SECONDARY SCHOOL IMPROVEMENT PROGRAMME (SSIP) 2019

GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

TERM 3: SATURDAYS' SSIP

GRADE 12

MATHEMATICAL LITERACY

LEARNER NOTES

TABLE OF CONTENTS

SESSION: 1
TOPIC: MEASURING WEIGHT
CONTEXT: GROWTH CHART

Use percentile values, together with various measuring instruments in the following contexts:

- Road to Health chart and other growth charts for children
- Test and exam results.

In order to:

1. Analyse the growth pattern of a baby/toddler.
2. Analyze the health status of a child using calculated Body Mass Index values.
3. Analyse the performance of a group of learners in a test and/or examination.

The growth chart is used to compare the BMI of an individual versus the one of their age group. This is also used to determine the health status of individuals.
Mass and height are used to determine the BMI. The formula for BMI is:

$$\text{BMI} = \frac{\text{Weight}}{\text{Height}^2}$$

3 types of questions should be covered:

- Reading information from the chart
- Understanding significance of the curve
- Understanding significance of positioning on the chart

GROWTH CHARTS

- Percentiles are measures of spread which divide the data into 100 equal portions.
- This is used to analyse the spread of large sets of data like data collected by census.
- The data is then divided into 100 portions and the report is given as a percentage.

- The value at the 5^{th} percentile implies that 5% of values lie below 5^{th} percentile and 95% of the values lie above the 5^{th} percentile.

- The value at quartile 1 implies that 25% of the values lie below 25^{th} percentile and 75% of the values lie above the 25^{th} percentile.

QUESTION 1

1.1. The sports organiser of Mano secondary school conducted a survey on weight status of girls at school. He calculated the Body Mass Index (BMI) of a sample of girls' population at the school. There were 365 girls at the schools.

Table 1: The age, mass and height of surveyed learners

Learner	Age (years)	Height (m)	Mass (kg)	BMI
Vuyo	14	1,65	65	23,9
Glynis	18	1,7	72	P
Doris	16	1,62	68	25,9
Yolanda	16	1,5	65	Q
Mpho	18	1,55	72	29,95
Tsakane	15	1,56	66	27,1
Refilwe	16	1,55	62	25,8
Norah	17	1,58	63	25,2
Siba	15	R	69	27
Noni	16	1,55	53	22,1
Yonela	17	1,66	81	29,4
Amanda	19	1,63	71	26,7

1.1.1 Determine the range of ages of the girls in the sample. (2)

1.1.2 Use the formula: BMI = $\frac{Weight\ (kg)}{Height\ (m)^2}$ to calculate: (3)

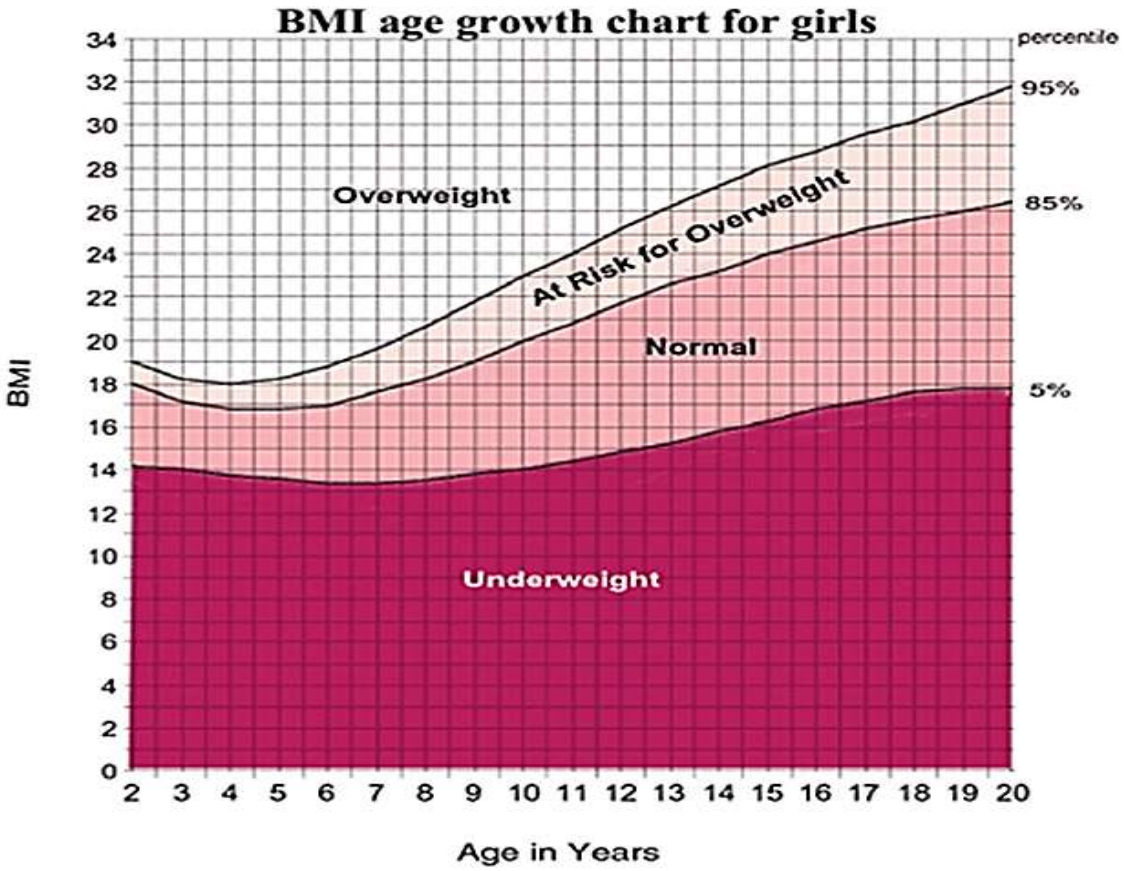
(a) P (2)

