South Sudan

Primary Mathematics 7

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South Sudan

PRIMARY 7

Mathematics

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UNIT 1: NUMBERS

1.1 Squares and square roots of perfect squares

Squares of numbers

What you had learnt in the previous grade about multiplication will be used in this, to describe special products known as squares and square root.

The process of multiplying a number by itself is called **squaring** the number.

If the number to be multiplied by itself is 'a', then the product (or the result $a \times a$) is usually written as a^2 and is read as:

- ☑ a squared or
- ☑ the square of a or
- ☑ a to the power of 2

In geometry, for example you have studied that the area of a square of side length 'a' is $a \times a$ or briefly a^2.

The **square** of a number is the number multiplied by itself. The square of a number can be written as the number to the power of two.

Example 1.

The square of 5 is $5^2 = 25$

A **perfect square** is a non-zero whole number that is produced by multiplying a whole number by itself.

Activity 1

In pairs, find the square of each. The first pair to finish is the winner.

a) 8 b) 10 c) 14 d) 19

In pairs, solve and explain to the class how you did it.

a) 30^2 b) 40^2 c) 52^2

Square roots of numbers (Perfect squares)

The **square root** of a positive number is the number when multiplied by itself, produce the given number. The notation for square root is '$\sqrt{\ }$'.

Example 2.

$\sqrt{25} = 5$

Activity 2

In pairs, find the square root of each of the following.

a) 100 b) 125 c) 169 d) 256 e) 625

1.2 Square and square roots of fractions and decimals.

Squares of fractions

To square a fraction, you multiply the fraction by itself.
A fraction can also be squared by squaring the numerator and then squaring the denominator, as shown below.

Example 3.

$$\left(\frac{4}{7}\right)^2 = \frac{4}{7} \times \frac{4}{7} = \frac{4^2}{7^2} = \frac{16}{49}$$

To square a mixed number, write the mixed number as an improper fraction and then square the fraction.

Write the question. $\left(1\frac{4}{7}\right)^2$

Write the mixed number as an improper fraction. $=\left(\frac{11}{7}\right)^2$

Square the numerator and square the denominator. $=\frac{11^2}{7^2}$

$=\frac{121}{39}$

Write the result as a mixed number. $=2\frac{23}{49}$

Square roots of fractions

The square root of a fraction can be obtained by finding the square root of the numerator and the square root of the denominator separately, as shown below.

Example 4.

$$\sqrt{\frac{81}{169}}=\frac{\sqrt{81}}{\sqrt{169}}=\frac{9}{13}$$

Square Root of Decimal Numbers

The square root will have half the number of decimal places as the number it has. Hence to calculate the square root of a decimal perfect square we should remember this:

Example 5.

Find the square root of: 0.0169

Solution

The square root of 0.0169 will have two decimal places.

The square root of 169 is 13.

Therefore the square root of 0.0169 = 0.13. $\sqrt{0.0168} = 0.13$

Exercise 1:

1. find the squares of $2\frac{3}{8}$. Write the answer as a mixed number. Show your working out.

2. Find the square roots of each of the following numbers.

(i) 2304 (ii) 4489 (iii) 3481 (iv) 529
(v) 3249 (vi) 1369

3. Find the square root of the following decimal numbers:

(i) 2.56 (ii) 7.29 (iii) 51.84 (iv) 42.25

1.3 Cubes of numbers

The cube of a number is the number raised to the power 3.

How do you find the volume of a cube of side s?

You multiply s by itself three times. Thus Volume of cube = $s \times s \times s = s^3$

When a number is multiplied by itself three times, we get the cube of the number.

The cube of 2 = $2^3 = 2 \times 2 \times 2 = 8$. The cube of 5 = $5^3 = 5 \times 5 \times 5 = 125$

8 and 27 are natural numbers which are cubes of natural numbers 2 and 3 respectively. Such numbers are called cubic numbers or perfect cubes.

A cubic number or perfect cube is a natural number which is the cube of some natural number.

The following numbers are perfect cubes.

$8 (= 2^3)$ $27 (= 3^3)$ $64 (= 4^3)$ $125 (= 5^3)$

$216 (= 6^3)$ $343 (= 7^3)$

Exercise 2:

1. In pairs, find the cube of each number.

a. 4 b. 9 c. 16 d. 14

e. 30 f. 20

1.4 Ratios and proportions using the unitary method

The Unitary Method sounds like it might be complicated but it's not. It's a very useful way to solve problems involving ratio and proportion.

Example 5.

If 12 tins of paint weigh 30kg, how much will 5 tins weigh?

<u>Solution</u>

The first step in solving this is to find what ONE tin weighs.

This will be $\frac{30}{12}$ so 2.5kg.

Then we scale this back up for 5 tins gives $5 \times 2.5 = 12.5$kg.

Activity 2

In groups find out the following;

1. If sixteen bricks weigh 192kg. What would nineteen bricks weigh?
2. If thirteen girls can plant 169 trees in a day. How many trees could fourteen girls plant in a day?

   Explain your answers

Exercise 3:

For each question show your working out.

1. If twenty two workers can dig 308 holes in an hour. How many holes could twenty seven workers dig in an hour?
2. If thirty four coins weigh 170g. What would fifty one coins weigh?
3. If fifteen buses can seat 420 people. How many people could thirty five buses seat?
4. Thirty three identical pipes laid end to end make a length of 462m. What length would fifty seven pipes make if they are laid end to end?
5. 31 toy building blocks placed one on top of another reach a height of 341cm. How high would 79 blocks be if placed one on top of the other?
6. 960g of flour is needed to make a special cake for 16 people. How much flour would be needed to make a cake for 33 people?
7. A vehicle travels one hundred and ninety eight km on 18 litres of fuel. How far would it travel on twenty eight litres?
8. Another vehicle travels four hundred and sixty eight km on 39 litres of fuel. How far would it travel on seventy nine litres?

1.5 Percentage increase and decrease

The term 'per cent' means one out of a hundred.

In mathematics we use percentages to describe parts of a whole

The whole being made up of a hundred equal parts.

The percentage symbol % is used commonly to show that the number is a percentage.

To calculate the percentage increase:

First: *work out the difference (increase) between the two numbers you are comparing.*

Increase = New Number - Original Number

Then: *divide the increase by the original number and multiply the answer by 100.*

% increase = Increase ÷ Original Number × 100.

If your answer is a negative number then this is a percentage decrease.

To calculate percentage decrease:

First: *work out the difference (decrease) between the two numbers you are comparing.*

Decrease = Original Number - New Number

Then: *divide the decrease by the original number and multiply the answer by 100.*

% Decrease = Decrease ÷ Original Number × 100

You can also put the values into this formula:

$$PERCENT\ INCREASE = \frac{(new\ amount - original\ amount)}{original\ amount} \times 100\%$$

Example 6.

1. There were 200 customers yesterday, and 240 today:

$$\frac{240-200}{200} \times 100\% = \frac{40}{200} \times 100\% = 20\%$$

Answer A 20% increase.

2. But if there were 240 customers yesterday, and 200 today we would get:

$$\frac{200-240}{240} \times 100\% = \frac{-40}{240} \times 100\% = -16.6\ldots\%$$

A 16.6...% decrease.

Exercise 4:

1. A price rose from SSP50000 to SSP70000. What percent increase is this?
2. A quantity decreased from SSP90000 to SSP75000. What percent decrease is this?
3. An item went on sale for SSP13000 from SSP16000. Write what you notice.
4. In a small town in south Sudan, the population has been slowly declining. In 2016 there were 2087 residents, and there were only 1560 residents in 2017. Work out the percent decline of the population.
5. Trees in our school increased from 90 trees to 120treees. What does this tell us about our school?

UNIT 2: MEASUREMENT

2.1 Circumference of circles

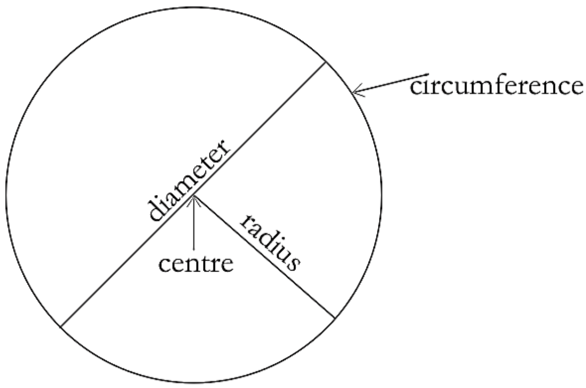
Circumference of a circle is the distance all round a circular shape. Such as coins, circular tins etc.

The **circumference (c)** of a circle is the distance all the way round the circle.

The distance from the circumference through the centre is its **diameter (d)**

The distance from the centre to the circumference is its **radius**.

2 radii (plural for radius) = diameter.



Activity 1

- Using a pair of compass draw a suitable circle on a manilla paper.
- Use a pair of scissors blade to cut it carefully around its circumference.
- Using a string measure the circumference.
- Use the circumference to find out how many times it can fit on the diameter.

- It will fit approximately $3\frac{1}{7}$ or 3.14 times around the diameter.
- Circumference of a circle divided by its diameter is approximatly $3\frac{1}{7}$ or 3.14
- $3\frac{1}{7}$ or $\frac{22}{7}$ or 3.14 are used as appriximations for π read as pi.

$$C \div d = \frac{C}{d} = \pi$$

$$C = \pi d$$

Or $$C = 2\pi r$$

In groups, peg a string on the ground to form center of a circle and draw a circle. Measure the line you have drawn.

Example 1.

Find the circumference of a circle where radius is 7m

Method: 1

$C = 2\pi r$

$C = 2\times \frac{22}{\not 7} \times \not 7m$

$C = 44m$

Method: 2

$C = 2\pi r$

$C = 2\times 3.14\times 7m$

$C = 6.28\times 7$

$C = 43.96$

The circumference is about 44m

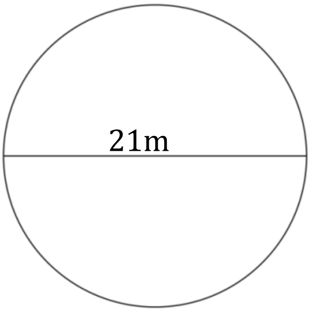
Formula of finding the circumference.

1) $C = \pi \times D \text{ or } \pi D$
2) $C = 2 \times \pi \times r \text{ or } 2\pi r$

Example 2.

1. Find the circumference of the figure below.

$(Take\ \pi = \frac{22}{7})$



Formula of finding the circumference.

1) $C = \pi \times d$ or πd
2) $C = 2 \times \pi \times r$ or $2\pi r$

Solution

Circumference $= \pi D$

$= \frac{22}{\not{7}} \times \overset{3}{\not{21}} m$

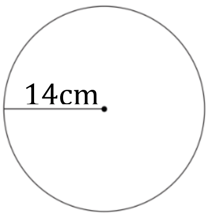
$= 66M$

Cancel 21 by 7 to get 3.

Multiply 22 by 3.

2. Find the circumference of the following figure.

$(Take\ \pi = \frac{22}{7})$



Solution

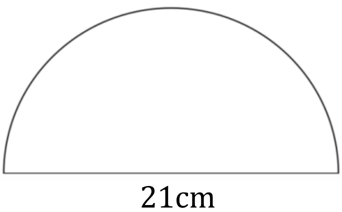
$C = 2 \times \pi \times r$

$= 2 \times \frac{22}{\not{7}} \times \overset{2}{\not{14}}$

$= 88cm$

2. What is the perimeter of the semi-circle drawn below?

$(Take\ \pi = \frac{22}{7})$



Solution

$P = \frac{\pi d}{2} + d$

$P = \left(\frac{1}{2} \times \pi \times d\right) + d$

$= \left(\frac{1}{\not{2}} \times \frac{\overset{11}{\not{22}}}{\not{7}} \times \overset{3}{\not{21}}\right) + 21$

$= 33cm + 21cm$

$= 54\ cm$

Divide the formula by 2 or multiply by $\frac{1}{2}$ because it is $\frac{1}{2}$ of a circle then add the diameter to get the distance all the way round.

Exercise 1:

1. Find the circumference of the circles whose measurements are shown below. Use $\pi = \frac{22}{7}$. Show how you will work this out.

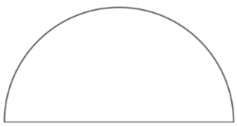
1) 14m	2) 70cm	3) 28cm
4) 0.35cm	5) 42cm	

2. Find the circumference of the circles whose measurements are shown below. Use $\pi = 3.14$

1) 10m	2) 12cm	3) 15m
4) 20cm	5) 100cm	

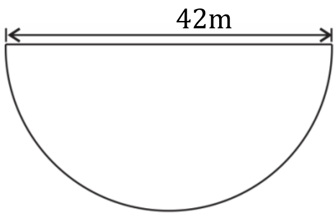
Use $\boldsymbol{\pi = \frac{22}{7}}$

3. The diagram below represents a flower garden of diameter 63m.



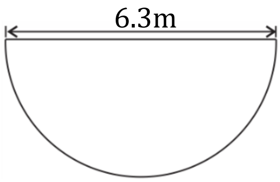
Find its perimeter in metres.

4. A plot of land is in the shape of a semi-circle of diameter 42m as shown below.



The plot was fenced by erecting posts 3m apart. How many posts were used?

5. The figure below represents a vegetable garden.

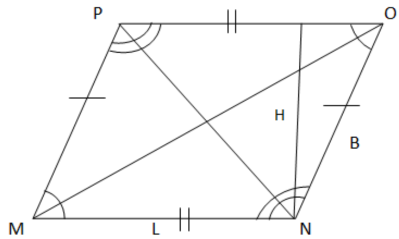


The garden is to be fenced all round using 5 strands of wire. What length of the wire in metres is required?

2.2 The Relationships between Quadrilaterals

There are many different types of quadrilaterals and they all share the similarity of having four sides, two diagonals and the sum of their interior angles is 360 degrees. They all have relationships to one another, but they are not all exactly alike and have different properties.

Parallelogram



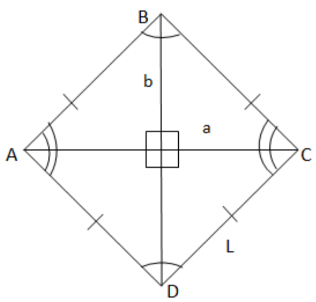
Properties of a parallelogram

- Opposite sides are parallel and equal.
- Opposite angles are equal.
- Adjacent angles are supplementary.
- Diagonals bisect each other and each diagonal divides the parallelogram into two equal triangles.

Important formulas of parallelograms

$$Area = L \times H$$

Rhombus



Properties of a Rhombus

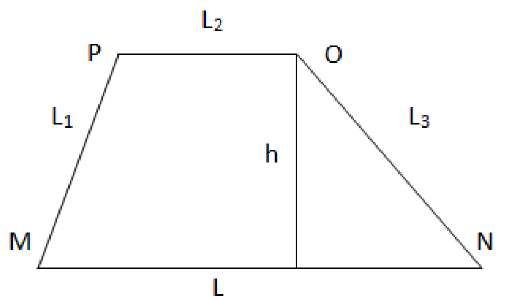
- All sides are equal.
- Opposite angles are equal.
- The diagonals are perpendicular to and bisect each other.
- Adjacent angles are supplementary (For eg., ∠A + ∠B = 180°).
- A rhombus is a parallelogram whose diagonals are perpendicular to each other.

Important formulas for a Rhombus

If a and b are the lengths of the diagonals of a rhombus,

$$Area = \left(\frac{a \times b}{2}\right)$$

Trapezium



Properties of a Trapezium

The bases of the trapezium are parallel to each other (MN ∥ OP).

