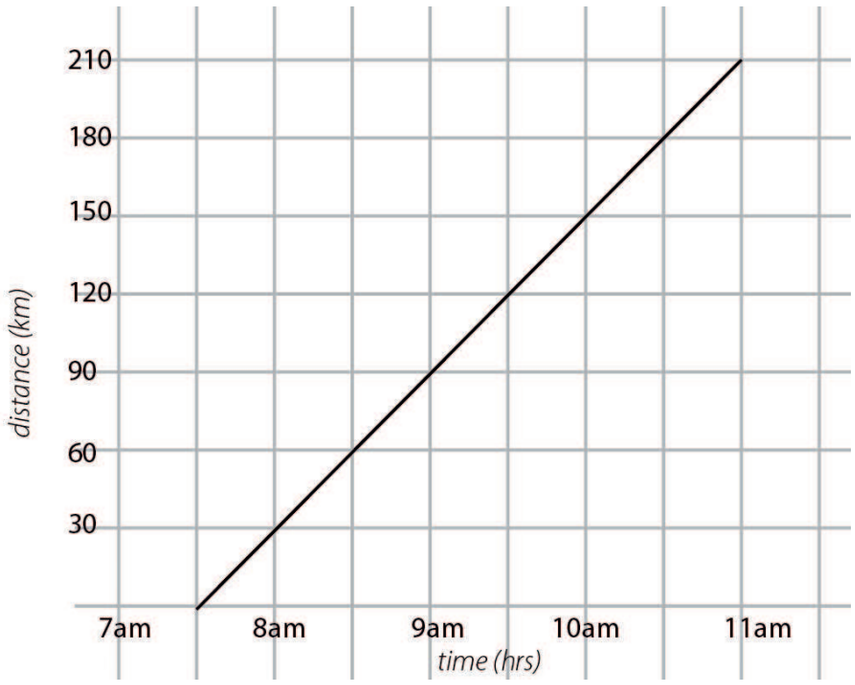
Solution;

You need to know the total distance Mary covered for this journey.
This can be got by multiplying speed given by the time taken.
Distance = Speed x Time
= 60 x 3½
= 210km

You then need to choose a suitable scale to represent 210km putting in consideration the size of paper or book you have.

You can consider a scale like this one on the y-axis, 1cm on paper to represent 30km on ground.

And on the x-axis, 1cm on paper to represent 30 minutes.



Exercise: You can try this work on your own.

A traveller left Kampala for Mbale at 7:00a.m. He covered the first distance in 2hours at a speed of 50km/hr. He rested for 30 minutes and resumed with the remaining journey reaching Mbale at Noon.

Draw a travel graph to show this journey.

Good Luck

LESSON 8:- Interpreting travel graph

You will;

- Study the given travel graphs carefully.
- Answer the questions correctly from the travel graphs drawn.

You will need;

A ruler, pen, pencil and a book.

Introduction:

Sometimes travel graphs can be drawn for us with suitable scales taken and we are asked to answer questions from them. In our lesson today, we are going to look at such travel graphs and answer questions from them.

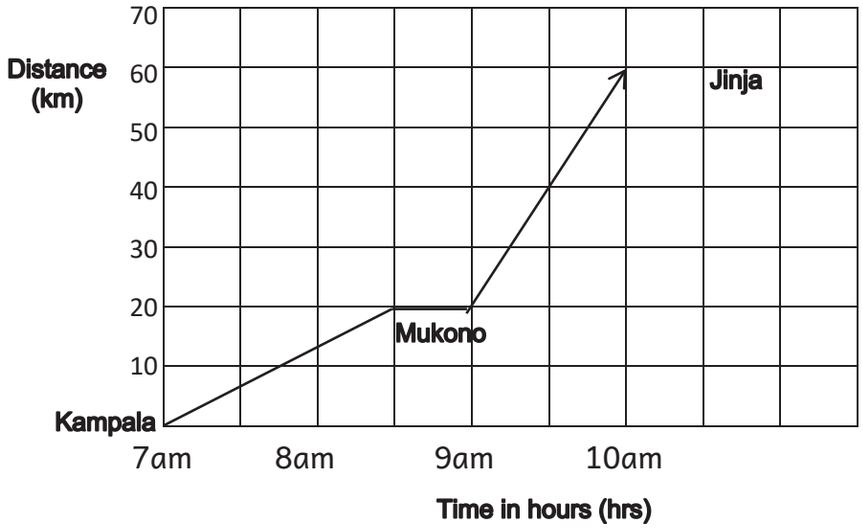
Step 1:

To find the speed at which one is moving or the distance covered or the time taken, note the point at which the x-axis, the y-axis and the straight line meet.

For example;

The graph below shows a cyclist's journey from Kampala to Jinja through Mukono.

In this case, you need to study carefully both axes on this graph. You then need to study when the traveller started the journey, how he moved until he reached his destination.



a) How far is Mukono from Jinja?

Solution;

From Kampala to Mukono is 20km and from Kampala to Jinja is 60km; then 60 – 20 = 40km

b) For how long did the cyclist ride from Kampala to Jinja?

Solution;

He started the journey at 7:00a.m. and ended at 10:00a.m.

Then; Time = Final time – Initial time

= 10:00 – 7:00

= 3 hours

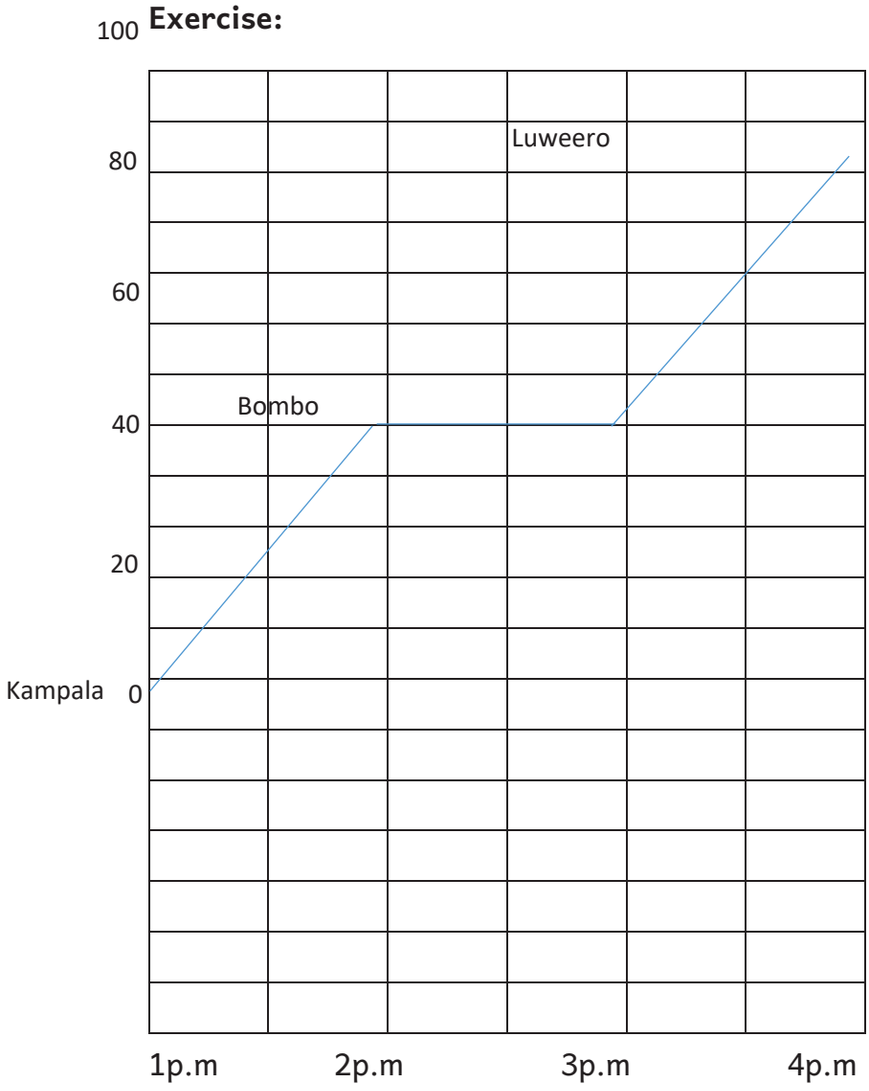
c) Calculate his average speed for the whole journey

$$Average\ speed = \frac{Total\ Distance\ covered}{Total\ Time\ taken}$$

$$= \frac{60}{3}$$

$$= 20km/hr$$

Exercise:



a) What is the scale on the vertical and horizontal axis?

b) How far is Bombo from Luweero?

c) At what speed was the cyclist riding between Bombo and Luweero?

