

# MATHEMATICAL LITERACY

WINTER CLASSES

GRADE 12

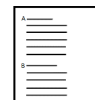
TERM 2

## TEACHER AND LEARNER CONTENT MANUAL

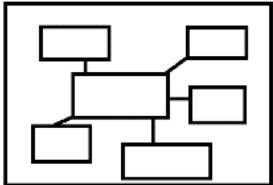

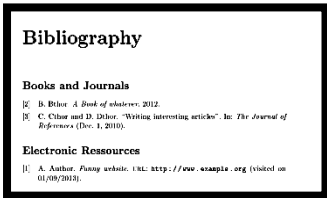
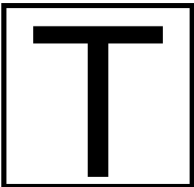
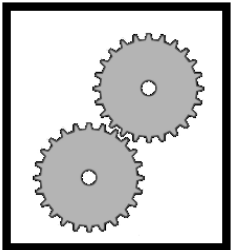





## MATHEMATICAL LITERACY PROGRAMME FOR 2025 WINTER CLASSES

| STRUCTURE OF EXAMINATION   |                       |             |              |
|--|-----------------------|-------------|--------------|
| PAPER  | TOPICS                | TOTAL MARKS | WEIGHTING    |
| <b>PAPER 1:</b><br>(FINANCE & DATA HANDLING)                                     | Finance               | ±90         | ± 60 %       |
|  | Data Handling         | ±53         | ± 35 %       |
|  | Probability           | ±7          | 5%           |
| <b>TOTAL</b>   |                       | ± 4         | ± 32%        |
| <b>PAPER 2:</b><br>(MEASUREMENT, MAPS, PLANS & SCALES)                           | Measurement           | ± 83        | ± 55%        |
|  | Maps, Plans and Scale | ± 60        | ± 40%        |
|  | Probability           | ±7          | ± 5%         |
| <b>TOTAL</b>   |                       | <b>150</b>  | <b>±100%</b> |
| Pre-test and Post-test to be administered focuses on Scale, Maps and Measurement |                       |             |              |



|  |                |
|--|----------------|
| <b>GUIDELINES</b> <ul style="list-style-type: none"> <li>○ Icon descriptions</li> <li>○ Examination Guideline</li> <li>○ Lesson Objectives</li> <li>○ Important terms and definitions</li> </ul> | <b>4 - 8</b>   |
| <b>SECTION 1: Maps And Scales</b> <ul style="list-style-type: none"> <li>○ Outlining the key concepts</li> <li>○ Worked examples.</li> <li>○ Activities</li> </ul>                               | <b>9 - 37</b>  |
| <b>SECTION 2: Measurement</b> <ul style="list-style-type: none"> <li>○ Outlining the key concepts</li> <li>○ Worked examples.</li> <li>○ Activities</li> </ul>                                   | <b>38 - 77</b> |
| <b>SECTION 3: Assembly Diagrams and Packaging</b> <ul style="list-style-type: none"> <li>○ Outlining the key concepts</li> <li>○ Worked examples.</li> <li>○ Activities</li> </ul>               | <b>78 -98</b>  |
| <b>BIBLIOGRAPHY</b>  | <b>98</b>      |

| ICON DESCRIPTION  |   |  |   |
|---|---|--|---|
| <b>MIND MAP</b><br>        | <b>EXAMINATION<br/>GUIDELINE</b><br> | <b>BIBLIOGRAPHY</b><br> | <b>TERMINOLOGY</b><br> |
| <b>WORKED EXAMPLES</b><br> | <b>STEPS</b><br>                     | <b>CONTENTS</b><br>     | <b>ACTIVITIES</b><br>  |

## Topic: Scale and Maps

### Examination Guidelines



| Section | Level 1<br>Knowing   | Level 2<br>Applying routine procedures<br>in familiar contexts  | Level 3<br>Applying multi-step<br>procedures in a variety of<br>contexts  | Level 4<br>Reasoning and reflecting   |
|---------|--|---|---|---|
| Scale   | <ul style="list-style-type: none"><li>Explain the meaning of a given scale, (e.g. explain what the scale 1 :100 means in terms of the measurements on a plan and actual dimensions).</li></ul> | <ul style="list-style-type: none"><li>Use a given scale to determine actual measurements when given measured values, or measured values from given actual values.</li></ul> | <ul style="list-style-type: none"><li>Use a given scale in conjunction with measurement on a plan/map to determine length/dimensions.</li><li>Determine the scale of a map or plan.</li><li>Use a given scale in conjunction with other content or skills to complete a project (e.g. use a given scale to determine the dimensions in which to draw a 2-dimensional plan of an object and then draw the plan).</li></ul> | <ul style="list-style-type: none"><li>Critique the scale in which an object has been drawn and offer an opinion as to a more appropriate scale.</li><li>Decide on an appropriate scale to which to draw a picture or build a model and then complete the project.</li></ul> |
| Maps    | <ul style="list-style-type: none"><li>Identify the labels/names of national roads (e.g. N3) that must be travelled on to travel between two locations.</li></ul>                               | <ul style="list-style-type: none"><li>Identify the position of two locations on a map and use given distance values on the map to determine the</li></ul>                   | <ul style="list-style-type: none"><li>Use a map in conjunction with a distance chart to determine the shortest route to travel between two locations.</li></ul>   | <ul style="list-style-type: none"><li>Critique a proposed travel route in relation to distance, estimated travelling times, etc. and suggest and justify possible alternative routes.</li></ul>   |

|  |   |   |   |  |
|--|---|---|---|--|
|  | <ul style="list-style-type: none"> <li>• Identify the names of the towns on the route between two locations.</li> <li>• Identify the scale of a map.</li> </ul> | <p>travelling distance between the two locations.</p> <ul style="list-style-type: none"> <li>• Interpret a given set of directions and describe what location the directions lead to.</li> <li>• Provide a set of directions to travel between two locations in a town using street names.</li> </ul> | <ul style="list-style-type: none"> <li>• Identify a possible route between two locations on a map, measure the distance between the locations, and use a given scale to estimate the distance between the two locations.</li> <li>• Estimate travelling times between two or more locations based on estimated travelling speed and known or calculated distances.</li> </ul> | <ul style="list-style-type: none"> <li>• Use maps in conjunction with other travel resources (e.g. exchange rate information; distance chart; bus timetable) and financial information (e.g. fare tables; petrol price) to plan and cost a trip).</li> <li>• Make decisions regarding appropriate stopping points during a journey based on considerations of fatigue, petrol</li> </ul> |
|--|---|---|---|--|

## LESSON OBJECTIVES

### SCALE

Learners must be able to:

|    |  |
|----|--|
| 1. | Work with two types of scales on maps, plans and in construction of models.                            |
| 2. | Calculate actual length and distance when map and/or plan measurements are known.                      |
| 3. | Calculate map and/or plan measurement when actual lengths and distances are known using a given scale. |
| 4. | Determine the most appropriate scale in which to draw; construct a map, plan and /or models.           |
| 5. | Determine the scale in which a map/or plan has been drawn.   |

### MAPS

Learners must be able to:

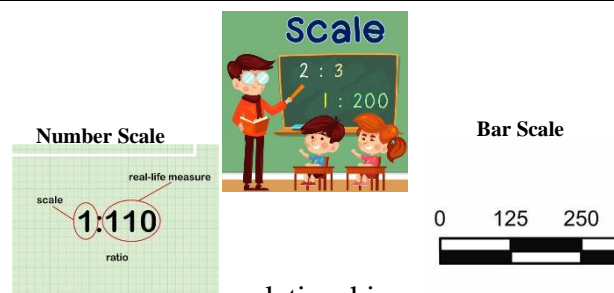
|     |   |
|-----|---|
| 1.  | Describe the position of an object in relation to the surrounding objects.                              |
| 2.  | Find locations, follow directions, and develop directions for travelling between two or more locations. |
| 3.  | Estimate distances using measurement given.   |
| 4.  | Estimate the time it will take to travel between two or more locations.                                 |
| 5.  | Estimate the amount and cost of fuel that will be used to travel between two or more locations.         |
| 6.  | Estimate the average speed travelled during a trip.   |
| 7.  | Determine appropriate stopping locations.   |
| 8.  | Plan and cost trips using timetables, fare charts, distance charts and budget.                          |
| 9.  | Work with combination of maps showing different perspective and scale.                                  |
| 10. | Interpret compass directions in the context of appropriate maps and plans.                              |
| 11. | Understand directions and signboards on roads and in map books.   |
| 12. | Interpret elevation plans of building   |

## IMPORTANT TERMINOLOGY

| Scale, Maps and Plans             |   |
|-----------------------------------|---|
| <b>Dimensions</b>                 | The measurements of an object which describes its size and shape, in terms of its length, width(breath) and height.   |
| <b>Numeric Scale/Number Scale</b> | A scale that is written in a ratio format. E.g., 1:100  |
| <b>Scale factor</b>               | The factor by which each dimension of the actual object is either reduced (for very large objects) or enlarged (for very small object).<br>e.g., 1:100..... where 100 is the scale factor             |
| <b>Bar Scale</b>                  | Also known as Linear scale. A map element that graphically represents the scale of a map by means of a line with ruler marking and units that are proportional to the scale.                          |
| <b>Map</b>                        | Two-dimensional representation of an area of the earth's surface. E.g., map of South Africa.  |
| <b>Compass Direction</b>          | The four directions or cardinal points are the four main compass directions: north, east, south, and west   |
| <b>Grid Reference</b>             | A map that has been divided up in rows and columns, forming a grid, which is labelled alphabetically or numerically and is used to easily reference a particular area or point on the map.            |
| <b>Strip map/chart</b>            | A linear map, not drawn to scale, represents the approximate distances between major towns along a main road, as well s the general direction in which the major towns lie relative to the main road. |
| <b>Distance table</b>             | A table which indicates the approximate distances between different towns.  |
| <b>Transport Map</b>              | A map which indicates the transport routes that a bus/taxi/train takes, together with its stops along the route.  |



TOPIC: Scales and Maps



What is a Scale?

A scale represents the relationship between a measurement on a model and the corresponding measurement on the actual object

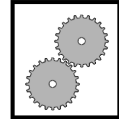
Types of Scales

| Number Scale   | Bar Scale  |
|--|--|
| <p>It is also known as <b>ratio scale</b>.<br/>Number Scales are always written in the form.</p> <p style="text-align: center;"><math>1 : 20</math><br/>Map : Reality</p> <p>This means that 1 unit on the map equals 100 units in reality.</p> <p><b>NB: The explanation is only correct when units are the same.</b></p> | <p>Also known as a <b>linear scale</b>, it is a means of visually showing the scale of the map.<br/>Example of a bar scale</p> <div style="text-align: center;"> </div> <p style="text-align: right;">It also</p> <p>shows the relationship between distances on the map and the real world.</p> |

ADVANTAGES AND DISADVANTAGES OF EACH TYPE OF SCALE

| Types of Scale | Advantages  | Disadvantages   |
|----------------|---|---|
| Bar Scale      | <ul style="list-style-type: none"> <li>Are quick and easy to use.</li> <li>You may be able to determine actual lengths and distances without doing calculations.</li> </ul> | <ul style="list-style-type: none"> <li>Measurements (using a ruler, string or markings) obtained using bar scales tend to be less accurate.</li> <li>Bar scales may still require calculation to determine the actual lengths and distances.</li> </ul> |
| Number Scale   | <ul style="list-style-type: none"> <li>Are more accurate than bar scales.</li> <li>Are more convenient to use when working with small scales.</li> </ul>                    | <ul style="list-style-type: none"> <li>Number scales require the use of calculators in determining actual distances.</li> <li>With digital printing number scales become inaccurate and if there is resizing of the map or plan.</li> </ul>             |

### Worked Example: Bar and Number Scale



- 1.1 On a map the scale is shown as 50 cm : 100 km. Use this information to answer the questions that follow

- 1.1.1 Write down the name of the scale given in the context.

(2)

**Possible Answer:**

Number Scale (Ratio Scale)

- 1.1.2 Express the given scale in the form of 1 : ...

(3)

**Possible Answer:**

50 cm : 10 000 000 cm

$$\frac{50 \text{ cm}}{50} : \frac{10\,000\,000}{50}$$

1 : 200 000

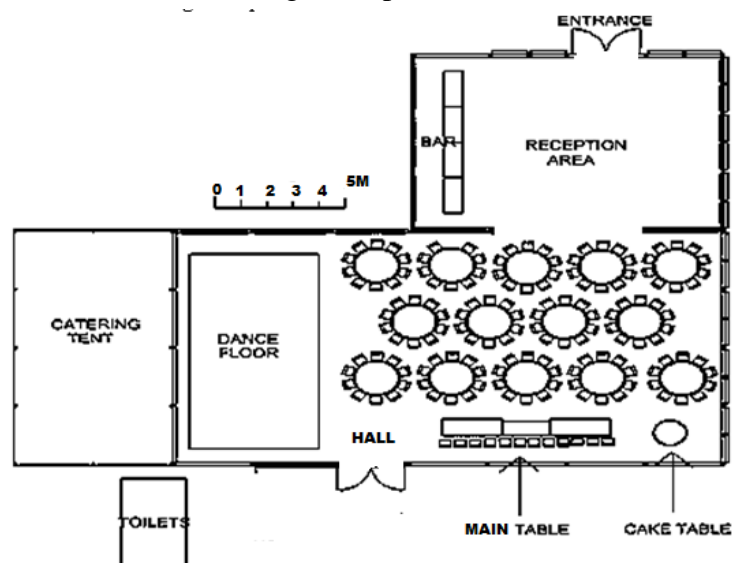
- 1.1.2 Write down the explanation of the scale above.

(2)

**Possible Answer:**

It means 50 cm on the map represents 100 km on the ground

- 1.2 Shown below is the layout plan for a wedding venue. The venue has a reception area and a hall where the wedding takes place.



- 1.2.1 Identify the type of scale seen on the layout plan. (2)

**Possible Answer:**

Bar Scale (Line Scale)

- 1.2.2 Explain what this scale represents. (2)

**Possible Answer:**

2,5 cm on the plan represents 5m in reality / 25 mm on the plan represents 5m in reality

- 1.2.3 Measure the scale and use your answer to write the scale as a number scale. (5)

**Possible Answer:**

1.6 cm/16mm (Measure the final printed copy)

1,6 cm = 5 m

1,6 : 500 (both values to cm)

1 : 312,5

- 1.2.4 Determine the total number of people the hall can seat. (3)

**Possible Answer:**

Number of people =  $(13 \times 10) + 9 + 12$   
= 151

### ACTIVITY 1: Bar and Number Scale

(25 marks: 20 minutes)



1.1 The scale below was shown on the map

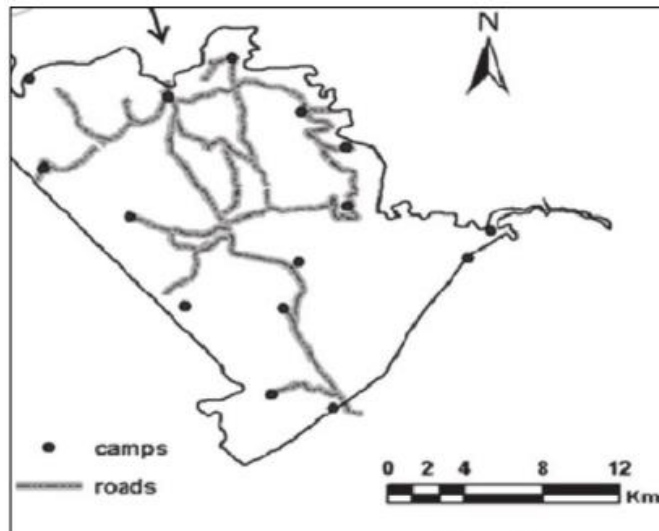
1 : 20

Choose the correct explanation for the scale above

- A. One cm on the map is equal to twenty centimetres in reality
- B. One cm on the map is equal to twenty millimetres in reality

(2)

1.2 The map of Mkhuze Game Reserve is shown below. Use the map to answer the questions that follow.



[Adapted from resource: researchgate.net]

1.2.1 Identify the type of scale used on the map.

(2)




1.2.2 Explain the meaning of the scale.

(2)

1.2.3 Complete the missing value:  
... mm = 12 km

(2)

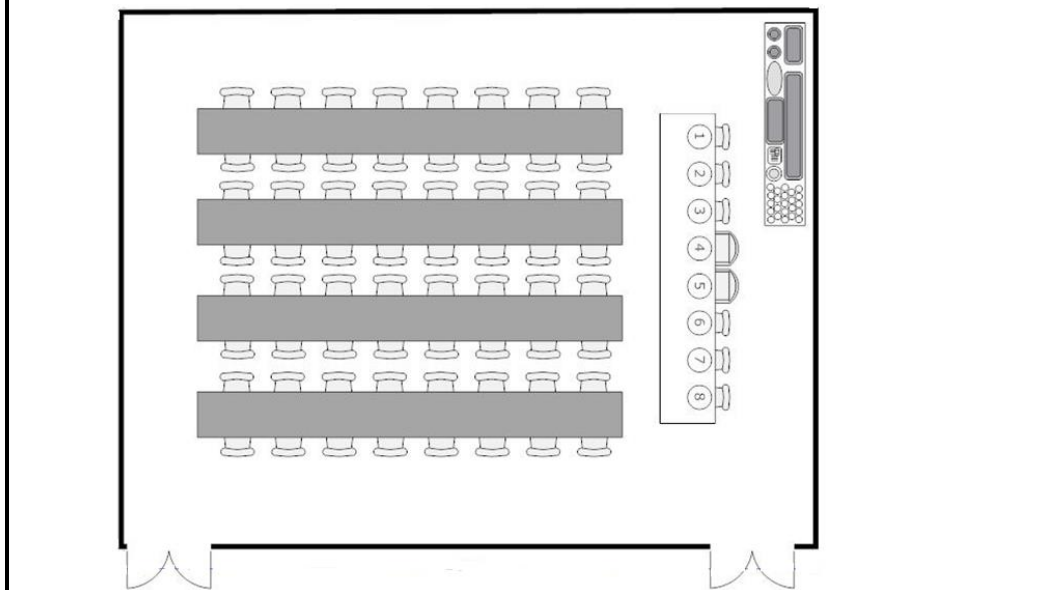
- 1.3 The three pictures below shows the same air balloon which is drawn using three different scales (A,B and C) in a random order

| Picture 1   | Picture 2   | Picture 3  |
|---|---|--|
|  |  |  |

- A. 1: 20 000  
B. 1: 100 000  
C. 1: 50 000

- 1.3.1 Name the type of scale used to draw the sketches above. (2)
- 1.3.2 Write down the explanation for scale B (2)
- 1.3.3 Match each picture with the correct scale. (6)

- 1.4 Shown below is the seating plan of a boardroom.



- 1.4.1 Write down the total number of people that can be seated in the boardroom. (2)
- 1.4.2 The actual outside length of the boardroom is 12m.
- (a) Measure the actual length of the boardroom on the seating plan. (2)
- (b) Hence, calculate the scale used in this seating plan. (3)

1.5

Netball world cup was held in Cape Town. A Netball first team from Bloemfontein decided to use the opportunity to raise funds for their tour in 2024. The team decided to raise funds for their trip to Cape Town. They decided to sell branded water bottles.

They made the stickers to paste on the bottles. The sticker will cover the whole height of the bottle. The sticker below is drawn to a scale of 1:5.



Use the information above to answer the questions that follow.

1.5.1 Explain the meaning of the number scale 1:5 (2)

1.5.2 Draw an appropriate bar scale that will represent the number scale, using the distances of 2 cm and 7 cm. (2)

1.5.3 Determine the circumference of the bottle if sticker does not cover 15% of the circumference. (5)

1.5.4 Explain why a bar scale and not a number scale would be more sought after. (2)

**[11]**

## Maps

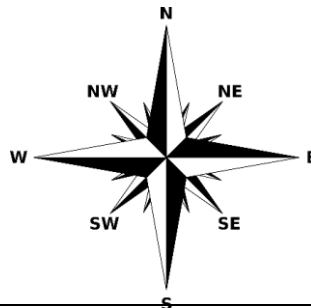
What is a Map?

A map is a two-dimensional representation of an area of the earth's surface, e.g. country map; street map; building map, etc.

Relative positions on a map are used when describing the position or directions to someone in relation to surrounding landmarks. Key words that must be used include; **left; right; up; down; in front of; behind;** and the compass directions which are also known as cardinal points [i.e. **North(N), South(S), East(E) and West(W)**]

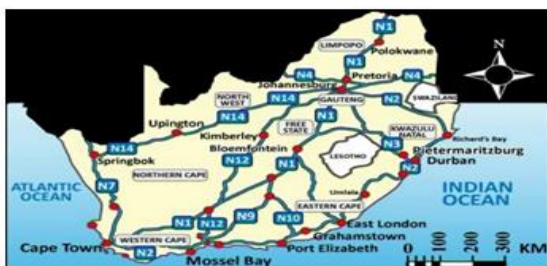
**NB:** Maps are often drawn to scale (**not always**) in order to allow calculations of actual lengths

### Compass Directions



### Different types of Maps

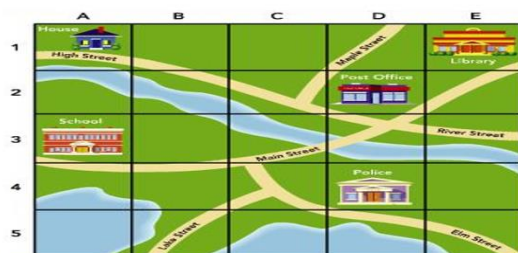
National road maps



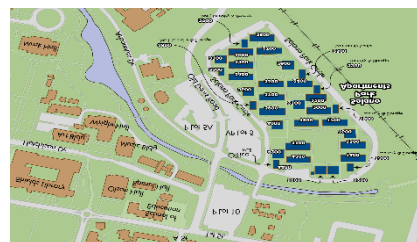
National and Provincial Road Map



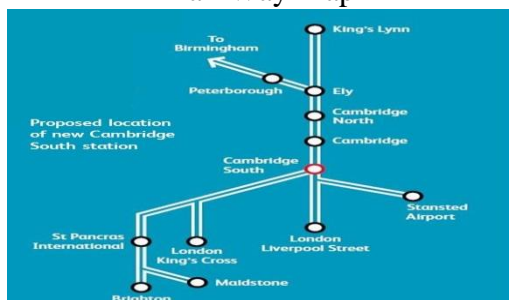
Street Map with Grid reference



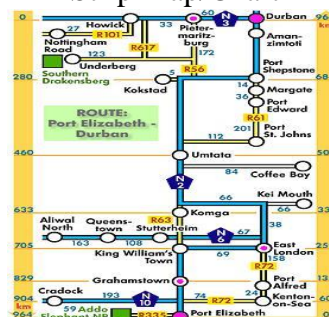
Residential or Housing maps



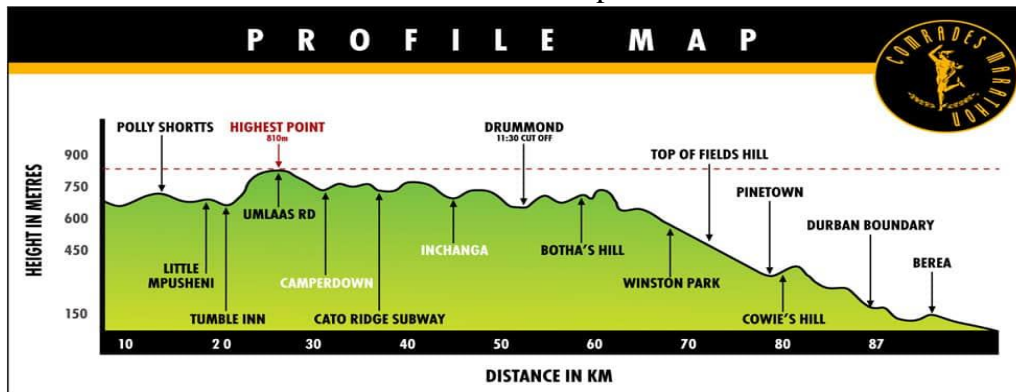
Rail Way Map



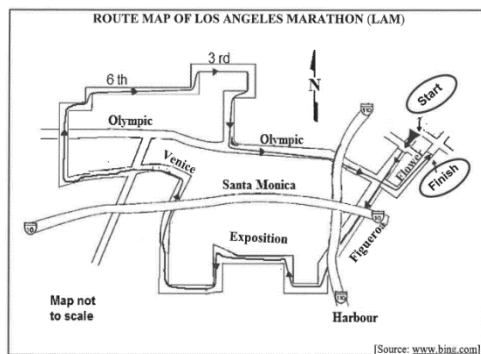
Strip Map/Chart



Elevation Map



Route Map



Regional Map

Regional map of Cyprus and the surrounding countries

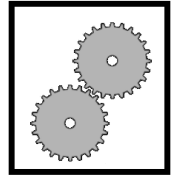


### Points to consider when working with maps.

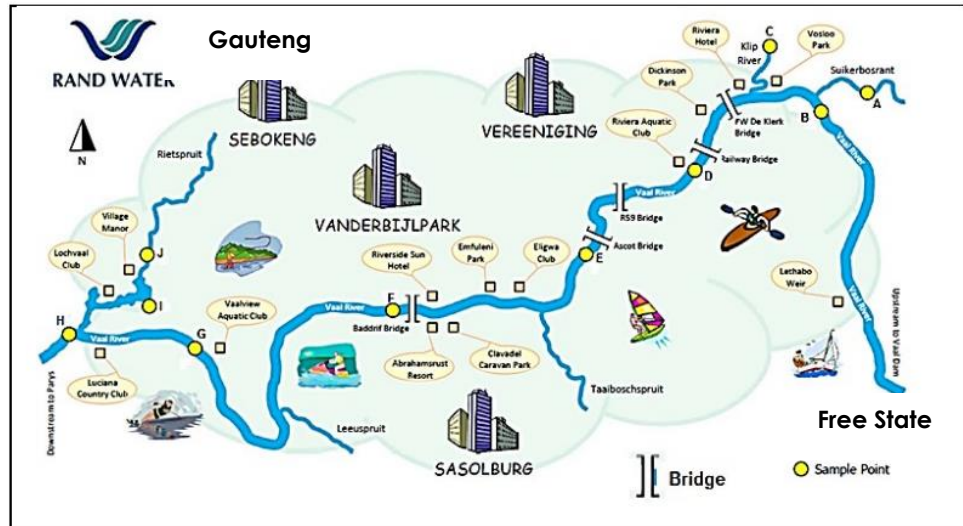
1. Type of the scale used.
2. Check the position of the compass direction (check where the North is pointing).
3. Read the key.
4. Identify labels/names of national and provincial roads.
5. Identify the names of towns on the route between two locations.
6. Interpret a given set of directions and describe what location the direction leads to.