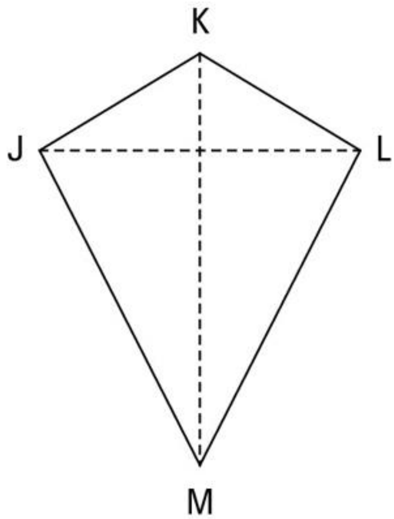
No sides, angles and diagonals are equal.

Important Formulas for a Trapezium

$$Area = \left(\frac{1}{2}\right) h\,(L + L_2)$$

Kite

A kite is a quadrilateral in which two disjoint pairs of consecutive sides are congruent ("disjoint pairs" means that one side can't be used in both pairs). Check out the kite in the below figure.



The properties of the kite are as follows:

- ☑ Two disjoint pairs of consecutive sides are congruent by definition

  ($\overline{JK} \cong \overline{LK}$ and $\overline{JM} \cong \overline{LM}$).

  Note: *Disjoint* means that the two pairs are totally separate.
- ☑ The diagonals are perpendicular.
- ☑ One diagonal (segment *KM*, the *main diagonal*) is the perpendicular bisector of the other diagonal (segment *JL*, the *cross diagonal*). (The terms "main diagonal" and "cross diagonal" are made up for this example.)
- ☑ The main diagonal bisects a pair of opposite angles (angle *K* and angle *M*).
- ☑ The opposite angles at the endpoints of the cross diagonal are congruent (angle *J* and angle *L*).

Summary of properties

Summarizing what we have learnt so far for easy reference and remembrance:

Activity 2

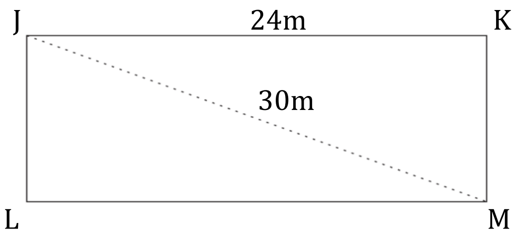
In groups, draw and cut out shapes of Parallelogram, Rhombus, square, rectangle and trapezium. List down different properties that can be observed from the shapes. Present them to the class using mathematical vocabulary, in a table

Activity 3

In groups, play the gues my shape game. (Instructions in the teachers guide)

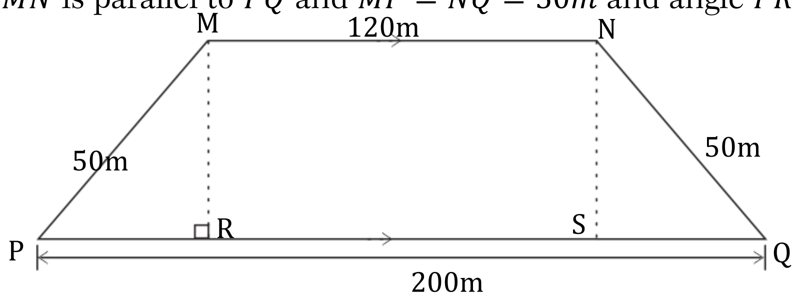
Exercise 2:

1. The figure below shows a rectangular grass lawn $JKLM$ in which $JK = 24m$ and $JM = 30m$.



What is the area covered by grass in m^2?

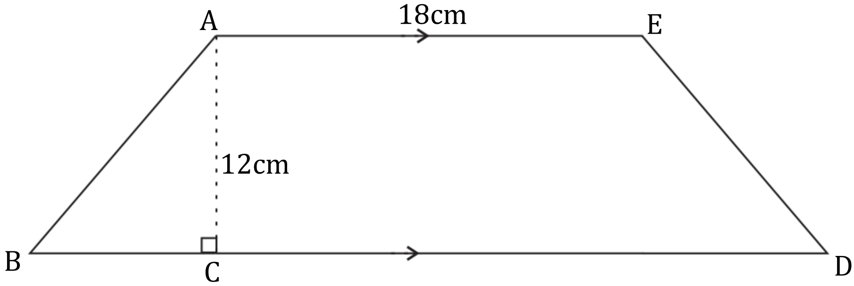
2. What is the area in hectares of the figure shown below? Where $PR = SQ$ and MN is parallel to PQ and $MP = NQ = 50m$ and angle $PRM = 90^0$



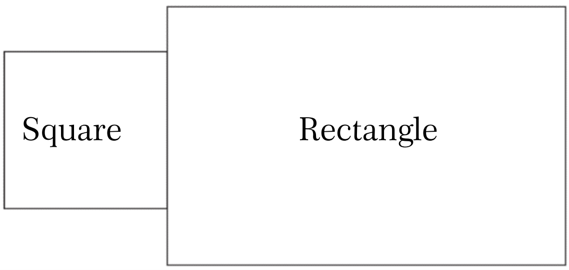
3. What is the area of a rhombus whose diagonals are 8m and 5m long in square metres?

4. The perimeter of a rectangular plot of land is 280 metres. The width is 60 metres. What is the area of the plot?

5. The diagram $ABCDE$ is a trapezium. If its area is 208cm^2, what is the measure of CD in cm?



6. The diagram below shows the shape of Ruth's house which is formed by a square and a rectangle. The area of the square is 196cm^2. If the area of the square is $\frac{1}{4}$ that of the rectangle, what is the width of the rectangle in centimetres, if the length is 49cm? explain your method of working out this to your partner



2.3 Surface area of common solids

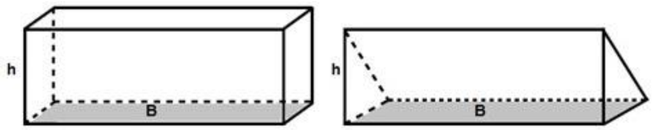
The surface area is the area that describes the material that will be used to cover the solid.

When we determine the surface areas of a solid we take the sum of the area for each geometric form within the solid.

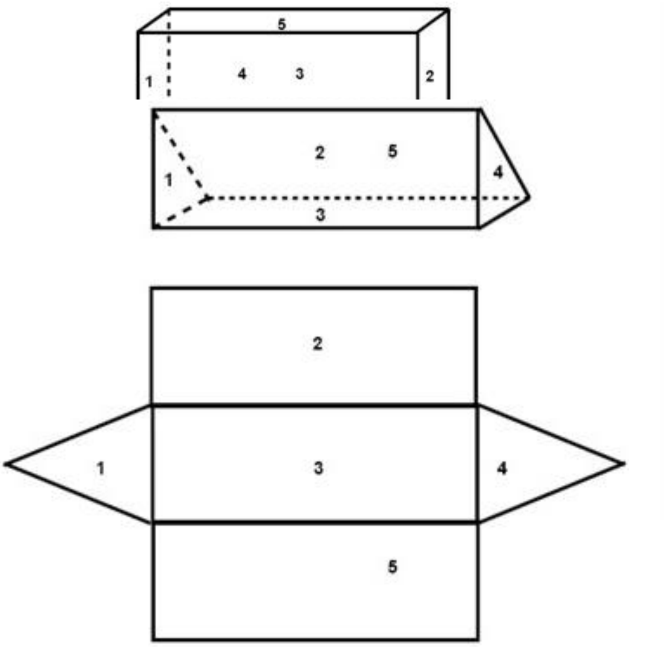
The volume is a measure of how much a figure can hold and is measured in cubic units. The volume tells us something about the capacity of a figure.

Surface area of a prism

A prism is a solid that has two parallel congruent sides that are called bases that are connected by the lateral faces that are parallelograms. There are both rectangular and triangular prisms.



To find the surface area of a prism (or any other geometric solid) we open the solid like a carton box and flatten it out to find all included geometric forms.

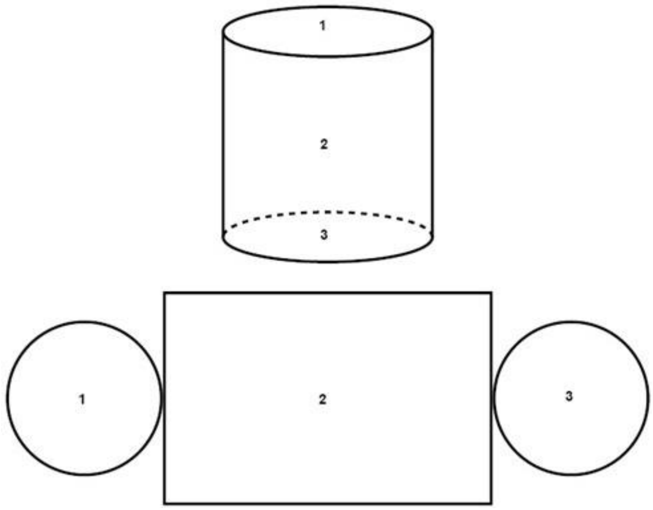


To find the volume of a prism (it doesn't matter if it is rectangular or triangular) we multiply the area of the base, called the base area B, by the height h.

$$V = Base\ area\ \times height = B \times h$$

Surface area of a cylinder

A cylinder is a tube and is composed of two parallel congruent circles and a rectangle which base is the circumference of the circle.



Example 3.

The area of one circle is:

$A = \pi r^2$

$A = \pi \times 2^2$

$A = 3.14 \times 4$

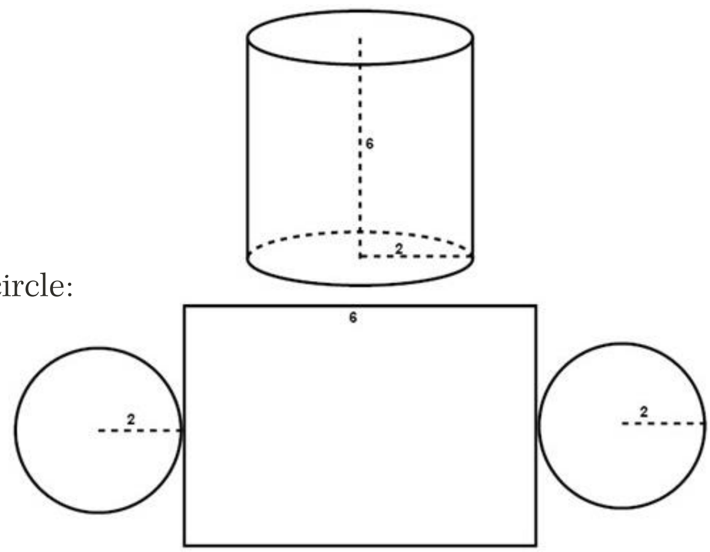
$A = 12.56$

The circumference of a circle:

$C = \pi d$

$C = 3.14 \times 4$

$C = 12.56$



The area of the rectangle:

$A = Ch$

$A = 12.56 \times 6$

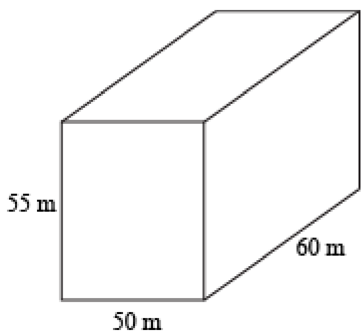
$A = 75.36$

The surface area of the whole cylinder:

$A = 75.36 + 12.56 + 12.56 = 100.48 \text{units}^2$

Exercise 3:

1. Find the total surface area of the solid.



2. Find the surface areas of the following..
   a. A cube of side length 1.5 m.
   b. A rectangular prism 6 m × 4 m × 2.1 m.
   c. A cylinder of radius 30 cm and height 45 cm, open at one end.
   d. A square pyramid of base length 20 cm and slant edge 30 cm.

2.4 Speed

In order to calculate the speed of an object we must know how far it's gone and how long it took to get there. That is why speed is written in terms of distance and time.

Speed has the dimensions of distance divided by time. The SI unit of speed is the metre per second, but the most common unit of speed in everyday usage is the kilometre per hour.

Speed is a measure of how fast something is moving, or rather, how much distance the object is moving per unit time.

$$Speed = \frac{Distance}{Time}$$

Converting km/hr to m/sec

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

$$1\ km/hr = \frac{1000}{3600}\ m/sec = \frac{5}{18}\ m/sec$$

To convert km/hr into m/sec, multiply the number by 5 and then divide it by 18.

Example 5.

Convert 54 km/hr into m/sec.

Solution:

54 km/hr

Step 1:

Multiply 54 by 5

We have 54 × 5 = 270

Step 2:

Divide 270 by 18

$\frac{270}{18} = 15$

Final Answer:

54 km/hr = **15 m/sec**

Activity 1

Work in pairs to convert the following to m/sec. How will you work it out?

a. 72 km/hr =	e. 252 km/hr =	i. 234 km/hr =
b. 162 km/hr =	f. 54 km/hr =	j. 144 km/hr =
c. 216 km/hr =	g. 108 km/hr =	k. 18 km/hr =
d. 180 km/hr =	h. 126 km/hr =	l. 198 km/hr =

Converting m/s to km/h

$$1\ m = \frac{1}{1000}\ km;\ 1\ sec = \frac{1}{3600}\ hr$$

$$1\ m/sec = \frac{\frac{1}{1000}}{\frac{1}{3600}}\ km/hr = \frac{3600}{1000}\ km/hr = \frac{18}{5}\ km/hr$$

To convert m/sec into km/hr, multiply the number by 18 and then divide it by 5.

Example 6.

Convert 20 m/sec into km/hr.

Solution:

20 m/sec

Step 1:

Multiply 20 by 18

We have 20 * 18 = 360

Step 2:

Divide 360 by 5

360/5 = **72**

Final Answer:

20 m/sec = **72 km/hr**

Activity 2

Work in pairs to convert the following to km/hr.

i) 45 m/sec
ii) 4 m/sec
iii) 1.5 m/sec
iv) 2.8 m/sec
v) 120 m/sec
vi) 840 m/sec
vii) 6.25 m/sec
viii) 22.5 m/sec

Exercise 4:

Show your working for the questions below

1. If a car travels 400m in 20 seconds how fast is it going?
2. If you move 50 meters in 10 seconds, what is your speed?
3. You arrive in my class 45 seconds after leaving math which is 90 meters away. How fast did you travel?
4. A plane travels 395 000 meters in 9 000 seconds. What was its speed?

Activity 3

Work in groups to solve the activities

1. You need to get to class, 200 meters away, and you can only walk in the hallways at about 1.5 m/s. (if you run any faster, you'll be caught for running). How much time will it take to get to your class?
2. In a competition, an athlete threw a flying disk 139 meters through the air. While in flight, the disk traveled at an average speed of 13.0 m/s. How long did the disk remain in the air?

2.5 Weight

The charts below will help you to convert between different metric units of weight.

METRIC WEIGHT CONVERSIONS					
1 gram	=	1000 milligrams	1g	=	1000 mg
1 decagram	=	10 grams	1dag	=	10g
1 kilogram	=	1000 grams	1 kg	=	1000 g
1 tonne (1 megagram)	=	1000 kilograms	1 tonne (1 Mg)	=	1000 kg
1 gigagram	=	1000 megagrams	1 Gg	=	1000 Mg

Exercise 5:

1. A tin of baked beans weighs 485g. How many grams less than 1.55kg will 2 tins of beans weigh?

2. The combined weight of 6 TV's is 138kg. How much does each TV weigh?

3. DVD players weigh 3kg and I buy 4 TV's and 4 DVD players. How much does my purchase weigh?

4. The limit of the baggage that each person can bring on an airplane is 20 kilograms. Achol's suitcase weighs 24 000 grams, and his brother Garang's weighs 23 500g. How much over the limit are their suitcases together?

5. To bake a 250g cake, you need to use 70 grams of butter.
   a) How much butter do you need to make a 2kg cake?

   b) If you use 280 grams of butter, how much does the cake weigh?

   c) If you use 560 grams of butter, what does the cake weigh?

6. Tim put a 0.975kg weight on one side of a set of balancing scales. William then put a 255g and a 300g weight on the other side.

   a) How much more does the William need to add to his side to make the scales balance?

   b) What does Tim need to add to his side of the scale to make it weigh 1560g?