LESSON 9:- APPLICATION OF MEAN, MODE AND RANGE

In this lesson, you will;

1. Read given statements with understanding
2. Solve problems involving mean, mode and range correctly

You will need;-

Pen, book

Introduction:- In your previous classes you learnt how to find mean, mode, range and median. In this lesson today you're going to solve problems involving mean, mode and range.

Step 1:- Example.

1. The average age of 3 girls is 15 years. Two of them are of the same age and the third is 11 years. How old are the other two girls?

Solution:-

You first find the sum of their ages by multiplying the average by their number.

Sum= average (mean) X number

= 15X3

= 45years

You subtract the age of the third girl

45 – 11 = 34 years

Since the other two girls are of the same age then you divide 34 by 2 to get age of each of the two girls.

34 ÷ 2 = 17

Therefore each of the two girls is 17 years.

2. The table below shows marks scored by p.7 pupils in a math test.

Marks	80	70	10	45	90
No. of Pupils	3	2	4	5	1

a) How many pupils are in this class?

3 + 2 + 4 + 5 + 1 = 15 pupils

b) Find the modal mark.

The modal mark is 45 since it was scored by most Pupils.

c) Find the modal frequency

Its 5

d) Find the range of these marks.

Range = highest mark – lowest mark

= 90 – 10

= 80 marks

e) Calculate the mean mark.

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

$=\frac{(80x3)+(70x2)+(10x4)+(45x5)+(90x1)}{3+2+4+5+1}$

$=\frac{240+140+40+225+90}{15}$

$=\frac{735}{15}$

=49 marks

Exercise

1. The average weight of 4 boys is 55 kg. When their teacher joins them, the average weight becomes 60kg. Find the weight of the teacher.
2. The table below shows marks scored by pupils of primary six in a science test.

Marks	72	56	82	60	95
Number of pupils	8	10	4	6	2

a) How many pupils did this test?

b) Find the modal mark.

c) Calculate the mean mark.

LESSON 10: PROBABILITY

In this lesson, you will

1. Identify the meaning of probability
2. Work out problem involving probability

You will need:

Paper/book, pen, coins, dice.

Introduction:-

When our mothers are pregnant, they have equal chances of giving birth to either a baby boy or baby girl. Remember also when we have exams, we can either pass or fail.

In our lesson we're going to learn about probability.

Probability is a branch of mathematics which deals with the study of chances.

So many events in our world happen by chance. For example sports betting, raining, playing cards, passing exams and many others.

Probability is calculated by dividing the desired chances with total chances.

$$\text{Probability} = \frac{\text{Desired Chances}}{Total\ chances}$$

Step 1:- For example;

1. In a box, there are 6 blue balls and 5 red balls. What is the probability of picking a blue ball from the box?

$$\text{Probability} = \frac{\text{Desired Chances}}{Total\ chances}$$

$$\text{Probability} = \frac{5}{11}$$

2. There are 48 rotten oranges in a bag. If the probability of picking a good orange is 2/3, find the number of oranges in the bag.

   Solution:

   Let the number of all oranges in the bag be y.

   Fraction for good oranges = 2/3

   Fraction for rotten oranges = 1/3

   1/3 of y = 48

   y/3 = 48

   y = 48 x 3

   y = 144

   So there are 144 oranges in the bag.

Exercise:

1. A bag contains 15 mangoes. If 4 of them are raw, what is the probability of picking a ripe mango at random?
2. If the probability that Aisu will pass his examination is 2/3, what is the probability that he will fail his examinations?
3. If the probability that our school team will win is 0.6, what is the probability that our team will lose?
4. The probability of picking a ripe orange from a bag is 2/5. If there are 120 oranges in the bag, find the number of raw oranges in the bag.

TOPIC: CONSTRUCTION

Lesson 1: Construction of Parallel lines

In this lesson you will:

- ✓ Draw arcs
- ✓ Construct parallel lines

You will need:

- ✓ A pencil

- ✓ A book
- ✓ A geometry set

Introduction:

Opposite walls of a building can never meet. This is because they appear to be having straight lines that are parallel to each other. In this lesson you will learn how to construct parallel lines.

Step 1: Activity

Get a piece of paper and a pencil. Get a Geometry set; put it on a paper you have got and trace out its two opposite sides.

What kind of lines have you drawn?

_____

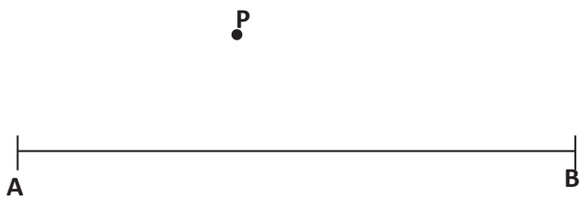
Geometry set

The kind of lines you have drawn are parallel lines.

Parallel lines have the same distance of separation between them and run in the same direction.

Step 2: Now look at this example.

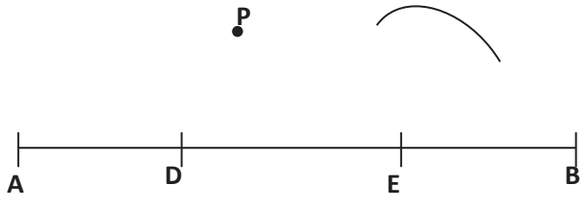
1. Using a pair of compasses, a ruler and a pencil, construct a parallel line to line AB through point P.



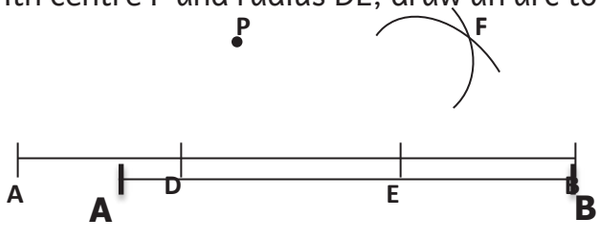
(i). Mark any two points D and E on line AB.



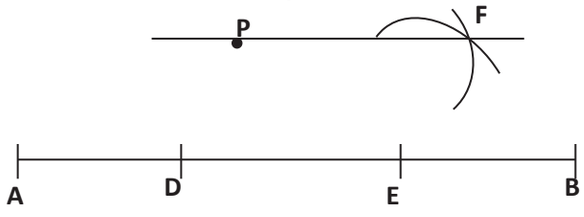
(ii). With centre E and radius DP, draw arc RT.



(iii). With centre P and radius DE, draw an arc to cut the first arc at F.



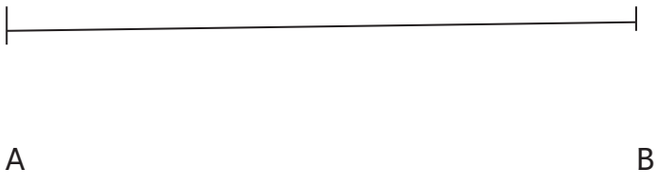
(iv). Join PF. The line PF is parallel to line AB.



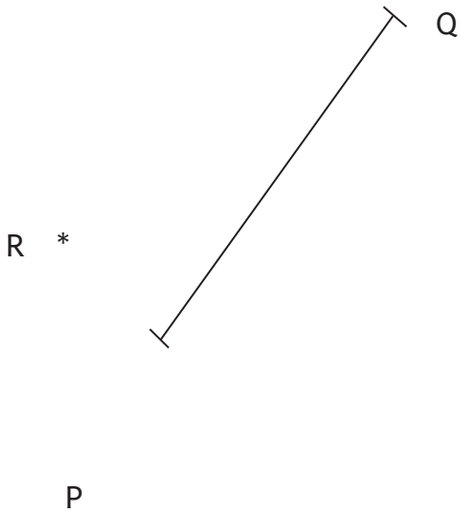
Exercise

Construct parallel lines through given points.

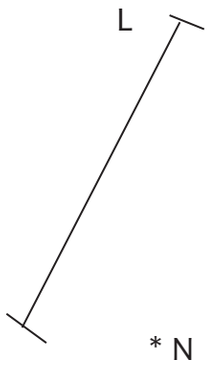
(a).



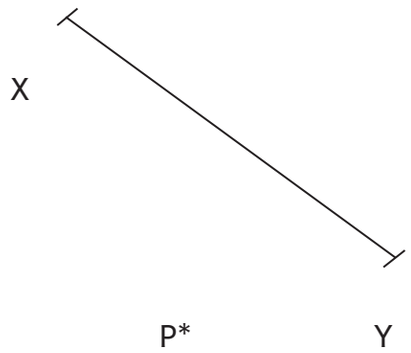
(b).



(c).



(d).



Lesson 2: Angles formed by Parallel lines

In this lesson you will:

- ✓ Draw angles on parallel lines
- ✓ Name Co-interior, Vertically opposite, alternate and corresponding angles.

You will need:

- ✓ A pencil
- ✓ A book
- ✓ A geometry set

Introduction:

In our previous lesson we learnt about Parallel and Skew lines. When 2 or more parallel lines are cut by a transversal line, different angles are formed. In this lesson you will learn about different angles formed on Parallel lines.