## Worked Example



- 1.1 Study the map on ANNEXURE B that shows the sample points for testing *Escherichia coli* (*E. coli*) and Blue Green Algae counts per 100 ml. Answer the questions that follow.



- 1.1.1 Give the names of the provinces appearing on the map. (2)

**Possible answer:**  
Gauteng and Free State

- 1.1.2 Write down the total number of bridges found upstream (North East) of the R59 bridge. (2)

**Possible Answer:** Two

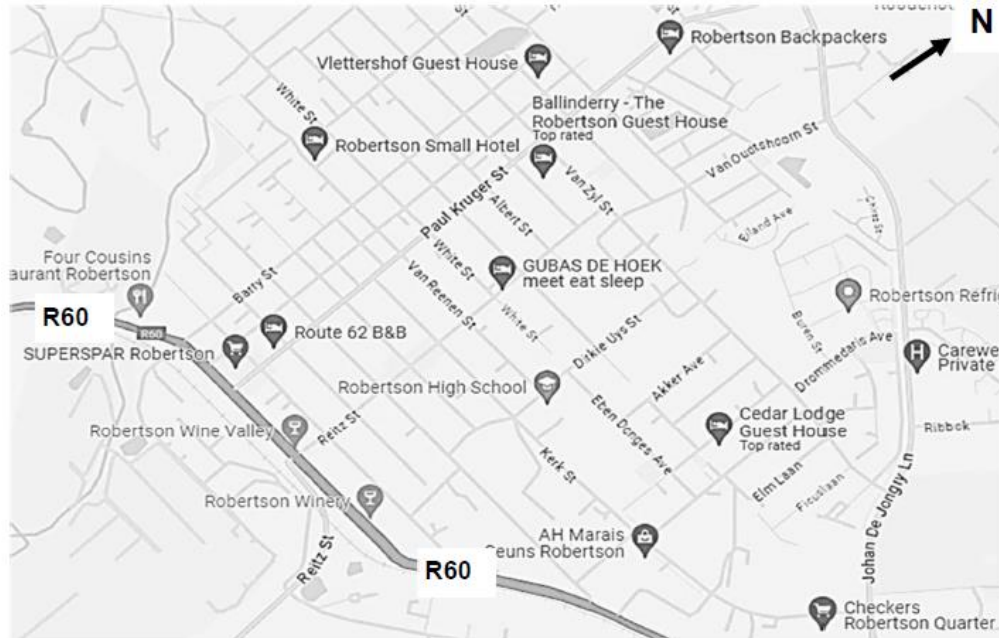
- 1.1.3 The distance between the R59 Bridge and Railway Bridge is 3 km. Calculate the distance on the map if the scale is 1: 25 000. Give your answer in cm. (3)

**Possible answer:**  
1 : 25 000  
Scaled length =  $\frac{3}{25\,000}$   
= 0,00012 km  
In cm = 0,00012 x 10 000  
= 12 cm

- 1.1.4 Give the general direction of Sasolburg from Sebokeng. (2)

**Possible answer:**  
South East

- 1.2 Kriel travelled to Robertson (a town in the Western Cape) during the school holidays to visit his aunt Nini. A part of the map of Robertson that Kriel used for his journey is shown below. Study the map and use it to answer the questions that follow.



[Source: <https://www.google.com/map>]

- 1.2.1 Name the road that passes through Robertson Winery and Robertson Wine Valley. (2)

**Possible answer:**

R60

- 1.2.2 Determine the general direction of the Robertson Small Hotel from the Cedar Lodge Guest House. (2)

**Possible answer:**

West/Westerly/W

- 1.2.3 Name TWO grocery stores indicated on the map. (2)

**Possible answer:**

Checkers Robertson

Superspar Robertson

- 1.2.4 Identify the name of the high school indicated on this map. (2)

**Possible answer:**

Robertson High School

- 1.2.5 Kriel arrived in Robertson at 11:03. Write down the time of Kriel's arrival in words. (2)

**Possible answer:**

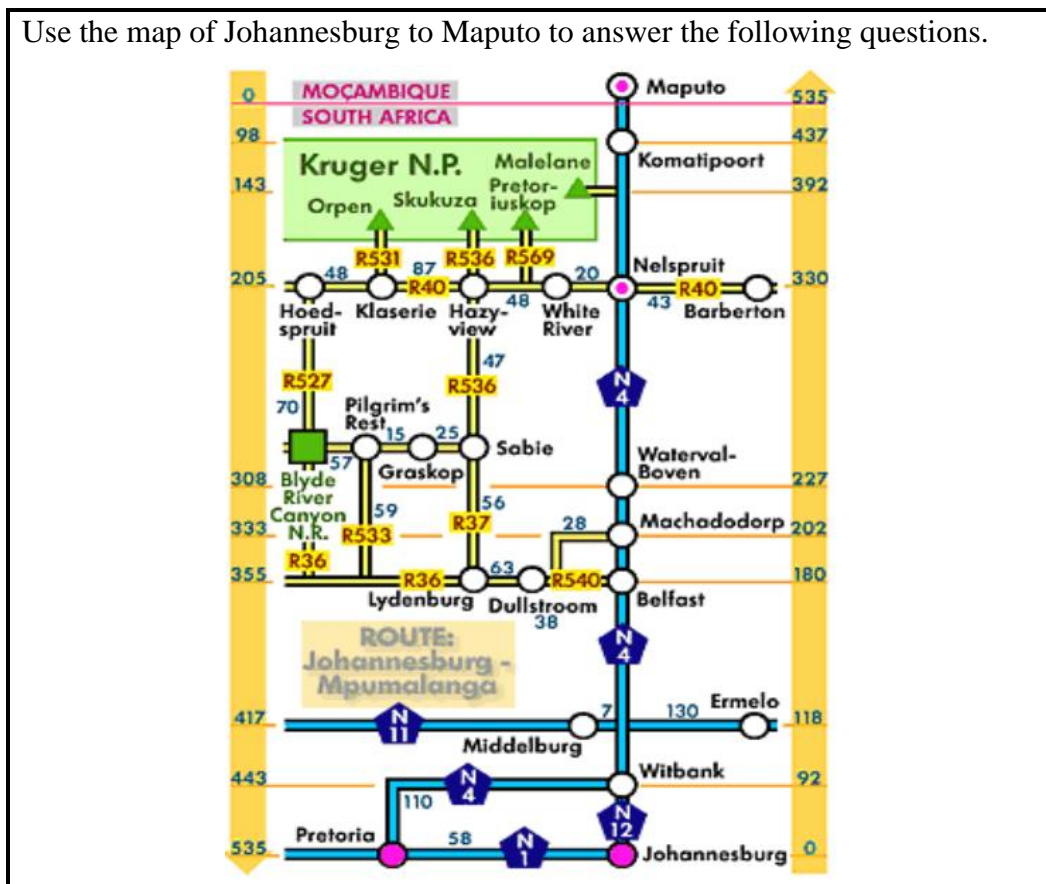
Three minutes past/after eleven

- 1.2.6 Identify the type of map shown above. (2)

**Possible answer:**

Street map /Road map

- 1.3 Use the map of Johannesburg to Maputo to answer the following questions.



- 1.3.1 Write down the name of the map used above. (2)

**Possible answer**

Strip Chart/Map

- 1.3.2 Write down all the national roads shown on the map. (2)

**Possible answer**

N1, N4, N12, N11

- 1.3.3 Write down the distance from Johannesburg to Nelspruit (2)

**Possible Answer**

330 km

- 1.3.4 Determine the distance between Maputo and Machadodorp. (2)

**Possible answer**

333km

OR

535 – 202

= 333km

- 1.3.5 On her way to Maputo Jolie had to go to Pilgrim's Rest to pick up her cousin. She used the following roads, N12, R540, R37, R527 and R40. Show by means of calculations that she will travel a total distance of 877km. (5)

**Possible answer**

Johannesburg to Belfast = 180km

Belfast to Dullstroom = 28km + 38km

Dullstroom to Lydenburg = 63km

Lydensburg to Sabie = 56km

Sabie to Pilgrim's rest = 25km + 15km

Pilgrim's rest to Hoedspruit = 57km + 70km

Hoedspruit to Nelspruit = 48km + 87km + 48km + 20 km

Nelspruit to Maputo = 205km

Total distance = 180km + 28km + 38km + 56km + 25km +  
15km + 57km + 70km + 48km + 87km +  
48km + 20 km + 205km  
= 877 km

- 1.3.6 On her way back, she stopped at Komatipoort. She then drives on the N4 towards Johannesburg. After approximately 107 km she turns to her right. She continues for approximately 68 km she turns left. After traveling for approximately 47km she arrives at her destination. Give the name of the town she is at. (2)

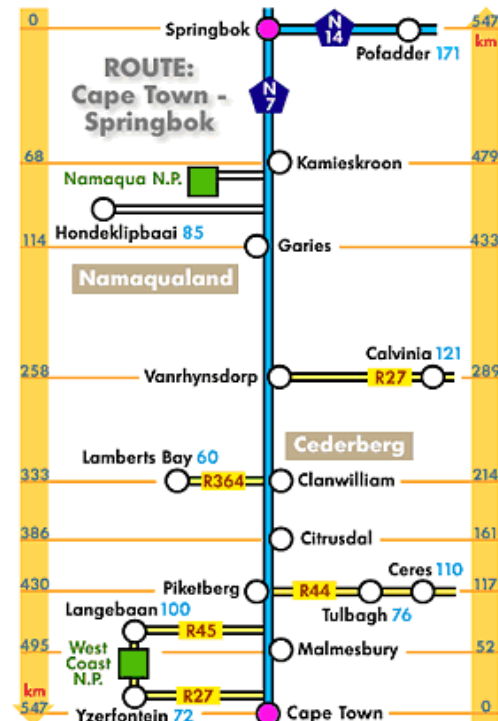
**Possible answer**

Sabie

## ACTIVITY 2: Maps



- 1.1 Franois wants to travel from Springbok to Cape Town for Easter holidays. Use the map below to answer the following questions.



- 1.1.1 Name the type of the map above. (2)
- 1.1.2 Mention the types of the roads found on the map. (2)
- 1.1.3 Determine the distance from Springbok to Cape Town. (2)
- 1.1.4 Write down the probability of finding a national park on the map. (2)
- 1.1.5 Write down the name of the town that is exactly 186 km from the national road. (3)
- 1.2 Mr Labuschagne, a paralympic athlete (athlete with disability) staying in South Africa, travelled to Tokyo to enter the 42 km paralympic marathon.

ANNEXURE A shows a route map of the marathon from the starting to the finishing point

Use the information above and ANNEXURE A to answer the questions that follow.

- 1.2.1 State the general direction of Tokyo Skytree from the starting point. (2)

- 1.2.2 Write down the probability of selecting a group with men and women participating in the marathon. Give your answer as a fraction. (2)
- 1.2.3 After completing his training in South Africa, Mr Labuschagne stated that he will be able to complete the marathon in 2 hours 33 minutes. State two factors that may affect his running pace during the marathon. (4)
- 1.2.4 Write down the name of the station which is situated at the 15 km mark of a marathon. (2)
- 1.2.5 Calculate how many kilometres will be left before reaching the finishing point when an athlete is at the 40 km mark of the marathon. (2)
- 1.2.6 Write down the number of U-turns shown on the map. (2)
- 1.2.7 The information about different groups participating in the marathon together with the starting times was provided on the internet.

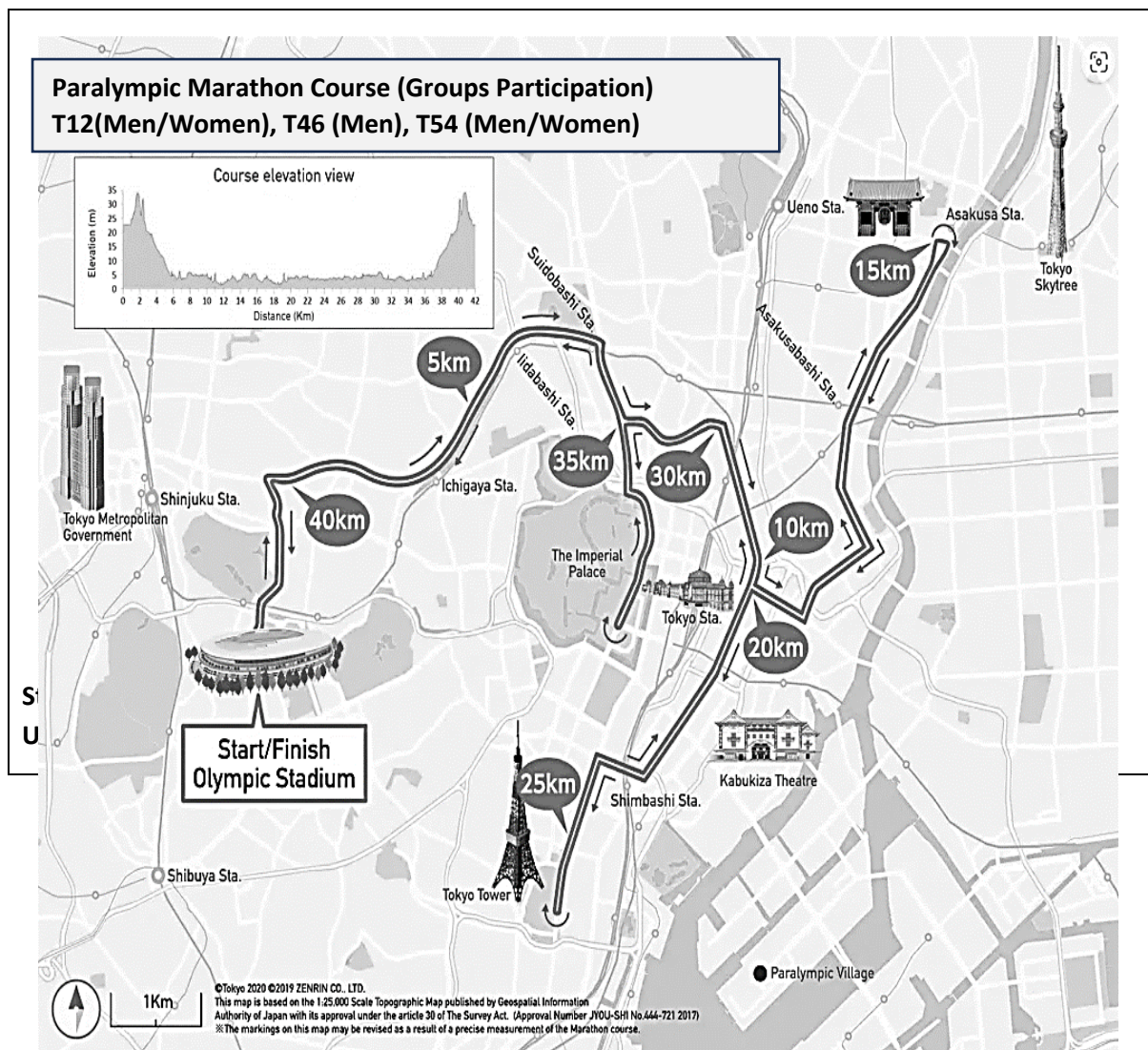
| Group                                     | Time     |
|---|----------|
| T12 – athletes with visual impairments    | 08:00 am |
| T46 – athletes with upper limb deficiency | 07:00 am |
| T54 – athletes on wheelchairs             | 06:30 am |

- (a) Give ONE possible reason why different groups start at different times. (2)
- (b) There were three thousand nine hundred and sixty athletes on the day of the marathon. Group T12 had 1 700 athletes and T54 had 1 580 athletes.

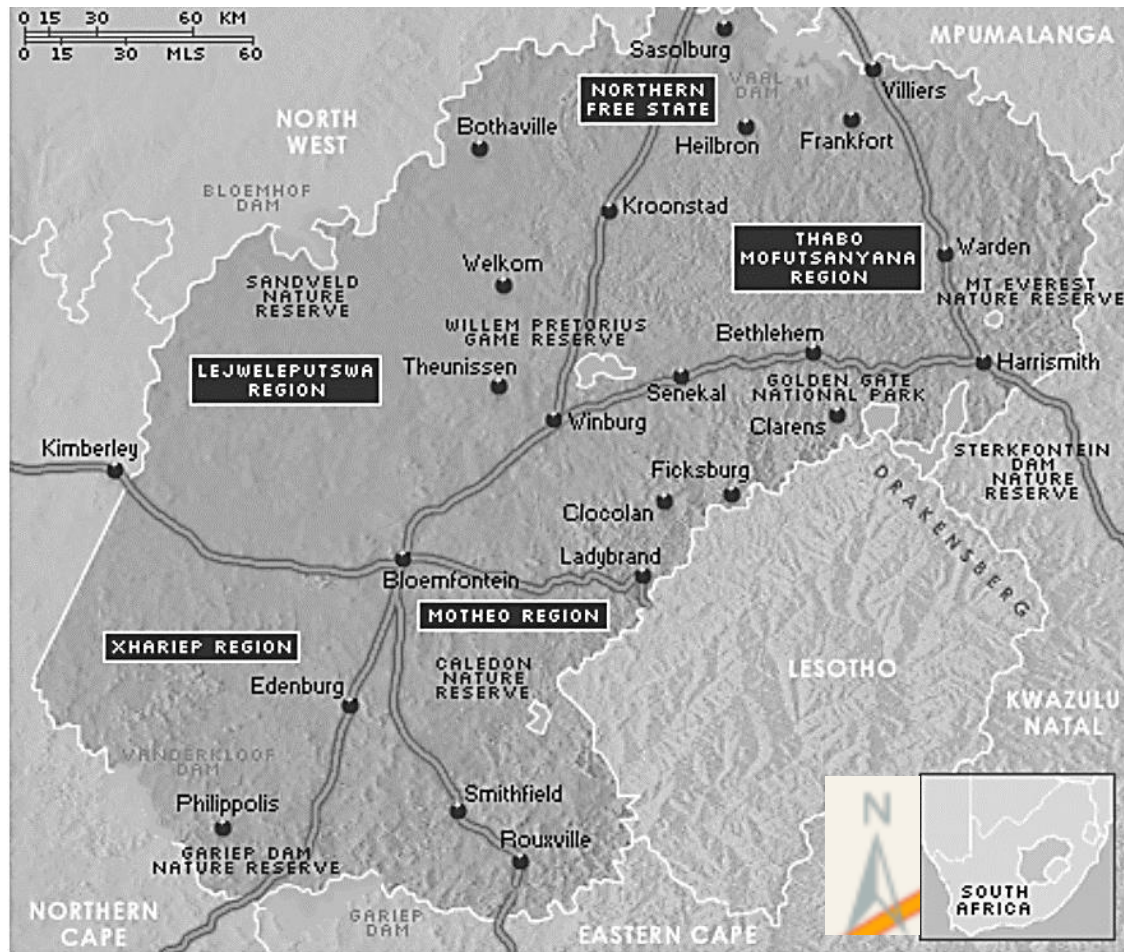
Write down, in a simplified form, the ratio of the three groups. (3)



## ANNEXURE A



- 1.3 Mr Labuschagne stays in Edenburg and he regularly travels to Bloemfontein to visit his parents. The map below shows the location of the two places.



[Source:sa-venues.com]

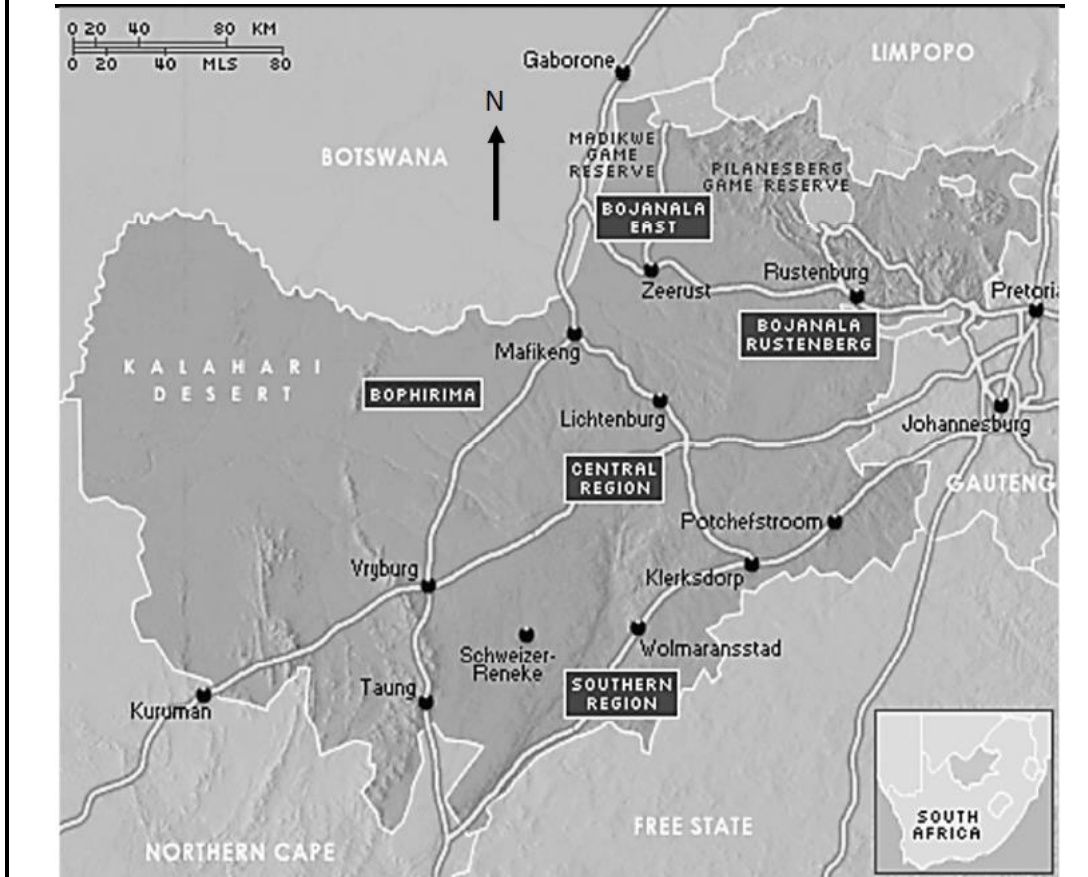
Use the information above to answer the questions that follow.

- 1.3.1 Write down the number of **nature reserves** appearing on the map (2)
- 1.3.2 Write down the name of the province that is situated in the north easterly direction from Edenburg. (2)
- 1.3.3 Mr Labuschagne wanted to check the distance from Edenburg to Bloemfontein. He used the distance calculator on the internet and found out that the distance between the two places is 77,5 km.

Calculate the distance between the two places using accurate measurement and the scale provided. Give one possible reason why the calculated distance and the one from the internet are not the same. (7)



- 1.4 North West is the sixth largest of the nine provinces in South Africa. It has an area of 40 495 square miles and a population of about 4,1 million people as of 2021. About 3,6% of the people in the North West Province live in Potchefstroom and the surrounding areas. The rest live in rural parts of the province. The map of the province is shown below. Use the map and the given information to answer the following questions.



- 1.4.1 Write down the name of the town farthest to the south-west of Mafikeng as shown on the map. (2)
- 1.4.2 Use a ruler to measure the distance (as the crow flies) from Lichtenburg to Taung. Give your answer in millimetres. (2)
- 1.4.3 Use the scale on the map to calculate the actual distance in kilometres between Lichtenburg and Taung. (4)
- 1.4.4 Determine the actual number of people living in rural parts of the province. (3)
- 1.4.5 Convert the land area of the North West Province to the nearest  $\text{km}^2$  given that  $1 \text{ km} = 0,62137119 \text{ miles}$ . (3)
- 1.4.6 Calculate the population density of the North West Province in  $\text{people}/\text{km}^2$ .