2.6 Temperature

The temperature of an object is measured by an instrument called thermometer. Now we will learn about the measurement of temperature.

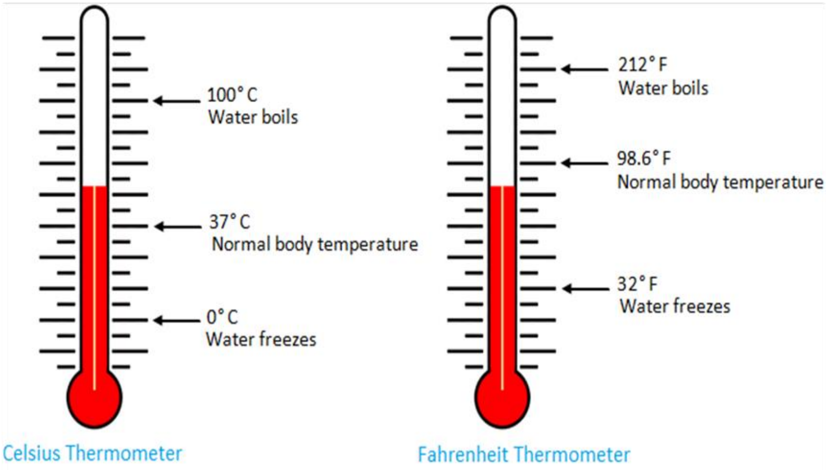
Activity 4

Take two cups, one containing normal water and another containing worm water. Put your finger in one cup and of another hand in the other cup. Discuss the difference, what do you notice?

We find, one contains cold water and the other contains hot water. But the question is how much cold and how much hot. To find this out, we need some measure of hotness or coldness.

Temperature is the degree of hotness or coldness of a body. The instrument which measures the temperature of body is known as **thermometer**.

Each thermometer has a scale. Two different temperature scales are in common use today:



Thermometer has scale in degree Fahrenheit (°F) and in degree Celsius (°C). The Fahrenheit scale has the melting point of ice at 32° F and the boiling point of water at 212° F.

Thus, the Fahrenheit scale is marked from 32° to 212° where 32° F shows the freezing point of water and 212° F shows the boiling point of water. At present most of the countries use the degrees Celsius thermometers.

The Celsius scale (is also called centigrade scale) thermometer has 0° C as freezing point of water and 100° C as the boiling point of water.

Activity 4

In pairs, ask your partner the following questions.

1. The instrument used to measure body temperature is called?
2. The normal body temperature is?
3. The liquid inside the thermometer is called?
4. The units of measure of temperature are?
5. 0°C is cooler than 0°F?

Conversion of Temperature

In conversion of temperature from one scale into another the given temperature in °C we can convert it into °F and also the temperature in °F we can convert it into °C.

$$°F = \frac{°C \times 9}{5} + 32$$

$$C^0 = \frac{5}{9}(F^0 - 32)$$

The steps which are used in this conversion are given as:

1. When the temperature is given in degree Celsius:

Step I: Multiply the given temperature in degree by 9

Step II: The product we obtained from step I divide it by 5.

Step III: Add 32 with the quotient we obtained from step II to get the temperature in degree Fahrenheit.

Temperature in degree Celsius → (Multiply by 9) → (Divide by 5) → (Add 32) → Temperature in °F

2. When the temperature is given in degree Fahrenheit:

Step I: Subtract 32 from the given temperature in degree

Step II: The difference we obtained from step I multiply it by 5.

Step III: The product we obtained from step II divide it by 9 to get the temperature in degree Celsius.

Temperature in degree Fahrenheit → (Subtract 32) → (Multiply by 5) → (Divide by 9) → Temperature in °C

Example 7.

1. Convert 50° C into degree Fahrenheit:

50° C

$$°F = \frac{°C \times 9}{5} + 32$$

$$°F = \frac{50 \times 9}{5} + 32$$

$$°F = \frac{450}{5} + 32$$

$$°F = 90 + 32$$

$$°F = 122$$

Therefore, 50° C = 122° F

2. Convert 212° Finto degree Celsius:

212° F

$$C^0 = \frac{5}{9}(F^0 - 32)$$

$$C^0 = \frac{5}{9}(212 - 32)$$

$$C^0 = \frac{5}{9}(180)$$

$$C^0 = \frac{5}{\cancel{9}}(\overset{20}{\cancel{180}})$$

$$C^0 = 100$$

Therefore, 212° F = 100° C

Play a game to understand Celsius and Fahrenheit

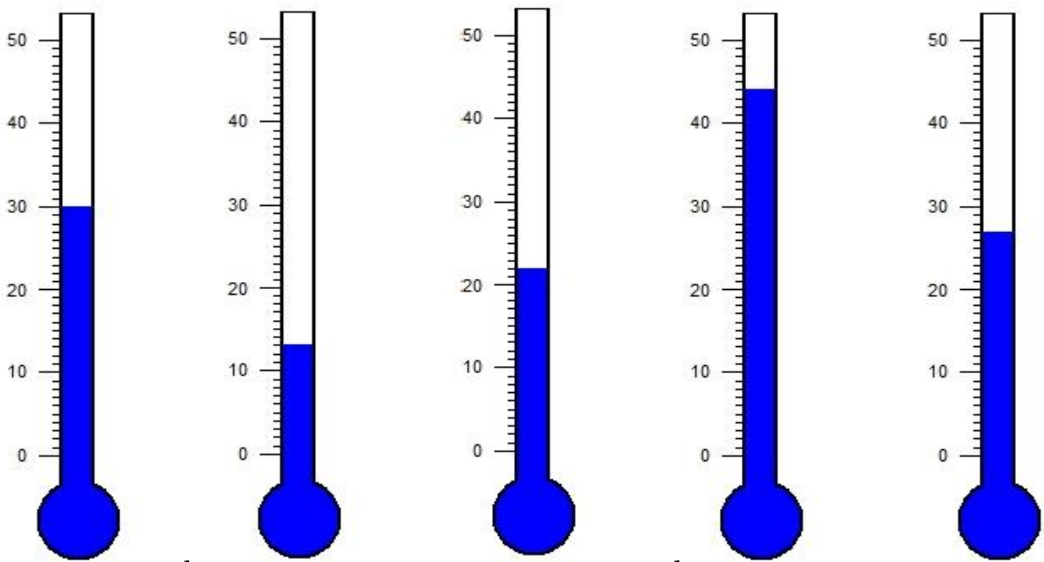
In groups of three, write and cut out the statements in the table below and share them out.

One learner calls out their card the person with the correct card holds it up.

	On the Celsius Scale	On the Fahrenheit Scale
Water freezes at	0°	32° F
Water boils at	100° C	212° F
Normal body temperature	37° C	98.6° F

Exercise 6:

1. Read and write the temperature shown on each thermometer in ^{0}C



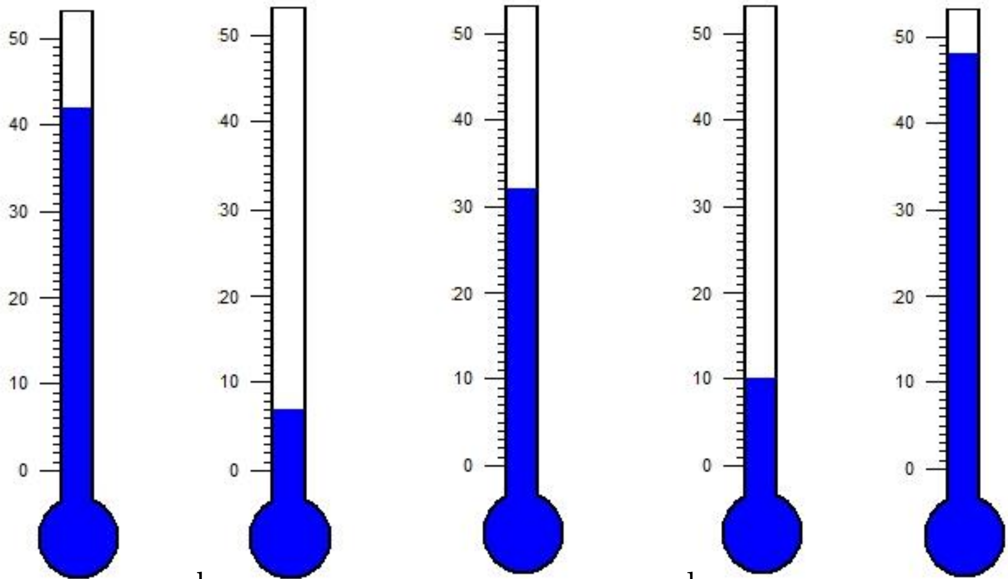
a. b. c. d. e.

2. Convert Celsius into Fahrenheit

a) 35^0C b) 20^0C c) 50^0C

d) 65^0C d) 90^0C e) 80^0C

3. Read and write the temperature shown on each thermometer in ^{0}F



a. b. c. d. e.

2. Convert Fahrenheit into Celsius

a)149^{0}F b) 95^{0}F c) 50^{0}F

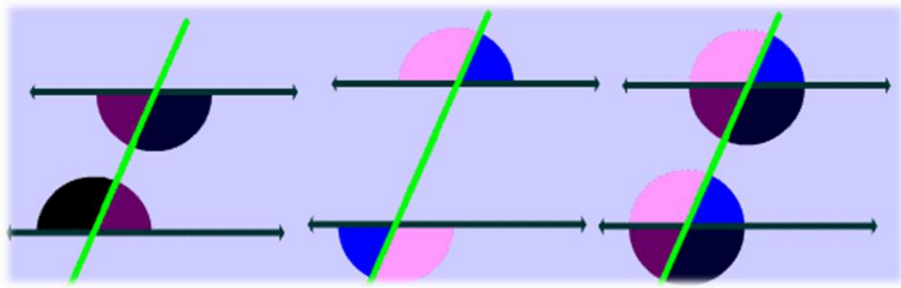
d) 122^{0}F e) 41^{0}F f) 194^{0}F

UNIT 3: GEOMETRY

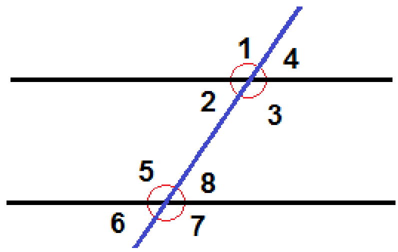
3.1 Transversal and angles they form

A **transversal** is a line that passes through two lines in the same plane at two distinct points.

There are 3 types of angles that are congruent: Alternate , and Corresponding Angles.



When a transversal intersects with two parallel lines eight angles are produced.



The eight angles will together form four pairs of **corresponding angles**. Angles 1 and 5 constitutes one of the pairs. Corresponding angles are congruent.

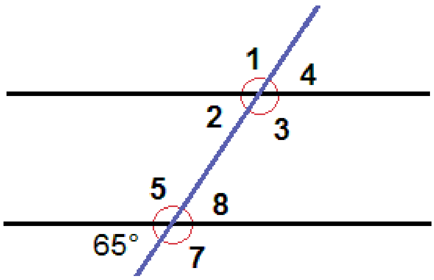
All angles that have the same position with regards to the parallel lines and the transversal are corresponding pairs e.g. 3 + 7, 4 + 8 and 2 + 6.

Angles that are in the area between the parallel lines like angle 2 and 8 above are called **interior angles** whereas the angles that are on the outside of the two parallel lines like 1 and 6 are called **exterior angles**.

Angles that are on the opposite sides of the transversal are called alternate angles e.g. 1 + 8.

All angles that are either exterior angles, interior angles, alternate angles or corresponding angles are all congruent.

Example 1.



The picture above shows two parallel lines with a transversal. The angle 6 is 65°. Is there any other angle that also measures 65°?

<u>Solution</u>

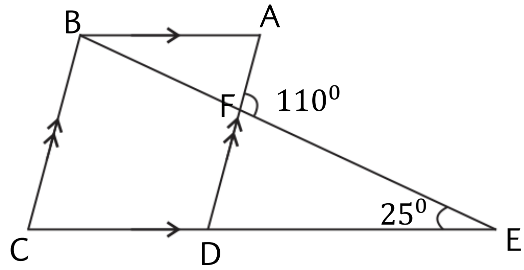
6 and 8 are vertical angles and are thus congruent which means angle 8 is also 65°.

6 and 2 are corresponding angles and are thus congruent which means angle 2 is 65°.

6 and 4 are alternate exterior angles and thus congruent which means angle 4 is 65°.

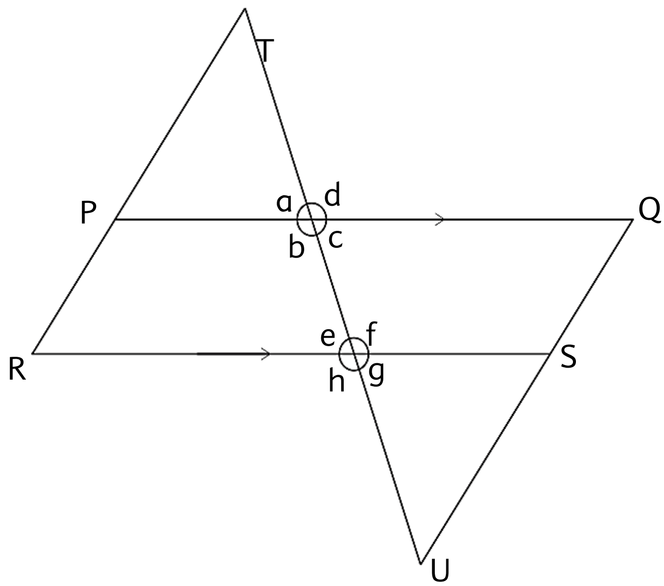
Exercise 1:

1. Figure ABCD shown below is a parallelogram. Line CDE is a straight line, angle DEF= 25° and angle EPA= 100°.



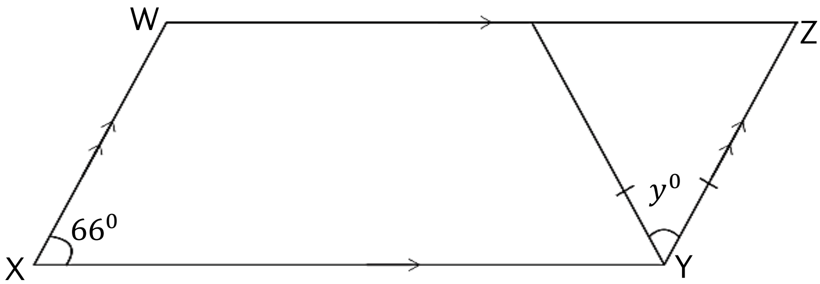
What is the size of angle EBC?

2. In the figure below, line PQ is parallel to line RS. Lines TR and TU are transversals.



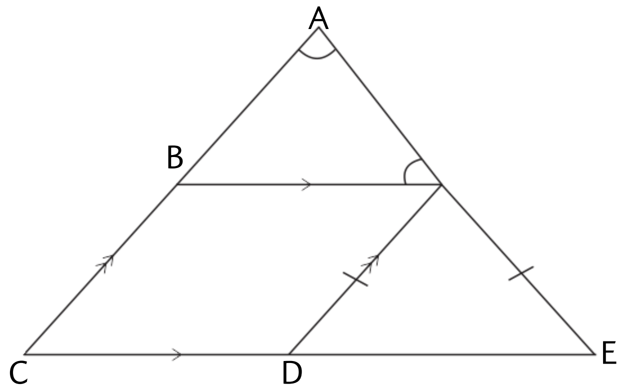
Write the correct statements about angles a, b, c, d, e, f, g and h?

3. What is the measure of the exterior angle XYZ in the quadrilateral WXYZ below drawn to scale?



What is the value of angle y?