Activity

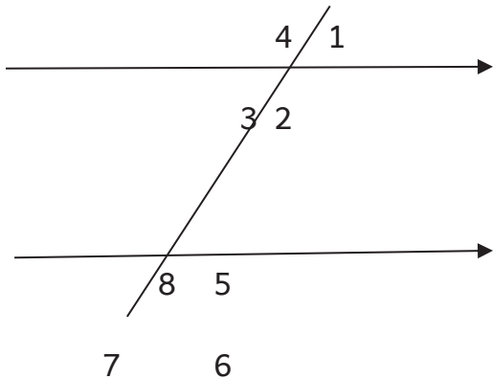
Get a ruler and draw a pair of parallel lines running horizontally. Draw a slanting line across the parallel lines. How many angles have you formed?

Step 1:

(i).draw a pair of parallel lines



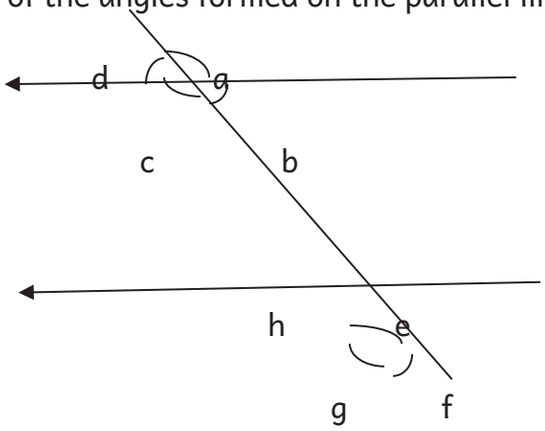
(ii).draw a slanting line across the parallel lines



(iii).How many angles have you formed? 8 angles

Step 2:

(i) Now measure each of the angles formed on the parallel lines below;



(ii) Write the sets of equal angles.

You will notice that;

(a) $\angle a = \angle c$, $\angle b = \angle d$, $\angle h = \angle f$ and $\angle e = \angle g$

These are called vertically opposite angles. Vertically opposite angles are equal.

(b) $\angle a = \angle e$ $\angle b = \angle f$ $\angle d = \angle h$ $\angle b = \angle h$ and $\angle c = \angle e$ $\angle c = \angle g$

These are called Corresponding angles. Corresponding angles are equal, face in the same direction and have a similar shape.

(c) <c = <e

These are Alternate interior angles. Alternate interior angles are equal.

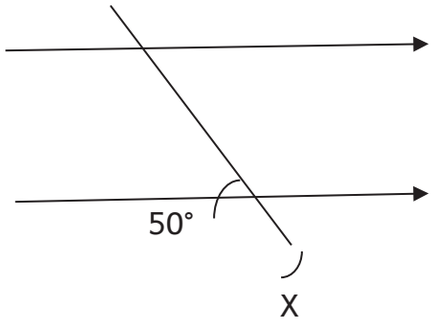
(d) $\angle b + \angle e = 180^0$ $\angle c + \angle h = 180^0$

These are Co-interior angles. Co-Interior angles add up to 180°. Angles b and e and c and h are co-interior angles.

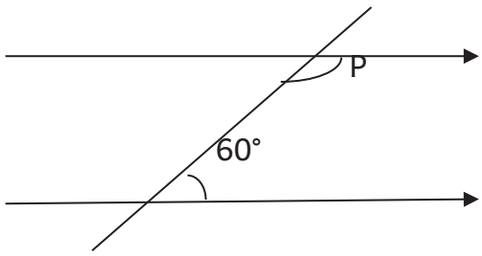
Exercise

Find the size of the marked angles.

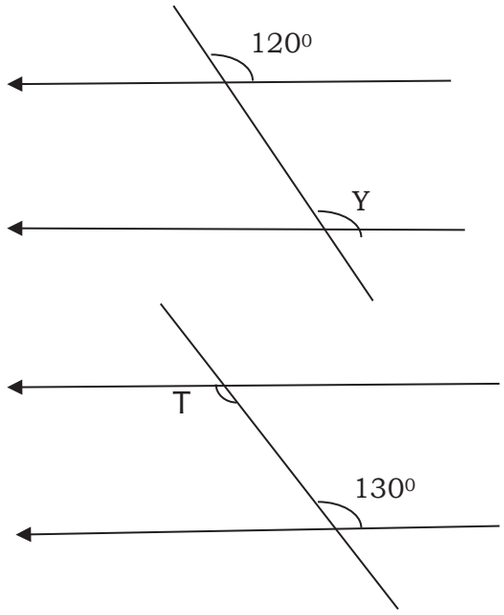
1.



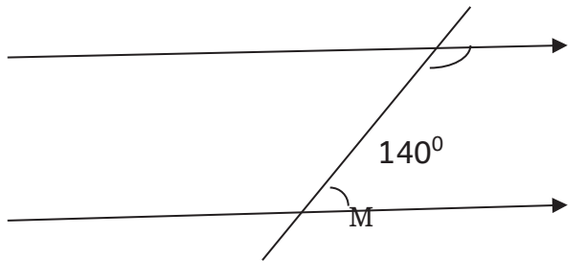
2.



3.



4.



Lesson 3: Constructing and bisecting angles

In this lesson you will:

- ✓ Construct angles
- ✓ Bisect angles

You will need:

- ✓ A pencil
- ✓ A pen
- ✓ A geometry set

Introduction:

Bisecting an angle means dividing the given angle into two equal angles. This can be done using a pair of compasses and a ruler. Constructing and bisecting angles is important because it helps builders to construct buildings and stair wells. In this lesson you will learn constructing and bisecting angles.

Step 1: Now look at these examples.

1. Construct and bisect an angle of 60°.
   (i).draw a straight line (180°)
   (ii).use same compass radius and mark 3 equal angles from point x
   (iii).draw a line through one of the marks
   (iv).bisect angle 60
   (v).Press the compass at each end of 60° and mark a point
   (vi).Draw a line through arcs.

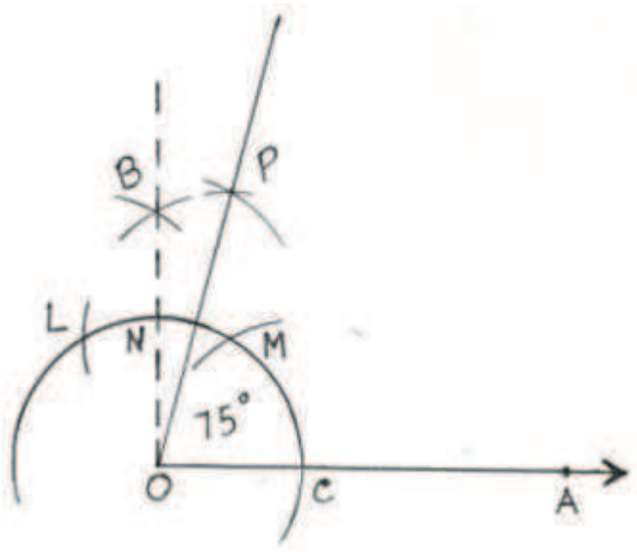
2. Construct and bisect an angle of 150°.

   (i).construct an angle of 30°

   (ii).The remaining angle is 150°

   (iii).Place the compass at the end of 150° and mark a point

   (iv).draw the line through the arcs.



Exercise

Construct and bisect these angles.

1. 90°
2. 150°
3. 45°
4. 165°
5. 135°

<u>Lesson 4:</u> Construction of triangles

<u>In this lesson you will:</u>

- Construct angles

- Measure angles
- Measure sides
- Construct triangles

You will need:

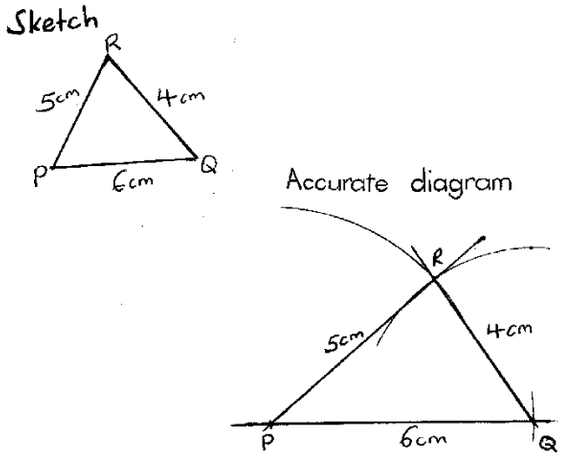
- A pencil
- A pen
- A book
- A geometry set

Introduction:

Triangular shapes are put on the road side to direct traffic users on the road. In this lesson you will learn how to construct triangles. Given side side side, side angle side and side angle angle.