You may use the following formula

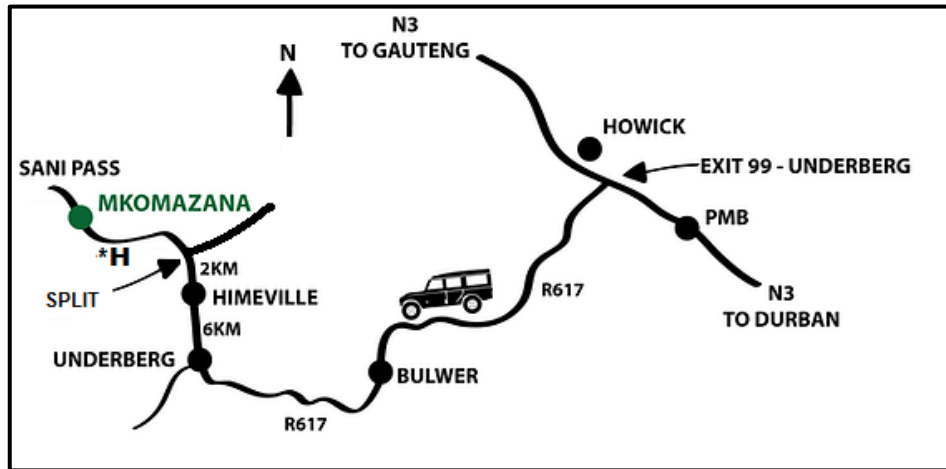
$$\text{Population density} = \frac{\text{Population}}{\text{Area}} \quad (3)$$

- 1.5 The route map showing the route between Johannesburg and Durban is shown below.



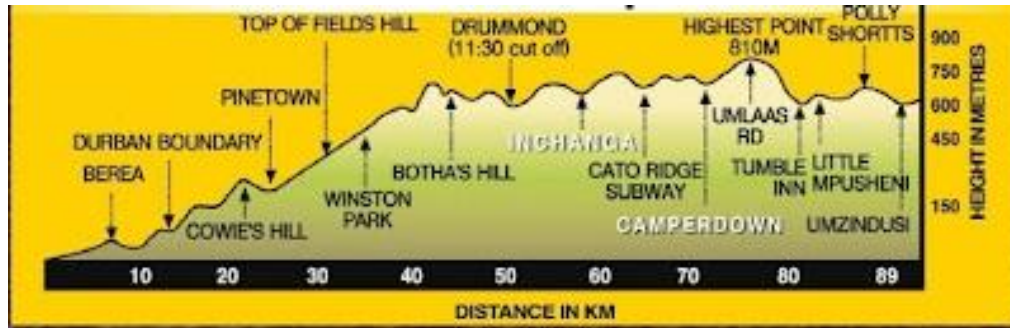
- 1.5.1 Write down the national roads shown on the map. (2)
- 1.5.2 What is the probability of finding a regional (provincial) road out of all the roads on the map? Give your answer as a decimal number rounded to three decimal places. (3)
- 1.5.3 Identify the towns on the route between Newcastle and Heidelberg when regional (provincial) roads are used. (4)
- 1.5.4 If a person travels from Harrismith to Cape Town, through which province will the person travel according to the route map? (2)
- 1.5.5 Mr. Joseph works in Johannesburg but travels regularly to Durban for business. Instead of taking the N3 directly to Durban, Mr Joseph decides to take another route. Describe the route. (4)
- 1.5.6 Give one reason why Mr. Joseph would travel the route with a longer distance than the route with the shorter distance. (2)

- 1.6 Lanri, Neo and three friends plan to drive to the Sani Pass in KwaZulu-Natal. They will travel from Johannesburg and stay at Mkomazana. The map below shows the route map to Mkomazana.



- 1.6.1 Write down the national roads found on the map. (2)
- 1.6.2 Write down the road number on which they will travel from exit 99 to Bulwer. (2)
- 1.6.3 Give the distance from Underberg to Himeville (2)
- 1.6.4 After driving 2 km from Himeville, the road splits to the left and the right. State in which direction (left or right) they must drive. (2)
- 1.6.5 It is 16 km from Himeville to Mkomazana. The distance between Mkomazana and the hotel is 4,4 km. Calculate how many kilometres after the split in the road the hotel (indicated with \*H on the map) is located. (3)

- 1.7 The Comrades Marathon is an ultra-marathon run between Durban and Pietermaritzburg. The race starts at 05:30 and finishes at 17:30. The Map below shows the distance of the Marathon from Durban to Pietermaritzburg.



- 1.7.1 Write down the total distance of the Marathon. (2)
- 1.7.2 Write down the name of the map shown above. (2)
- 1.7.3 A cut off point is a certain point which point the runners must reach within a prescribed time so that they may continue their participation in the Marathon
- (a) Write down the cut-off point and time for the marathon (2)
- (b) Calculate the distance from the cut-off point to the end of the marathon (2)
- 1.7.4 Tebogo participated in the marathon, and he finished the marathon in six and half hours. Calculate his average speed in km/h.
- You may use the formula: **Average Speed** =  $\frac{\text{Distance}}{\text{Time}}$  (4)
- 1.7.5 One of the runner 's best average speed for the run was his average speed of 19km/h from the highest point to the 80 km mark. Use the elevation map to explain why this was the case. (2)

1.8

Khanya and her family are visiting relatives in Edinburgh Scotland and decide to make use of public transport while there.

They found the Scotrail Train Routes from Edinburgh to Dundee (**ANNEXURE A**) along with the timetable of the trains (**ANNEXURE B**) to help them plan their traveling.

Use the information above along with ANNEXURE A and ANNEXURE B to answer the following questions.

1.8.1 The family decides to take the following train route one day:

- Start the journey at Edinburgh Train Station
- Travel in the direction of Glenrothes with Thornton
- The family then gets off the train three stops after Rosyth.

Write down the station at which the family will get off the train. (2)

1.8.2 Determine as a decimal, rounded to one decimal place, the probability of choosing a mode of transport that does not travel constantly on land. (3)

1.8.3 The family wants to travel from Edinburgh to Dundee without changing trains.

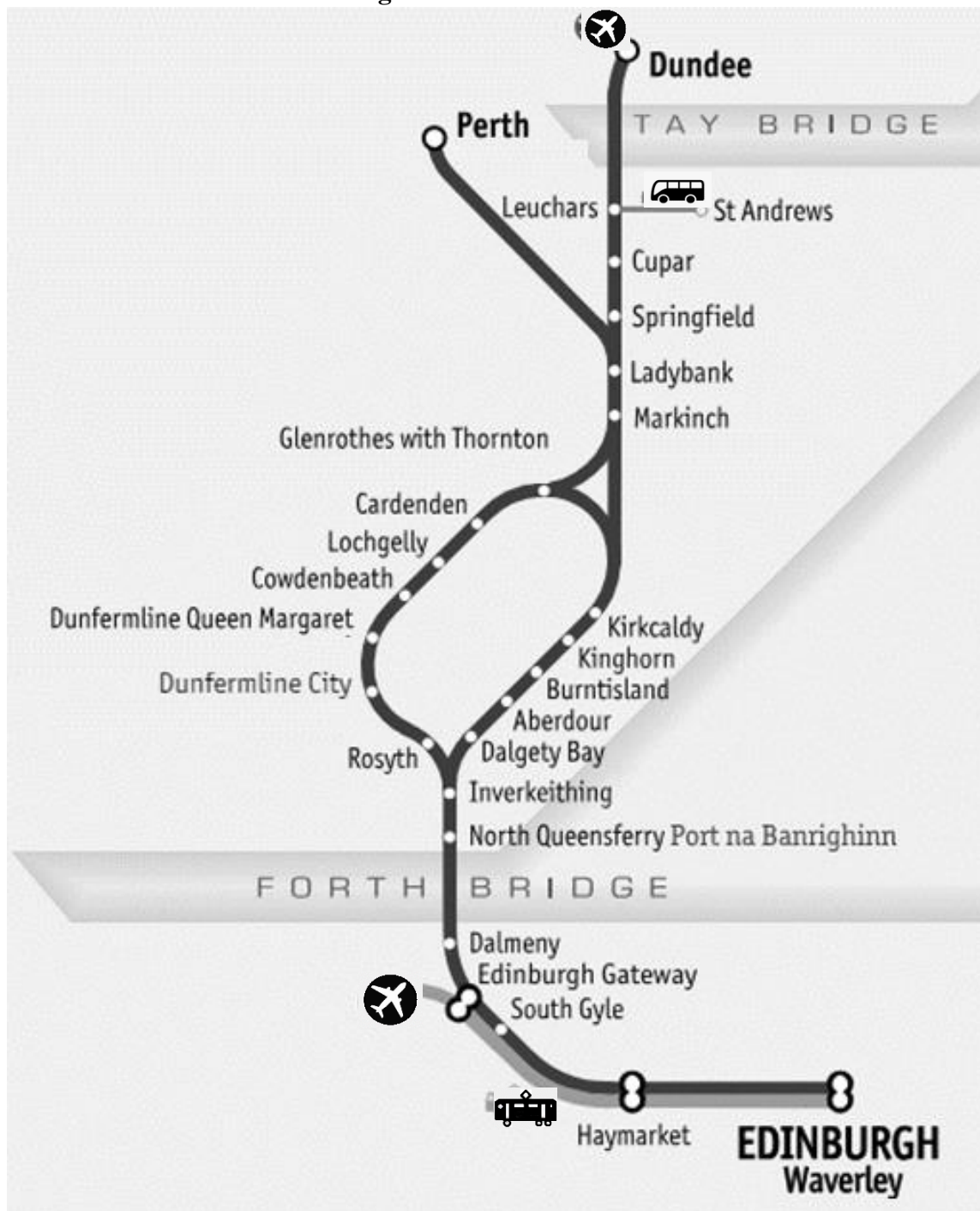
Write down the times at which they can leave from Edinburgh station. (2)

1.8.4 Calculate the difference in time between when the first train and the last train departs from Kirkcaldy. (2)

[09]

## ANNEXURE A

### Scotrail Train Routes from Edinburgh to Dundee



Key:

|   |   |   |
|---|---|---|
|  |  |  |
| Tram  | Airplane  | Bus   |



## ANNEXURE B

### Timetable of Scotrail Train Routes from Edinburgh to Perth & Dundee

| AM train: Edinburgh to Perth & Dundee |   |      |      |      |      |      |      |      |      |
|---------------------------------------|---|------|------|------|------|------|------|------|------|
| Edinburgh                             | d | 5:30 | 6:00 | 6:18 | 6:30 | 6:35 | 6:48 | 7:00 | 7:18 |
| Haymarket                             | a | 5:34 | 6:04 | 6:22 | 6:34 | 6:39 | 6:52 | 7:06 | 7:22 |
|                                       | d | 5:35 | 6:04 | 6:22 | 6:35 | 6:39 | 6:52 | 7:06 | 7:22 |
| South Gyle                            | d | -    | -    | -    | -    | 6:44 | 6:57 | -    | -    |
| Edinburgh Gateway                     | d | -    | 6:10 | 6:28 | -    | 6:47 | 6:59 | 7:12 | 7:28 |
| Dalmeny                               | d | -    | -    | 6:34 | -    | -    | 7:05 | -    | 7:34 |
| North Queensferry                     | d | -    | -    | 6:37 | -    | -    | 7:09 | -    | 7:37 |
| Inverkeithing                         | d | 5:49 | 6:23 | 6:41 | -    | 7:00 | 7:13 | 7:25 | 7:41 |
| Rosyth                                | d | -    | -    | 6:45 | -    | -    | 7:16 | -    | 7:45 |
| Dunfermline City                      | d | -    | -    | 6:50 | -    | -    | 7:21 | -    | 7:50 |
| Dunfermline Queen Margaret            | d | -    | -    | 6:53 | -    | -    | 7:25 | -    | 7:53 |
| Cowdenbeath                           | a | -    | -    | 7:00 | -    | -    | 7:31 | -    | 8:00 |
|                                       | d | -    | -    | 7:01 | -    | -    | 7:31 | -    | -    |
| Lodhgelly                             | d | -    | -    | 7:06 | -    | -    | 7:37 | -    | -    |
| Cardenden                             | d | -    | -    | 7:10 | -    | -    | 7:41 | -    | -    |
| Dalgety Bay                           | d | -    | 6:26 | -    | -    | 7:04 | -    | 7:28 | -    |
| Aberdour                              | d | -    | 6:31 | -    | -    | 7:08 | -    | 7:33 | -    |
| Burntisland                           | d | -    | 6:35 | -    | -    | 7:13 | -    | 7:37 | -    |
| Kinghorn                              | d | -    | 6:40 | -    | -    | 7:18 | -    | 7:42 | -    |
| Kirkcaldy                             | d | 6:04 | 6:45 | -    | 7:03 | 7:23 | -    | 7:47 | -    |
| Glenrothes with Thornton              | a | -    | -    | 7:18 | -    | -    | 7:48 | -    | -    |
| Markinch                              | d | 6:12 | 6:54 | -    | -    | 7:31 | -    | 7:56 | -    |
|                                       | d | 6:13 | 6:54 | -    | -    | 7:32 | -    | 7:56 | -    |
| Ladybank                              | d | 6:20 | 7:01 | -    | -    | 7:40 | -    | 8:03 | -    |
| Perth                                 | a | -    | -    | -    | -    | 8:05 | -    | -    | -    |
| Springfield                           | d | -    | -    | -    | -    | -    | -    | -    | -    |
| Cupar                                 | d | 6:27 | 7:07 | -    | 7:21 | -    | -    | 8:09 | -    |
| Leuchars                              | d | 6:34 | 7:14 | -    | 7:28 | -    | -    | 8:16 | -    |
| Dundee                                | a | 6:48 | 7:28 | -    | 7:42 | -    | -    | 8:30 | -    |

| Note: |                     |
|-------|---------------------|
| d     | departure           |
| a     | arrival             |
| -     | Train does not stop |

Source: [scotrail.co.uk]

1.9

A team of netball players from Jacobsdal Agricultural School together with their coach travelled to Cape Town to attend the netball world cup final match. Due to the unavailability of accommodation at Cape Town they booked at a hotel in Paarl.

A map on **ANNEXURE C** shows the distances in kilometres from Paarl to Cape Town and the surrounding towns.

Use the information above and ANNEXURE C to answer the questions that follow.

1.9.1 Write down the name of the town that is closest to Paarl. (2)

1.9.2 On the day of the match, the team together with their coach left the hotel at 08:30 in the morning. They travelled to Waterfront Mall where they had their breakfast. It took them 1 hour and 57 minutes from the hotel until they left the mall to Cape Town International Convention Centre netball courts.

(a) Write down the time that they left the mall. (2)

(b) Calculate the average speed, in km/h, of their vehicle from Paarl to Waterfront mall if it took them 58 minutes to travel to Cape Town CBD.

You may use the formula: **Distance = speed × time** (6)

1.9.3 The school arranged a friendly match between their team and a High School in one of the towns around Paarl. Use the directions below to write down the town where the friendly match will take place.

- From Paarl, they travelled 25 km to Franschhoek.
- 28 km from the Franschhoek, at the T-junction, they turned right.
- Their destination was the first town from the T-junction. (2)



- 1.10 The table below shows the accommodation arrangements for the team and their coach. The rates given are for one night only.

**TABLE 1: RATES PER ROOM FOR ONE NIGHT**

| Rooms allocated | Number accommodated<br>per room | Rates per room per<br>night |
|-----------------|---------------------------------|-----------------------------|
| 3               | 4 adults                        | R2 800                      |
| 4               | 2 adults                        | R2 950                      |
| 1               | 1 adult                         | R3 200                      |

**NOTE:** The team arrived at 17:00 on the 05<sup>th</sup> of August and checked out at 08:00 on the 07<sup>th</sup> of August  
They travelled with a 22-seater bus that has a fuel consumption of 10,5ℓ/100 km.  
The total distance for a round trip was 2769,2 km.

Use the information above to answer the questions that follow.

- 1.10.1 Write down the total number of players of the team. (2)

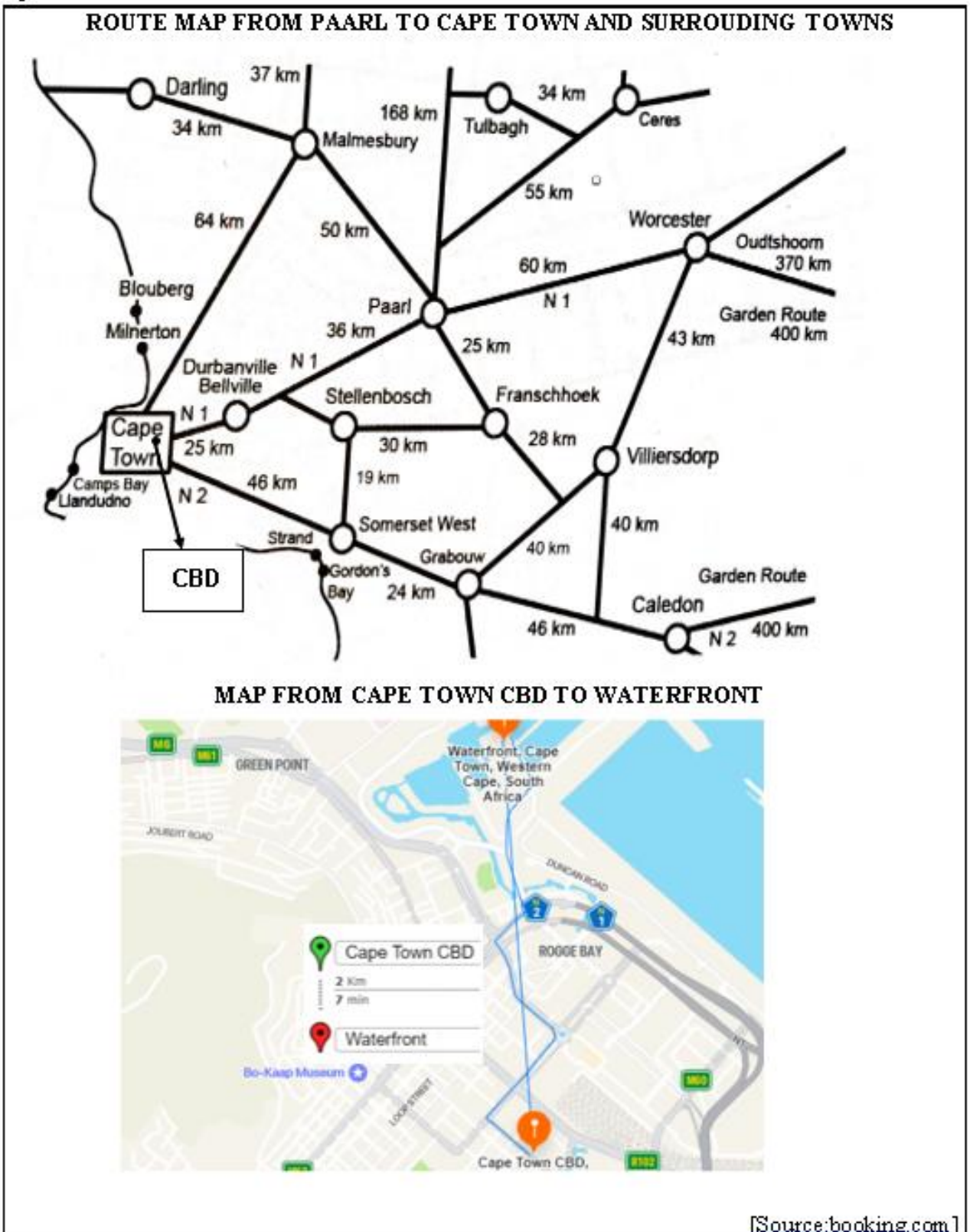
- 1.10.2 Explain the meaning of 'round trip' as used in the context. (2)

- 1.10.3 50% of the total amount for accommodation and petrol will be paid by the School Governing Body (SGB) and the other 50% will be shared equally amongst the members of the team including the coach.

Show, by means of calculations, that each member will pay R1 269,78c.

You may use R22,46 as the fuel price per litre. (9)  
[25]

ANNEXURE C  
QUESTION 3.1



- 1.11 ANNEXURE A shows the Free State province and other surrounding provinces of South Africa.

Use Annexure A to answer the following questions

- 1.11.1 Write down the name of the National Road that connects Bloemfontein and Kimberly (2)
- 1.11.2 Use the scale provided and accurate measurement to determine the real-life direct distance (as the crow flies) from Kimberly to Koppies. Give your answer in km rounded to the nearest whole number. (6)
- 1.11.3 Give the general direction of Bloemfontein from Bethlehem (2)
- 1.11.4 Write down the two towns where an airport can be found. (2)
- 1.11.5 Give a set of direction for traveller from Springfontein to Warden. Use the names of towns, names of roads and compass directions (4)

- 1.12 Caroline studied a strip chart connecting Springbok in South African with Windhoek in Namibia.

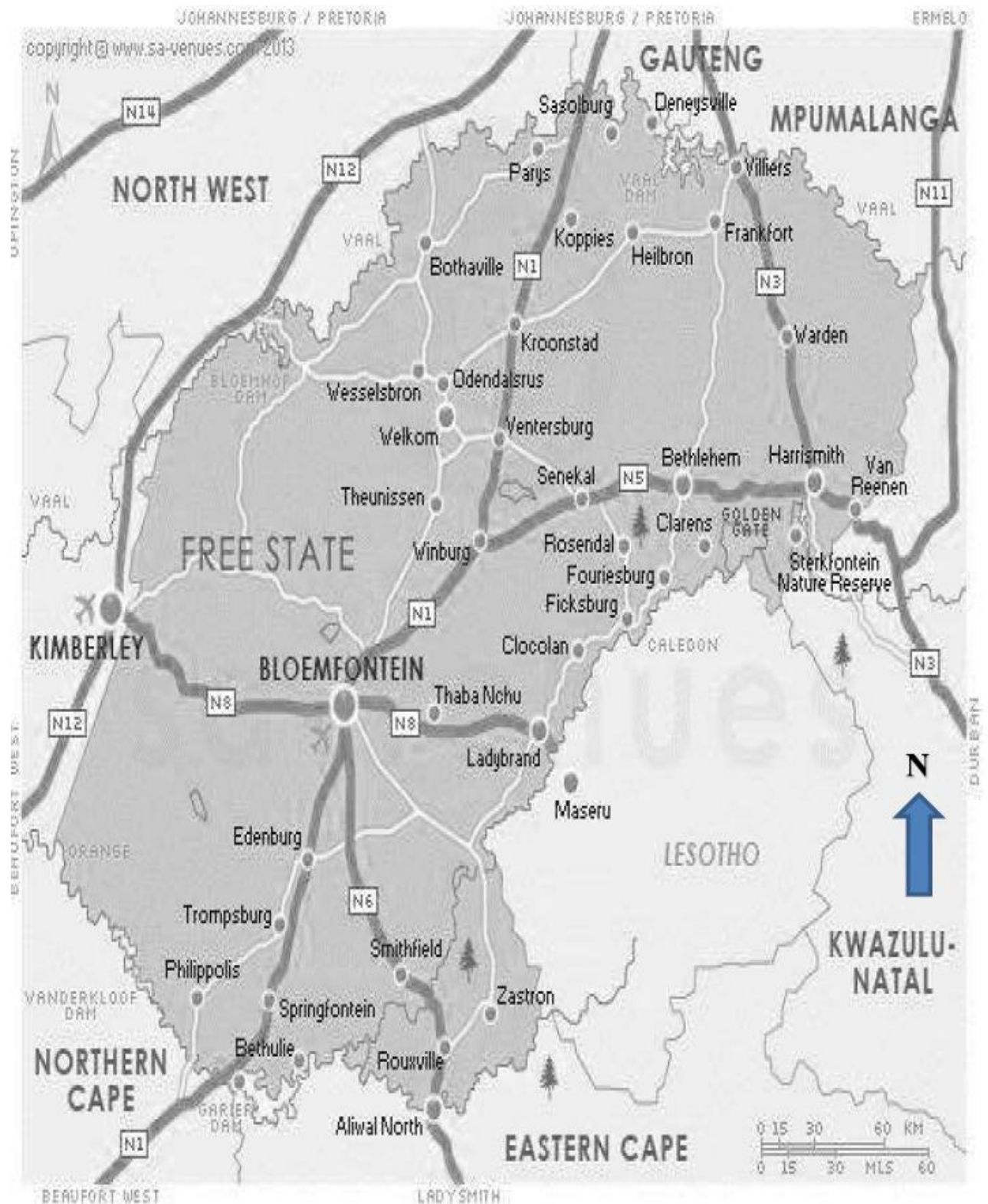
On ANNEXURE B is a strip chart showing road distances in kilometres from Springbok to Windhoek.