(b) Q (2)

(c) R (2)

1.2 The BMI is used to determine the weight status of individuals. The sports organiser used the following BMI growth chart for girls to determine the weight status for this sample.

Use Table 1 above and the BMI age growth chart below to answer the following questions.



1.2.1 Determine Tsakane's weight status. (2)

1.2.2 Determine the number of 16 year old girl(s) whose weight status lies between the 5th and 85th percentile. (2)

1.2.3 What is the weight status of girl(s) in 2.2.2 above? (2)

1.2.4 Amanda is worried about her weight status. She wants her status to be normal.

(a) What is Amanda's current weight status? (2)

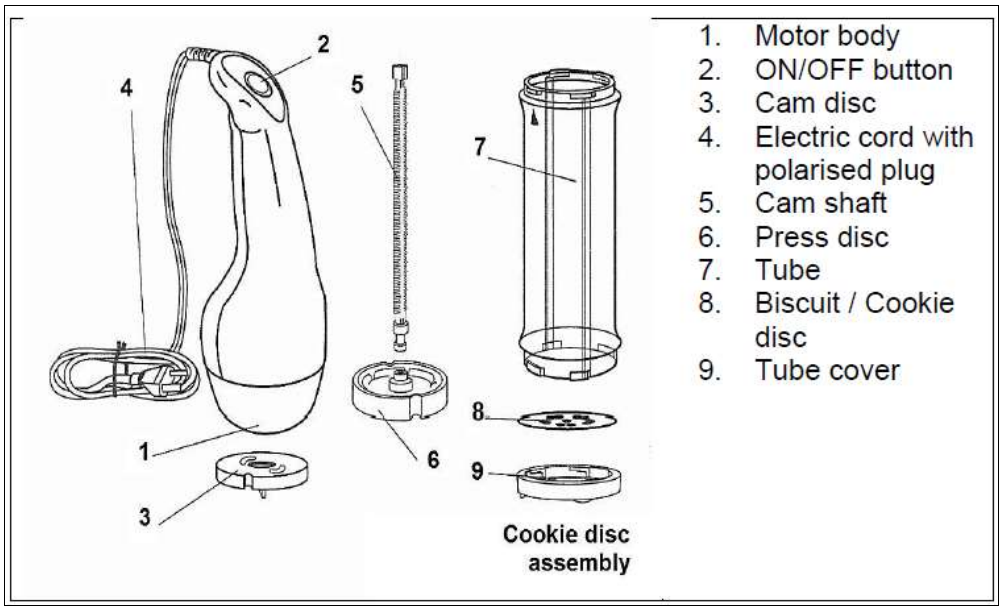
(b) Calculate the minimum number of kilograms Amanda must lose to get a normal weight status. (4)

SESSION: 2
TOPIC: MODELS

QUESTION 1:

Mrs Letswalo, the educator at Lethabong Secondary school is assisting the grade 12 learners to raise funds towards their Matric dance. She engaged some learners in the business of baking and selling of biscuits and cookies. To make their task easier, she decided to buy an electrical biscuit and cookie maker as shown in the diagram below.