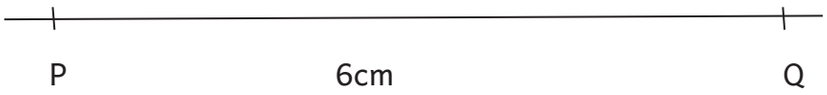
Step 2: Now look at these examples.

1. Construct a triangle PQR with PQ=6cm, QR=4cm and PR=5cm
   (i).Sketch in order (SSS)
   PQ=6cm, PR=5cm, QR=4cm



(ii).Draw a line and mark off PQ.

(iii).Measure 5cm with the pair of compasses, from P



(iv).Measure 4cm with the pair of compasses and aim from Q to R

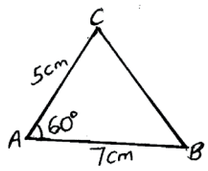
(v).Join P to R and Q to R.

2. Construct triangle ABC where AB=7cm, angle BAC=60° and AC=5cm.

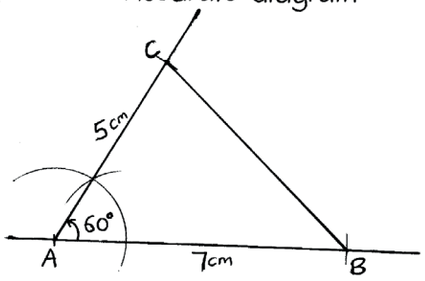
   (i).Make a sketch

   AB=7cm, angle <A =60°

Sketch



Accurate diagram



(ii).Draw a line and mark off AB=7cm

(iii).At A construct an angle of 60°

(iv).At the line of 60°, measure 5cm to C

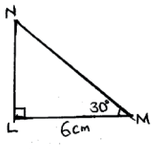
(v).Join C to B.

3. Construct triangle LMN, where LM=6cm and angle L=90° and angle M=30°.

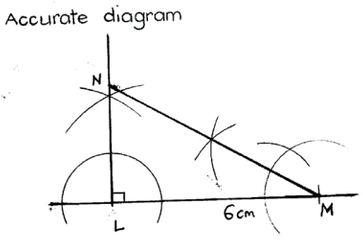
(i).Make a sketch

LM=6cm, angle at L=90° and angle at M=30°

Sketch



Accurate diagram



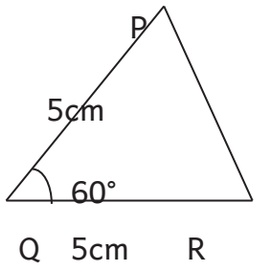
(ii).draw a line and mark off LM=6cm

(iii).Construct 90° at L

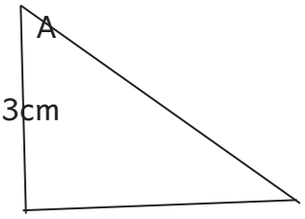
(iv).Construct 30°at M remember it comes from 60°.

Exercise: Construct triangles whose sketches are given below.

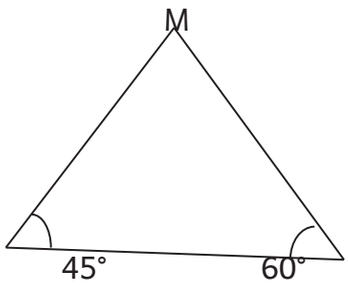
1



2



3



Lesson 5: Construction of triangle Involving bisecting angles and drawing perpendiculars

In this lesson you will:

- Construct triangles
- Bisect angles
- Drop a perpendicular to a given line

You will need:

- A pencil
- A book
- A geometry set

Introduction:

In the previous lesson we looked at construction of triangles given SSS, SAS and SAA. In this lesson you will learn construction of triangles involving bisecting angles and dropping perpendicular to given lines.

Step 1:

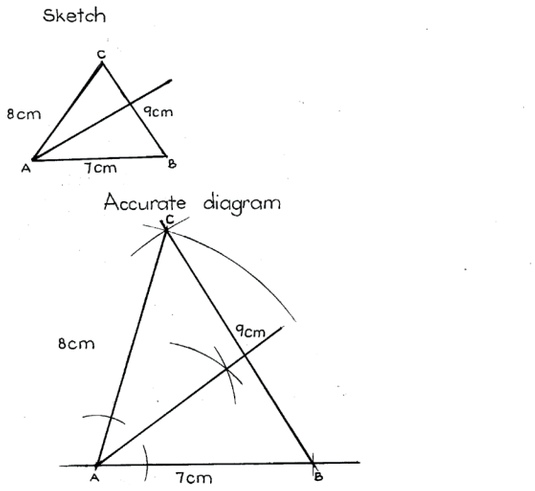
Now look at this example.

Construct a triangle ABC such that AB=7cm, AC=8cm and BC=9cm. Bisect angle BAC, let the bisector meet BC at T. Measure CP and calculate the area of the triangle

(a)(i). Draw a line, mark off AB = 7cm

(ii).Measure off 8cm from the pair of compasses and from A draw an arc above line AB.

(ii).Measure off 9cm from the pair of compasses and from B draw an arc to meet the arc of 8cm above line AB.



(b)(i).Bisect angle BAC

(ii).Drop a perpendicular from C to AB at point P

(iii).Measure CP

(iv).Work out the area

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

h=7.6cm

A= $\frac{1}{2} \times 7cm \times 7.6cm$

= $\frac{1}{2} \times 7.6cm \times 7cm$

=$3.8cm \times 7cm$

=$26.6cm^2$

Exercise

1. Construct a triangle XYZ where XY=8cm, YZ=7cm and XZ=6cm. bisect angle XYZ and let the bisector meet XZ at P. Measure angle P XY and ZPY.

Lesson 6: Construction of Simple Polygons

- ✓ Rhombus
- ✓ Parallelogram

In this lesson you will:

- Measure sides and angles
- Construct angles
- Construct a Rhombus
- Construct a Parallelogram

You will need:

- A pencil
- A pen
- A book

Introduction:

Learning about simple polygons helps us to identify many types of traffic signs on road side by their shape. In this lesson you will learn how to construct Rhombuses and Parallelograms.

Step 1: Activity.

Set P= {Quadrilaterals}. How many elements are in set P?

(i).Quadrilaterals are plane figures with 4 sides

(ii).These are squares, kite, rectangles, Rhombus, Parallelogram, and Trapezium

(iii).Number of elements in set P is 6.

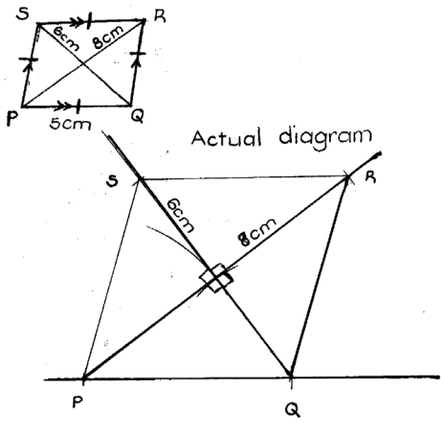
Step 2:

Now look at these examples.

1. Construct a Rhombus PQRS of side 5cm with diagonals PR=8cm and QS=6cm. A rhombus is a four sided figure with equal sides.

(i) Sketch the Rhombus

Sketch



(ii) draw diagonal PR=5cm

(iii) with the compass radius of 3cm, stand at point Q and make an arc

(iv) measure 4cm on the compass and stand at point P to make an arc.

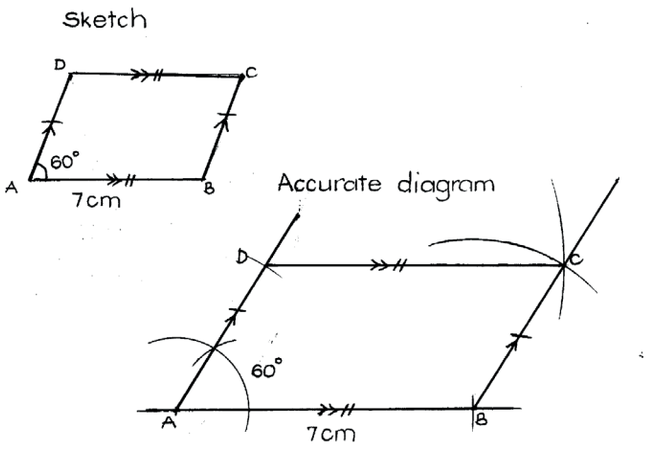
(v) let the arcs intersect at point C

(vi) from C, measure 3cm along diagonal QS and 4cm along PR

(vii) join P to S, S to R and R to Q.

2. Construct a Parallelogram ABCD such that AB=7cm, AD=4cm and angle BAD=60°. Measure the diagonals.

(i).Sketch the parallelogram



(ii).draw line AB = 7cm

(iii).At point A construct an angle of 60°

(iv).Get a pair of compasses with length of 4cm

(v).Aim at Point A. Mark off 4cm on the arm of 60° to get point D. And with the same length aim from point B and draw an arc above B.