Use Annexure B to answer the following questions

- 1.12.1 Explain the difference between a normal road map (as found on ANNEXURE A) and a strip chart (as found on ANNEXURE B) (2)
- 1.12.2 Write down the probability to find a national road between Windhoek and Springbok. (2)
- 1.12.3 Determine the total distance between Springbok and Gobabis (4)
- 1.12.4 Caroline intends to travel from Windhoek to Keetmanshoop. She claims it will take her 4 hours and 23 minutes to cover the distance if she travels at an average speed of 110 km/h. Is Caroline Correct. Verify her stamen with calculations. (5)

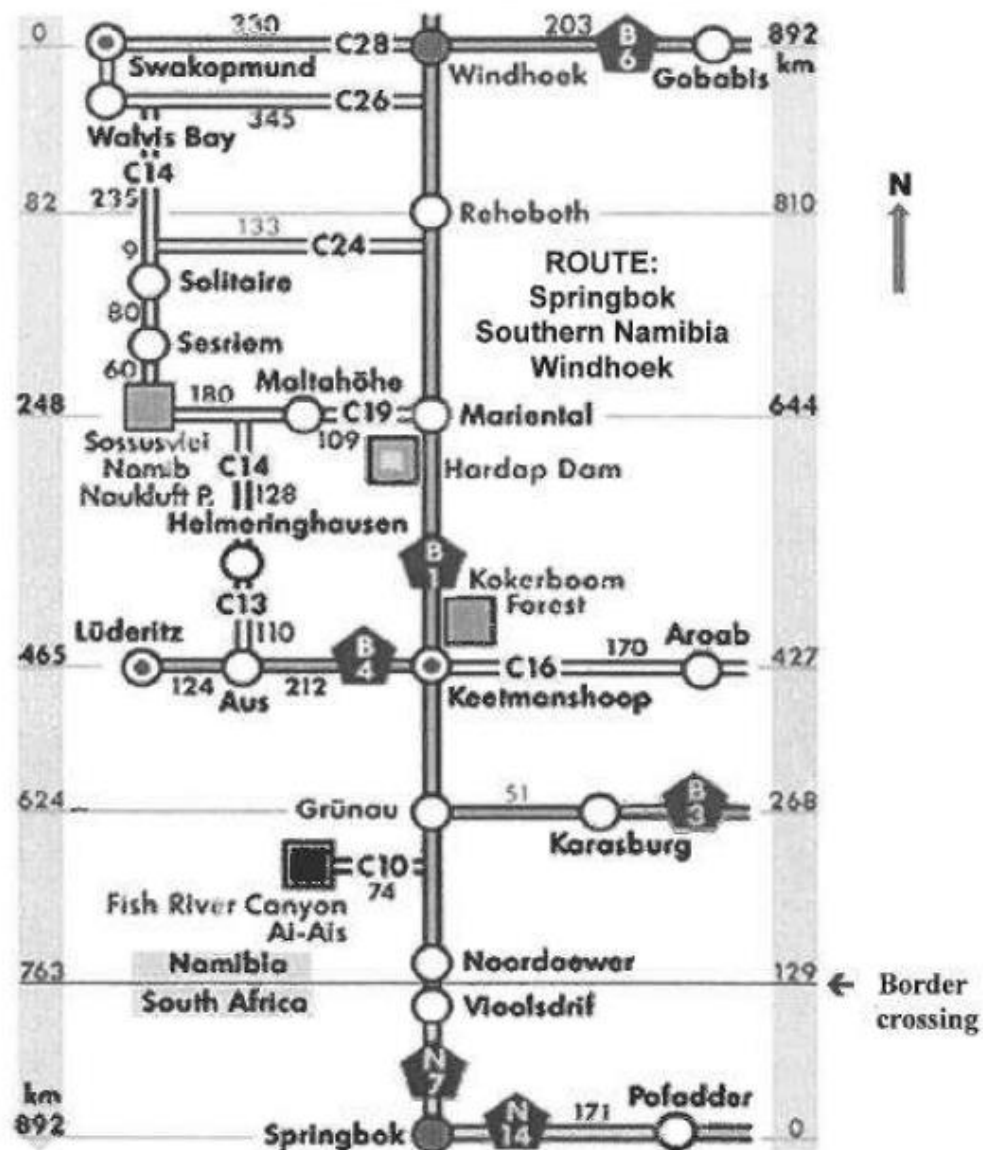
[29]

## ANNEXURE A



## ANNEXURE B

STRIP CHART WITH ROAD DISTANCES IN KILOMETRES (km)  
FROM WINDHOEK TO SPRINGBOK



### KEY

| Symbol | Description               | Average speed on the road |
|--------|---------------------------|---------------------------|
| N or B | National or highway roads | 120 km/h                  |
| C      | Gravel road               | 80 km/h                   |
|        | Places of interest        |                           |

NB: B1 is a national high way in Namibia.

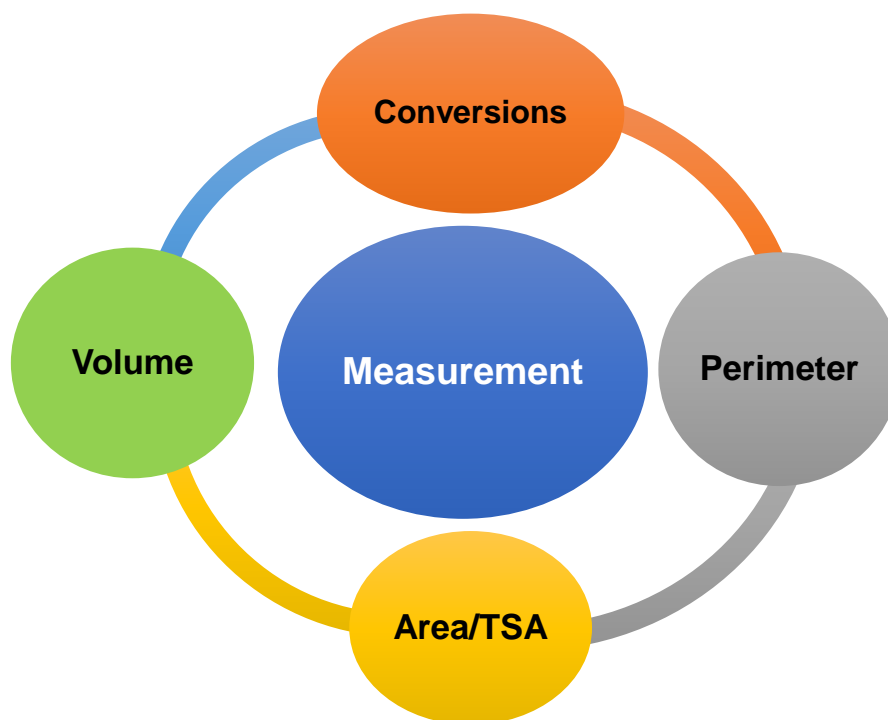
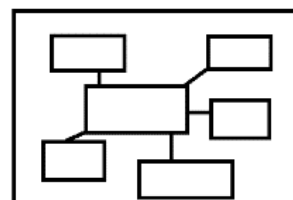


## MEASUREMENT

### LESSON OBJECTIVES

| Measurement               |  |
|---------------------------|--|
| Learners must be able to: |  |
| 1.                        | Use the correct terminology when working with Measurements.  |
| 2.                        | Estimate and measure using the correct units.  |
| 3.                        | Convert between various units of measurement.  |
| 4.                        | Calculate Perimeter / Circumference, Area, TSA, Volume and Capacity.   |
| 5.                        | Substitute correctly into the given formulae.  |
| 6.                        | Apply the knowledge of measurement to calculate cost of products be able to draw conclusions based on previous calculations. |

### MEASUREMENT: LIST OF SECTIONS





## Examination Guidelines

### Topic: Measurement

| Section    | Level 1: Knowing   | Level 2: Applying routine procedures in familiar contexts  | Level 3: Applying multi-step procedures in a variety of contexts   | Level 4: Reasoning and reflecting  |
|------------|--|--|--|--|
| Conversion | <ul style="list-style-type: none"> <li>Convert between mm, cm, m and km.</li> <li>Convert between g and kg.</li> <li>Convert between ml and litres.</li> </ul> | <ul style="list-style-type: none"> <li>Convert from °C to °F (and vice versa) using given formulae.</li> <li>Convert between different systems using given conversion factors (e.g. convert from m<sup>3</sup> to litres using the fact that 1 m<sup>3</sup> = 1 000 litres).</li> </ul> | <ul style="list-style-type: none"> <li>Convert between different systems using given conversion tables, where it is necessary to first identify and then use an appropriate conversion factor from the table.</li> </ul> | <ul style="list-style-type: none"> <li>Compare solutions to a problem expressed in different units and make a decision about what unit is the most appropriate or useful for the particular context in which the problem is posed.</li> </ul>  |
| Time       | <ul style="list-style-type: none"> <li>Read time values on a clock or watch.</li> <li>Converting between seconds, minutes and hours</li> </ul>                 | <ul style="list-style-type: none"> <li>Record time values and perform calculations with time.</li> </ul>   | <ul style="list-style-type: none"> <li>Interpret time values on a bus timetable to determine departure, arrival and travelling times.</li> </ul>   | <ul style="list-style-type: none"> <li>Perform time calculations in conjunction with maps and other travel resources in order to plan a trip (e.g. determine approximate travelling times, appropriate stopping points for refuelling, the time to start a journey in order to arrive at a destination at a particular time).</li> </ul> |

|                            |   |  |   |   |
|----------------------------|---|--|---|---|
| Perimeter, area and volume | <ul style="list-style-type: none"> <li>• Define terms (e.g., 'area', 'perimeter', 'volume', 'radius').</li> <li>• Identify from a list of given formulae which formulae relate to perimeter calculations, which relate to area calculations, etc.</li> <li>• Determine the radius of a circle from a given diameter.</li> <li>• Know that area is expressed in units<sup>2</sup> (e.g., cm<sup>2</sup>) and volume in units<sup>3</sup> (e.g., cm<sup>3</sup>).</li> <li>• Know and use formulae for perimeter, area and volume.</li> </ul> | <ul style="list-style-type: none"> <li>• Calculate perimeter, area and volume by substituting given values into given formulae.</li> <li>• Describe relationships between input and output values in a table of data concerning space, shape and measurement.</li> </ul> | <ul style="list-style-type: none"> <li>• Perform preliminary calculations to determine dimensions required in perimeter/area/volume calculations and then calculate perimeter/area/volume (e.g. when asked to determine the volume of concrete needed for the foundations of a house, interpret top view plans of the foundation trench of a house, use the plans to determine the dimensions of the trench, and then calculate the volume of the trench).</li> </ul> | <ul style="list-style-type: none"> <li>• Use perimeter, area and/or volume calculations to complete a project, where it is not stated specifically what type of calculation is required, (e.g. when asked to determine the amount of paint needed to paint a building, first interpret plans to determine dimensions of the walls, then calculate the surface area of the walls, then use the paint conversion ratio on the back of the paint tin to determine the required number of litres of paint required).</li> </ul> |
|----------------------------|---|--|---|---|



## IMPORTANT TERMINOLOGY



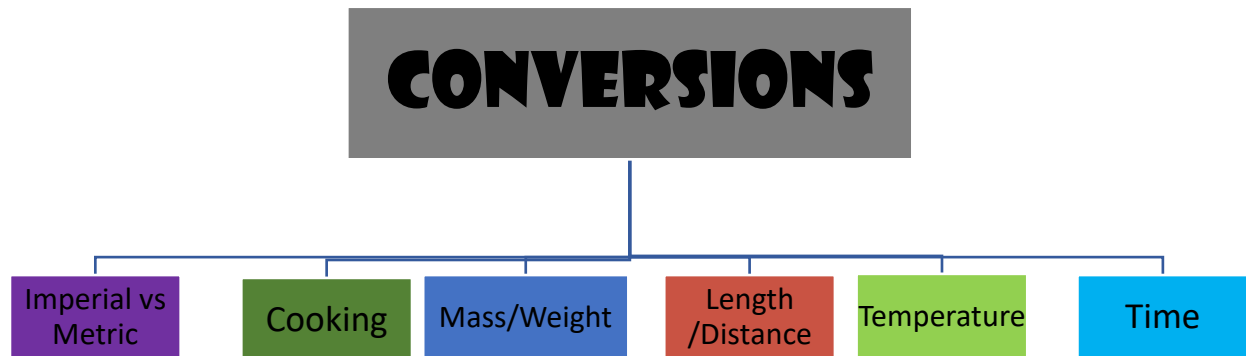
| Measurement                      |  |
|----------------------------------|--|
| <b>Distance</b>                  | Length of a line joining any two points.   |
| <b>Actual/true/real distance</b> | Real distance between any two points.  |
| <b>Radius</b>                    | A straight line from the centre to the circumference of a circle or sphere   |
| <b>Diameter</b>                  | A straight line passing from side to side through the centre of a body or figure, especially a circle or sphere.   |
| <b>Circumference</b>             | The distance around the edge of a circle (or any curvy shape).   |
| <b>Two-dimensional shape</b>     | It is a shape with length and width (breadth), without the height. Examples of such shapes are, <b><i>a page of a book or ordinary page, a floor of a room, a circle.</i></b>                |
| <b>Area</b>                      | The amount of space inside the boundary of a flat (2-dimensional) object (It is measured in square units e.g., m <sup>2</sup> , cm <sup>2</sup> , etc.)                                      |
| <b>Perimeter</b>                 | is the total length/distance around a shape or around the boundary. Perimeter of a circle is called the circumference.   |
| <b>Prism</b>                     | A 3-dimesional shape that has the same shape (and size) on both ends an the same thickness along the entire shape.   |
| <b>Surface Area</b>              | It is the sum of the areas of all faces of the shape. By calculating the surface area you can be able to know the amount of material needed to build or make the particular shape or object. |
| <b>Volume</b>                    | is the amount of space that an object or substance occupies.   |

## Conversion

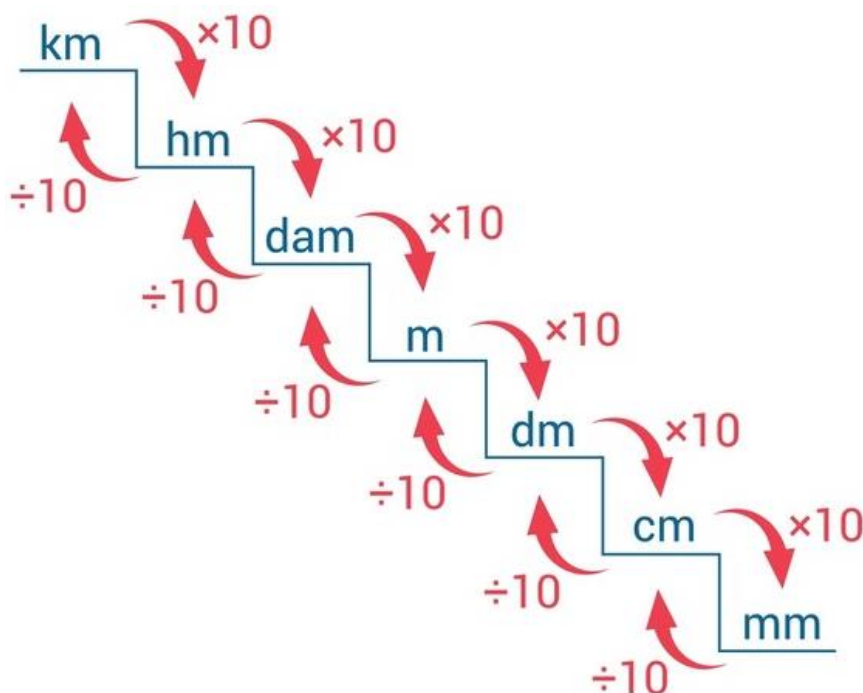
- Being able to convert measurements is important for many household tasks including cooking and baking.
- You need to understand why and when we use different measurement units in different contexts.

**For exam purpose, as a learner you must be able to**

- convert metric units of length, volume and weight from memory.
- convert cooking units using a given table.
- read, calculate and convert different time units and formats.
- use timetables and calendars for personal planning and time management



**Basic Conversions (Not given in the exam, learners must know)**



## Imperial to Metric (Always given in the exam)

1 inch (in) = 2,54 cm  
1 yard (yd.) = 0,9144 m  
1 mile (mi) = 1,6093 km  
1 foot (ft.) = 0,3048 m  
1 ounce(mass) = 28,35g  
1 fluid ounce = 29,57ml  
1 gallon= 3,8 litres

## Cooking conversions

- 1 cup = 250 ml
- 1 tablespoon (tbsp.) = 15 ml
- 1 teaspoon (tsp) = 5 ml
- 1 dozen = 12 units



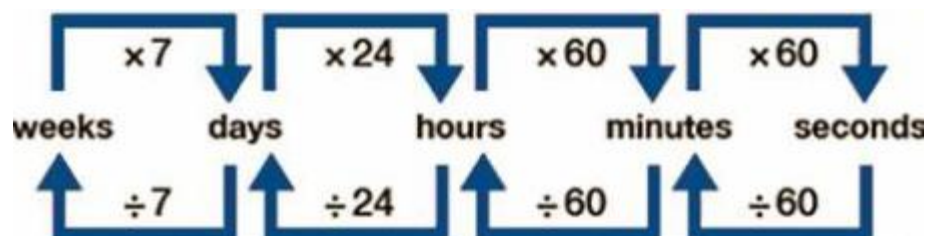
## Conversions with time

### Equivalent units:

60 mins = 1 hour (hr)  
24 hrs = 1 day  
7 days = 1 week  
52 weeks = 1 year  
12 months = 1 year  
365,25 days = 1 year  
366 days = 1 leap year (a leap year occurs after 4 years, the 4 quarters make up an extra day)



## Conversions with time



## General method for conversions

Write the conversion as a fraction (that equals one)

Multiply it out (leaving all units in the answer)

Cancel any units that are both top and bottom



## Worked Example

T

- 1.1 Mrs Smith has a small business where she sells cakes. For her to make one cake she needs 0,8 kg of flour, 650 g of sugar and 900 000 mg of butter.

- 1.1.1 Determine the total mass of these ingredients. Give your answer in kilograms

(3)

**Possible answer**

Flour = 0,8 kg

Sugar =  $650 \text{ g} \div 1\,000 = 0,65 \text{ kg}$

Butter =  $900\,000 \text{ mg} \div 1\,000 = 900 \text{ g}$

$900 \div 1\,000 = 0,9 \text{ kg}$

Total mass =  $0,8 + 0,65 + 0,9$   
= 2,35 kg

- 1.1.2 If you have 0,5 kg block of butter, will you have enough butter for the recipe? Show all your calculations to justify your answer.

(2)

**Possible answer**

0,5 kg

Butter needed **0,9 kg**

You won't have enough butter

- 1.1.3 If sugar comes in 150 g bags at a cost of R5,95 per 150g bag, determine the total cost of the sugar needed for this recipe.

(5)

**Possible answer**

Number of bags of sugar =  $650 \text{ g} \div 150 \text{ g}$

= 4,33


$\approx 5$  bags

Total cost =  $5 \text{ bags} \times \text{R}5,95$

= R29,75

- 1.2 Neilisha makes fudge and sells it for pocket money. Below is the recipe that she uses to prepare fudge. The selling price for a block of fudge is R2,50.

NOTE: 1 Batch of fudge = 54 Blocks

| Recipe for making 1 Batch  | PICTURE OF FUDGE BLOCK   |
|--|--|
| 1 tin of condensed milk<br>250 g of butter<br>250 ml of milk<br>5 ml of vanilla essence<br>1 kg of sugar |  |

- 1.2.1 Write the ratio of the mass of the butter to the mass of the tin of condensed milk in the simplest form if the mass of one tin of condensed milk is 385 g. (2)

**Possible answer**

$$\begin{aligned} 250 \text{ g} : 385 \text{ g} \\ 50 : 77 \end{aligned}$$

- 1.2.2 Neilisha buys 1 litre of milk at a shop. She calculates that she can make four batches of fudge with the 1 litre. Do calculations to show if she is correct or not. (4)

**Possible answer**

$$\begin{aligned} 1 \text{ litre} &= 1000 \text{ ml} \\ \frac{1000 \text{ ml}}{250 \text{ ml}} &= 4 \text{ batches} \\ \text{Yes, she is correct} \end{aligned}$$

- 1.2.3 Neilisha buys 2,5 kg bag of sugar at a cost of R38,95. She calculates that the sugar for two batches of fudge will cost her R32,80. Do calculations to verify whether she is correct or not (5)

**Possible answer**

$$\begin{aligned} \text{For 1 batch you need 1 kg of sugar} \\ \text{For 2 batches you need 2 kg of sugar} \\ 2,5 \text{ kg of sugar costs R } 38,95 \\ 2 \text{ kg costs } \frac{2 \times 38,95}{2,5} = \text{R}31,16 \\ \text{No, she is not correct} \end{aligned}$$

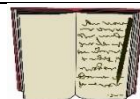
- 1.2.4 The price of a bottle of Vanilla essence is R25,99 with 15% VAT already included. What is the VAT payable on a bottle of Vanilla essence? (5)

**Possible answer**

$$\begin{aligned} \frac{\text{R}25,99}{1,15} &= \text{R}22,60 \\ \text{R}25,99 - \text{R}22,60 &= \text{R}3,39 \end{aligned}$$

## ACTIVITY: Conversion

(22 marks: 25 minutes)



- 1.1 Hope is hosting a stokvel meeting and she plans on serving tea and muffins to the members during the meeting. The stokvel consists of twenty other members and Hope.  
The ingredients for tea are given below.

| Ingredients for making tea in a 3 litre teapot: | NOTE:                              |
|---|------------------------------------|
| 2,5 l boiling water                             | *Boiling water is at 212°F         |
| 10 tea bags                                     | *A 3-litre teapot serves 10 people |
| 30 tea-spoons sugar                             | *1 cup per person                  |
| 500ml fresh milk                                |                                    |

- 1.1.1 Write down the number of members belonging to this stokvel. (2)
- 1.1.2 Write down (in the simplest form) the ratio of the number of tea bags to the number of tea-spoons of sugar. (3)
- 1.1.3 Convert 212 °F to degrees Celsius.  
The following formula may be used:  
$$^{\circ}\text{C} = (^{\circ}\text{F} - 32^{\circ}) \div 1,8$$
 (3)
- 1.1.4 If one tea bag weighs 40g, determine the number of kilograms of teabags that will be in one teapot. (4)

1.2

Thabo is a grade 9 learner at Vele Secondary school who intends to sell toffee apples during the school's market day. He decided to use the recipe below to prepare the toffee apples.



**Ingredients:**

25 Granny Smith Apples (small size)  
1 000 mℓ Sugar  
1 cup Boiling water  
2 tsp Red food colouring  
1½ tsp Cream of tartar  
Spray and Cook

It takes  $\frac{1}{3}$  hours to prepare the recipe.  
Mixture's boiling temperature: **150 °C.**

Note: 1 cup = 250 mℓ  
1 tsp = 5 mℓ  
1 tbsp = 15 mℓ

Adapted from {[www. Millerinthecity.co.za](http://www.Millerinthecity.co.za)}

1.2.1 Identify the number of apples needed for this recipe (2)

1.2.2 Determine, in minutes, the time it takes to prepare toffee apples (2)

1.2.3 Write down the cream of tartar in m ℓ (2)

1.2.4 Determine the number of cups of sugar needed for this recipe. (2)



1.2.5 Convert the boiling temperature of the mixture to °F.

You may use the following formula:  $^{\circ}\text{F} = (^{\circ}\text{C} \times \frac{9}{5}) + 32$  (2)

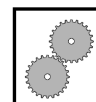


## Time

- We have two types of time formats, namely **12-hour format** and **24-hour format**.

| 12-hour format   | 24-hour format  |
|--|---|
| <p>09:00 am or 09:00 pm are examples of reading time using 12-hour format. The format is seen of the <b>analogue clocks</b>.</p>  <p>When we use the 12-hour clock, we use the letters “<b>a.m.</b>” to show that the time is before midday (12 o'clock or noon) and “<b>p.m.</b>” to show that it is after midday. For example, school may start at 7:30 a.m. (in the morning) and finish at 2 p.m. (in the afternoon)</p> | <p>21:00 is an example of the 24-hour time format. This format is seen on the <b>digital watches</b></p>  <p>On digital clocks, the number on the left shows the hour and the number of the right shows the minutes. Some digital watches have a third, smaller number on the far right which shows us seconds.</p> |

## Worked Example



- 1.1 The clock shown below is on the wall of Bongi’s kitchen:



[Source: adapted from [american-time.com/product/clock-ssiq-15-round](http://american-time.com/product/clock-ssiq-15-round)]

- 1.1.1 Identify the type of clock. (2)

**Possible answer**

Analogue clock

- 1.1.2 Write the time displayed in words. (2)

**Possible answer**

Ten minutes before two o'clock

- 1.1.3 Bongi started baking at the time displayed on the clock. She would like to bake two dozen Brownies, determine the finishing time if she includes the preparation and baking time. (4)

**Possible answer**

Time to bake one batch

$$= 10\text{min} + 20\text{min}$$

$$= 30\text{min}$$

Two batches

$$= 30\text{min} \times 2$$

$$= 60\text{min}$$

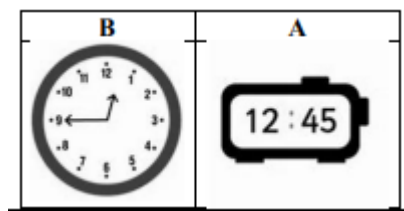
Finishing time

$$= 13:50 + 60\text{min}$$

$$= 14:50$$

- 1.2 Below are two watches representing time differently as they are commonly found in circulation or real life.

**TIME REPRESENTATION BY TWO TYPES OF WATCHES (B and A)**



- 1.2.1 State in words the time displayed in both watches. (2)

**Possible answer**

Quarter to one 0'clock/ Fifteen minutes to One in the afternoon

- 1.2.2 State the type of watch in the way time is displayed or read from each. (2)

**Possible answer**

A = digital watch and B = analogue watch

- 1.2.3 How many minutes past after noon? (2)

**Possible answer**

45 minutes after noon /45 minutes after 12 o'clock

- 1.2.4 Convert minutes shown on B into hours (2)

**Possible answer**


$$45 \div 60 = 0,75 \text{ hour}$$

$$(12 \times 60 + 45) \div 60 = 765 \text{ minutes} \div 60 = 12,75 \text{ hrs}$$

- 1.3 Thandi planned a travelling trip to visit her friend in Pretoria by a Greyhound bus during the Easter Holidays.

Below is a bus time-table for Durban - Johannesburg - Pretoria.