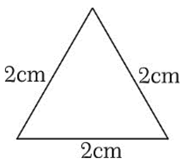
4. The figure below is made up of a parallelogram BCDF, triangles DFE and ABF, angle BAF= 80°and angle BFA= 52°



What is the value of angle DFE?

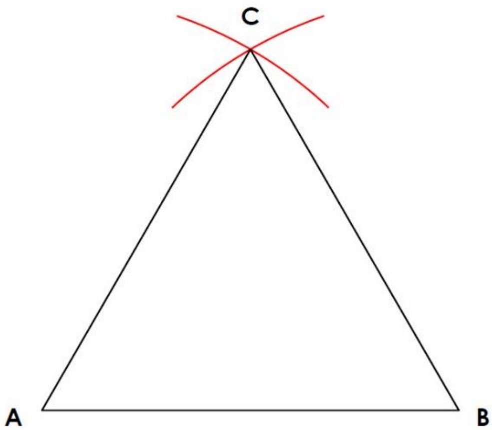
3.2 Types of triangles based on sides

Equilateral triangle: A triangle having all the three sides of equal length is an equilateral triangle.



Since all sides are equal, all angles are equal too.

How to construct an equilateral triangle

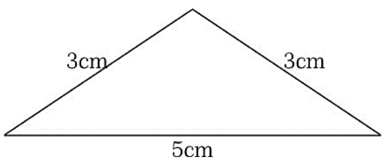


By setting your compass to radius AB and swinging two arcs from Point A and point B, you will create point C.

Join point A to C and B to C. This will create an Equilateral triangle.

Activity 1
In groups, draw an equilateral triangle using the above steps.

Isosceles triangle: A triangle having two sides of equal length is an Isosceles triangle.

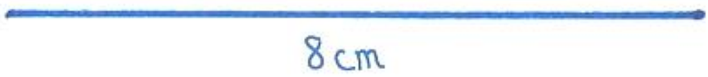


The two angles opposite to the equal sides are equal.

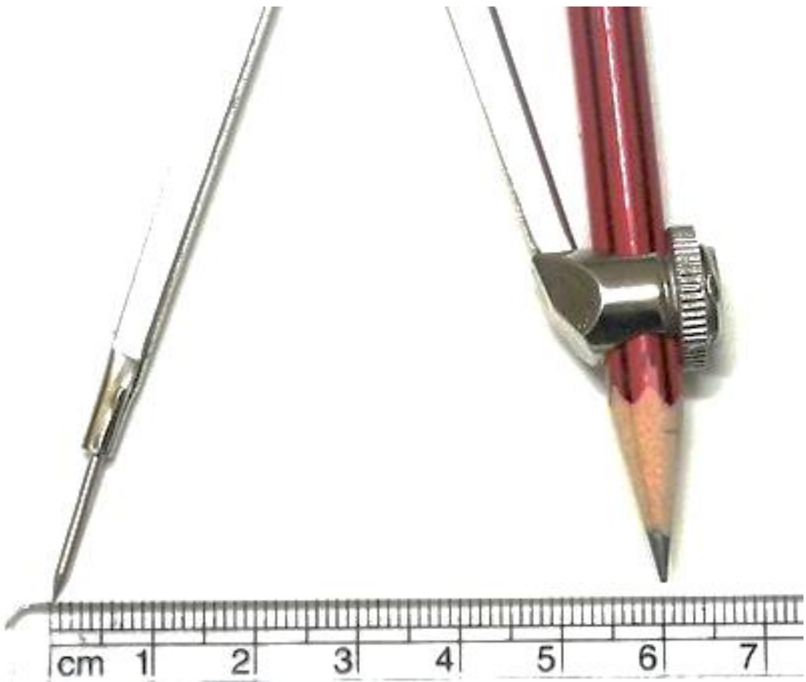
How to Construct an Isosceles Triangle

Using a protractor, you can use information about angles to draw an isosceles triangle.

We should know the length of the triangle's base and the length of the two equal sides.

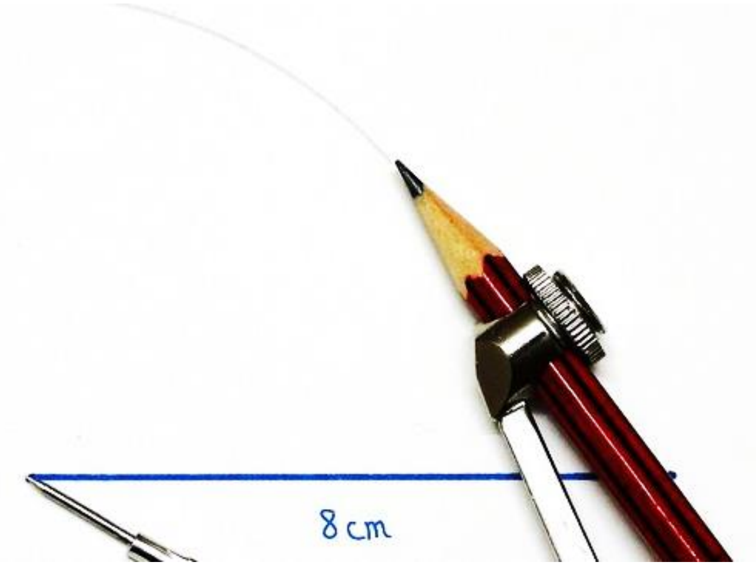


Draw the base. Use a ruler to make sure that your line is measured exactly. For example, if you know that the base is 8 cm long, use a pencil and a ruler to draw a line exactly 8 cm long.

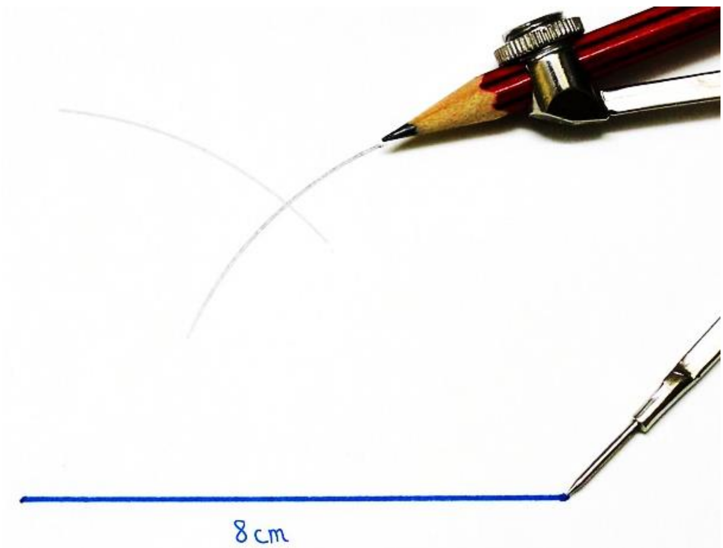


Set the compass. To do this, open the compass to the width of the equal side lengths. If you are given the measurement, use a ruler.

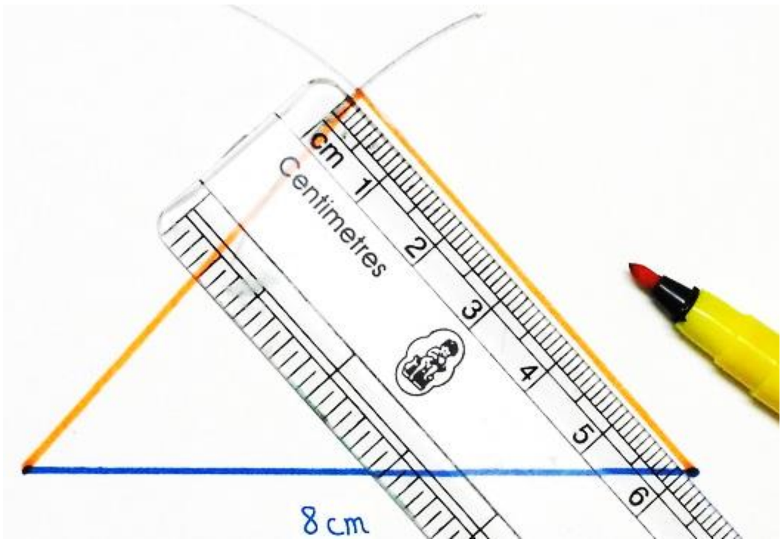
For example, if the side lengths are 6 cm, open the compass to this length.



Draw an arc above the base. To do this, place the tip of the compass on one of the base's endpoints. Sweep the compass in the space above the base, drawing an arc. Make sure the arc passes at least halfway across the base.



Draw an intersecting arc above the base. Without changing the width of the compass, place the tip on the other endpoint of the base. Draw an arc that intersects the first one.

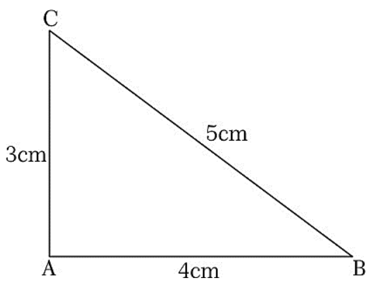


Draw the sides of the triangle. Use a ruler to draw lines connecting the point where the arcs intersect to either endpoint of the base. The resulting figure is an isosceles triangle.

Activity 2

In groups draw an isosceles triangle using the above steps.

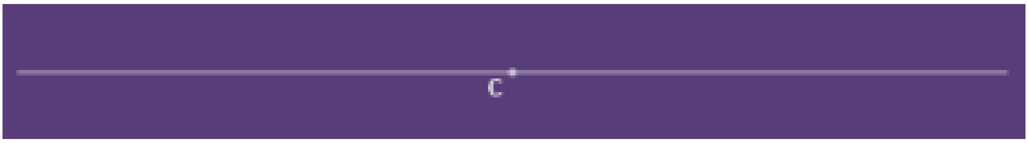
Right-angled triangle: A triangle whose one angle is a right-angle is a Right-angled triangle.



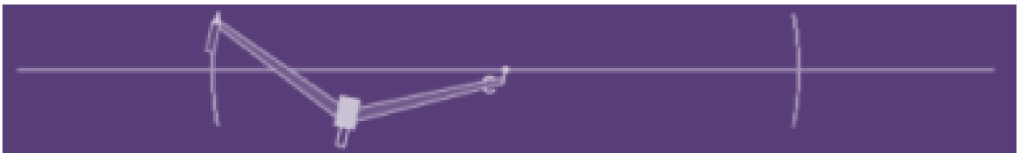
Constructing a Right Angled Triangle

The requirements for the construction are a ruler and a compass. Let us construct a right-angled triangle ABC, right angled at C. Consider the length of the hypotenuse AB = 5 cm and side CA = 3 cm. The steps for construction are:

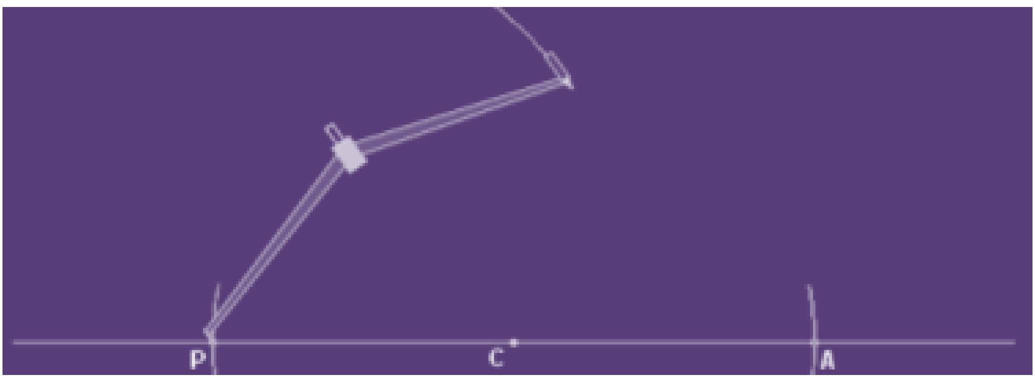
- **Step 1:** Draw a horizontal line of any length and mark a point C on it.



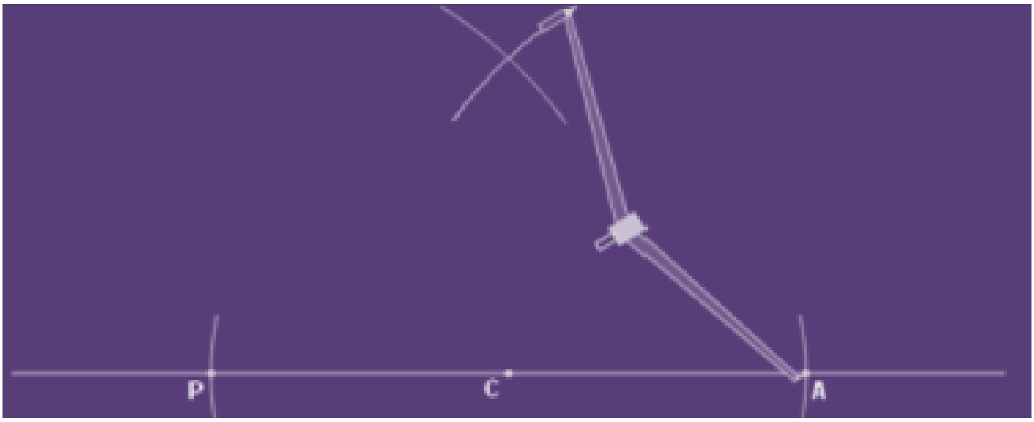
- **Step 2:** Set the compass width to 3 cm.
- **Step 3:** Place the pointer head of the compass on the point C and mark an arc on both the sides of C.



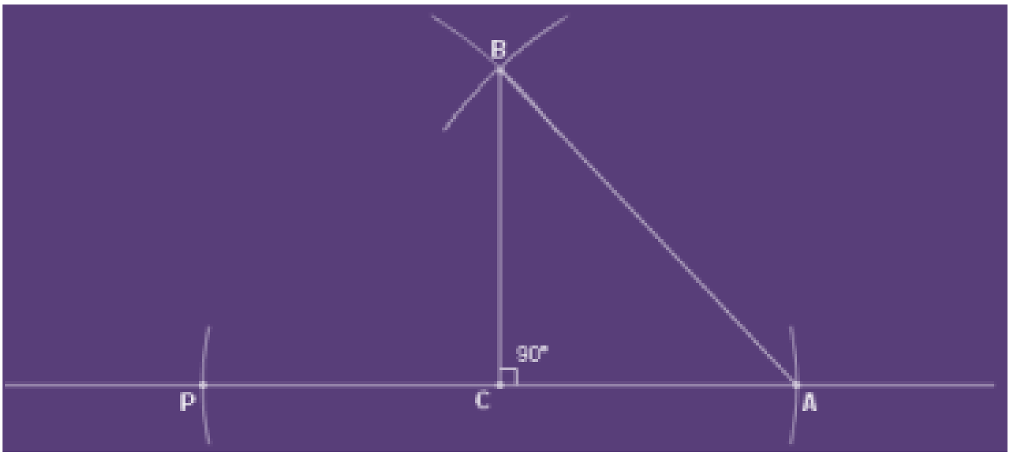
- **Step 4:** Mark the points as P and A where the arcs cross the line.
- **Step 5:** Set the compass width to the length of the hypotenuse, that is, 5 cm.
- **Step 6:** Place the pointer head of the compass on the point P and mark an arc above C.



- **Step 7:** Repeat step 6 from the point A.



- **Step 8:** Mark the point as B where the two arcs cross each other.
- **Step 9:** Join the points B and A as well as B and C with the ruler.



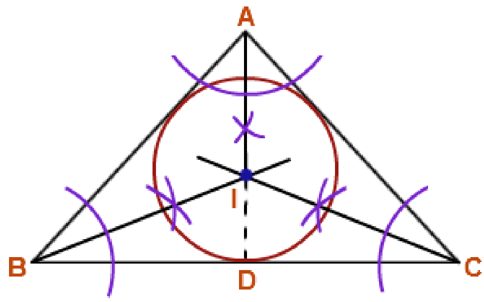
We obtain a right-angled triangle ACB of the required measurements.