(vi).Adjust the pair of compasses to a length of 7cm and aim from D to draw an arc to intersect the arc you drew from B.

(vii).Join your points D to C to B

(viii).Measure the diagonals

AC=9.6cm

BD=6.1cm

All diagonals of a parallelogram bisect each other but they do not meet at 90°.

Exercise

1. Construct a Rhombus ABCD, where AB=6cm, diagonal AC=10cm and line BD=6cm. Measure angle ABC
2. Construct a Parallelogram PQRS where PQ=8cm, PS=5cm and angle QPS is 45°

Lesson 7: Construction of regular Pentagon given side and radius

In this lesson you will:

- Calculate Interior and exterior angles of a Pentagon
- Measure angles
- Construct regular pentagon

You will need:

- A pencil
- A pen
- A book
- A geometry set

Introduction:

In the previous lesson, you constructed a rhombus and a parallelogram. We can also construct a pentagon following similar steps. A pentagon is a five sided polygon. Makers of carpets use different shapes to design their work. In this lesson you will learn how to construct regular Pentagons.

Step 1:

Now look at these examples

1. Construct a regular Pentagon of side 4cm.

   (i).Sketch the regular Pentagon

   (ii).Calculate the exterior and interior angle

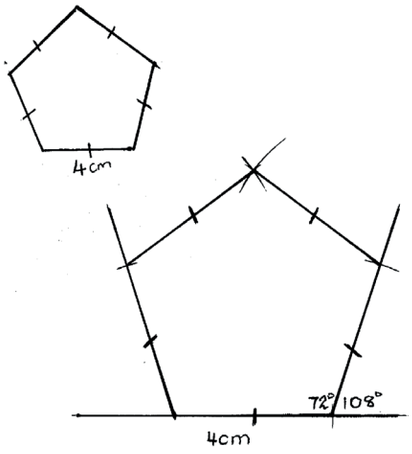
   Exterior angle= $\frac{360}{5}$

   =72°

   Interior angle=180°-72°

   =108°

   (iii).Draw a line AB =4cm



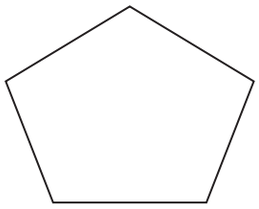
   (iv).Use a protractor to measure 108° at both points A and B.

   (v).Use a compass to mark off 4cm from points A and B.

   (vi).From the new arcs, using the same compass length make arcs to get the fifth point.

2. Construct a regular pentagon of radius 4cm

   (i).Sketch the Pentagon

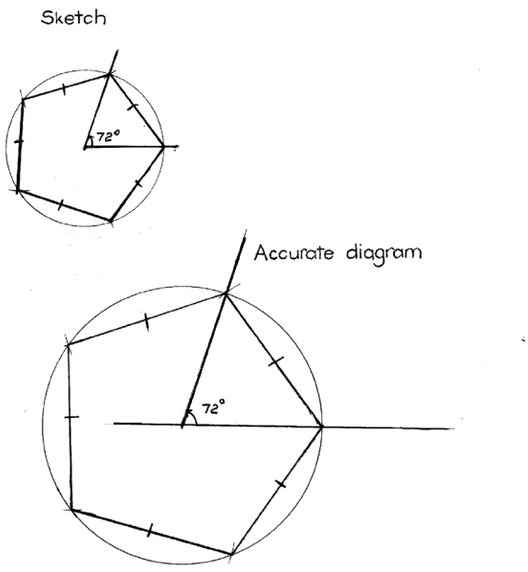


   (ii).Calculate the centre angle $\frac{360^\circ}{5}$ =72°

   (iii).draw a line and mark point O

   (iv).Using a protractor measure 72° at O

   (v).Using a pair of compasses, draw a circle of radius 4cm at O



(vi).Using a pair of compasses, measure the length of the arc for 72° and using the same compass length, make arcs round the circle.

(vii).Join the arcs to form a regular polygon that has 5 equal sides, equal angles and has 5 lines of folding symmetry.

Exercise

1. Construct a regular Pentagon of side 5cm using Interior angles.
2. Construct a regular Pentagon of radius 3cm using centre angle.

Lesson 8: Finding sum of Interior and exterior angles of a Polygon

In this lesson you will:

- Find the exterior angle
- Find the Interior angle sum of Polygons

You will need:

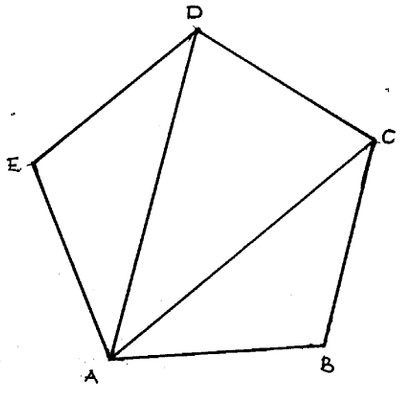
- A pen
- A book

Introduction:

In the previous lessons we have learnt construction of polygons. In this lesson you will learn to find the Interior angle sum of regular polygons.

Step 1: Activity.

Draw a sketch of a Pentagon, ABCDE. Join A to C and A to D.



(i).How many triangles have you formed?

Find the sum of the Interior angles of the triangles formed?

(ii).Name the points

(iii).Join A to C and A to D

(iv).There are 3 triangles

(b).1 triangle has an angle sum of 180°

So, 3 triangles=3x180°

=540°

Step 2: Now look at these examples

1. Find the Interior angle sum of a regular Polygon whose Interior angle is 120°
   (i).If the Interior is 120° then exterior=180°-120°=60°
   (ii).Number of sides of this Polygon =360°÷60°=6 sides
   (iii).Number of sides=number of Interior angles
   (iv) Sum of interior angles = 6×120^0
   $= 720^0$

2. Find the interior angle sum of a regular Polygon whose exterior angle is 72°.

   (i).Number of sides of this Polygon is 360°÷72°=5 sides
   (ii).Value of each Interior angle=180°-72°=108°
   (iii).Angle sum of the Interior angles=108°x5
   =540°

Exercise

1. Find the Interior angle sum of a regular polygon whose Interior angles are;

   (a). 140°

(b). 135°
(c). 162°

2. Find the sum of the Interior angles of a regular polygon whose exterior angles are;

(a). 30°
(b). 60°
(c). 120°

Lesson 9: Finding number of sides of Polygons given the Interior angle sum

In this lesson you will:

- Use a formula to find number of sides of polygons
- Form equations
- Solve the given problems

You will need:

- A pen
- A box
- A pencil

Introduction:

Step 1: Activity

Study this table and fill in the missing numbers.

Polygon	Triangle	Square	Pentagon	Hexagon	Heptagon	Octagon	Nonagon	Decagon
Number of sides	3	4	5	6	7	8		
Number of triangles	1	2	3	4	5			

(i).Finding the number of sides for;

Octagon has 8, Nonagon has 9 and Decagon has 10

(ii).Number of triangles

3 sides 1 triangle

4 sides 2 triangles

5 sides 3 triangles

6 sides 4 triangles

7 sides 5 triangles

n sides (n-2) triangles

So, Octagon has 8-2= 6 triangles

Nonagon has 9-2= 7 triangles

Decagon has 10-2 =8 triangles

Step 2: Now look at these examples

1. Find the number of sides of a polygon whose Interior angle sum is 540°

   (i).Number of triangles=n-2

   (ii).Each triangle has angle sum of 180°

   (iii).Form up an equation 180(n-2) = 540

   (iv).Solve:180(n-2) =540°

   (v).Remove the bracket

   180n-360°=540°

   180n-360°+360°=540+360

180n = 900°

(vi).Divide both sides by 180

$\frac{180n}{180} = \frac{900}{180}$

$n = \frac{90}{18}$

n=5

The polygon has 5 sides.

Method (ii)

180(n-2) =90(2n-4)

(i).Use 90(2n-4) to form the equation

90(2n-4) =540

(ii).Divide both sides by 90 90(2n-4) =540

$\frac{90(2n-4)}{90} = \frac{540}{90}$

$2n-4 = \frac{54}{9}$

2n-4 =6

2n -4+4 =6+4

(iii).divide both sides by 2

2n =10

$\frac{2n}{2} = \frac{10}{2}$

The Polygon has 5 sides

Exercise

1. Find the number of sides of a regular polygon whose Interior angle sum is;
   (a) 900°
   (b) 1080°
   (c) 360°
   2. Name the polygon whose Interior angle sum is 1260°

Lesson 10: Solid figures

In this lesson you will:

- Name the solid figures
- Draw the solid figures
- State the properties of solid figures

You will need:

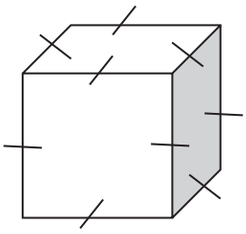
- *a* pen
- *a* pencil
- *a* book
- *a* geometry set

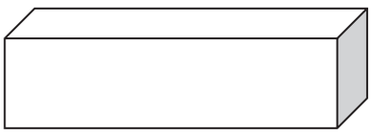
Introduction:

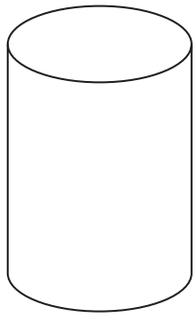
In primary four you learnt about solid figures. You identified, named, modelled and drew solid figures. You looked at so many solids which we use in our daily lives, such as a water tank, a box of chalk, a box of matches and many others. In this lesson you will learn about solid figures and their properties. Solid figures are in two groups, prisms and pyramids

Step 1:

Now look at these prisms

1. 