TABLE 3: Travel route between Cities, Durban - Johannesburg – Pretoria in order

| Route: Durban – Johannesburg – Pretoria |     |  |                                       |                                |                                       |
|---|-----|--|---------------------------------------|--------------------------------|---------------------------------------|
| STATIONS                                |     | GDJ0806<br>DAILY<br>DREAMLINER   | GDJ1106<br>DAILY<br>BUDGET<br>SERVICE | GDJ2204<br>DAILY<br>DREAMLINER | GDJ2306<br>DAILY<br>BUDGET<br>SERVICE |
| <b>Durban</b>                           | Dep | 08h00  | 11h00                                 | 22h00                          | 23h00                                 |
| <b>Pinetown</b>                         | Dep | -  | 11h25                                 | -                              | -                                     |
| <b>Pietermaritzburg</b>                 | Dep | 09h15  | 12h30                                 | 23h00                          | 23h55                                 |
| <b>Howick</b>                           | Dep | 09h45  | -                                     | -                              | -                                     |
| <b>Escourt</b>                          | Dep | -  | -                                     | -                              | -                                     |
| <b>Swinburne</b>                        | Arr | 11h45  | 15h00                                 | 01h30                          | 02h30                                 |
| <b>Swinburne</b>                        | Dep | 12h15  | 15h30                                 | 02h00                          | 03h00                                 |
| <b>Harrismith</b>                       | Arr | 12h34  | -                                     | -                              | -                                     |
| <b>Harrismith</b>                       | Dep | 12h38  | 15h50                                 | 02h20                          | 03h20                                 |
| <b>Vereeniging</b>                      | Dep | -  | 18h25                                 | -                              | -                                     |
| <b>Johannesburg</b>                     | Dep | 15h45  | 19h30                                 | 05h00                          | 06h00                                 |
| <b>Midrand</b>                          | Dep | 16h05  | 19h50                                 | 05h20                          | 06h20                                 |
| <b>Pretoria</b>                         | Arr | 16h30  | 20h10                                 | 05h45                          | 06h45                                 |

Source: [www.greyhound.co.za](http://www.greyhound.co.za)

Key: Dep. = Departure  
Arr. = Arrival

- 1.1.1 From which station does the bus depart? (2)

**Possible answer**

Durban Station

- 1.1.2 What is the name of the bus company that Thandi will be using for travelling? (2)

**Possible answer**

Greyhound

- 1.1.3 For how long will the Daily Budget Service **GDJ2306** bus wait at Swinburne? (2)

**Possible answer**

Time at Swinburne = 03h00 – 02h30  
= 30minutes

- 1.1.4 At what time does the Daily Budget Service **GDJ1106** depart from Harrismith? (2)

**Possible answer**

15h50

- 1.1.5 Calculate the difference time taken from Durban to Pretoria station by **GDJ0806** and **GDJ2204**. Give a possible reason for the difference. (5)

**Possible answer**

$GDJ0806 = 16H30 - 08H00 = 8 \text{ hours } 30\text{min}$

$GDJ2204 = 05H45 - 22H00 = 2\text{hrs to midnight} + 5H45 = 7 \text{ hours } 45\text{min}$

$8\text{hrs } 30 \text{ min} - 7\text{hrs } 45 \text{ min} = 45 \text{ minutes}$

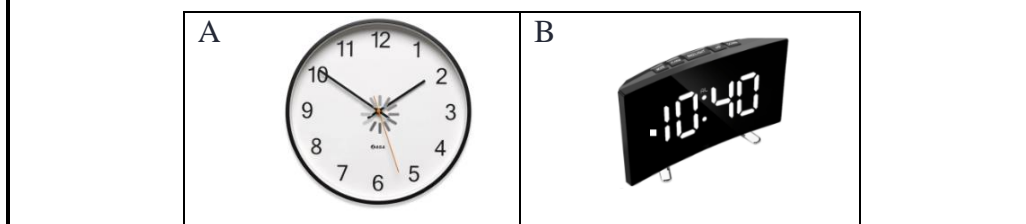
Traffic might be lesser at night (any relevant answer)

### ACTIVITY: Time

(20 marks: 20 minutes)





- 1.1 During the check-up visit, the doctor advised Eunice that having a regular schedule during the **day** can help her **child's sleep** stay on track. Eunice uses the two types of clocks below to monitor the time.



- 1.1.1 Write down the time displayed on clock B in words if the time format for the clock is 24-hour time. (2)
- 1.1.2 The child slept at the time displayed on clock A in the afternoon. Write down the time in 24-hour format. (2)
- 1.1.3 Eunice went to Heilbron with the child to visit her mom. She left her home at the time displayed on clock B and arrived in Heilbron at 14:10. Determine the time, in hours, taken to reach her home (2)

1.2 Study the figures above to answer the following questions:

| Figure 1  | Figure 2   |
|---|--|
|  |  |
| NOTE: 12:59 a.m.  |  |

1.2.1 Identify the type of clock represented by figure 1 and figure 2. (2)

1.2.2 Write the time indicated by the clock in figure 1 in words. (2)

1.2.3 What does **a.m.** in figure 2 mean? (2)

1.3 Mr Soetmelk's wife bakes homemade all-bran rusks for her family. The recipe that she uses is shown below.

**INGREDIENTS**

Makes 30 rusks

Baking time: 55 minutes

- 500 g butter
- 370 g sugar
- 500 ml buttermilk
- 1 ml lemon juice
- 3 large free-range eggs
- 1 kg flour
- 2 t baking powder
- 1 t salt
- 240 g all-bran wheat flakes
- 100 g oats (uncooked)
- 100 g pecan nuts or almonds

The oven should be heated to 180 °C.



1.3.1 How many grams of all-bran wheat flakes are needed for this recipe? (2)

- 1.3.2 Each batch of rusks needs to be baked for 55 minutes. The last batch was taken out at the time indicated on the watch alongside.



Convert 55 minutes to hours.

(2)

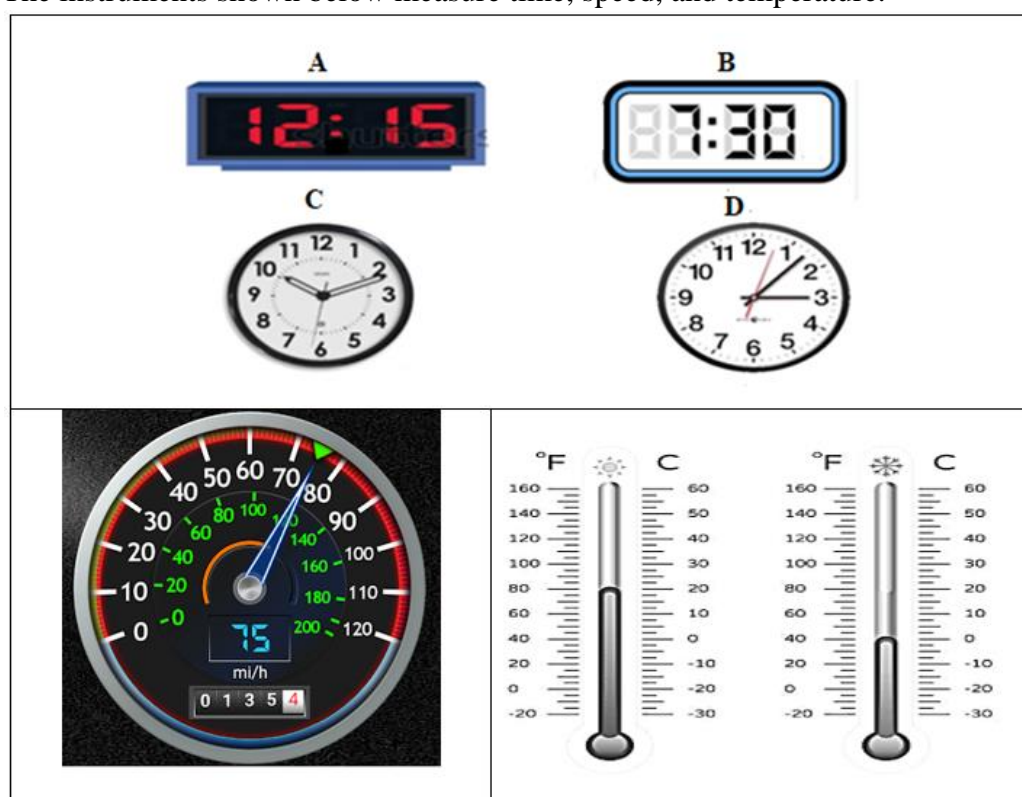
- 1.3.3 Write down the type of time format displayed on the watch.

(2)

- 1.3.4 Write down the time indicated on the watch in 24-hour format.

(2)

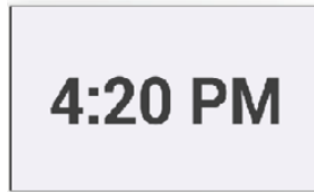
- 1.4 The instruments shown below measure time, speed, and temperature.



Use the information above to answer the following questions.

- 1.4.1 Identify the two different types of clocks represented above. (2)
- 1.4.2 Name the notation that can be used to differentiate the time of day on a 12-hour digital clock. (2)
- 1.4.3 Write the time in the evening on clock C in 24-hour time format (2)
- 1.4.4 Identify the speed in miles/hour that is seen on the speedometer. (2)
- 1.4.5 Write the temperature of 20°C in °F. (2)

- 1.5 Tsietsi is an athlete at his school, and he obtained position one in a race. He completed his race in exactly 52 minutes. The time he started the race is displayed on the following clock.



- 1.5.1 Identify the type of clock displayed. (2)
- 1.5.2 Which one of the following A, B, or C is **NOT** applicable to p.m.?  
A. It is a time after 12:00 noon.  
B. It is an example of 12-hour time.  
C. It is a time in the morning. (2)
- 1.5.3 Write down the time Tsietsi completed the race. (3)
- 1.6 Ms Nandi travels every day 90 km to her place of work. She travels every working day on the same road.

**TABLE 2: Time and distance travelled**

| Time                     | 07:00 | 07:15 | 07:30 | 07:45 | 08:00 | 08:15 | 08:30 |
|--------------------------|-------|-------|-------|-------|-------|-------|-------|
| Distance travelled in km | 0     | 15    | 30    | 45    | 60    | 75    | 90    |

- 1.6.1 Calculate the distance Ms Nandi travel every day to and from work. (2)
- 1.6.2 At what time will Ms Nandi arrive at work? (2)
- 1.6.3 Write down the distance Ms Molete covered 1 hour after she left for work. (2)

**[13]**







## Perimeter

### What is Perimeter?

- Is the total length/distance around a shape or around the boundary.

### Understanding Perimeter

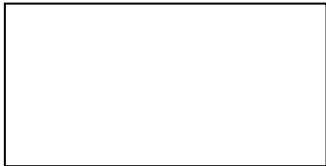


- It is a distance around a shape.
- Measured units are mm, cm, m and km.
- Perimeter of a circle is called the circumference.
- Shapes are one dimensional.

| Square  | Rectangle   | Triangle   | Circle  |
|---|---|--|---|
|  |  |  |  |

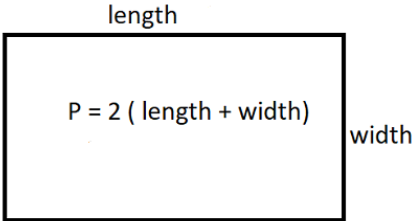
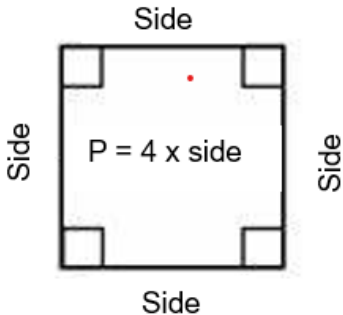
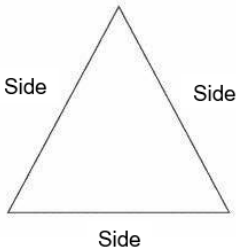
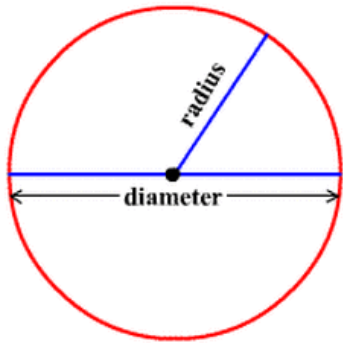
### How to calculate Perimeter

- For any shape with straight lines: Add the lengths of all the sides.
- For specific shapes like, square, rectangle and circle: A formula will always be provided.

**Note: Make sure that all units are the same before you start with your calculations.**

|   |   |
|---|---|
| <p style="text-align: center;"><b>Rectangle</b></p> <div style="text-align: center;"><p style="margin-left: 100px;">162 cm</p><p style="margin-right: 100px;">800 mm</p></div> |   |
| <p>Perimeter = 2 x (length + width)</p> <p> = 2 x (162 <b>cm</b> + 800 <b>mm</b>)</p> <p>= 1924 mm</p>   | <p>Perimeter = 2 x ( length + width)</p> <p> = 2 x (1620 <b>mm</b> + 800 <b>mm</b>)</p> <p>= 4840 mm</p> |

## Shapes involved when calculating Perimeter:

| Shape            | Perimeter Formula   |   |
|------------------|---|---|
| <b>Rectangle</b> | Perimeter<br>= $2 \times \text{length} + 2 \times \text{width}$   |    |
| <b>Square</b>    | Perimeter = $4 \times \text{length}$<br>OR<br>Perimeter = $4 \times \text{sides}$   |    |
| <b>Triangle</b>  | Perimeter =<br>Length 1 + length 2 + length 3   |   |
| <b>Circle</b>    | Perimeter (Circumference)<br>= $\pi \times (2 \times \text{radius})$<br>OR<br>Perimeter (Circumference)<br>= $\pi \times \text{diameter}$<br><br>Note $\pi = 3,142$ |  |

## Area

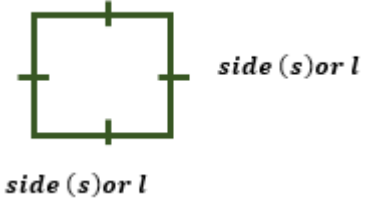
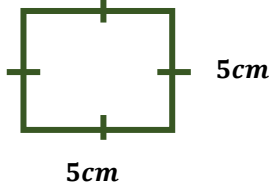
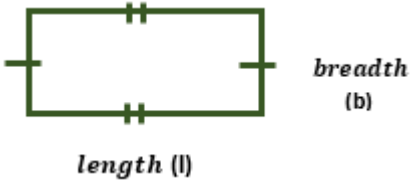
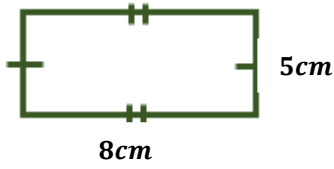
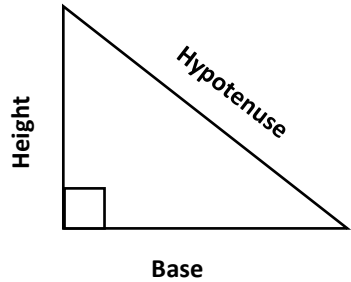
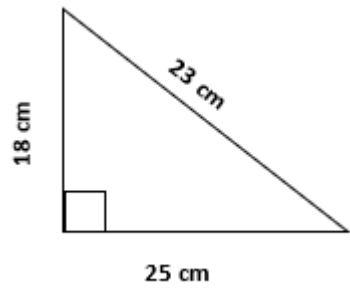
### What is an area?

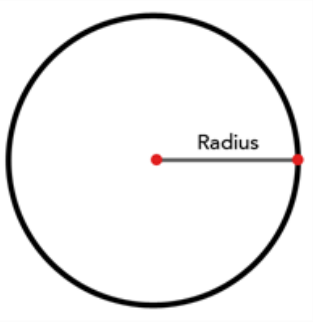
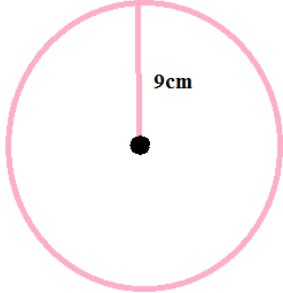
- The amount of space inside the boundary of a flat (2-dimensional) object

### Understanding Area

- Shapes are two dimensional (2D).
- It is measured in square units, e.g.,  $\text{cm}^2$ ,  $\text{m}^2$ ,  $\text{mm}^2$ , etc)

## Area of a square, rectangle, triangle, and circle.

| Shape  | Area (A)  | Worked Examples   |
|--|---|---|
| <b>Square</b><br>     | $\text{Area} = \text{side} \times \text{side}$ $= (\text{side})^2$                | <br><br>$\begin{aligned} \text{Area} &= \text{side} \times \text{side} \\ &= 5\text{cm} \times 5\text{cm} \\ &= 25\text{cm}^2 \end{aligned}$   |
| <b>Rectangle</b><br> | $\text{Area} = \text{length} \times \text{breadth}$                               | <br><br>$\begin{aligned} \text{Area} &= \text{length} \times \text{breadth} \\ &= 8\text{cm} \times 5\text{cm} \\ &= 40\text{cm}^2 \end{aligned}$  |
| <b>Triangle</b><br> | $\text{Area} = \frac{1}{2} \times \text{base} \times \text{perpendicular height}$ | <br><br>$\begin{aligned} \text{Area} &= \frac{1}{2} \times \text{base} \times \text{perpendicular height} \\ &= \frac{1}{2} \times 25\text{ cm} \times 18\text{ cm} \\ &= 225\text{ cm}^2 \end{aligned}$ |

|   |   |  |
|---|---|--|
| <p>Circle</p>  | $\text{Area} = \pi \times \text{radius}^2$ $= \pi \times r^2$ |  $\begin{aligned}\text{Area} &= \pi \times \text{radius}^2 \\ &= \pi \times r^2 \\ &= 3,142 \times 9^2 \\ &= 254,5 \text{ cm}^2\end{aligned}$ |
|---|---|--|

### Working with Area

- When working with complex shape, break it down into smaller (basic) shapes.
- Add all the areas of the smaller (basic) shapes to get the area of the complex shape.
- Make sure that all the units are the same.
- Rounding must only be done at the end of the calculations.
- Rounding must always be done according to the context.

### Surface Area

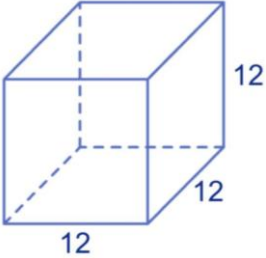
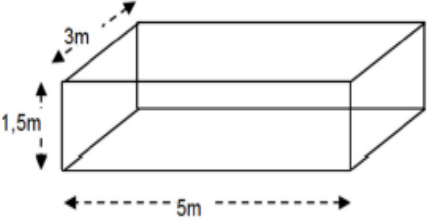
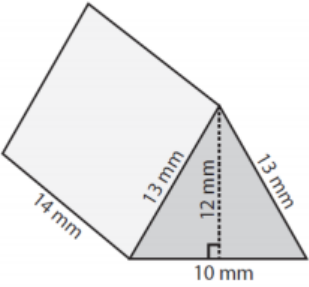
#### What is Surface Area?

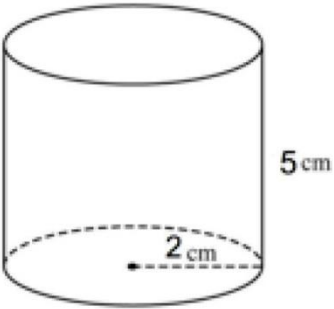
- The total exterior area of all the exposed surface area a 3D object.

#### Understanding Area

- Shapes are three dimensional (3D).
- The difference between the total surface area (TSA) and area is that the total surface area refers to 3D objects and the area refers to 2D objects.
- It is measured in square units, e.g.,  $\text{cm}^2$ ,  $\text{m}^2$ ,  $\text{mm}^2$ , etc)

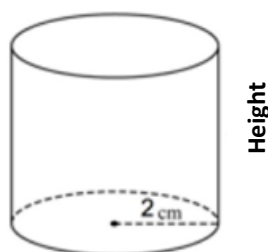
## Total Surface Area of a rectangular prism and cylinder.

| Shape   | Total Surface Area (TSA)  | Worked Examples   |
|---|---|---|
| <p>Cube</p>    | <p>Total Surface Area (TSA)<br/>= 6 x side</p>  | <p>Total Surface Area (TSA)<br/>= 6 x side<br/>= 6 x 12<br/>= 72 units<sup>2</sup></p>                                      |
| <p>Rectangular Prism</p>  <p>Length = 5m<br/>Breadth = 3m<br/>Height = 1,5m</p>                         | <p>Total Surface Area (TSA)<br/>= (2 x length x breadth) +<br/>(2 x length x height) +<br/>(2 x breadth x height)</p>     | <p>Total Surface Area (TSA)<br/>= (2 x 5m x 3m) + (2 x 5m<br/>x 1,5m) + (2 x 3m x 1,5m)<br/>= 54 m<sup>2</sup></p>          |
| <p>Triangular Prism</p>  <p>Breadth = 10 mm<br/>height = 12 mm<br/>side = 13 mm<br/>Height = 14 mm</p> | <p>Total Surface Area<br/>= 2 x (<math>\frac{1}{2}</math> x breadth x height)<br/>+ (side + side + side) x<br/>Height</p> | <p>Total Surface Area =<br/>2 x (<math>\frac{1}{2}</math> x 10 x 12) +<br/>(13 + 13 + 10) x 14<br/>= 624 mm<sup>2</sup></p> |

|   |  |  |
|---|--|--|
| <p>Cylinder</p>  | <p>Total Surface Area =<br/> <math>2 \times (\pi \times \text{radius}^2) + (2 \times \pi \times \text{radius}) \times \text{height}</math></p> <p>Where <math>\pi = 3,142</math></p> | <p>Total Surface Area =<br/> <math>2 \times (3,142 \times 2^2) + (2 \times 3,142 \times 2) \times 5</math><br/> <math>= 87,976 \text{ cm}^2</math></p> |
|---|--|--|

**A case where the Total Surface Area is given and there is a missing value.**

Total surface area =  $87,976 \text{ cm}^2$



$$\begin{aligned}
 \text{T.S.A} &= 2 \times (\pi \times \text{radius}^2) + (2 \times \pi \times \text{radius}) \times \text{height} \\
 87,976 \text{ cm}^2 &= 2 \times (3,142 \times 2^2) + (2 \times 3,142 \times 2) \times \text{Height} \\
 87,976 \text{ cm}^2 &= 17,5952 \times \text{Height} \\
 \frac{87,976 \text{ cm}^2}{17,5952 \text{ cm}} &= \text{Height} \\
 \therefore \text{Height} &= 5 \text{ cm}
 \end{aligned}$$

## Volume

### What is a Volume?

- The 3-dimensional space occupied by a gas, liquid, or a solid substance.

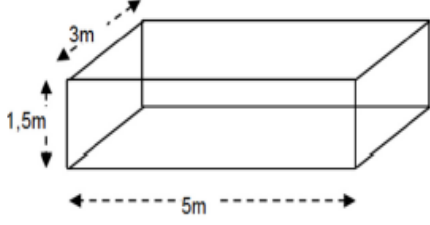
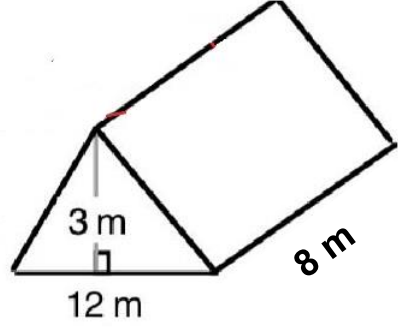
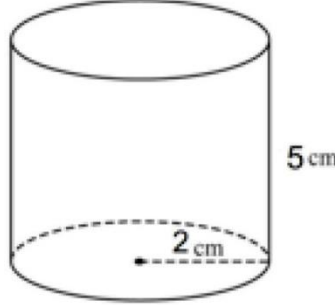
### What is Capacity?

- The amount an object can hold.  
E.g., the capacity of the stadium is how many spectators it can hold, whereas the volume is the space they occupy.