Activity 3

In pairs, draw a right angled triangle using the above steps.

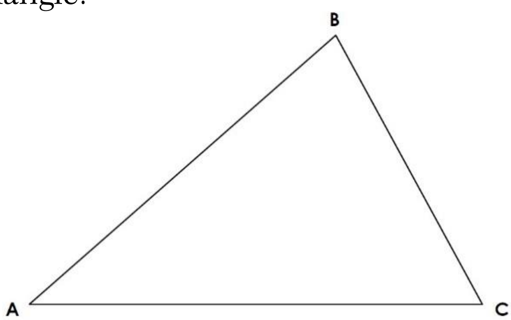
Inscribing a triangle.

Look at the diagram below. Discuss in groups what you can note.

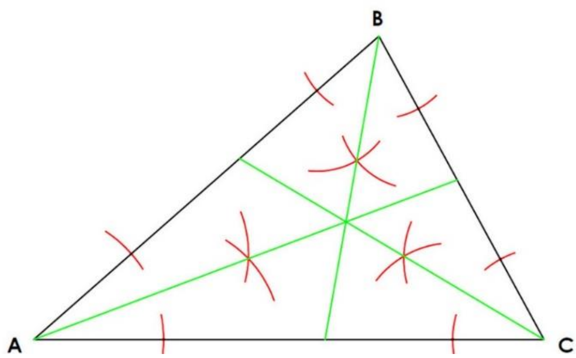


Here is a method for constructing the circle that inscribes a triangle.

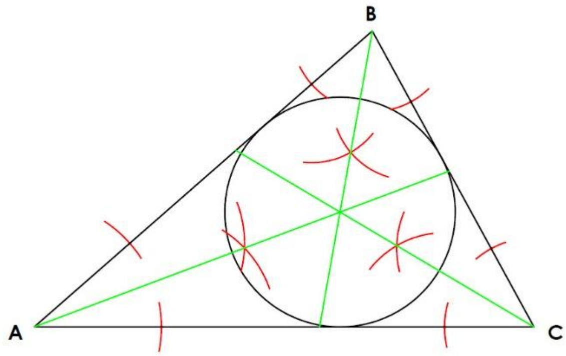
1. Draw the triangle.



2. Draw the angle bisector for each angle of the triangle. Draw the lines long enough so that you see a point of intersection of all three lines.



3. Draw the circle with radius at the intersection point that passes through the point you obtained in the last step. This is the desired circle.



A circle that inscribes a triangle is a circle contained in the triangle that just touches the sides of the triangle.

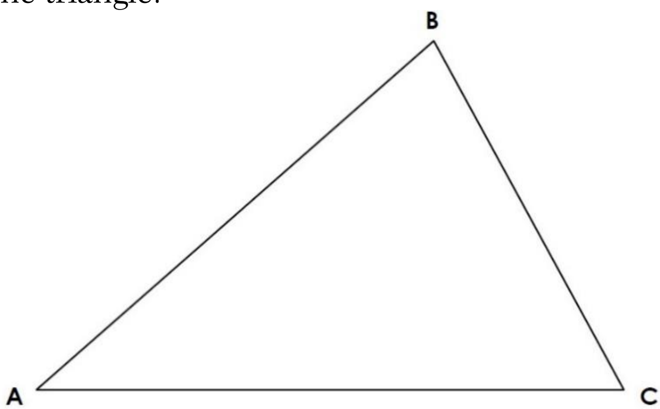
Activity 4

In pairs, draw a triangle and inscribe it using the above steps.

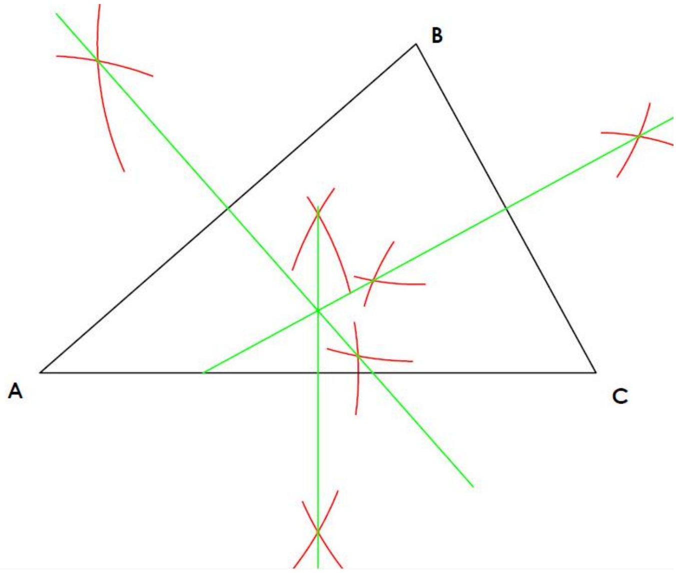
Circumscribing a triangle.

Here is a method for constructing the circle that circumscribes a triangle.

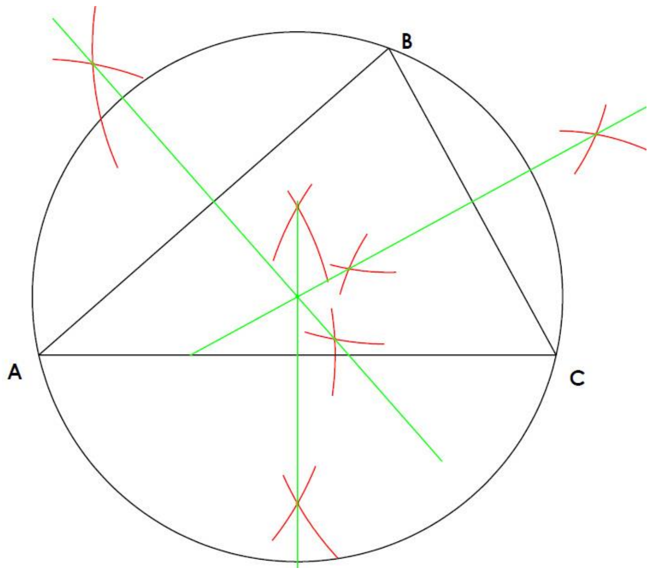
1. Draw the triangle.



2. Construct the perpendicular bisector of each side of the triangle. Draw the lines long enough so that you see a point of intersection of all three lines.



3. Draw the circle with radius at the intersection point of the bisectors that passes through one of the vertices. You should see that this circle passes through all three vertices, and that it is the desired circle.



Activity 5

In groups, draw two triangles of different shapes and then construct the circle that circumscribes them. Next, draw two triangles and then construct the circle that inscribes them.

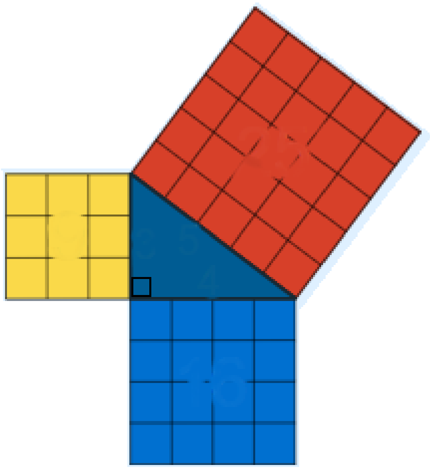
3.3 Pythagoras' Theorem

When a triangle has a right angle (90°), and squares are made on each of the three sides, then the biggest square has the exact same area as the other two squares put together.

This is called "Pythagoras' Theorem" after an ancient Greek mathematician who is attributed with proofing the results which was well known in India, china and the Middle East before him.
This can be written in one short equation:

$$a^2 + b^2 = c^2$$

Pythagoras squares = $a^2 + b^2 = c^2$



Note:

c – It is the longest side of the triangle.

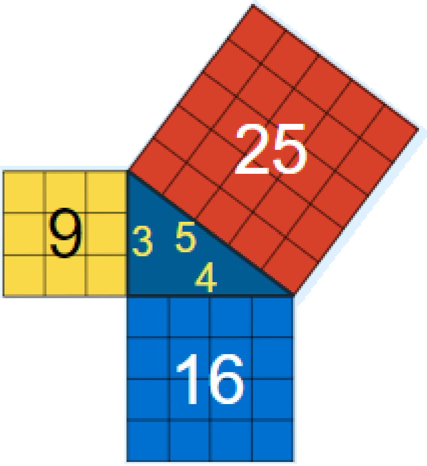
The longest side of the triangle is called the "hypotenuse".

a and b are the other two sides.

In a right angled triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides.

Example 2.

A 3, 4, 5 triangle has a right angle in it.



Let's check if the areas are the same:

$3^2 + 4^2 = 5^2$

Calculating this becomes:

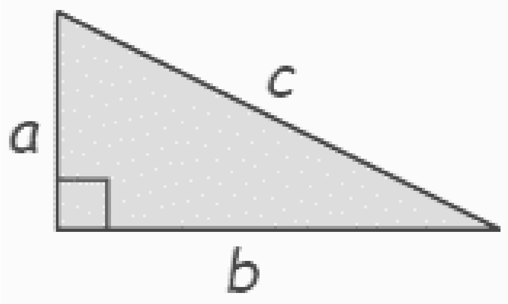
$9 + 16 = 25$

Why is this useful?

If we know the lengths of two sides of a right angled triangle, we can find the length of the third side.

Note: This only works on right angled triangles.

Write it down as an equation:

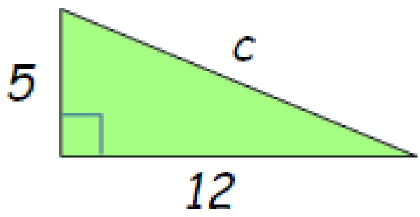


$a^2 + b^2 = c^2$

Then we use algebra to find any missing value, as in these examples:

Example 3.

Find the missing side.



Start with: $a^2 + b^2 = c^2$

Put in what we know: $5^2 + 12^2 = c^2$

Calculate squares: $25 + 144 = c^2$

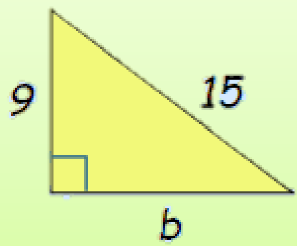
$25+144=169$: $169 = c^2$

Swap sides: $c^2 = 169$

Square root of both sides: $c = \sqrt{169}$

Activity 6

In pairs, solve and find the value of the letter;

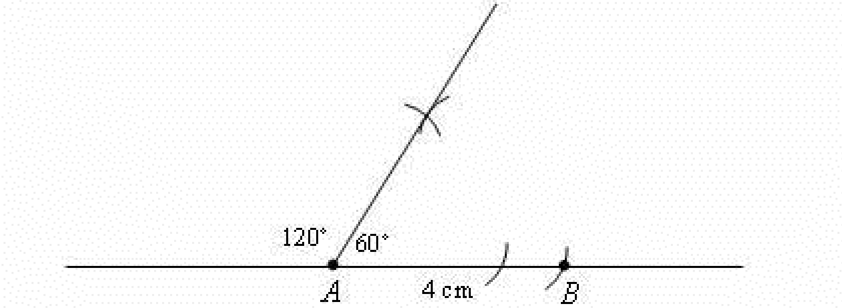


3.4 Construct a Parallelogram

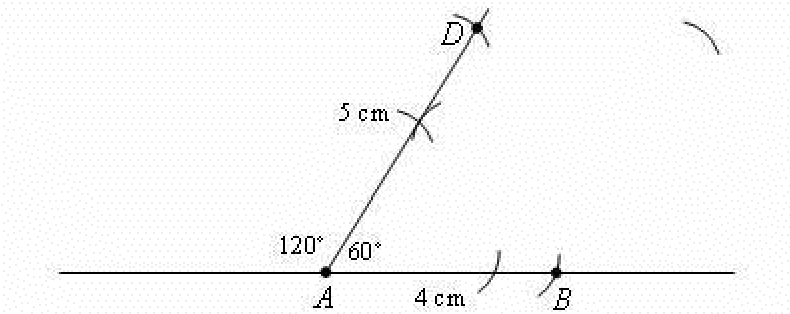
Construct a parallelogram *ABCD* with sides $AB = 4$ cm and $AD = 5$ cm and angle $A = 60°$. In pairs, follow the steps below.

Steps

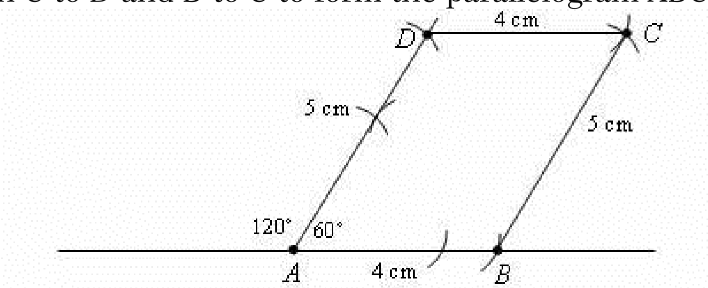
Step 1: Construct a line segment $AB = 4$ cm. Construct a $60°$ angle at point *A*.



Step 2: Construct a line segment $AD = 5$ cm on the other arm of the angle. Then, place the sharp point of the compasses at $B$and make an arc 5 cm above B.

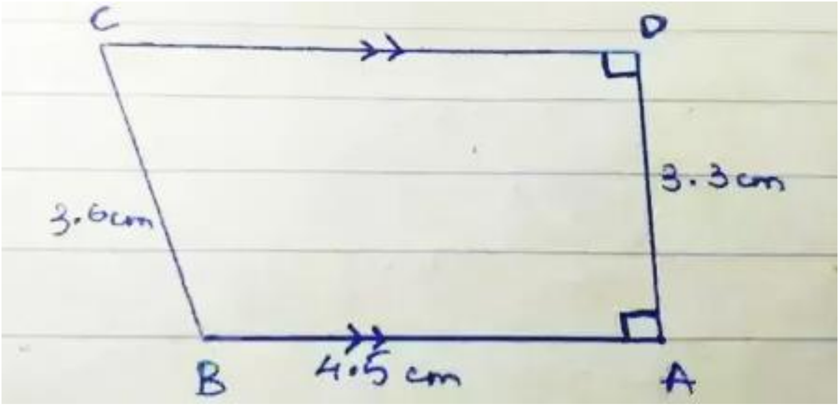


Step 3: Stretch your compasses to 4 cm, place the sharp end at D and draw an arc to intersect the arc drawn in step 2. Label the intersecting point C. Join C to D and B to C to form the parallelogram $ABCD$.



3.5 Construct a trapezium

This is the figure of the trapezium.



AB and CD are parallel.

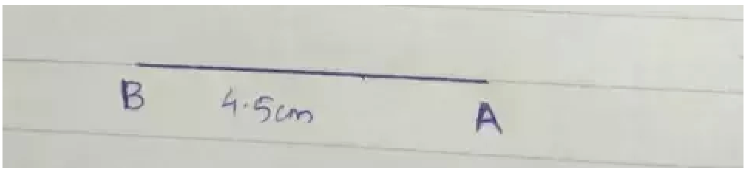
The height of the trapezium is AD = 3.3cm.

BC= 3.6 cm

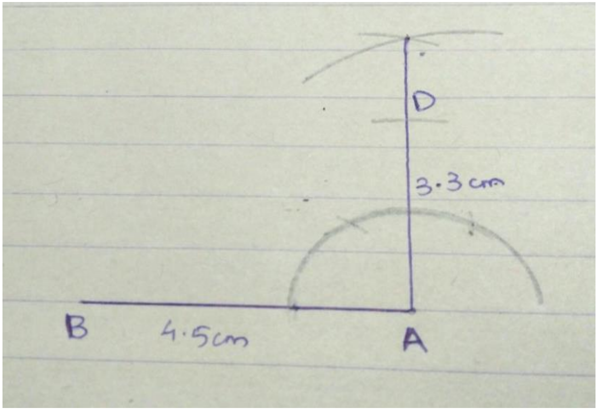
Example 4.