2. 

3. 

Write the name and number of faces, edges and vertices for each prism

What are:

(i).Faces? *Faces are the sides*

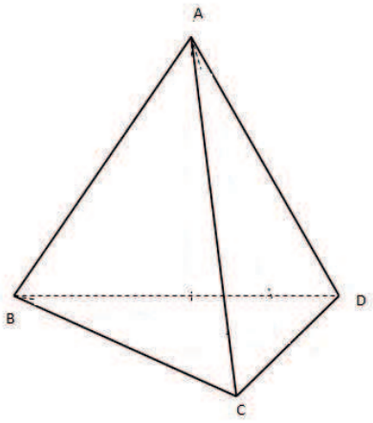
(ii).Vertices? *Vertices are the corners*

(iii).edges? *Edges are the lines*

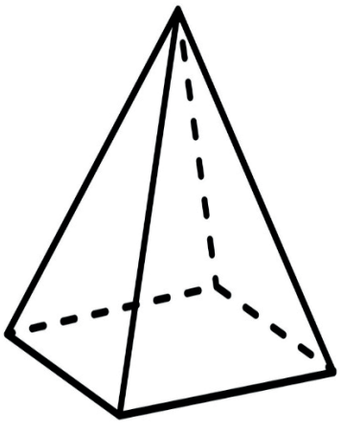
No	Name	Faces	Vertices	Edges
1	Cube	6	8	12
2	Rectangular prism	6	8	12
3	Square based prism	6	8	12
4	Triangular prism	5	6	9
5	Trapezoid	6	8	12

Step 2: Now look at this Pyramids

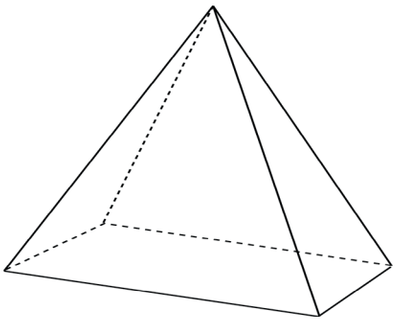
Tetrahedron (Triangular pyramid)



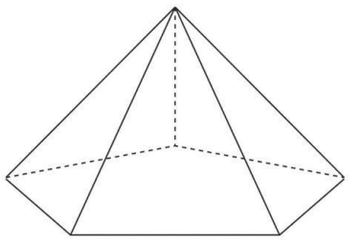
Square based pyramid



Rectangular based pyramid



Pentagon based pyramid



Name	Faces	Vertices	Edges
Tetrahedron	4	4	6
Square based pyramid	5	5	7
Rectangular based pyramid	5	5	7
Pentagon based pyramid	6	6	10

Lesson 11: Compass direction

In this lesson you will:

- Draw the compass direction
- Find the angles moved
- Draw the sketches

You will need:

- A pencil
- A pen
- A note book
- A geometry set

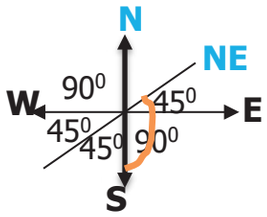
Introduction:

In primary three and four you learnt about finding directions of places from a given place. In this lesson you will learn about compass direction. Knowing compass directions helps us to locate places and compare distances between them.

Step 1: Activity

Face in NE directions and turn clockwise to face in the South. What angle have you turned through?

Draw the compass direction.



So the angle turned is 90°+45° =135°

Step 2:

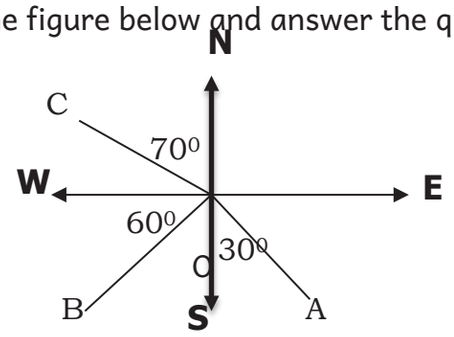
When telling direction of a place using a compass, there is need to give the degree of location. For example, if a place lies in 50^0 in the North East, we write N50^0E.

Note: Places that lie above the East – West line are in the Northern region while those that lie below the East – West line are in the Southern region.

The angle describing direction is measured either from **North** or **South**.

Now look at these examples

1. Study the figure below and answer the questions



What is the direction of?

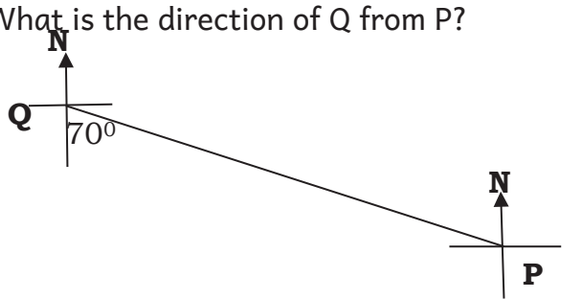
(a) A from O? S30^{0}E

(b).B from O? $90^0 - 60^0 = 30^0$

S30°W

(c).C from O? N70°W

2. What is the direction of Q from P?

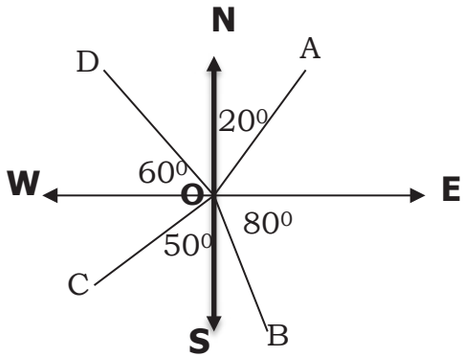


- Stand at P
- Where is O? Is it north of P or South? It is in the north
- What is the angle between North of P and Point Q? 70° alternate to angle 70° at Q.

- Write the answer: The direction of Q from P is N70°W

Exercise

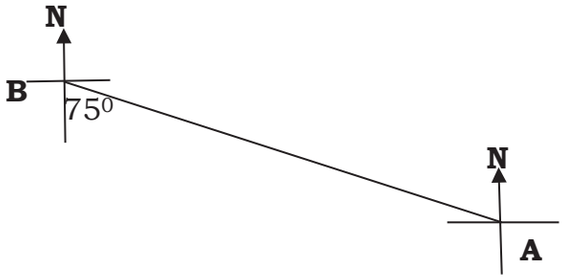
1. Study the figure below and answer the questions that follow



What is the direction of?

(i).A from O (ii).B from O (iii).C from O (iv).D from O

2. What is the direction of A from B?



<u>Lesson 12:</u> Bearings

<u>In this lesson you will:</u>

- Draw sketches
- Turn clockwise
- Name the bearing

You will need:

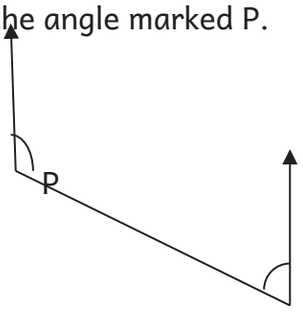
- A pencil
- A pen
- A note book
- A geometry set

Introduction:

In the previous lesson we learnt about telling and writing direction. In this lesson you will learn how to read and write bearings. Knowing bearing help people like pilots, sailors, forest tourists, mountain climbers to locate places where they are going.

Step 1: Activity.

Find the angle marked P.



- Angle P and 60° are co-interior angles
- Co-interior angles add up to 180°
- So p+60°=180°

  P+60°-60°=180°-60°

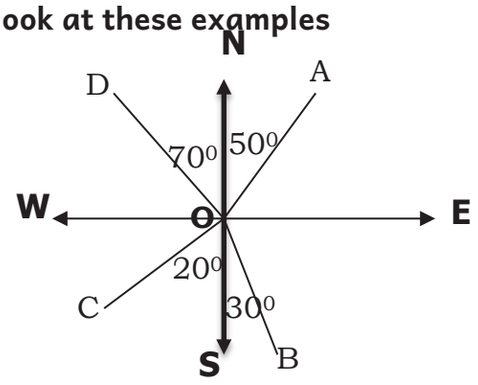
  P=120°

  Step 2:

  All bearing are measured in clockwise direction.