### Understanding Volume

- It is also known as Capacity.
- Shapes are three dimensional (3D).
- Units of a volume include  $\text{m}^3$ ,  $\text{l}$  and  $\text{kl}$
- Units of a solid volume include:  $\text{mm}^3$ ,  $\text{cm}^3$ ,  $\text{m}^3$ ,  $\text{km}^3$

## Total Surface Area of a rectangular prism and cylinder.

| Shape  | Volume (V)   | Worked Examples  |
|--|--|--|
| <p>Rectangular Prism</p>  <p>Length = 5m<br/>Breadth = 3m<br/>Height = 1,5m</p> | <p>Volume = length x breadth x height</p>  | <p><math>V = 5\text{m} \times 3\text{m} \times 1,5\text{m}</math><br/><math>= 22,2 \text{ m}^3</math></p>  |
| <p>Triangular Prism</p>  <p>Base = 12m<br/>height = 3m<br/>Height = 8m</p>     | <p>Volume = <math>\frac{1}{2} \times b \times h \times H</math></p>  | <p><math>V = \frac{1}{2} \times b \times h \times H</math><br/><math>= \frac{1}{2} \times 12\text{m} \times 3\text{m} \times 8\text{m}</math><br/><math>= 144\text{m}^3</math></p> |
| <p>Cylinder</p>  <p>Radius = 2cm<br/>Height = 5 cm</p>                        | <p>Volume = <math>\pi \times \text{radius}^2 \times \text{height}</math></p> <p>Where <math>\pi = 3,142</math></p> | <p><math>V = 3,142 \times (2 \text{ cm})^2 \times 5\text{cm}</math><br/><math>= 62,84 \text{ cm}^3</math></p>  |



## Calculating Volume

- Make sure that units are the same before substituting into the given formula.
- When the diameter is given, divide it by two to get the radius before substituting into the formula.
- (radius)<sup>2</sup> does not mean “multiply by 2”.  
e.g.  $5^2 = 5 \times 5 = 25$  ✓

$$5^2 \neq 5 \times 2$$

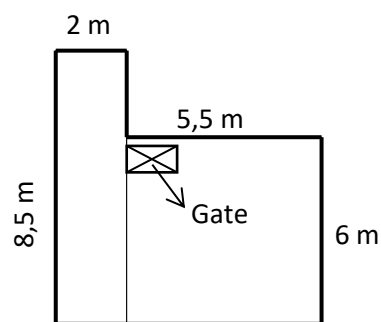


## ACTIVITY: Perimeter, Area, Surface Area and Volume

(125 marks:1 hour 45 minutes)



- 1.1 Sam would like to design a vegetable garden. The measurements (dimensions) of Sam's vegetable garden are given below:

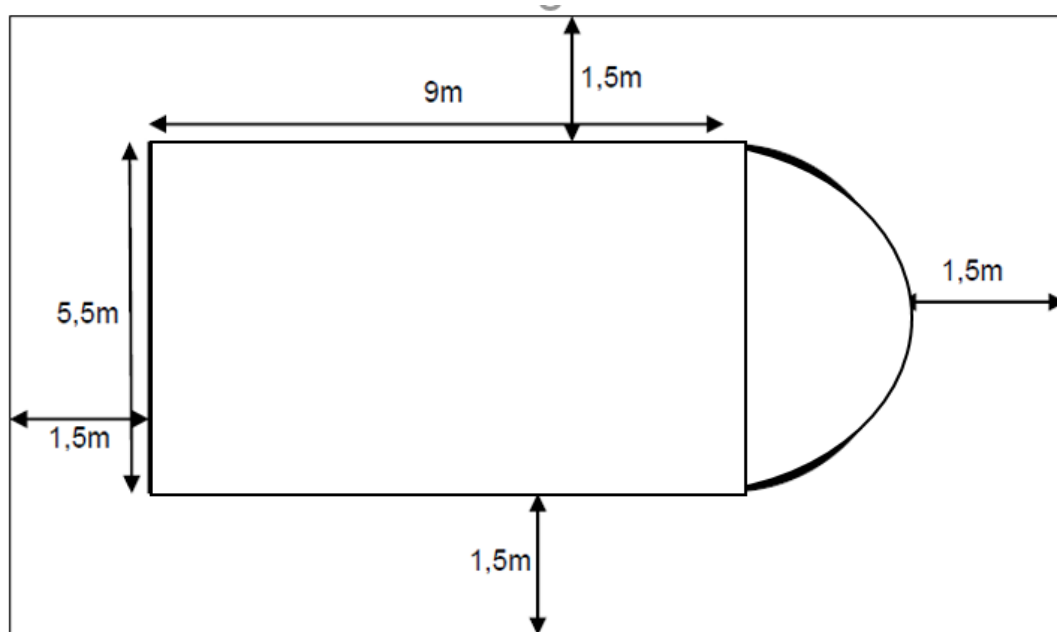


Width of the gate = 1 m

Use the information above to answer the questions that follow.

- 1.1.1 Define the term *perimeter* according to the given context. (2)
- 1.1.2 Calculate the perimeter of the garden (3)
- 1.1.3 Sam would like to put a fence around his vegetable garden. Each panel is 1,5 m wide and can be cut up into smaller pieces. How many panels does he need? Show all your calculations. (4)

- 1.2 Consider the fence surrounding the fishpond is placed about 1,5m away from the pond. As indicated below:



- 1.2.1 Explain the term **perimeter** according to the context given above. (2)
- 1.2.2 Determine the perimeter of the fence. (4)
- 1.2.3 Determine the cost if the fencing is sold in 5m rolls for R162,50 per roll. (4)
- 1.2.4 Determine how many poles are required to hold the fence if the poles are to be spaced with a maximum space of 1,8 m and if there is to be a pole on every corner. (3)
- 1.2.5 Calculate how much will all the poles cost if they sold in groups of 6 for R500 (3)

- 1.3 Hope makes rectangular scarfs, as shown in the picture below, and sells them at a local flea market.

| Rectangular scarf   | Folded scarf  | Dimensions of one scarf:                       |
|---|---|--|
|  |  | Length = 450 mm = A<br>Width = 300 mm = 0,30 m |

- 1.3.1 Convert the length (A) of the scarf to metres. (2)

1.3.2 Explain the meaning of the term *perimeter*. (2)

1.3.3 Which of the following formulae can be used to calculate the perimeter of a rectangle?

A.  $\text{Perimeter} = \text{length} \times \text{width}$

B.  $\text{Perimeter} = \text{length} + \text{length} + \text{width}$

C.  $\text{Perimeter} = (2 \times \text{length}) + (2 \times \text{width})$  (2)

1.4 The gate at the College has the following dimensions: height = 2,08 m and length = 3,5 m.

1.4.1 Calculate the perimeter of the gate. (2)

1.4.2 Calculate the area occupied by the gate. You may use the following formula:  
**Area = length  $\times$  height** (2)

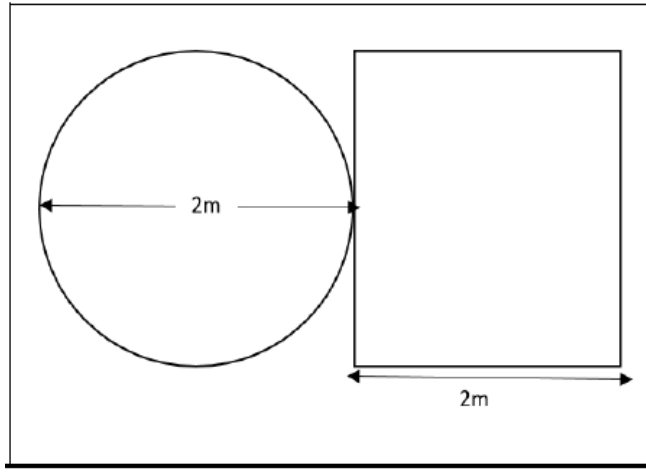
- 1.5 Mr Sethole bought a swimming pool for his children to use during December holidays. The swimming pool has a diameter of 1 830 cm.



- 1.5.1 Define the term *diameter* according to the given context (2)
- 1.5.2 Calculate the radius of the swimming pool in metres. (3)
- 1.5.3 To calculate the circumference of the swimming pool, Mr Sethole had to choose from the list of formulae given below. Which formula is the correct one?
- A. Circumference of the circle =  $3,142 \times \text{radius}$
- B. Circumference of the circle =  $3,142 \times \text{diameter}$
- C. Circumference of the circle =  $2 \times 3,142 \times \text{diameter}$
- D. Circumference of the circle =  $3,142 \times \text{radius}^2$  (2)

- 1.6 Mr Mbhele just bought a new house and his yard is not big enough to have a space to plant vegetables. He decided to go and buy two garden pots (a circular and square pot). The two pots will form his vegetable garden. The diagram below shows the top-view and dimensions of the two pots.

**DIAGRAM 1: TOP VIEW OF GARDEN POTS**



- 1.6.1 Determine in (mm) the radius of the circular pot. (3)

- 1.6.2 Calculate:

- (a) The circumference of the circular pot in mm.

You may use the formula:

$$\text{Circumference of a circle} = 2 \times \pi \times r \text{ where } \pi = 3,142 \quad (2)$$

- (b) The area in (cm<sup>2</sup>) of the square.

You may use the formula:

$$\text{Area of the square} = \text{length} \times \text{width} \quad (3)$$

- (c) The total perimeter of the vegetables garden. (2)

- 1.6.3 Is it advisable for Mr Mbhele to have vegetable garden? Give a reason for your answer. (2)

- 1.7 A farmer in the United States of America uses the containers below to store and supply milk to local factories.

**330 Gallon IBC Tote**



**55 Gallon drum**



**Inside dimensions**

Length = 48 inches

Width = 40 inches

Height = 46 inches

[Source: IBCtanks.com]

**NOTE:**

1 gallon = 4,546092 litres

1 inch = 2,54 cm

1 m ℓ = 1 cm<sup>3</sup>

- 1.7.1 Convert 55 gallons to litres. Round your answer to the nearest whole number. (3)

- 1.7.2 Write down TWO dairy products that can be produced by using milk. (2)

- 1.7.3 Show, by means of calculations, that the IBC tote can hold more than 310 gallons of milk.

You may use the formula:

$$\text{Volume of a rectangular prism} = \text{length} \times \text{width} \times \text{height} \quad (6)$$

- 1.7.4 The farmer decided to paint the total external surface area of the drum to keep it away from rusting. The spread rate of the paint is 2,5m<sup>2</sup>/ℓ and the paint is sold in 1ℓ tins. Calculate how many tins of paint will be needed to paint one drum.

You may use the formula:

**Surface area of a cylinder (in m<sup>2</sup>)**

$$= (2 \times 3,142 \times r^2) + (2 \times 3,142 \times r \times h)$$

Where **r** = radius and **h** = height

(9)

- 1.8 The farmer checks the weight of the cows once per term to make sure that they are healthy so that they can produce enough milk. He uses a manual way of calculating the weight by measuring the cow's girth and the body length.

NB: Girth is the measurement around the middle of the cow.

- 1.8.1 Choose the most accurate tool from the ones listed in the bracket.

The farmer may use the (measuring tape/ruler) to measure the girth and the body length of the cow. (2)

- 1.8.3 Show, by means of calculations, that a cow with a girth of 70 inches and a body length of 78 inches has a weight of 577,88 kg.

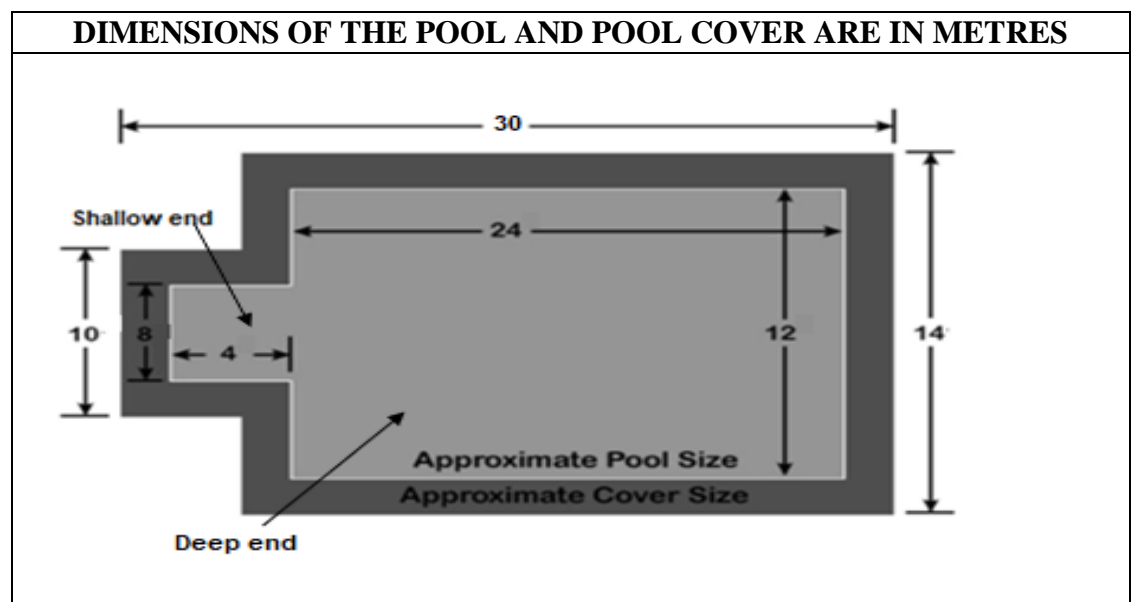
You may use the formula:

$$\text{Animal weight in pounds} = \frac{(\text{girth})^2 \times \text{body length}}{300}$$

**Note: 1 kg = 2,2046 pounds** (4)

- 1.9 The pool at school needs a pool cover. A pool cover prevents people falling into the pool and protects the pool. The diagram below shows the dimensions of the pool and the cover.

The pool cover overlaps the pool by 1 metre all around



- 1.9.1 Determine the perimeter of the pool cover.

You may use the formula:

$$\text{Perimeter} = 2 (L + B) \quad (3)$$



- 1.9.2 Determine how many times larger the area of the pool cover is compared to the area of the pool. Show all the work.

You may use the formula:

$$\text{Area} = \text{length} \times \text{breadth} \quad (8)$$

- 1.10 The shallow end of the pool has a depth of 1m and the deep end has a depth of 2m.

- 1.10.1 Determine the total capacity of the pool.

You may use the formula:

$$\text{Volume} = \text{length} \times \text{breadth} \times \text{height} \quad (4)$$

- 1.10.2 Chlorine is a chemical that is used to prevent bacteria and algae from forming in the pool. For every 1000 litres of pool water 1,5 teaspoons of chlorine is required.

**NOTE: 1 teaspoon = 5ml**

Determine the number of litres of chlorine required to treat the pool. (7)

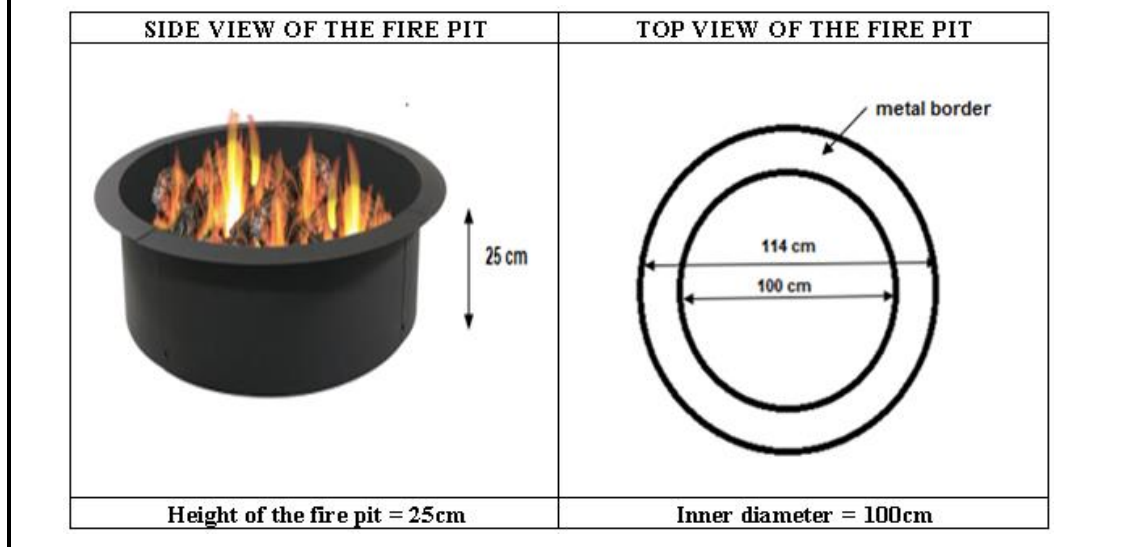
- 1.11 The pool needs to be refilled with water. An empty pool fills with water at a rate of 9 gallons per minute.

- 1.11.1 Determine the number of litres of water per minute required to refill the pool.

**NOTE: 1 gallon = 3,78541 litres.** (2)

- 1.11.2 Determine the time taken, in days, to fill the pool. Round up your answer to the nearest day. (6)

- 1.12 Siya makes fire pits for a living. A fire pit can be used for outdoor entertaining. The pit is made of metal.



- 1.12.1 Determine the area of the metal border.

You may use the formula:

$$\text{Area of a circle} = 3,142 \times r^2 \quad (4)$$

- 1.12.2 Siya claims he needs  $1,99\text{m}^2$  of metal sheeting, including 10% for wastage, to make one fire pit.

Verify his **CLAIM** by showing all calculations.

You may use the formula:

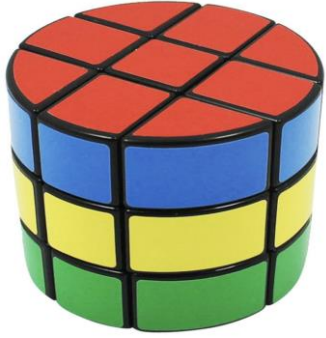
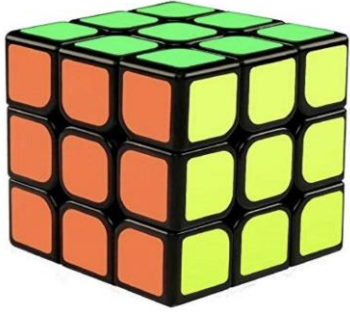
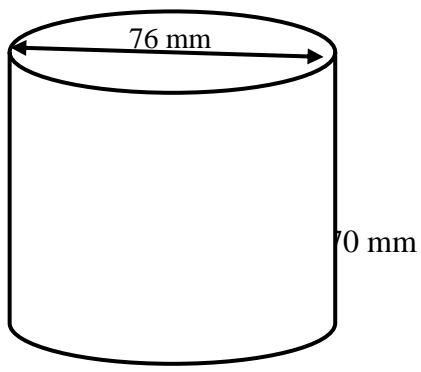
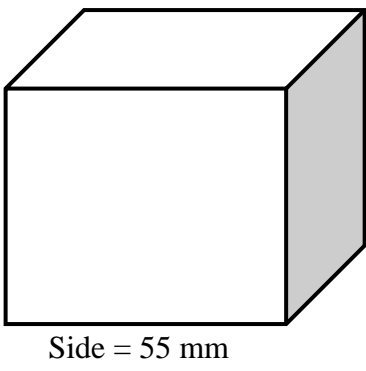
$$\text{Surface Area of a Cylinder} = (2 \times 3,142 \times r^2) + (2 \times 3,142 \times r \times h) \quad (8)$$

- 1.12.3 Siya wants to apply two coats of paint to the fire pit to rust proof it. Determine the number of litres of paint he must buy if one litre of paint covers  $5\text{m}^2$

(4)

## Summative Assessment 1

1.1 Magic cubes were popular 3D puzzle toys in the 1980's.

| CYLINDRICAL MAGICAL CUBE   | CUBIC MAGIC CUBE  |
|--|---|
|   |   |
| DIMENSIONS OF A CYLINDRICAL MAGIC CUBE   | DIMENSIONS OF A CUBIC MAGIC CUBE  |
|  |  |

[Adjusted from [bing.com/images](http://bing.com/images)]

Use the information above to answer the questions that follow.

1.1.1 Calculate the radius of the cylindrical magic cube. (2)

1.1.2 Calculate in  $\text{cm}^3$ , the volume of the cylindrical magic cube.

You may use the formula:

**Volume of cylinder =  $3,142 \times \text{radius} \times \text{radius} \times \text{height}$ .** (3)

1.1.3 Determine the number of square sides of a cube. (2)

1.1.4 a) Define *total surface area* in this context. (2)

b) Calculate in  $\text{mm}^2$ , the total surface area of the magic cube.

You may use the formula: **Area of a square = side  $\times$  side** (3)

1.2

The picture below shows one of the tables in the dining room.



The following are the dimensions of the table:

Length = 270 cm      Width = 90 cm      Height = 76 cm

1.2.1 Show that the perimeter of the top of the table is 720 cm.

You may use the formula: **Perimeter of a rectangle** =  $2 \times (\text{length} + \text{width})$  (3)

1.2.2 Each person occupies 60,96 cm space when seated around the table.

Determine the actual number of people that can sit comfortably around the table. (5)

[19]

## Summative Assessment 2

- 1.1 ANNEXURE A shows Sharon's study desk unit with a bookshelf that is fitted against the wall of her room. The diagram with dimensions are also shown.

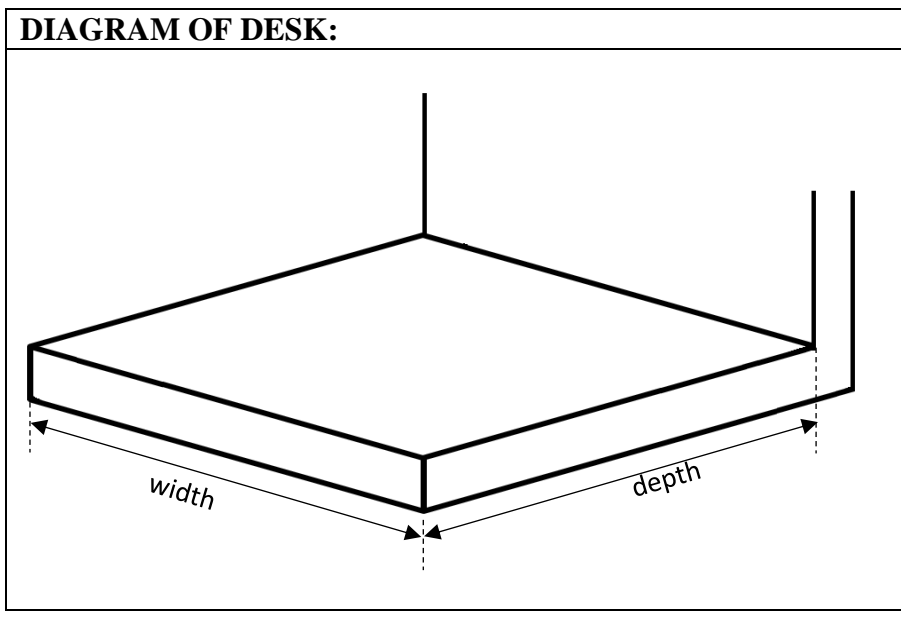
Use ANNEXURE A to answer the questions that follow.

- 1.1.1 The height of one of the parts of the unit is  $\frac{3}{4}$  of a metre.

Write down the name of the part. (2)

- 1.1.2 Write down the depth of the bookshelf in metre. (2)

- 1.1.3 The width of the desk is 1,5 m. Calculate in  $\text{m}^2$ , the work surface of the desk, rounded to two decimal places.



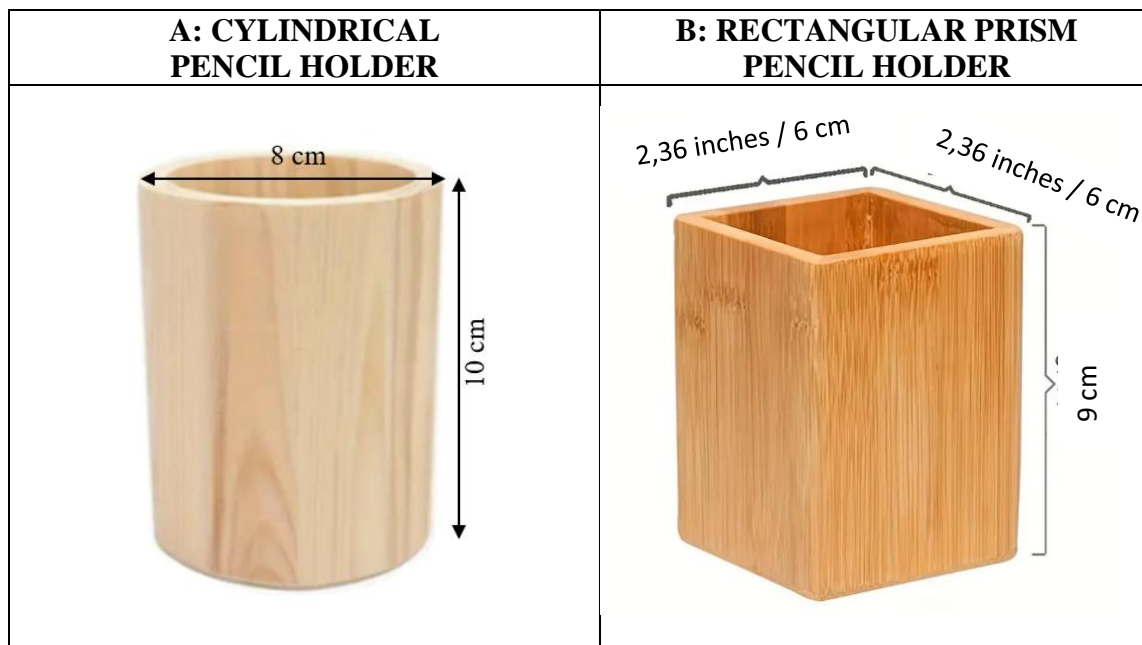
(4)

- 1.1.4 Calculate in cm, the maximum height of a book packed vertically in the bookshelf.

(6)

- 1.2 Sharon wants to buy a new pencil holder to hold as much stationery as possible such as pens, pencils, kokis and whiteboard markers.

She wants to make a choice between the two pencil holders **A** and **B** as shown in the diagram below.



You may use the following formulae:

**Volume of a cylinder** =  $\pi \times (\text{radius})^2 \times \text{height}$  use  $\pi = 3,142$

**Volume of a rectangular prism** =  $\text{length} \times \text{width} \times \text{height}$

**Surface Area of cylindrical holder** =  $(\pi \times r^2) + (2 \times \pi \times r \times h)$ , use  $\pi = 3,142$

**Surface Area of Rectangular Prism holder** =  $lw + 2lh + 2wh$

where  $r$  = radius

$h$  = height

$l$  = length

$w$  = width

- 1.2.1 Determine the radius in cm of the cylindrical holder. (2)

- 1.2.2 Determine the conversion factor for cm to inches, correct to three decimal places, in the form 1 cm = ... inches. (3)

- 1.2.3 A decorative ribbon will be tied around the rectangular prism pencil holder.

Calculate the total length of the ribbon if an extra 8 cm is added for a bow. (3)

- 1.2.4 Sharon wants to buy the pencil holder that can hold the most stationery.

Advise her on which pencil holder to choose by showing all relevant calculations.