In pairs follow the steps to draw a trapezium.

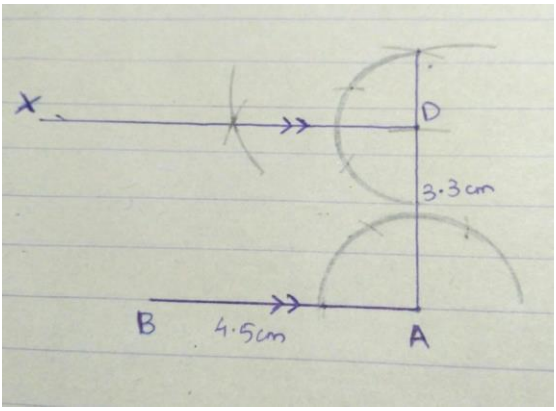
Draw a line AB=4.5 cm.



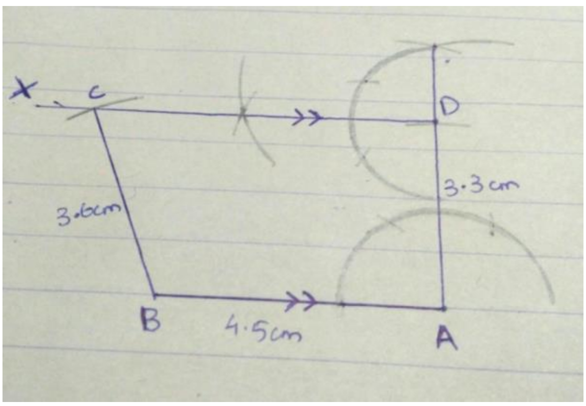
Next using the compass construct an angle BAD=90°. Since, the distance between the parallel sides is 3.3cm, it implies that the line perpendicular to AB at A is 3.3 cm. So, cut an arc of 3.3 cm on the perpendicular line and name it D.



The two sides (AB and CD) are parallel. Therefore, construct an angle ADX=90°. Draw a line DX which is parallel to AB.



Now we have three sides of the trapezium. So, cut an arc of 3.6 cm from B on line DX. Join B and C.



Thus, a trapezium with sides AB=4.5 cm, AD=3.3 cm, BC=3.6 cm and Angle B is obtuse.

3.6 Drawing and interpreting linear scale

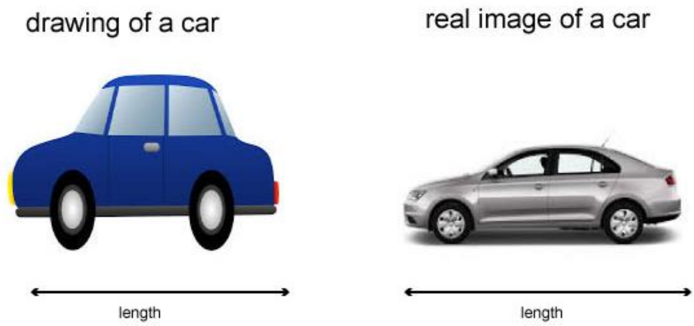
Given a scale diagram we can make drawing measurements.

Similarly, real (actual) measurements can be made on a real object.

Linear scale shows, the relationship between drawing (scale) length and actual length.

Linear scale of a diagram is given in statement or ratio form.

When the ratio form is used the unit of measurement for the drawing length and actual length is the same.



This is scale drawing.

It is not always possible to draw on paper the actual size of real-life objects such as the real size of a car, an airplane, house we need scale drawings to represent the size like the one you have seen.

Example 4.

In a scale diagram 1cm represents 50 m

(a) Write the scale in ratio form.

(b) Find the drawing length for 1.25 km.

(c) Find the actual length in kilometers corresponding to a length of 10.5cm on the diagram.

Solution

(a) 1cm represents 50cm = 50 x 100 c = 5 000cm

Ratio from is 1:5000

(b) 1.25 km = 1.25 x 1000m = 1 250m

Drawing length for 50m is 1cm
drawing length for 1 250m is $\frac{1\,250}{50}$ = 25 m

(c) 10.5 cm represents 10.5 x 50 cm = 525m = 0.525km

Activity 6

In a diagram of a plan of a factory a length of 2.5 cm represents an actual length of 12.5 m

(a) Work out the linear scale in ratio form.

(b) Find the distance on the plan between two buildings which are 35 m apart.

Conversions to recall

1 km =1000 m
1 km = 100,000 cm
1 m = 100 cm
1 ha = 10,000 m^2

Why are scale drawings important?

Careers that involve construction, architecture, city planning, design and map-reading all require knowledge of scale drawings

You also need to be able to use scale-drawings when you are travelling. (Maps)

UNIT 4: ALGEBRA

4.1 Simplify algebraic expressions

To simplify an algebraic expression, we collect like terms together.

Example 1.

Simplify $21y + 5 - 13y + 8$

$21y - 13y + 5 + 8$ Collect like terms together.

$8y + 13$ Simplify.

Activity 1

In groups, simplify the following algebraic expressions. Talk in your groups how you have done this.

a) $15x + 6 - 4x + 3$

b) $4 + 13p - 2 + 3p$

c) $12q - 5 + 5q + 8 - 3y$

d) $5 + 20s + 4 - 12s$

e) $18r + 6 - 12xy + 5r + 9$

f) $21p + 9 + 8p - 4 + 12xy$

Example 2.

Simplify $2(xy + 2) - 4(y + 3)$

$2xy + 4 - 4y + 12$ First open the brackets by multiplying by the number outside the bracket.

$2xy + 4 + 12 - 4y$ Collect the like terms together.

$2xy + 16 - 4y$ Simplify.

Activity 2

In groups, simplify the following equations showing your working out.

a) $3(p + 2) + 2(4p + 1)$

b) $q(2 + 4) - 4(5 + 2p)$

c) $4(r + 2) + 2(r - 2)$

d) $5(s + 6) + 3(2s - 5)$

e) $4(5q + 2) - 2(3 + 2q)$

f) $3(6z - 5) + 4(2z - 3)$

4.2 Evaluating expression by substitution

To solve the expression we replace letters with numbers.

Example 3.

1. What is the value of 4p+5q?

When the value of p=3 and q= 2

$(4 \times 3) + (5 \times 2)$ Replace the letters with their number representation.

$= 12 + 10$

$\underline{\underline{= \mathbf{22}}}$

2. What is the value of? $(2p + 3y) - (2y + 3p)$

When the value of $p = 4$ and $y = 6$

$(2 \times p)+) (3 \times y) - (2 \times y) + (3 \times p)$

$(2 \times 4) + (3 \times 6) - (2 \times 6) + (3 \times 4)$

$= (8 + 18) - (12 + 12)$

$= 26 - 24$

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

Activity 3

In pairs what is the value of the expressions below:

When $p = 3, q = 5, r = 2, s = 7, c = 6, g = 4$

Show your working out.

a) $s + c - q$

b) $q \times g$

c) $q \times s \times p$

d) $p + c - r$

f) $c \times r$

g) $s + q - p$

h) $s \times c$

e) $q + s - g$

Example 4.

What is the value of?

$$\frac{1}{3}(3x + 5y) + 2y^2 + 7p - 6$$

When

$$x = 4,\ p = 2x \text{ and } y = \frac{1}{2}x + 5$$

Therefore $x = 4,\ p = 2 \times 4 = 8$ and y$= \frac{1}{\cancel{2}} \times \overset{2}{\cancel{4}} \times 6 = 12$

Solution

$$\frac{1}{3}(3 \times 4 + 5 \times 12) + (2 \times 12 \times 12) + (7 \times 8) - 6$$

$$\frac{1}{\cancel{3}} \times \overset{4}{\cancel{12}} + \frac{1}{\cancel{3}} \times \overset{20}{\cancel{60}} + 288 + 50$$

$$4 + 20 + 288 + 50$$

$$= 24 + 338$$

$$\underline{\underline{= 362}}$$

Exercise 1:

When done working out, check your answers with your partner.

1. Solve for p in the equation

   $2p + q + r = 10$ If $q = 4, r = 1$

2. Solve for w in the equation

   $x + w - z = 12$ If $x = 4, z = 2$

3. Given that $x = -2, y = 4$, determine the value of z in the equation

   $x + 2y - z = 0$

4. Given that $p = -3, q = -4$, determine the value ofr in the equation

   $3p - q = r$

5. If $x = -3, z = 10$, determine the value of y if the equation is

   $x + y = z$

6. When $c = 3, a = 4, b = 5$ what is the value of:
   - a) $(c + a) - (b - a)$
   - b) $(b + a) + (b - c)$
   - c) $(b - c) + (a - c)$
   - d) $(c \times a) - (b + a)$
   - e) $(b \times a) + (c + b)$
   - f) $(b - a) + (a - c)$

7. If h=8, g=7, f=5 what is the value of:
   - a) $2(h - f)$
   - b) $(h + h) - (g + f)$
   - c) $3g + 5f - h$
   - d) $(g - f) + (h - g)$

8. When $d = 4, e = 6, q = 2$ what is the value of:
   - a) $(d \times q) + (e \times d)$
   - b) $e + d - q$
   - c) $3d + 2e - q$
   - d) $(e + d) - (e - q)$
   - e) $2(q + d)$
   - f) $4q + 3d - 2e$

4.3 Forming and solving algebraic equations

We use these expressions to find the numbers of the unknown items.

Example 5.

The statements below can be expressed in algebraic expressions as shown.

1. **d** added to thrice **d** is expressed as d + 3d

2. what is the cost of 6 pens if each pen costs p-3 is expressed as

   $6\,(p - 3) = 6p - 18$

3. Add twice f to 5f – 7 is expressed as

   $5f - 7 + 2f$

   $= 5f + 2f - 7$

   $= 7f - 7$

Activity 4

In groups, write the following statements in algebraic form:

a) Q added to thrice q.

b) Twice p added to $m + 4$

c) Sum of b and 8 subtracted from the sum of 2a and 6.

d) P subtracted from thrice p.

e) S added to half s.

f) R added to $2r + q$

Example 6.

In a class of 12 pupils each pupil has y exercise books, how many exercise books are in that class altogether?

Number of pupils $= 12$

Number of books $= y$

Total number of exercise books $= 12 \times y$

$= 12y$ Exercise books

Activity 5

In groups, form and write algebraic expressions for the following statements.

a) Samuel has q books and Mercy has 6, how many books do they have in total?

b) A class has 24 pupils in total, how many boys are there if there are y girls?

c) Mary bought a pen for y South Sudanese Pounds, a book for twice as much the price of the pen and a bag for thrice as much the price of the book, how much did she spend in total?

d) James wants to buy p kg of rice which cost 100 South Sudanese Pounds per kg and y kg of sugar which cost 80 South Sudanese Pounds per kg, how much must he have in order to buy the items?

Exercise 2:

1. Find the value of $2y(x + 2q) + yq$ when $x = y = 6$ and $q = 3$

2. What is the value of $a\,(2b + c) + b - 3c$ when $a = 8, b = 4$ and $c = \frac{a+b}{6}$?

3. What is the value of?

$\frac{5e+f}{g} + e$ if $e = 3, f = 3g + 2$ and $g = e + 1$

4. What is the value of $\frac{\text{qp}-\text{q}\times\text{r}}{p-r}$, if $p = 6, q = r + 3$, and $r = p - 2$

5. What is the value of J if $JL = \frac{12\times0.7}{6}$ and $L = 25$?

6. Find the value of p, $p = \frac{\text{xz}+2\text{yz}}{z+y}$ if $x = 1\frac{1}{2}, y = 3, z = 5$

7. What is half the value of?

$\frac{4b(2a^2-8c)}{6c+d}$ When $a = 6,\ b = c - 1,\ c = 5,\ d = a - b$

8. What is the value of the expression? $\frac{q^2(m^2-n)}{mn}$ Where $q = 3, m = q + 2$ and $n = q + 3$

9. What is the value of? $\frac{r+s}{m-n}$ given that $r = 3,\ s = r + 1,\ m = r + s$ and $n = m - 2$

10. Find the value of $\frac{2k-l}{n} + m$, When $m = 5,\ n = 2m,\ k = m + 9$ and $l = k - 6$

11. What is the value of $3(m^2 - n^2 + mn \div n$ if $m = 5, n = m - 1$?

12. Find the value of $\frac{2abc+ac}{a} + bc$ if $a = 6,\ b = c + a,\ c = 4$

4.4 Different notations in sets

To learn about sets we shall use some accepted notations for the familiar sets of numbers.

Some of the different notations used in sets are:

Notation	Definition
$\in$	Belongs to
$\notin$	Does not belongs to
: or |	Such that
$\emptyset$	Null set or empty set
n(A)	Number of elements in set A
$\cup$	Union of two sets
$\cap$	Intersection of two sets
$\mathbb{N}$	Set of natural numbers = {1, 2, 3, ...}
$\mathbb{Z}_0^+$	Set of whole numbers = {0, 1, 2, 3, ...}
$\mathbb{Z}$	Set of integers = {........., -2, -1, 0, 1, 2, ...}
$\mathbb{Z}^+$	Set of all positive integers=$\mathbb{N}$
$\mathbb{Q}$	Set of all rational numbers
$\mathbb{Q}^+$	Set of all positive rational numbers
$\mathbb{R}$	Set of all real numbers
$\mathbb{R}^+$	Set of all positive real numbers
$\mathbb{C}$	Set of all complex numbers

These are the different notations in sets generally required while solving various types of problems on sets.

Note:

i. The pair of curly braces { } denotes a set. The elements of set are written inside a pair of curly braces separated by commas.

ii. The set is always represented by a capital letter such as; A, B, C….

iii. If the elements of the sets are alphabets then these elements are written in small letters.

iv. The elements of a set may be written in any order.

v. The elements of a set must not be repeated.

vi. The Greek letter Epsilon '∈' is used for the words 'belongs to', 'is an element of', etc.

vii. Therefore, x ∈ A will be read as 'x belongs to set A' or 'x is an element of the set A'.

viii. The symbol '∉' stands for 'does not belongs to' also for 'is not an element of'.

Therefore, x ∉ A will read as 'x does not belongs to set A' or 'x is not an element of the set A'.

Activity 6

From the notations learners to write the notations on cards and their explanations on different cards. Give them to your partners for them to match. Check if your partner got it correct.

4.5 Equivalent Sets

Two sets A and B are said to be equivalent if their cardinal number is same, i.e., n(A) = n(B). The symbol for denoting an equivalent set is '$\leftrightarrow$'.

Example 7.

A = {1, 2, 3} Here n(A) = 3

B = {p, q, r} Here n(B) = 3

Therefore, A $\leftrightarrow$ B

4.6 Equal sets

Two sets A and B are said to be equal if they contain the same elements. Every element of A is an element of B and every element of B is an element of A.

Example 8.

A = {p, q, r, s}
B = {p, s, r, q}

Therefore, A = B

Exercise 3:

Working in pairs, discuss which of the following pairs of sets are equivalent or equal.

a) $A = \{x : x \in N, x \leq 6\}$
$B = \{x : x \in W, 1 \leq x \leq 6\}$

b) P = {The set of letters in the word ‘plane’}
Q = {The set of letters in the word ‘plain’}

c) X = {The set of colors in the rainbow)
Y = {The set of days in a week}

d) $M = \{4, 8, 12, 16\}$
$N = \{8, 12, 4, 16\}$

e) $A = \{x \mid x \in N, x \leq 5\}$
$B = \{x \mid x \in I, 5 < x \leq 10\}$

With your partner make a group with another pair;

One pair goes first and demonstrates using an example

How they know if a set is equivalent or equal

The other pair listens and then share their example.

4.7 Solving set problems using venn diagrams

One Venn diagram can help solve the problem faster and save time. This is especially true when more than two categories are involved in the problem.

Example 9.

In a class of 100 learners, 35 like science and 45 like math. 10 like both. How many like either of them and how many like neither?