Bearings are written in 3 figures or digits.

Now look at these examples



What is the bearing of

(i).A from O?

The angle from the north to A is 50°.So the bearing of A from O is 050°

(ii).B from O?

The angle from north to south is 180°

So the angle from north to B is 180°-30°=150°

Bearing of B from O is 150°

(iii).C from O?

The angle from north to C is 180°+20°=200°

Bearing of C from O is 200°

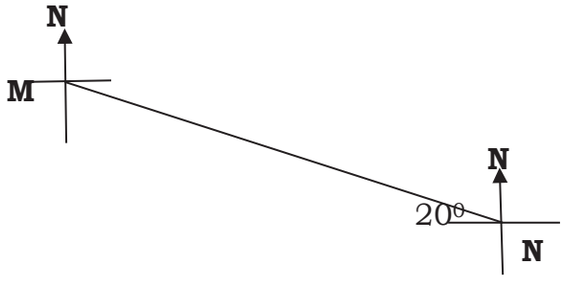
(iv).D from O?

The angle moved from north back to north is 360°

Now angle from north to D is 360°-70°=290°

Bearing of D from O is 290°

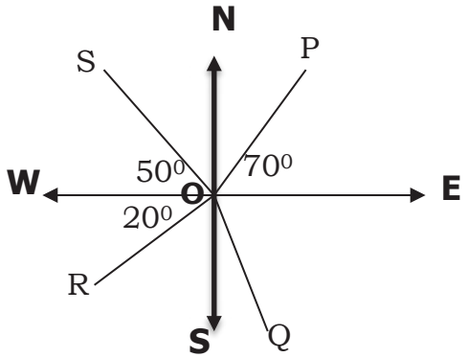
2. What is the bearing of M from N?



- Always mark the word from
- The angle for the answer is at N(From N)
- So, the bearing of M from N is 270°+20°=290°

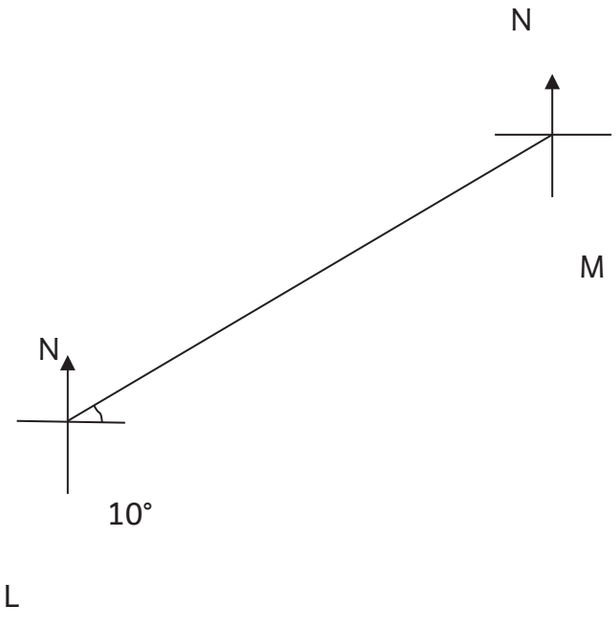
Exercise

1. What is the bearing of;

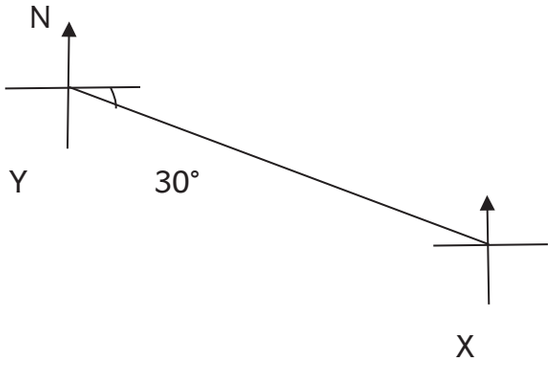


(i) P from O (ii) Q from O (iii) R from O (iv) S from O

2. Find the bearing of L from M?



3. Find the bearing of X from Y.



<u>Lesson 13:</u> Bearing and Scale drawing

<u>In this lesson you will:</u>

- Draw sketches
- Measure angles and sides
- Draw angles

- Draw accurate diagrams

You will need:

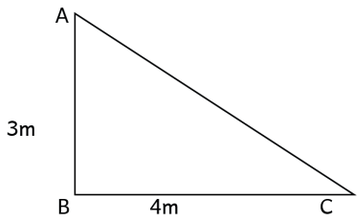
- A pen
- A pencil
- A note book
- A geometry set

Introduction:

In the previous lesson you learnt about bearings. In this lesson you are going to learn how to draw accurate diagrams with bearings.

Step 1: Activity

Find the shortest distance between point A and C.



- ABC is a right angled triangle
- We shall use Pythagoras theorem to work out AC
- $3^2 + 4^2 = AC^2$

  $9+16=AC^2$

  $25=AC^2$ *find square root*

  $\sqrt{25}=AC$

  $5=AC$

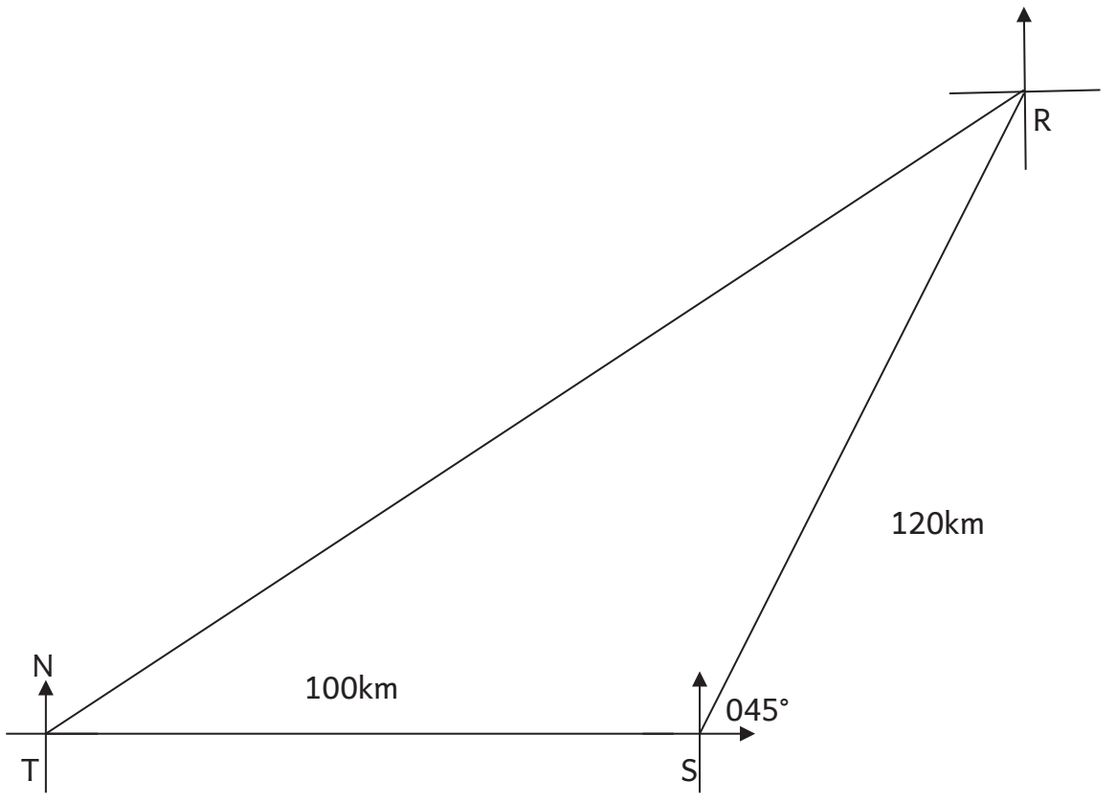
  $So, shortest\ distance\ between\ A\ and\ C\ is\ 5m$

Step 2: Now look at this example

A helicopter flew from town T to town S for a distance of 100km on a bearing of 090°. From town S, it continued for another 120km on a bearing of 045° to town R. *Use scale 1cm=20km*

It is very hard to draw big distances on a piece of paper. We therefore use a scale to represent big distances so that they fit on a small paper.

(i). draw a sketch



(ii).Use the scales to get accurate lengths in cm

120km÷20=6cm

100km÷20=5cm

- Draw line TS= 5cm
- Use a protractor and measure 90 ° at T
- Measure (90°+45°) =135° at S

- Measure SR=6cm

Measure the shortest distance from T to R.