(6)

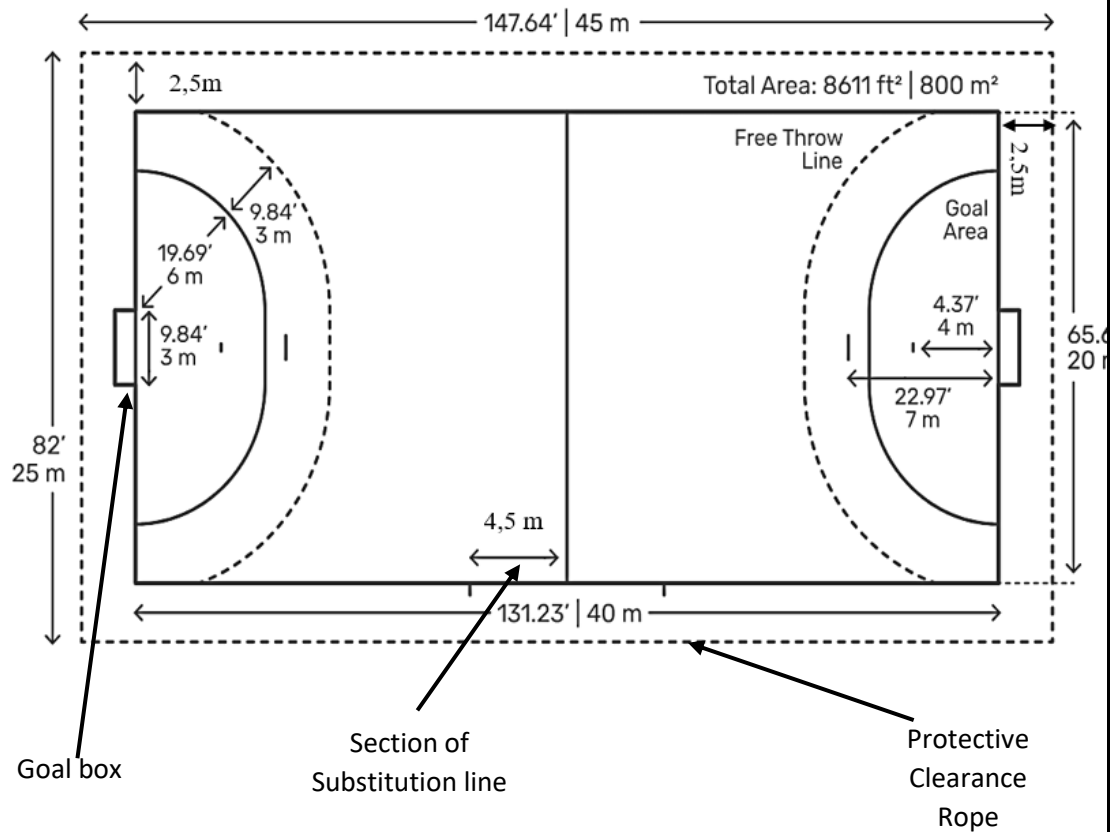
[28]

## Question 2

2.1

While visiting Scotland Khanya and her family attend a handball match. Handball is an Olympic Team Sport.

The layout of a Handball court with measurements is shown in the diagram below:



### NOTE:

Dimensions are provided in both imperial and metric units

1 Foot (') = 0,3048 m

[Source: Adapted <https://handball-toronto.ca/about-handball/>]

Use the information above to answer the following questions.

2.1.1 Convert the length of the section of the substitution line provided to feet. (2)

2.1.2 The court will need a protective clearance rope around the outside of the court as indicated on the diagram.

Calculate the amount of protective clearance rope they will need in metres.

**You may use the following formula:**

**Perimeter = 2 (length + width)** (3)

- 2.1.3 The total volume of one Handball goal box is  $6\,000\,000\text{ cm}^3$ .

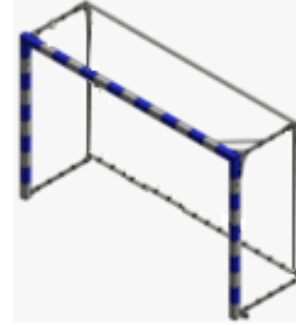
The depth of the goalbox is 1 m.

Determine the height of the goalbox in metres.

**You may use the following formula:**


$$\text{Volume} = \text{Height} \times \text{Width} \times \text{Depth}$$

**Diagram of goal box:**



(5)

- 2.1.4 The goal area will need to be painted in a different colour using the paint below:

| RHINO COURT- COURT LUXE  |                       |
|--|-----------------------|
|  |                       |
| Cost:  | R2 608 Incl. VAT      |
| Spread Rate:   | $1,5\text{ m}^2/\ell$ |
| Volume:  | 20 $\ell$             |

[Source:<https://rhinoluxe.co.za>]

The total area to be painted is  $113,112\text{ m}^2$ .

Khanya did some calculations and claims that the total cost to paint the goal areas will be less than R10 000.

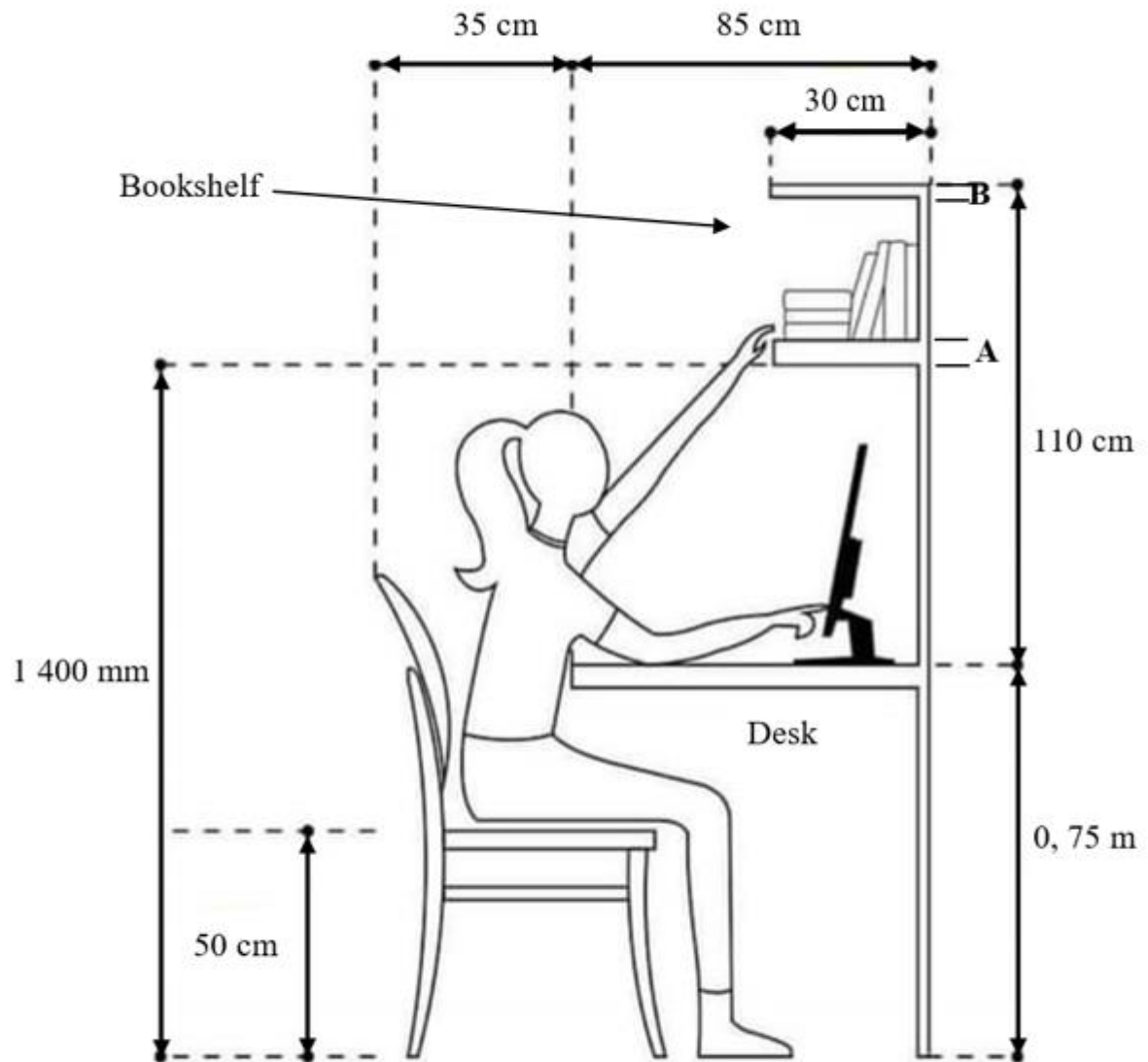
Verify, showing all calculations whether her statement is valid.

(7)  
[17]



## ANNEXURE A

### DIAGRAM OF STUDY DESK UNIT WITH BOOKSHELF:



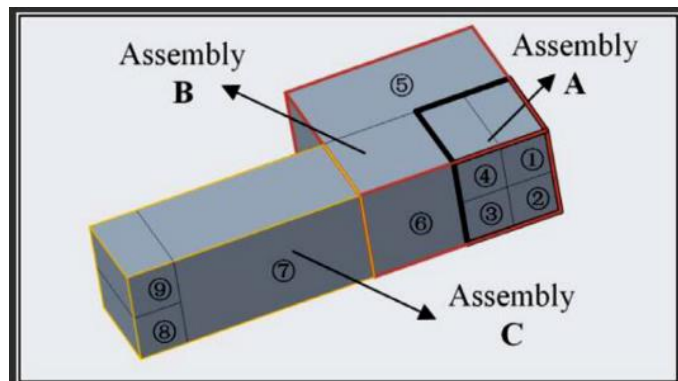
**NOTE:** The thickness of  
**A** = 3 cm, and  
**B** = 1,5 cm

You may use the following formula:  
**Area of rectangle = depth × width**

## PLANS (INSTRUCTION/ ASSEMBLY DIAGRAMS)

### OBJECTIVES

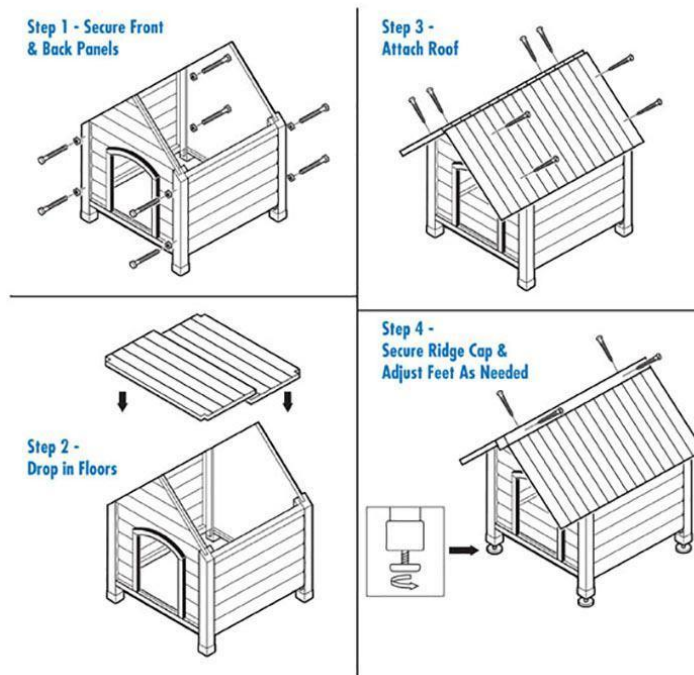
- By the end of this section learners must be able to:
- Use instruction / assembly diagrams, containing words and/or pictures.
- Complete the task completed in the instructions and/or explain what the instructions mean and/or represent



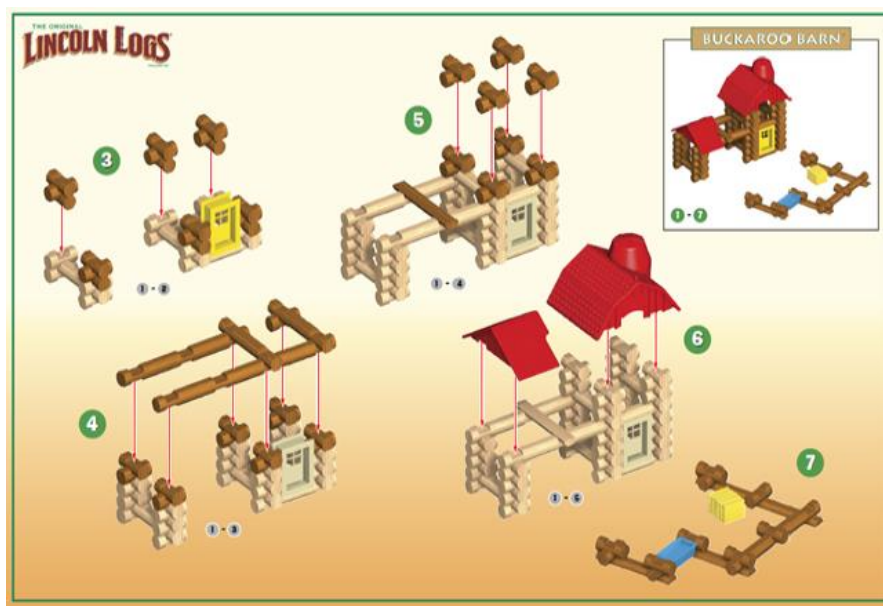
## ASSEMBLY DIAGRAMS

- Show diagrams/pictures/nets of complete items
- They use symbols for the different components of an item.
- They have written instructions on how to put the different components together.

## INSTRUCTION/ ASSEMBLY DIAGRAMS ON HOW TO BUILD A PALLET DOGHOUSE



## INSTRUCTION/ ASSEMBLY DIAGRAMS CHILDREN'S TOYS



## INSTRUCTIONS AND ASSEMBLY DIAGRAMS

- When we buy goods such as furniture (TV stands, chairs, etc) or electronic equipment (cell phones, computers, printers, etc), they sometimes come in pieces, and we need to follow instructions provided in manuals to assemble them.
- It is therefore important to make sense of the instructions if you want the optimal use from the item that you have bought.
- Failing to follow the instructions might lead to the equipment not been able to work properly.

### Note to learners:

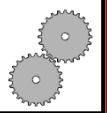
The following points are important when you have to write your own set of instructions:

- Use short and clear sentences.
- Use precise and descriptive words.
- Numbering, arrows, and dotted lines help to show the measurement and direction.
- Diagrams and pictures should be clear, large and easily understandable.
- Colourful diagrams are very effective.

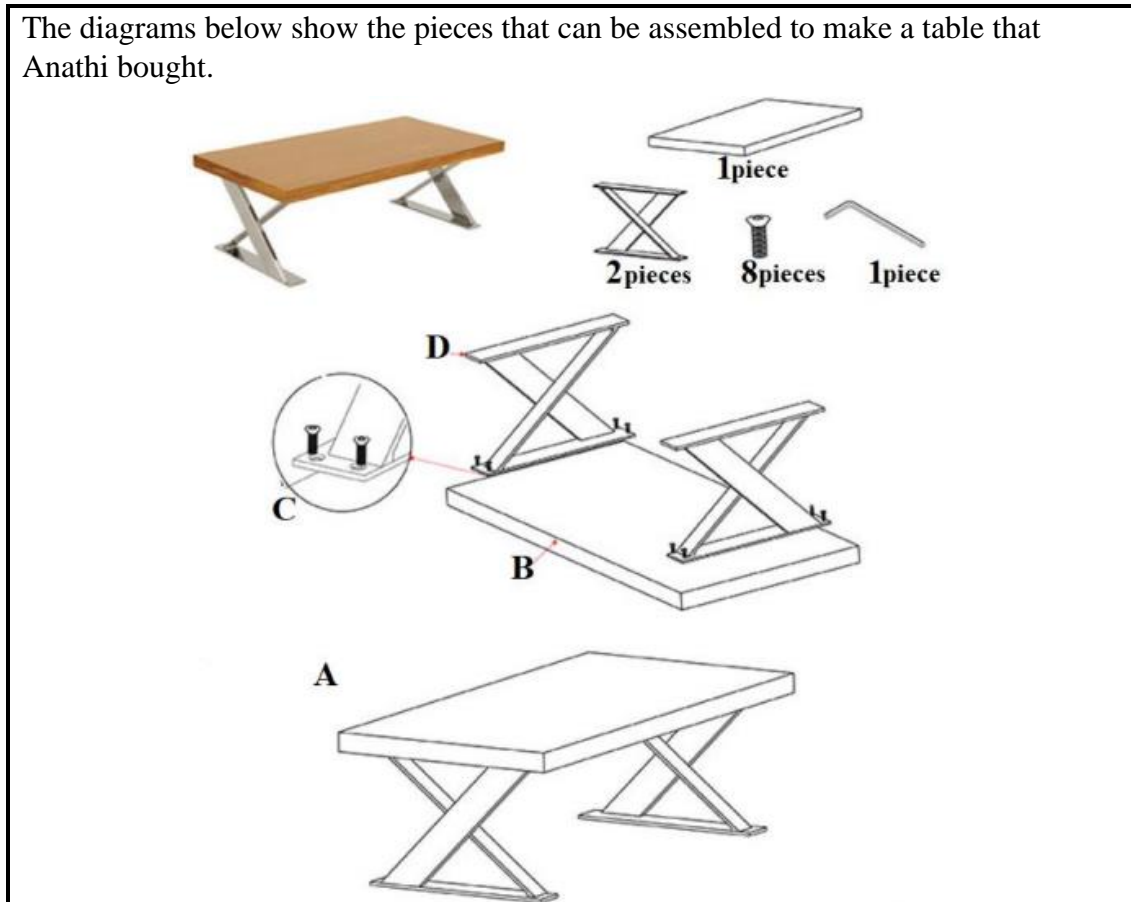
### Example

| Instructions to assemble the Cell phone holder  |   |  |
|---|---|--|
| Clean the desired location then peel the protective skin from the suction pad.<br> | Place the suction pad on the desired surface.<br>  | Pull down the lever to secure the mount.<br>      |
| Adjust the car mount in any angle.<br>   | Place your cell phone on the holder and adjust the holder according to the size of the cell phone.<br> | Pull on the tab at the side for easy removal.<br> |

## Worked Examples



- 1.1 The diagrams below show the pieces that can be assembled to make a table that Anathi bought.



Study the diagram above and answer the questions that follow.

- 1.1.1 Determine the number of pieces needed to assemble this table. (2)

**Possible answer**

**1 piece + 2 pieces + 8 pieces + 1 piece  
= 12 parts**

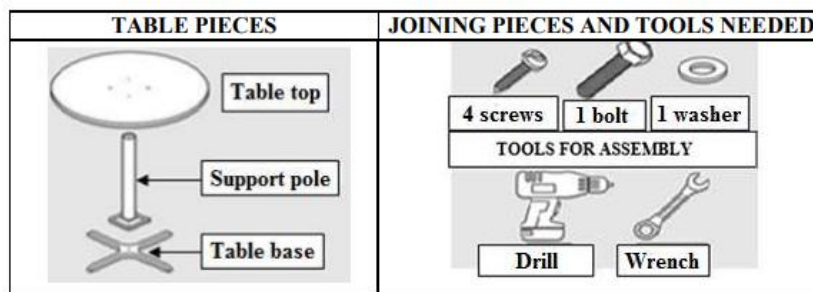
- 1.1.2 Arrange the given steps (using A to D) to show Anathi how this table can be assembled. (4)

**Possible answer**

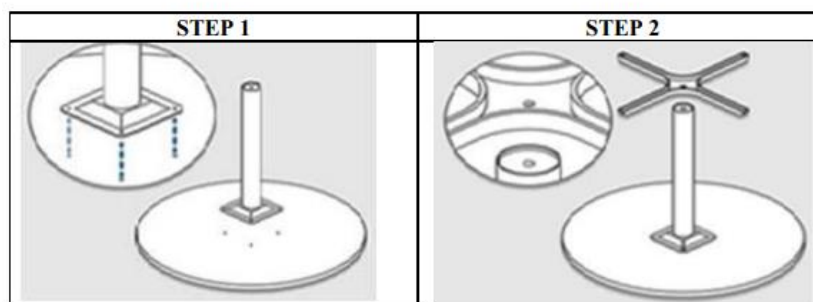
**B, D, C, A**

- 1.2 Miss Ndoe, the manager of the theatre bought a table for her home. The pieces needed to assemble the table comes in a box and the assembly instructions are as shown below.

**DIAGRAM 2: TABLE- & JOINING PIECES AND TOOLS NEEDED**



**DIAGRAM 3: ASSEMBLY INSTRUCTIONS**



[Source: [www.globalindustrial.com](http://www.globalindustrial.com)]

Use DIAGRAM 2 AND DIAGRAM 3 above to answer the questions that follow.

- 1.2.1 Determine the number of screws that are provided to assemble this table. (2)

**Possible answer**

**4 screws**

- 1.2.2 Name ONE tool that must be used to assemble the table. (2)

**Possible Answer**

**Drill OR Wrench**

- 1.2.3 Identify the STEP (give number only) in the ASSEMBLY INSTRUCTIONS that represents the following instruction:

“Use the bolt and the washer to install the table base to the table support pole.” (2)

**Possible Answer**

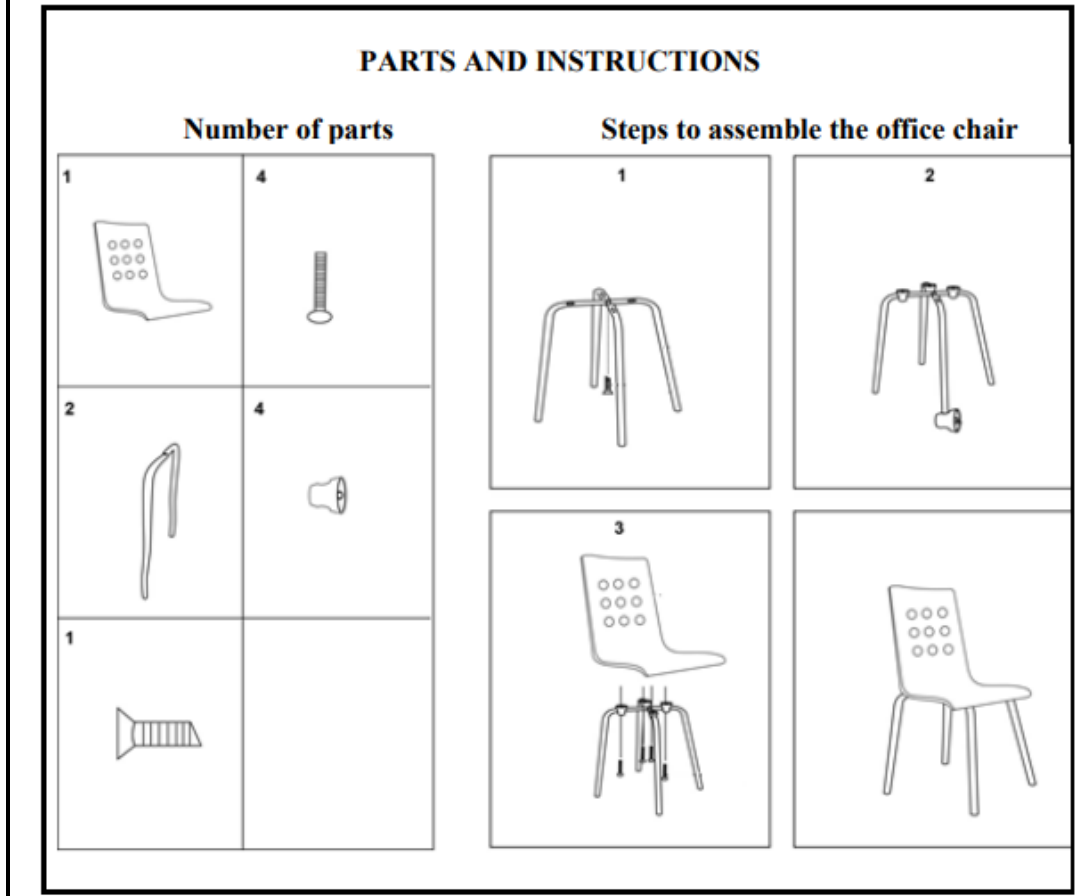
**2 OR Step 2**

- 1.2.4 What kind of shape is the long part of the support pole? (2)

**Possible Answer**

**Cylinder OR Cylindrical**

- 1.3 The fruit canning company bought some office chairs, but they must assemble it. The following is an illustration with instruction sheet on how the chairs should be assembled. Study the illustration and answer the questions that follow.



- 1.3.1 Determine how many pieces in total will be used to assemble 75 office chairs. (3)

**Possible Answer**

**Number of pieces to assemble 75 office chairs**

$$= (1 + 4 + 2 + 4 + 1) \times 75$$

$$= 12 \times 75$$

$$= 900 \text{ pieces}$$

- 1.3.2 Give a detailed description of how an office chair should be assembled. (6)

**Possible Answer**

- Screw the 2 bars together with the big screw.
- Insert the 4 rubber stoppers to the end of the 4 legs of the chair.
- Use the 4 small screws to attach the seat to the bars.

[9]

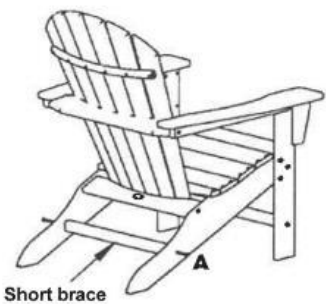

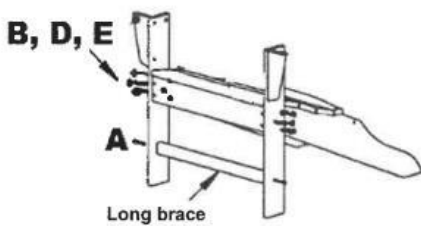
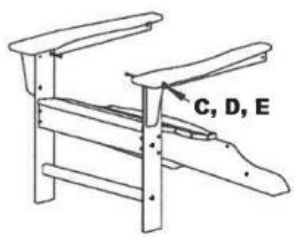







## ACTIVITIES



- 1.1 Illustrated below are steps and some instructions to assemble a deck chair. To assemble the deck chair, the wooden pieces are joint together using fasteners (screws, bolts, washers and nuts). There are 32 pieces in the packet of fasteners. Each bolt is screwed by a nut and a washer.