Solution:

Total number of learners, n = 100

Number of science learners, $n(S) = 35$

Number of math learners, $n(M) = 45$

Number of learners who like both, $n(M \cap S) = 10$

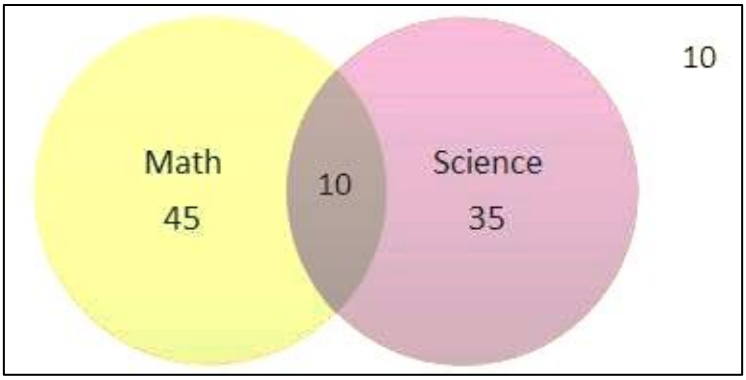
Number of learners who like either of them,

$n(M \cup S) = n(M) + n(S) - n(M \cap S)$

$\rightarrow 45+35-10 = 70$

Number of learners who like neither $= n - n(M \cup S) = 100 - 70 = 30$

The easiest way to solve problems on sets is by drawing Venn diagrams, as shown below.



Activity 5

In groups, use venn diagrams to solve the following;

1. There are 30 learners in a class. Among them, 8 learners are learning both English and Mathematics. A total of 18 learners are learning English. If every learner is learning at least one subject, how many learners are learning Mathematics in total?

2. In a group, there were 115 people whose proofs of identity were being verified. Some had passport, some had voter id and some had both. If 65 had passport and 30 had both, how many had voter id only and not passport?

3. Among a group of people, 40% liked red, 30% liked blue and 30% liked green. 7% liked both red and green, 5% liked both red and blue, 10% liked both green and blue. If 86% of them liked at least one colour, what percentage of people liked all three?

UNIT 5: STATISTICS

5.1 Frequency Distribution

A frequency distribution is defined as an orderly arrangement of data classified according to the magnitude of the observations.

Frequency distribution helps us

1. To analyze the data.
2. To estimate the frequencies of the data.
3. To facilitate the preparation of various statistical measures.

Frequency and Frequency Tables

The **frequency** of a particular data value is the number of times the data value occurs.
A **frequency table** is constructed by arranging collected data values in ascending order of magnitude with their corresponding frequencies.

When the set of data values are spread out, it is difficult to set up a frequency table for every data value as there will be too many rows in the table. So we group the data into **class intervals** (or groups) to help us organize, interpret and analyze the data.

Each group starts at a data value that is a multiple of that group. For example, if the size of the group is 5, then the groups should start at 5, 10, 15, 20 etc.

Likewise, if the size of the group is 10, then the groups should start at 10, 20, 30, 40 etc.

The **frequency of a group** (or class interval) is the number of data values that fall in the range specified by that group (or class interval).

Example 1.

The number of calls from motorists per day for roadside service was recorded for the month of December 2016. The results were as follows:

28	122	217	130	120	86	80	90	120	140
70	40	145	187	113	90	68	174	194	170
100	75	104	97	75	123	100	82	109	120
81									

Set up a frequency table for this set of data values.

Solution:

To construct a frequency table, we proceed as follows:

Smallest data value = 28

Highest data value = 217

$$\text{Difference} = \text{Highest value} - \text{Smallest value}$$
$$= 217 - 28$$
$$= 189$$

Let the width of the class interval be 40.

$$\therefore \text{ Number of class intervals} = \frac{189}{40} = 4.7 = 5 \qquad \{\text{Round up to the next integer}\}$$

There are at least 5 class intervals. This is reasonable for the given data.

Step 1: Construct a table with three columns, and then write the data groups or class intervals in the first column.

The size of each group is 40. So, the groups will start at 0, 40, 80, 120, 160 and 200 to include all of the data.

Note that in fact we need 6 groups (1 more than we first thought).

Class interval	Tally	Frequency
0 - 39		
40 - 79		
80 - 119		
120 - 159		
160 - 199		
200 - 239		

Step 2: Go through the list of data values. For the first data value in the list, 28, place a tally mark against the group 0-39 in the second column.

For the second data value in the list, 122, place a tally mark against the group 120-159 in the second column. For the third data value in the list, 217, place a tally mark against the group 200-239 in the second column.

Class interval	Tally	Frequency
0 - 39	I	
40 - 79		
80 - 119		
120 - 159	I	
160 - 199		
200 - 239	I	

We continue this process until all of the data values in the set are tallied.

Step 3: Count the number of tally marks for each group and write it in the third column. The finished frequency table is as follows:

Class interval	Tally	Frequency
0 - 39	I	1
40 - 79	~~IIII~~	5
80 - 119	~~IIII~~ ~~IIII~~ II	12
120 - 159	~~IIII~~ III	8
160 - 199	IIII	4
200 - 239	I	1
	Sum =	31

Exercise 1:

1. Construct the frequency distribution table for the data on heights (cm) of primary 7 pupils using the class intervals 130 - 135, 135 - 140 and so on.
   The heights in cm are: 140, 138, 133, 148, 160, 153, 131, 146, 134, 136, 149, 141, 155, 149, 165, 142, 144, 147, 138, 139.

2. Construct a frequency distribution table for the following weights (in gm) of 30 oranges using the equal class intervals, one of them is 40-45 (45 not included). The weights are: 31, 41, 46, 33, 44, 51, 56, 63, 71, 71, 62, 63, 54, 53, 51, 43, 36, 38, 54, 56, 66, 71, 74, 75, 46, 47, 59, 60, 61, 63.

Activity 1

Measure the heights of all the learners in the class and record the heights. Construct a frequency distribution table.

5.2 The mean

To calculate the mean, simply add all of your numbers together.

Next, divide the sum by however many numbers you added. The result is your *mean* or average score.

Example 2.

Let's say you have four test scores: 15, 18, 22, and 20.

To find the average, you would first add all four scores together, then divide the sum by four. The resulting mean is 18.75. Written out, it looks something like this:

$(15 + 18 + 22 + 20) / 4 = 75 / 4 = 18.75$

Exercise 2:

Calculate the mean of the following groups of data.

a. 97, 11, 13, 21, 70, 61, 45, 85, 87

b. 5, 38, 79, 5, 2, 50, 69, 16, 70, 27

c. 76, 13, 22, 74, 20, 1, 1, 74, 10

d. 32, 50, 78, 69, 50, 46, 22, 76, 94

e. 60, 17, 11, 70, 18, 25, 70, 90, 17

5.3 The median

The median is the middle value in a data set.

To calculate it, place all of your numbers in increasing order. If you have an odd number of integers, the next step is to find the middle number on your list.

Example 3.

Find the median.

3, 9, 15, 17, 44

The middle or median number is 150

If you have an even number of data points, calculating the median requires another step or two.

First, find the two middle integers in your list. Add them together, then divide by two.

The result is the median number.

Example 4.

Find the median.

3, 6, 8, 12, 17, 44

The two middle numbers are 8 and 12.

Written out, the calculation would look like this:

$(8 + 12) \div 2 = \frac{20}{2} = 10$

In this instance, the median is 10.

Exercise 3:

Find the mean and median for the following list of values:

13, 18, 13, 14, 13, 16, 14, 21, 13

5.4 The mode

The mode is about the frequency of occurrence. There can be more than one mode or no mode at all; it all depends on the data set itself. For example, let's say you have the following list of numbers:

3, 3, 8, 9, 15, 15, 15, 17, 17, 27, 40, 44, 44

In this case, the mode is 15 because it is the integer that appears most often. However, if there were one fewer 15 in your list, then you would have four modes: 3, 15, 17, and 44.

Exercise 4:

Calculate the Median for Each of the Sets of Numbers:

1.18, 38, 46, 7, 12, 43, 11

2. 23, 48, 6, 1, 3, 8, 1

3. 34, 50, 20, 44, 30, 49

4. 34, 26, 30, 18, 7, 30

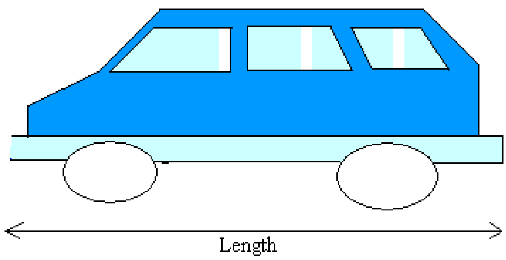
5. 30, 7, 9, 36, 32, 44, 29

Activity 2

Using the data collected in activity 1, calculate the mean, median and mode.

5.5 Scale Drawings

Since it is not always possible to draw on paper the actual size of real-life objects such as the real size of a car, an airplane, we need scale drawings to represent the size like the one you see below of a van.



In real-life, the length of this van may measure 240 inches. However, the length of a copy or print paper that you could use to draw this van is a little bit less than 12 inches

Since $\frac{240}{12} = 20$, you will need about 20 sheets of copy paper to draw the length of the actual size of the van

In order to use just one sheet, you could then use 1 inch on your drawing to represent 20 inches on the real-life object

You can write this situation as 1:20 or $\frac{1}{20}$ or 1 to 20

Example 5.

The length of a vehicle is drawn to scale. The scale of the drawing is 1:20

If the length of the drawing of the vehicle on paper is 12 inches, how long is the vehicle in real life?

Set up a proportion that will look like this:

$$\frac{\text{Length of drawing}}{\text{Real Length}} = \frac{1}{20}$$

Do a cross product by multiplying the numerator of one fraction by the denominator of the other fraction

Length of drawing × 20 = Real length × 1

Since length of drawing = 12, we get:

$$12 \times 20 = Real\ length \times 1$$
$$240\ inches = Real\ length$$

Exercise 5:

Show your working out.

1. A map has a scale of 1cm: 3 miles. On the map, the distance between two towns is 7cm. What is the actual distance between the two towns

2. The diagram shows part of a map. It shows the position of a school and a shop.

The scale of the map is 1cm = 100 metres.

Work out the real distance between the school and the shop. Give your answer in metres.

3. A map has a scale of 1cm: 4 kilometres. The actual distance between two cities is 52 kilometres. What is the distance between the cities on the map?

4. A map has a scale of 1:4000. On the map, the distance between two houses is 9cm. What is the actual distance between the houses? Give your answer in metres.

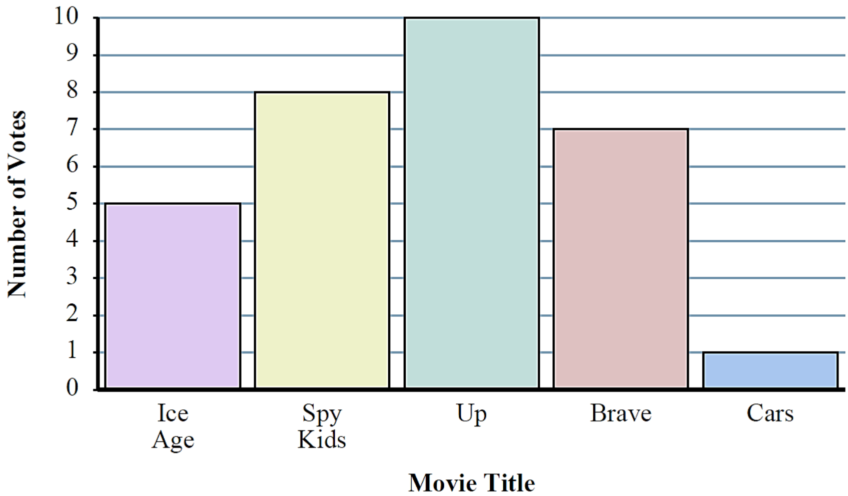
5. A scale drawing has a scale of 1:20. In real life the length of a boat is 150m. What is the length of the boat on the scale drawing? Give your answer in centimetres.

5.6 Graph

Bar Graph

A Bar Graph (also called Bar Chart) is a graphical display of data using bars of different heights.

At home the learners had to vote on which movie to watch. The voting results are listed below. Use the bar graph to answer the questions.



Work in pairs;

1) How many people voted for Ice Age?
2) Did more people vote for Ice Age or for Up?
3) Did fewer learners vote for Cars or for Brave?
4) Which movie received exactly 10 votes?
5) What is the difference in the number of people who voted for Brave and the number who voted for Spy Kids?
6) What is the combined number of people who voted for Up and Brave?

Circle Graphs or Pie Charts

A pie chart (also called a Pie Graph or Circle Graph) makes use of sectors in a circle. The angle of a sector is proportional to the frequency of the data.

The formula to determine the angle of a sector in a circle graph is:

$$\text{Angle of sector} = \frac{\text{Frequency of data}}{\text{Total frequency}} \times 360°$$

Study the following steps of constructing a circle graph or pie chart:

Step 1: Calculate the angle of each sector, using the formula

$$\text{Angle of sector} = \frac{\text{Frequency of data}}{\text{Total frequency}} \times 360°$$

Step 2: Draw a circle using a pair of compasses
Step 3: Use a protractor to draw the angle for each sector.
Step 4: Label the circle graph and all its sectors.

Example 6.

In a school, there are 750 learners in Year1, 420 learners in Year 2 and 630 learners in Year 3. Draw a circle graph to represent the numbers of learners in these groups.

Solution:

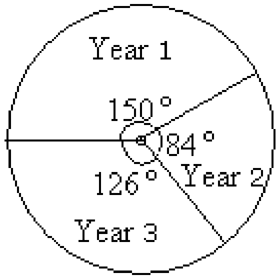
Total number of learners = 750 + 420 + 630 = 1,800.

$$\text{Year 1: size of angle} = \frac{750}{1800} \times 360° = 150°$$

$$\text{Year 2: size of angle} = \frac{420}{1800} \times 360° = 84°$$

$$\text{Year 3: size of angle} = \frac{630}{1800} \times 360° = 126°$$

Draw the circle, measure in each sector. Label each sector and the pie chart.



Groups of students in a school

Activity 3

Look at this record of traffic travelling down a particular road.

Type of vehicle	Number of vehicles
Cars	140
Motorbikes	70
Vans	55
Buses	5
Total vehicles	270

Drawing a pie chart.

5.7 Probability

The probability of an event is a number describing the chance that the event will happen.

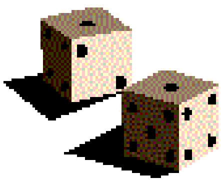
An event that is certain to happen has a probability of 1.

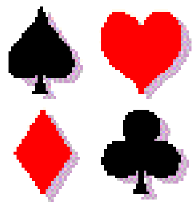
An event that cannot possibly happen has a probability of zero.

If there is a chance that an event will happen, then its probability is between zero and 1.

Examples of Events:

- Tossing a coin and it landing on *heads*.
- Tossing a coin and it landing on *tails*.
- Rolling a '3' on a die.
- Rolling a number > 4 on a die.
- It rains two days in a row.
- Drawing a card from the suit of clubs.
- Guessing a certain number between 000 and 999 (lottery).





Events that are certain:

- If it is Thursday, the probability that tomorrow is Friday is certain, therefore the probability is 1.
- If you are sixteen, the probability of you turning seventeen on your next birthday is 1. This is a certain event.

Events that are uncertain:

- The probability that tomorrow is Friday if today is Monday is 0.
- The probability that you will be seventeen on your next birthday, if you were just born is 0.

Let's take a closer look at tossing the coin. When you toss a coin, there are two possible outcomes, "heads" or "tails."

Examples of outcomes:

- When rolling a die for a board game, the outcomes possible are 1, 2, 3, 4, 5, and 6.
- The outcomes when choosing the days of a week are Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, and Saturday.

Activity 4

In groups, collect different marbles or any available safe materials to do the activity.