Exercise

1. Town Q is 50km west of town P and town R is 40km from town P on a bearing of 150°. (i).using a scale of 1cm=10km, draw an accurate diagram showing the three towns. Find the shortest distance from Q to R.
2. Town M is 60km on a bearing of 045° to town N. Town L is 80km on a bearing of 120° from town N
   (i).draw a sketch showing the positions of the towns. Take scale 1cm: 10km
   (ii).draw an accurate diagram for the 3 towns
   (iii).What is the actual distance between M and L
   (iv). what is the bearing of N from M

TOPIC: TIME

LESSON 1:- Converting time from 12-hour to 24-hour and vice-versa.

In this lesson you will;-

1. Identify time in the 12-hour clock and time in the 24-hour clock
2. Convert time from 12-hour clock to 24-hour clock and vice-versa.

You will need;-

Pen, pencil, pair of compass and a book.

Introduction:-

In your previous classes, you learnt how to read and tell time using a.m. and p.m. In our lesson today, we're going to learn how to convert time from 12-hour clock to 24-hour clock and vice versa.

Expressing time from 12-hour to 24-hour clock.

Time from mid-night to mid-day appears almost similar apart from when it has 3 digits. In this case you add a zero before the time.

From mid-day to mid-night we add 12 hours to the 12 hour clock time given.

Expressing time from 24-hour to 12-hour clock.

For morning hours, time appears in the same state. For afternoon hours you subtract 12 hours from the time given.

Step 1: Example.

1. Express a) 5.30 a.m. b) 10.45am in a 24-hour clock.

Solution a) 5.30 a.m. = 05:30 hours.

b) 10.45 a.m. = 10:45 hours

2. Express *a*) 1.15pm b) 6.20 p.m. in *a* 24-hour clock.

Solution *a*) 1.15 b) 6.20
+12.00 + 12 .00
13:15 hours 18:20 hours

Express *a*) 06:30 hours b) 11:25 hours to *a* 12 hour clock.

Solution *a*) 06:30 b) 11:25
-00 00 - 00 00
6.30 *a*.m. 11.25 *a*.m.

Express: 21:40 hours to *a* 12-hour clock.

Solution 21.40
-12.00
9.40 pm

Exercise

1. Express the following time in *a* 24-hr clock.
   a) 2.15 *a*m c) 10.45 *a*m d) 2. 30pm
   b) 6.30 *a*m e) 11.20 pm
2. Express the following time in *a* 12-hour clock.
   a) 03:10 hours b) 07:15 hours c) 12:50 hours
   b) 14:45 hours e) 21:30 hours.

LESSON 2:- Reading time-tables

In this lesson, you will;-

1. Read the given time tables
2. Work out the given problems correctly.

You will need;-

Pen, book, ruler and pencil.

Introduction;-

In your previous lesson you learnt how to convert time. In this lesson today, you're going to learn how to read different time-tables.

You need to identify arrival and departure time.

Step1; - Example

1. The table below shows the flight time-table for Kenya Airways from Entebbe airport.

Flight	Arrival time	Departure time
Entebbe to Nairobi		05:30hrs
Nairobi to Bujumbura	06:30hrs	07:30hrs
Bujumbura to Kigali	08:40hrs	09:10hrs
Kigali to Johannesburg	09:50hrs	15:30hrs
Johannesburg to London	16:30hrs	02:00hrs
	06:00hrs	

a) How long is the stopover in Nairobi?

Solution;

Arrival in Nairobi = 06:30 hrs.

Departure from Nairobi =07:30

Duration = Departure time – Arrival time

= 07:30 - 06:30

= 1hour

b) How long is the flight from Bujumbura to Kigali?

Departure from Bujumbura = 09:10 hrs.

Arrival at Kigali = 09:50 hrs.

Duration: Arrival time – departure time

09:50 - 09:10

= 40 minutes.

c) Change the time the plane leaves Johannesburg for London to 12-hour clock

Departure from Johannesburg = 02:00hrs

02:00 -00:00

= 2.00a.m

2. Below is a class time-table for p.7

FROM	8.30	9.10	9.50	10.30	11.00	11.40	12.20	1.00	2.10	2.50	3.30
TO	9.10	9.50	10.30	11.00	11.40	12.20	1.00	2.10	2.50	3.30	4.30
MON	ENG	MTC	CAPE1	B	ENG	ENG	LIB	L	RE	CAPE1	G
TUE	MTC	SST	RE	R	ENG	CAPE3	CAPE3	U	SST	LIB	A
WED	SCI	SCI	CAPE2	E	SST	MTC	LL	N	CAPE1	ENG	M
THUR	MTC	SST	MTC	A	LL	SCI	RE	C	SCI	SST	E
FRI	SCI	SCI	CAPE2	K	MTC	MTC	LIB	H	ENG	CAPE3	S

a) At what time does lunch break start?

It starts at 1.00pm

b) How long is local language(LL) on Thursday

Ending time = 11.40am

Starting time = 11.00am

Duration = ending time – starting time

= 11.40 - 11.00

= 40 minutes.

c) What time do the pupils take studying math in a week?

= 7lessons x 40 minutes = 280 minutes

280/60 = 4 hours 40 minutes.

Exercise

1. The table below shows the time-table for a bus company.

Station	Arrival	Departure
Kayabwe		7.15am
Buwama	7.53am	8.40am
Kammengo	9.10am	9.17am
Mpigi	9.47am	10.02am
Katende	10.15am	10.25am
Nsangi	10.40am	10.48am

i) What is the departure time from Mpigi?

ii) How many stop overs are between Kayabwe and Katende?

iii) How long did the bus take from Kamengo to Mpigi?

2. Study the class time table for p.3.

FROM	8.30	9.00	9.30	10.00	10.30	11.00	11.30	12.00	12.30
TO	9.00	9.30	10.00	10.30	11.00	11.30	12.00	12.30	1.00
MON	ENG	MTC	LIT.1	LIT2	B	RE	LL	OL	CAPE2
TUE	MTC	RE	LL	CAPE1	R	ENG	CAPE2	LIT.1	LIT.2
WED	ENG	LIT.1	LIT2	CAPE2	E	MTC	RE	LL	CAPE3
THUR	MTC	ENG	LL	RE	A	CAPE1	O.L	ENG	LIB
FRI	ENG	MTC	RE	CAPE1	K	OL	LL	LIT.1	LIT.2

a) How long is each lesson?

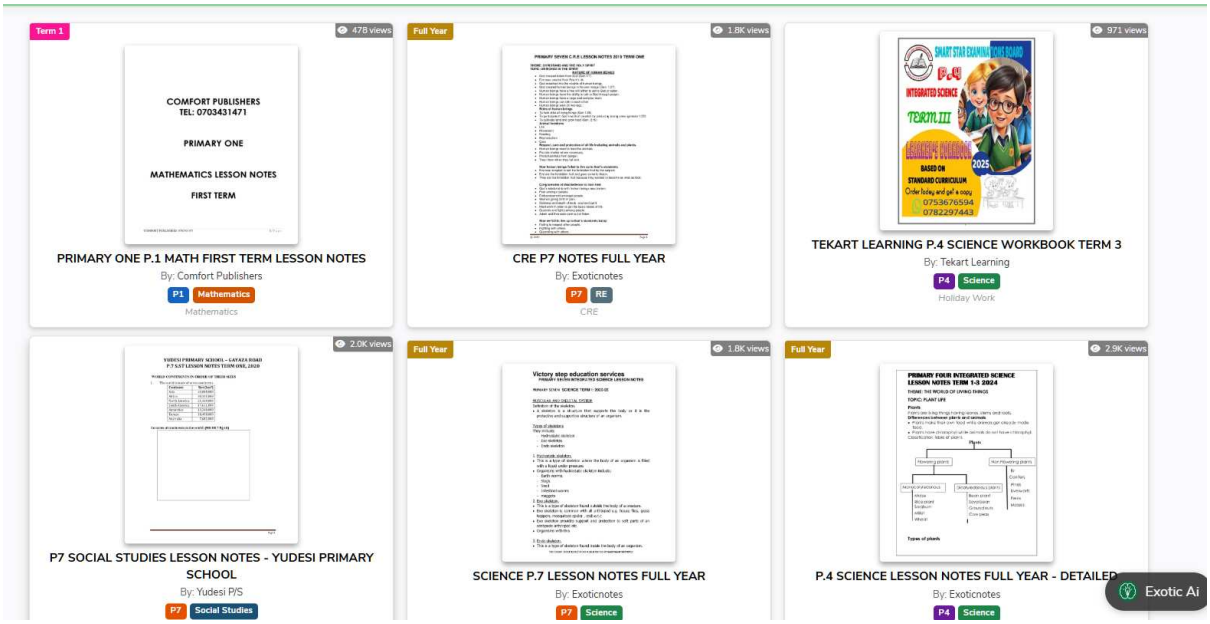
b) What time do the pupils take studying English in a week



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