**STEPS TO ASSEMBLE A DECK CHAIR**

|  |  |
|--|--|
| <p style="text-align: center;"><b>STEP 4<br/>COMPLETED CHAIR</b></p>  <p style="text-align: center;"><b>STEP 3</b></p>  <p style="text-align: center;">Attach the back to the seat and arms using the screws (A).</p> | <p style="text-align: center;"><b>STEP 1</b></p>  <p style="text-align: center;">Attach the seat using bolts (B), nuts (E) and washers (D) to the two front legs. Attach the long brace using the screws (A).</p> <p style="text-align: center;"><b>STEP 2</b></p>  <p style="text-align: center;">Attach the arms to the two front legs using the bolts (C), nuts (E) and washers (D).</p> |
|--|--|

| TYPE OF FASTENER  |   |   |  |   |
|---|---|---|--|---|
| A   | B   | C   | D  | E   |
| Screw   | Bolt  | Bolt  | Washer   | Nut   |
|  |  |  |  |  |
| Quantity  | 8   | 6   | ...  | 8   |

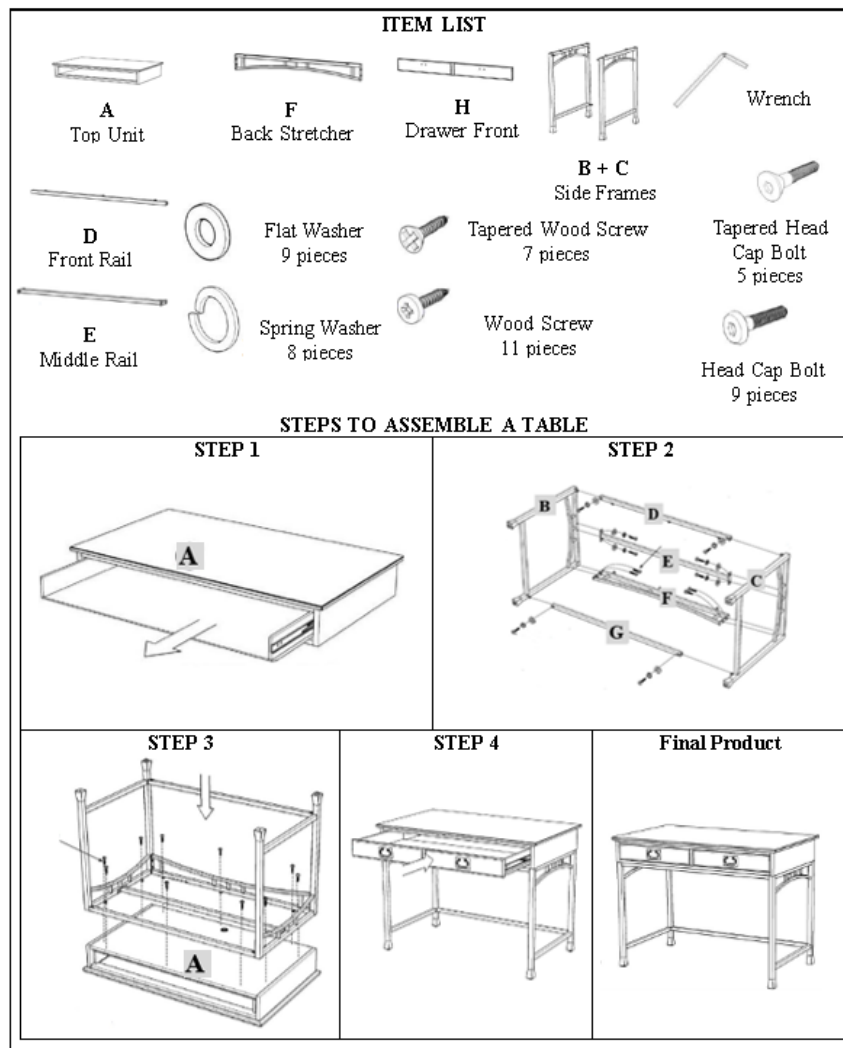
[Adapted from [www.bin.com](http://www.bin.com)]

Use the information above to answer the questions that follow.

- 1.1.1 Determine the number of type C bolts used to assemble the deck chair (2)
- 1.1.2 State the number of nuts left over after step 1 is completed. (2)
- 1.1.3 Name the piece required to complete the assembly of the deck chair. (2)



- 1.2 The Central University of Technology wants to replace the old student desks in their student accommodation centres with new ones.  
The picture below shows the item list that comes in the box of a student desk.

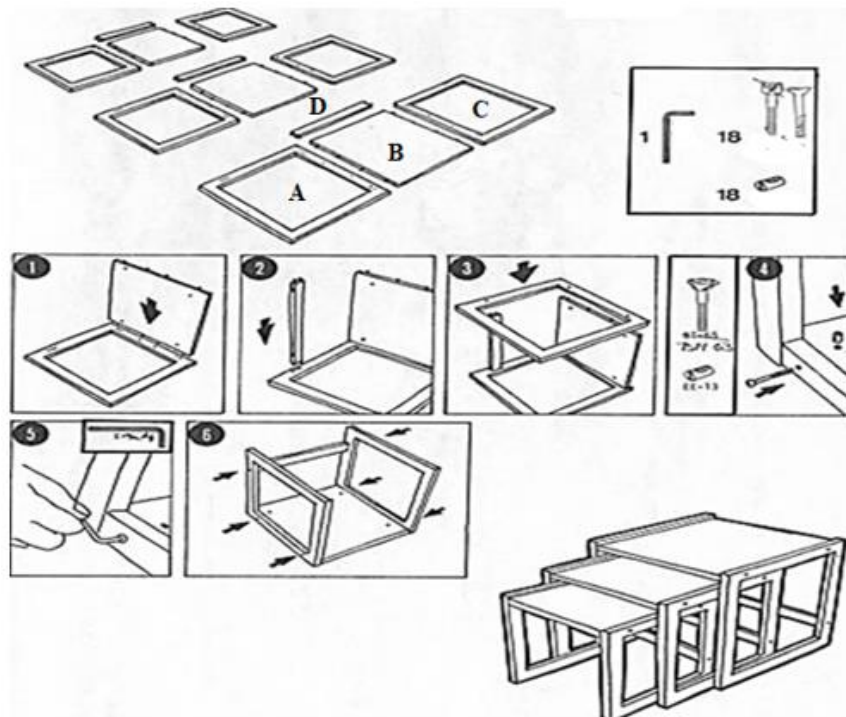





Use the information above to answer the questions that follow.

- 1.2.1 Determine the total number of washers needed to assemble the student desk. (2)
- 1.2.2 Give ONE use of a student desk. (2)
- 1.2.3 Write down the item, using a symbol from step 2, which is not listed under the item list. (2)
- 1.2.4 Write down the number of screws used to attach the top unit in step 3. (2)
- 1.2.5 One apartment has four rooms. Calculate the number of new desks needed for fifteen apartments if one desk is placed in every room. (2)

1.3

An assembly plan for a set of side tables can be seen below. This assembly plan has no instructions.



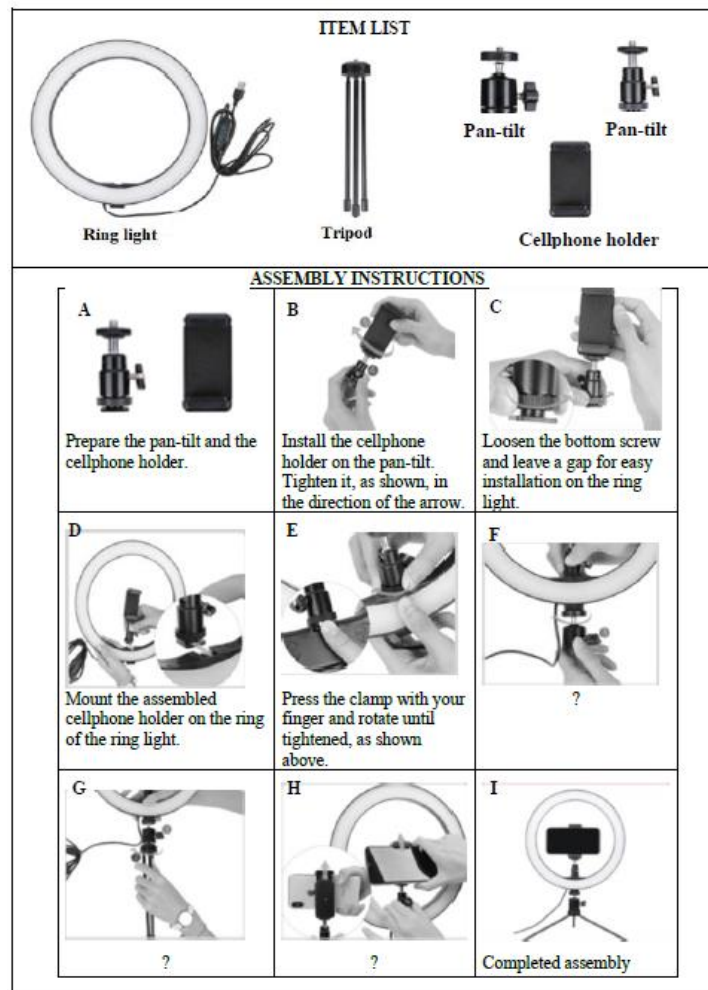
| COMPONENTS USED TO ASSEMBLE THE TABLES  |   |   |
|---|---|---|
| 1 ALLEN KEY   | 18 BIG SCREWS   | 18 SMALL BOLTS  |
|  |  |  |

Use the information above to answer the following questions.

- 1.3.1 Determine the total number of parts that must be used to make up all the tables. (3)
- 1.3.2 Identify the part of the table that will help to reinforce or support the table. (2)
- 1.3.3 Name the step of the assembly diagram which will secure the screws and small bolts. (2)
- 1.3.4 Write a set of instructions for Steps 1 to 3 of the assembly diagram. (3)

1.4

Ring lights are the best lighting option for close-up photography and videography. Ring lights are used for projects like make-up sessions. The picture below shows the item list and assembly instructions for a ring light. Some of the instructions have been omitted.



Use the information above to answer the following questions.

- 1.4.1 Determine the total number of items needed to assemble the ring light. (2)
- 1.4.2 Identify, in the list, the item that will be used as the ring light stand. (2)
- 1.4.3 Is the direction of the arrow in diagram B clockwise or anticlockwise? (2)
- 1.4.4 Match the following instructions with the correct picture (**F**, **G** or **H**): (2)
- (a) Clamp the cellphone to the cellphone holder (2)
- (b) Install the tripod on the pan-tilt and rotate until tightened. (2)

## MODELS

### Examination Guidelines



| Level 1: Knowing   | Level 2: Applying routine procedures in familiar contexts   | Level 3: Applying multi-step procedures in a variety of contexts  | Level 4: Reasoning and reflecting   |
|--|---|---|---|
| <ul style="list-style-type: none"><li>Measure the dimensions of a structure for which a model or 2D drawing will be constructed.</li></ul> | <ul style="list-style-type: none"><li>Build a model using a given table of dimensions or a given net/cut-out.</li></ul> | <ul style="list-style-type: none"><li>Use a given scale to determine the dimensions in which to build a model or make a 2D drawing and complete the project.</li><li>Build a model and use the model in conjunction with other content, skills, or applications to solve a problem (e.g., build a model of a container and use the model to investigate different types of packaging arrangements; or build a model of a container and determine the surface area and volume of the model to investigate the amount of storage space available in the container).</li></ul> | <ul style="list-style-type: none"><li>Decide on an appropriate scale in which to build a model or make a 2D drawing, use the scale to determine dimensions, and complete the project. Construct and compare two models in terms of storage space and materials used and make a decision about which model will be the better choice for packaging an item.</li><li>Analyse a model and critique the layout of the structure shown in the model.</li></ul> |

## MODELS

### Objectives

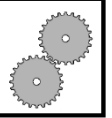
**By the end of this section learners must be able to:**

- Determine the most appropriate way to package can/or optimum use of space
- Determine the most cost-effective way to package a number of cans and/or boxes
- Investigate the best packaging shape for packaging a particular product.
- Investigate the best packaging shape to use for fragile and irregular shaped objects.
- Investigate the amount of material used to make a box.
- Investigate the number of furniture items that can fit into a venue.
- Estimate quantities of materials needed.
- Investigate possible ways to stack/arrange boxes in a storeroom in order to maximise wasted space.
- Critique aspect of the layout and/or design of a structure and make suggestions for alterations
- Investigate the placement of furniture in a room

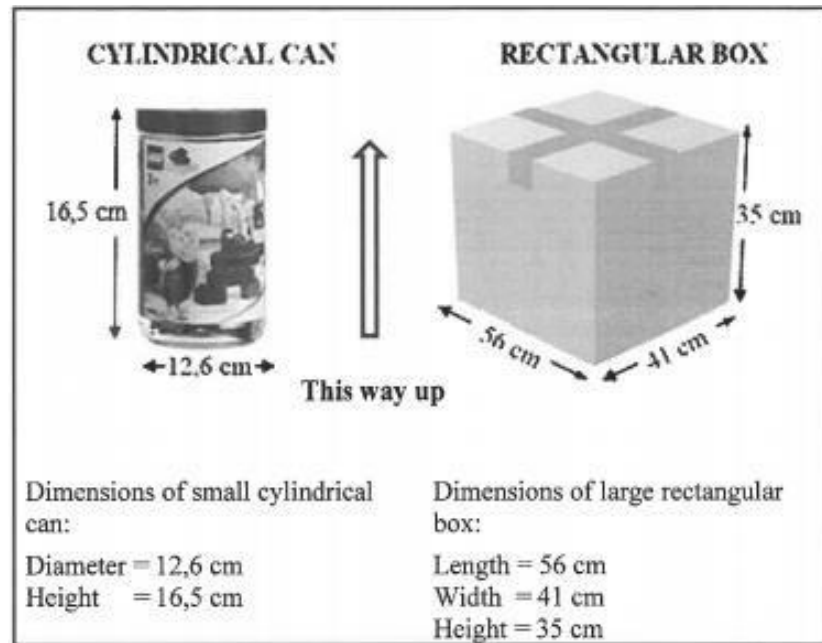
| MODELS (PACAKGING IN 2DIMENSIONAL SCALE)  | MODELS (PACAKGING IN 3-DIMENSIONAL SCALE)  |
|---|--|
|  |  |

|                              |  |
|------------------------------|--|
| <b>PACKAGING LENGTH-WISE</b> | <div data-bbox="678 224 1324 459" data-label="Image"> </div> <p>The <b>Length(l1)</b> of the small box is packed along the <b>Length(l)</b> of the large box.</p> <p><b>CALCULATION:</b><br/> The number of small boxes = <b>Length</b> of large box ÷ <b>Length(l1)</b> of the small box that can be packed along Length(l) of the large box.</p>   |
| <b>PACKAGING WIDTH-WISE</b>  | <div data-bbox="651 784 1308 952" data-label="Image"> </div> <p>The <b>Width</b> of the small box is packed along the <b>Width/Breadth</b> of the large box.</p> <p><b>CALCULATION:</b><br/> The number of small boxes = <b>Width(w)</b> of large box ÷ <b>Width(w1)</b> of the small box that can be packed along <b>Width(w)</b> of large box</p>  |
| <b>PACKAGING HEIGHT-WISE</b> | <div data-bbox="619 1310 1388 1444" data-label="Image"> </div> <p>The <b>Height(h1)</b> of the small box is packed along the <b>Height(h)</b> of the large box.</p> <p><b>CALCULATION:</b><br/> The number of small boxes = <b>Height(h)</b> of large box ÷ <b>Height(h1)</b> of the small box that can be packed along Height(h) of the large box<br/> Total number of small = number at length × number at width × number at height boxes packed</p> |

## Worked Example 1



- 1.1 The building blocks are packed into small cylindrical cans that are then packed into a large rectangular box as shown in the diagrams below.



The cylindrical cans are placed upright in the box.

- 1.1.1 Determine the number of layers of cans that can be placed in an upright position of the box. (2)

**Possible answer**

$$\begin{aligned}\text{Number of layers} &= 35 \text{ cm} \div 16, \\ &= 2,12... \\ &\approx 2\end{aligned}$$

- 1.1.2 Hence, determine the maximum number of cans that can be packed into ONE box. (3)

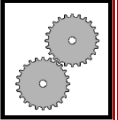
**Possible answer**



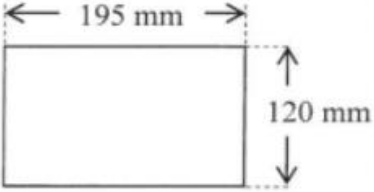
$$\begin{aligned}\text{Number of cans which can be packed lengthwise} &= 56 \text{ cm} \div 12,6 \text{ cm} \\ &= 4,444... \\ &\approx 4\end{aligned}$$

$$\begin{aligned}\text{Number of cans which can be packed width-wise} &= 41 \text{ cm} \div 12,6 \text{ cm} \\ &= 3,253... \\ &\approx 3\end{aligned}$$

$$\text{Maximum number of cans} = 4 \times 3 \times 2 = 24$$

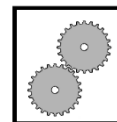
## Worked Example 2



|   |   |
|---|---|
| 1 | <p>Petru buys rectangular boxes with reels of thread for stitching stockings. The radius of a cylindrical reel is 11,5 mm.</p> <div data-bbox="292 427 1366 723"> <div> <p><b>Reels of thread</b></p>  </div> <div> <p><b>A box with reels of thread</b></p>  </div> <div> <p><b>Top view showing dimensions of the box</b></p>  </div> </div> <p>Determine the maximum number of reels of thread that will fit exactly into a rectangular box that is 120 mm wide and 195 mm long. Show ALL calculations</p> |
|   | <p><b>Solution</b></p> <p>Number of reels along length = <math>195\text{mm} \div 23\text{mm}</math><br/> <math>= 8,4782\dots</math><br/> <math>= 8</math></p> <p>Number of reels along breadth = <math>120\text{ mm} \div 23\text{ mm}</math><br/> <math>= 5,2173\dots</math><br/> <math>= 5</math></p> <p>Total = <math>5 \times 8 = 40</math></p>   |


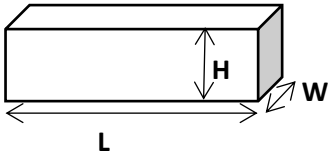


### Worked Example 3



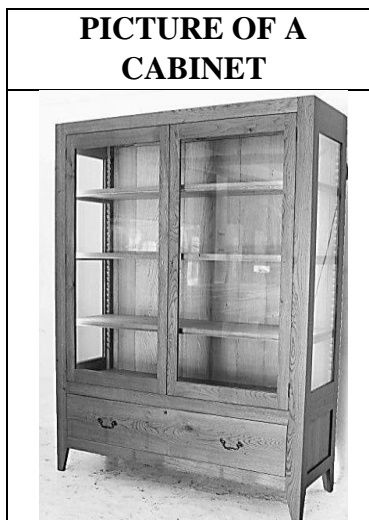
1.1 A Mathematical Literacy teacher collected 36 reams of paper from her learners.

Shown below is a picture and a diagram, with the dimensions, of a ream of paper.

| PICTURE OF A REAM OF PAPER  | DIAGRAM OF A REAM OF PAPER WITH DIMENSIONS   |
|---|--|
|  |  <p>Length (<b>L</b>) = 27,94 cm<br/> Width (<b>W</b>) = 21,59 cm<br/> Height (<b>H</b>) = 6,35 cm</p> |

The teacher intends packing the reams of paper in a secure cabinet, as shown in the picture alongside.

The dimensions of the maximum space on one shelf are 102 cm long, 44 cm wide and 39 cm high.



Use the information above to answer the questions that follow.

1.1.1 Show, with calculations, that all the reams of paper collected can fit on ONE shelf of the cabinet.

Possible Solution

Number of reams lengthwise  
 $102 \text{ cm} \div 27,94 \text{ cm} = 3,65$   
 $\approx 3$

Number of reams widthwise

(7)

$$44 \text{ cm} \div 21,59 \text{ cm} = 2,04 \\ \approx 2$$

Number of reams heightwise

$$39\text{cm} \div 6,35 = 6,14 \\ \approx 6$$

Total number of reams

$$= 3 \times 2 \times 6 \\ = 36$$

- 1.1.2 Give ONE reason why the teacher would like to pack the reams of paper in the cabinet. (2)

Possible solution

To keep them dust free

**OR**

To keep them safe for later use

**OR**

For learners to see that the teacher is using their reams of paper

**OR/OF**

To keep the reams dry

## ACTIVITIES



- 1.1 The cylindrical bottles of Coca-Cola are packaged as shown below:



Dimensions of the trailer cover:

- Length = 8,1 m
- Width = 2,45 m
- Height = 2,6 m

Measurements of a 2 litre Coca-Cola bottle:

- Radius = 52 mm and height = 327 mm
- Size of pallet consists of 8 x 8 bottles

NOTE:

- 1 ton = 1 000 kg
- 1 kg = 1 litre

Use the information above to answer the questions that follow.

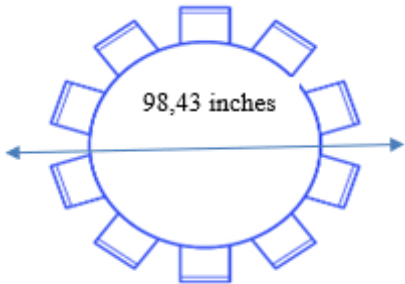
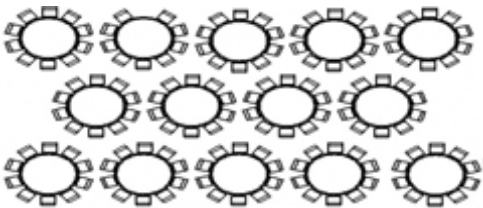
- 1.1.1 Calculate the maximum number of the Coca-Cola pallets that could be loaded on the second trailer of the truck. (8)

- 1.1.2 Duan states that 12 pallets of the load from the second trailer will fit into a smaller van used by a shop owner for his own stock.

The van load size is 1,5 tons.

Verify, showing ALL calculations, whether his statement is true. (5)

- 1.2 The layout plan shows the number of round tables that can fit in the seating area in the hall. A wedding planner wants to confirm that the seating area can accommodate all the tables shown below.

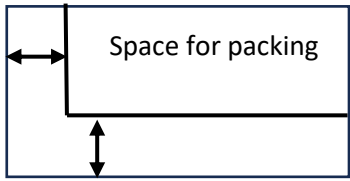

| LENGTH OF TABLE INCLUDING CHAIRS AND SPACE AROUND TABLE                           | DIMENSIONS OF THE SEATING AREA   |
|---|--|
|  |  |
| <b>NOTE: 1 inch = 2,54 cm</b>   | <b>LENGTH = 15 metres</b><br><b>WIDTH = 7,5 metres</b>                             |

Use the information above to answer the following questions.

- 1.2.1 Determine the length of the table, including chairs, and the space around the table in metres. (4)
- 1.2.2 Calculate the maximum number of tables that can fit in the seating area. (5)

1.3

Bedroom 2 will be used to store boxes of paper for printing purposes. 20% of the space on each side as shown on the picture below will not be used to allow movement when the packing and unpacking of the boxes is done.

| LAYOUT PLAN FOR PACKAGING   | PICTURE OF A BOX OF PAPER   | DIMENSIONS OF THE BOX  |
|---|---|--|
|  |  | <p>Length = 28 cm</p> <p>Width = 23 cm</p> <p>Height = 31,8 cm</p> |

| Dimensions of bedroom 2    | Dimensions of Master Bedroom |
|----------------------------|------------------------------|
| Length = 3 m               | Length = 3 m                 |
| Width = 2,6 m              | Width = 3 m                  |
| Height of the wall = 2,4 m |                              |

Use the information above to answer the questions that follow.

- 1.3.1 One of the employees stated that they will be able to pack seven layers of boxes in the bedroom.

Verify, using calculations, whether his statement is VALID. (5)

- 1.3.2 Calculate the maximum number of boxes that can be packed in the bedroom if the length of the box is packed along the width of the room and the width of the box along the length of the room. (8)

## BIBLIOGRAPHY

- 2021 Mathematical Literacy Grade 12 Examination Guideline
- Curriculum Assessment Policy Statement (CAPS)
- FS JUNE EXAMINATION 2023
- DBE WORKBOOKS
- JENN-UFS LEARNER & TEACHER MANUAL
- IEB 2022-2023
- VIVLIA STUDY GUIDE
- FS DAILY ASSESSMENT TASKS
- NSC 2020-2024
- Trial 2024Gauteng P2
- Trial 2024 Limpopo P2
- KZN 2024 P1 and P2
- Trial 2024 FS P2
- 2023 Jenn booklet

### Bibliography

#### Books and Journals

- [2] B. Bhor. *A Book of whatever*. 2012.  
[3] C. Chua and D. Dhor. "Writing interesting articles". In: *The Journal of References* (Dec. 1, 2010).

#### Electronic Ressources

- [1] A. Author. *Fluffy website*. URL: <http://www.example.org> (visited on 01/09/2019).