Materials: Sack; marbles of two different colors - 100 of one color (blue), 25 of another color (green).

Procedure:

Put all the marbles in the sack.

We will try to find out - without looking in the sack and counting whether there are more blue marbles or more green marbles in the sack.

Have four learners draw five marbles each from the sack. (Make sure that the marbles are put back into the sack after each draw.)

Have every learner record the numbers and colors of marbles for each of the four draws.

Questions

1. On the basis of the first four draws how many marbles of each color are there in the sack?

   Let each learner in the rest of the class draw five marbles each from the sack. (Be sure to put the marbles back in the sack after each drawing.)

2. What are the totals for each color of marble?
3. Do you think there were more marbles of one color than the other? Why?
4. If so, what do you think the ratio of one color to the other might be? G. Open the sack and count the number of marbles of each color.
5. What is the ratio of one color to the other color?

UNIT 6: BUSINESS ACCOUNTING

6.1 profit and loss

When a trader sells an item at a higher cost than the initial buying price, the difference between the **buying price** and **selling price**, is termed as a **profit.**

At times a trader may sell an item at a lower price as compared to the initial buying price, the difference between the **selling price** and the **buying price** is termed as a **loss.**

Example 1.

1. A seller bought a bag of rice at 7000 South Sudanese Pounds and later sold it at 100000 South Sudanese Pounds. What profit did he make?

Buying price = 7000 South Sudanese Pounds.

Selling price = 100000 South Sudanese Pounds.

Profit = selling price – buying price.

= 100000 – 70000
= 30000 South Sudanese Pounds.

2. A seller bought a bag of maize at 10000 South Sudanese Pounds and later sold it at 8000 South Sudanese Pounds. What loss did he make?

Buying price =10000 South Sudanese Pounds.
Selling price = 8000 South Sudanese Pounds.
Loss = buying price – selling price.
= 10000 – 8000

= 2000 South Sudanese Pounds.

Activity 1.

Work in groups. Record your working out.

a) A seller bought a bag of potatoes at 1500 South Sudanese Pounds and later sold it at 800 South Sudanese Pounds. What loss did he make?

b) A boy bought a shirt at 600 South Sudanese Pounds and later sold it to his friend at 900 South Sudanese Pounds. What profit did he make?

c) A seller bought a bag of potatoes at 20000 South Sudanese Pounds and later sold it and made a profit of 5000 South Sudanese Pounds, how much did he sell the bag?

d) A seller bought a bag of maize at 3000 South Sudanese Pounds and made a loss of 600 South Sudanese Pounds, what was the selling price?

Exercise 1:

1. Copy the table and find the missing values in the table below. Show your working out.

Buying price in SSP	Selling price in SSP	Profit in SSP	Loss in SSP
500		30	
	300		20
600	400		
	200	50	
300			70
100	150		
	500	80	

2. Kuol bought a bike at 500 South Sudanese Pounds and later sold it at 300 South Sudanese Pounds, how much loss did he make?

3. A seller bought vegetables at 50 South Sudanese Pounds and later sold them at 70 South Sudanese Pounds, did he get a profit or a loss and of how much?

4. A girl bought a dress at 120 South Sudanese Pounds and on getting home it was not her size so she sold it to her friend at a loss of 50 South Sudanese Pounds, how much did she sell the dress?

6.2 Discount

At times traders reduce prices of their goods in order to attract more customers. This reduction is what is referred to as **discount.**

Example 2.

The marked price of a trouser is 1000 South Sudanese Pounds. After bargaining David bought it at 800 South Sudanese Pounds. What discount was he allowed for the trouser?

Marked price = 1000 South Sudanese Pounds

Selling price = 800 South Sudanese Pounds

Discount = marked price – selling price

= 1000 - 800

= 200 South Sudanese Pounds

Note: The difference between **marked price** and **selling price** is the **discount**.

Activity 2.

Work in groups or pairs.

a) Faheem bought a pair of shoe at 250 South Sudanese Pounds after a discount of 20 South Sudanese Pounds, what was the marked price of the shoe?

b) The marked price of a bicycle is 500 South Sudanese Pounds, David bought the bicycle for 350 South Sudanese Pounds, and how much was the discount?

c) Samuel bought 14 sweets at 60 South Sudanese Pounds, if the marked price of each sweet is 5 South Sudanese Pounds, how much discount was he given?

d) The marked price of a bag of maize is 300 South Sudanese Pounds, Faith bought 20 bags at 5800 South Sudanese Pounds. How much discount was she given per bag?

Exercise 2:

1. Copy the table and fill in the missing amounts.

Marked price in SSP	Selling price in SSP	Discount in SSP
a. 200		50
b.	500	20
c. 400	300	
d. 600		100
e.	300	30
f. 250		25

2. The marked price of pair of shoes is 5 800 South Sudanese Pounds James bought it for 4 500 South Sudanese Pounds, how much discount did he get?

3. Mary bought a dress at 3 300 South Sudanese Pounds whose marked price was 3 500 South Sudanese Pounds. How much discount was she given?

4. The marked price of a watch is 800 South Sudanese Pounds, James buys the watch at a discounted price of 150 South Sudanese Pounds. How much did he buy the watch?

6.3 Simple interest

Simple interest is the amount paid for money borrowed or deposited.

Interest is normally paid at a rate expressed as a percentage per year. For instance, a simple interest of 10% per annum (p.a) means that for every 100 South Sudanese Pounds borrowed an interest of 10 South Sudanese Pounds is paid every end year.

Example 3.

1. Faheem borrowed a loan of 2000 South Sudanese Pounds for 1 year. He paid simple interest at the rate of 12% p.a. How much interest did he make?

Simple interest $= Pricipal \times \frac{rate}{100} \times time$

Simple interest $= 20\cancel{00} \times \frac{12}{1\cancel{00}} \times 1$

$= 240$ South Sudanese Pounds

2. David deposited 10 000 South Sudanese Pounds in a saving bank, the bank paid simple interest at the rate of 13% p.a. How much interest did his money earn in 6months?

Simple interest $= Pricipal \times \frac{rate}{100} \times time$

Interest earned after 1 year $= 10000 \times \frac{13}{100} \times 1$

Interest period $= \frac{6}{12}$

Interest earned $= = 10\,000 \times \frac{13}{100} \times \frac{6}{12}$

= 650 South Sudanese Pounds

Activity 3

Work in groups or pairs.

1. Find the simple interest of each of the following
   a. 2 000 South Sudanese Pounds borrowed at the rate of 15% p.a for 3 years.
   b. 5000 South Sudanese Pounds borrowed at the rate of 18% p.a for 7 months
   c. 6 000 South Sudanese Pounds borrowed at the rate of 6% p.a for 1 year.
   d. 3 000 South Sudanese Pounds borrowed at the rate of 5% p.a for 6 months.

2. Mary borrowed 10 000 South Sudanese Pounds for a period of 3months, she was charged simple interest at the rate of 12% p.a. How much interest did she pay?

Example 4.

David borrowed 2000 South Sudanese Pounds in a financial institution that charged 18% p.a. He repaid the loan in 4 months, how much did he pay in total?

Simple interest = principal x rate x time

Simple interest $= Pricipal \times \frac{rate}{100} \times time$

$$= 2000 \times \frac{18}{100} \times \frac{4}{12}$$

= 120 South Sudanese Pounds

Amount paid = 2000 + 120

= 2120 South Sudanese Pounds

Activity 4

Work in groups; How would you work it out.

1. Leyla deposited 20 000 South Sudanese Pounds in a savings account that acquired 12% interest per annum. Calculate the amount of money Leyla had at the end of 3years

2. David borrowed 30 000 South Sudanese Pounds from a financial institution whose simple interest rate is 15%. He repaid the loan at the end of 6 months, how much did he pay in total?

3. Mary borrowed 50 000 South Sudanese Pounds in a financial institution, whose simple interest rate is 14% p.a. She repaid the loan at the end of a year, how much did she pay in total?

How can you check your answers?

Exercise 3:

1. Copy and fill in the missing amounts:

Principal in South Sudanese Pounds	Rate p.a	Time	Simple Interest	Amount
20 000	15%	5 months		
50 000	14%	2 years		
12 000	12%	6 months		
160 000	15%	4 months		
35 000	5%	3 years		
52 000	13%	1 year		
15 000	12%	7 months		

2. Samantha borrowed a loan of 120 000 South Sudanese Pounds and paid in a period of 2 years at a simple interest rate of 12%.
    a. How much interest did she pay?
    b. How much money did she pay in total?

3. Sam deposited 500 000 South Sudanese Pounds in a savings account that acquired simple interest at the rate of 14%, how much did he have in his account at the end of 4years?

4. Mary borrowed 150 000 South Sudanese Pounds from bank whose simple interest rate is 12%. She paid the loan in a period of 3years.
    a. How much interest did she pay?
    b. How much did she pay in total?

6.4 Commission

This is an earning based on percentage of total sales.

Example 5.

1. Joy is paid on commission basis. She is given 5% for every sale she makes. If she sold goods worth 10 000 South Sudanese Pounds, how much was she paid?

   Commission paid = $\frac{5}{100} \times 10\ 000$

   = 500 South Sudanese Pounds.

2. David is paid a salary of 10000South Sudanese Pounds and a 2% commission for every sale he makes. Last month he made a sale of 30000 South Sudanese Pounds, how much was he paid in total?

   Commission = 2/100 x 30000

   = 600

   Total salary = 10 000 + 600

   = 10 600 South Sudanese Pounds.

Activity 5

Work in pairs

1. A store pays 5% commission to its employees for each sale made. Last month their salespersons sold items as follows:

   Sales person A = 20000 South Sudanese Pounds

   Sales person B = 15000 South Sudanese Pounds

   Sales person C = 35000 South Sudanese Pounds

   Sales person D = 55000 South Sudanese Pounds

   How much was each sales person paid?

2. A sales person is paid 30 000 South Sudanese Pounds every end month and a commission of 5% for every sale made. This month he made a sale of 40 000 South Sudanese Pounds, how much money will he be paid in total?

Exercise 4:

1. A sales person is paid a commission of 10% for every sale made, in a certain month he made sales worth 50 000 South Sudanese Pounds, how much was he paid?

2. A store pays its employees on commission basis. Each employee is given a 5% commission for each sale done plus a monthly salary of 30000 South Sudanese Pounds. A certain employee made a sale of 10 000 South Sudanese Pounds, how much was he paid for that month?

3. A sales person is paid a commission of 3% for every sale made, in a certain month he made sales worth 50 000 South Sudanese Pounds, how much was he paid for that month?

4. In a certain month a sales person sold 25 packets of rice each going for 300 South Sudanese Pounds. He is paid a commission of 5% for his sales, how much was he paid for that month?

5. A store pays its sales persons 8% for every sale, David sold 15 bags of rice each at 250 South Sudanese Pounds. How much was he paid for that month?

6.5 Hire purchase

This is whereby a client pays a certain amount first (deposit) and pays the rest over a certain period of time? (Installments).

Example 6.

David bought a chair on hire purchase terms, where he paid a deposit of 2000 South Sudanese Pounds and 5 equal installments of 1000 South Sudanese Pounds each. The original price was 5000. How much was the hire purchase price? How much interest did he incur?

Solution

Hire purchase price = deposit + installments

$= 2000 + (5 \times 1000)$

$= 2000 + 5000$

= 7000 South Sudanese Pounds

Interest = total amount paid – original price

= 7000 – 2000

= 5000 South Sudanese Pounds.

Activity 6

Work in groups

1. Mary bought a bed at a hire purchase price, the price of the bed was 2 000 South Sudanese Pounds or a deposit of 800 South Sudanese Pounds and 4 equal installments of 400 South Sudanese Pounds.
    a) What is the hire purchase price of the bed?
    b) How much interest did she pay?

2. The cash price of a dining set is 5 000 South Sudanese Pounds or a deposit of 1 500 South Sudanese Pounds and 4 equal monthly installments of 1 000 South Sudanese Pounds. Amin opted to buy with the hire purchase price. How much more did he pay?

Exercise 5:

1. David bought a phone on hire purchase basis, where he paid a deposit of 20 000 South Sudanese Pounds and 5 equal installments of 5 000 South Sudanese Pounds each. The cash price of the phone was 30 000 South Sudanese Pounds.
    a) What was the hire purchase price?
    b) How much more did he pay?

2. Malusi bought a radio at a hire purchase price, where he paid a deposit of 30 000 South Sudanese Pounds and 4 equal monthly installments of 5 000 South Sudanese Pounds. The cash price of the radio was 80 000 South Sudanese Pounds.
    a) How much Interest did he pay?
    b) What was the hire purchase price?

3. The marked price of a TV set is 120 000 South Sudanese Pounds. Asim bought at a hire purchase price, which had no deposit, he paid 7 equal monthly installments of 20 000 South Sudanese Pounds. How much more did he pay for it?

4. Rita bought a microwave whose marked price was 15 000 South Sudanese Pounds, she paid a 10% deposit and 6 equal monthly installments of 4 000 South Sudanese Pounds.
    a) How much did she pay for the microwave?
    b) How much would she have saved if she bought cash?

6.5 Bills

This is a printed or written statement of the money owed for goods to be bought or services offered.

Example 5.

Grace bought the following items from a supermarket: 2 packets of rice @ 200 South Sudanese Pounds, 2 packets of flour at 500 South Sudanese Pounds, a loaf of bread @ 50 South Sudanese Pounds and a liter of oil @ 300 South Sudanese Pounds. Prepare a bill for the items.

	ITEM	SOUTH SUDANESE POUNDS
1.	2 packets of rice	2000
2.	2 packets of flour	5000
3.	A loaf of bread	500
4.	A liter of cooking oil	3000
	Total	**10 500**

Total to be paid is SSP10 500

Activity 7

Work in groups and present your calculations.

1. David bought the following items: A radio @ 50 000 South Sudanese Pounds, a TV set @ 80 000 South Sudanese Pounds, a fridge @ 120 000 South Sudanese Pounds, a phone @ 30 000 South Sudanese Pounds and a sofa set @ 150 000 South Sudanese Pounds. Prepare a bill for the items.

2. Mary bought the following items from the market: tomatoes @ 70 South Sudanese Pounds, onions @ 50 South Sudanese Pounds, carrots @ 100 South Sudanese Pounds and potatoes @ 200 South Sudanese Pounds. She paid 500 South Sudanese Pounds.

    a) Prepare a bill for the items
    b) How much change was she given?

Exercise 6:

1. A learner bought the following items: A pencil @ 30 South Sudanese Pounds, a text book @ 200 South Sudanese Pounds, an exercise book @ 50 South Sudanese Pounds, a rubber @ 10 South Sudanese Pounds and a ruler @ 15 South Sudanese Pounds.
    a) Prepare a bill for the learner.
    b) If the learner paid with 500 South Sudanese Pounds, how much change was she given?

2. Grace bought the following items: a pair of shoes @ 350 South Sudanese Pounds, a dress @ 150 South Sudanese Pounds, sunglasses @ 200 South Sudanese Pounds and a bracelet @ 60 South Sudanese Pounds. Prepare a bill for her.

3. Amin bought the following items: a set of plates @ 300 South Sudanese Pounds, a set of cups @ 250 South Sudanese Pounds, a set of spoons @ 150 South Sudanese Pounds and 5 table mats @ 100 South Sudanese Pounds.
    a) Prepare a bill for Amin
    b) If he paid 1000 South Sudanese Pounds how much was he to add to clear the bill?

4. A farmer bought the following items from farm inputs shop
    i. 3 kg of pesticides at 750ssp per kg
    ii. 5 kg fertilizer at 550 ssp per kg
    iii. 5 kg of beans at 650 ssp per kg.
    iv. 8 bags of maize at 1050 ssp per bag.

    If he gave ssp. 150 000 to the shop attendant, how much balance was he given?

Activity 8

With the guidance of the teacher, visit a nearby shop or hotel and request the shop or hotel owner to explain how they prepare bills.

South Sudan

Primary Mathematics 7

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