In order for the learners to use the biscuit and cookie maker, they have to read through all the instructions to assemble it. The following shows illustrations of the different parts of the biscuit and cookie maker.



The following pictured instructions were included in the box. The pictures are not necessarily in the correct order for assembly.

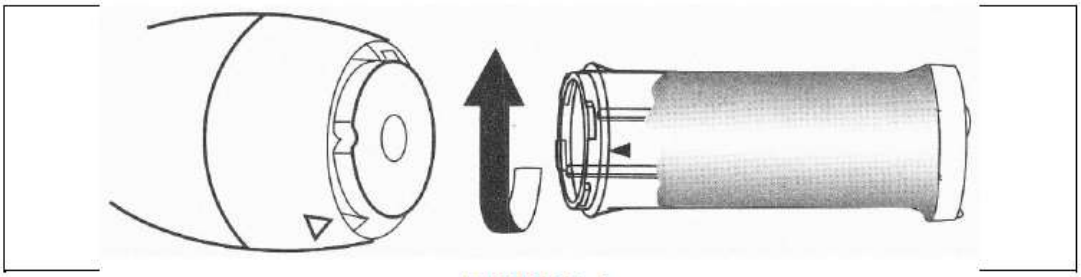


FIGURE A

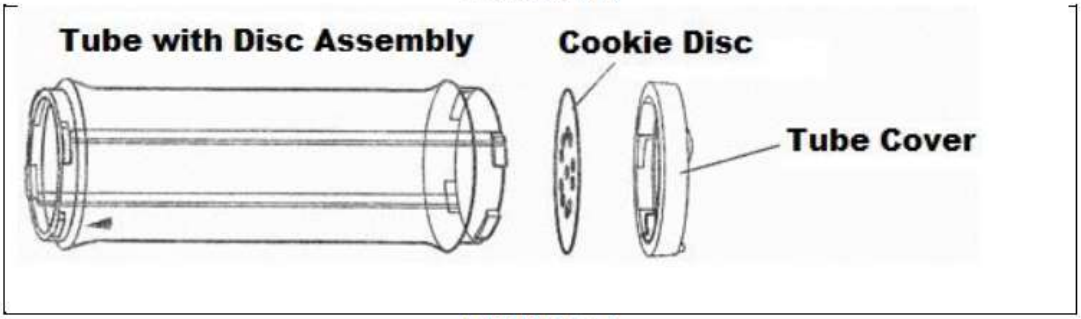


FIGURE B

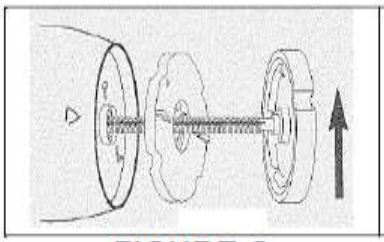


FIGURE C

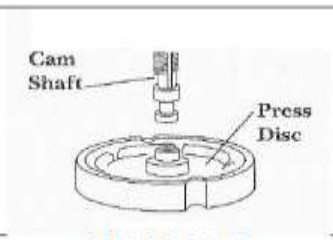


FIGURE D

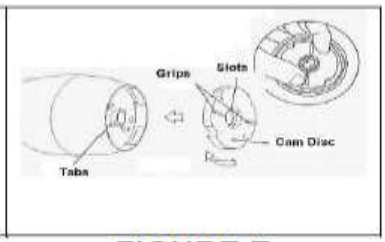


FIGURE E

1.1.1 Read through the following chronological instructions. **CHOOSE** the correct figure that best matches each of the instructions below.

1. Attach Cam Shaft to the Press Disc by inserting the stem of the Shaft into the Press Disc's centre hole. Press firmly. You will hear a click as the Shaft snaps in place.

2. Line the Tabs on the Motor Body up with the slots on the Cam Disc. Insert the Cam Disc into the Motor Body. Using the two Grips on Disc, turn slightly clockwise until the Disc clicks into position.

3. Fit the Shaft all the way inside the unit, until the outside contours of the 2 Discs line up.

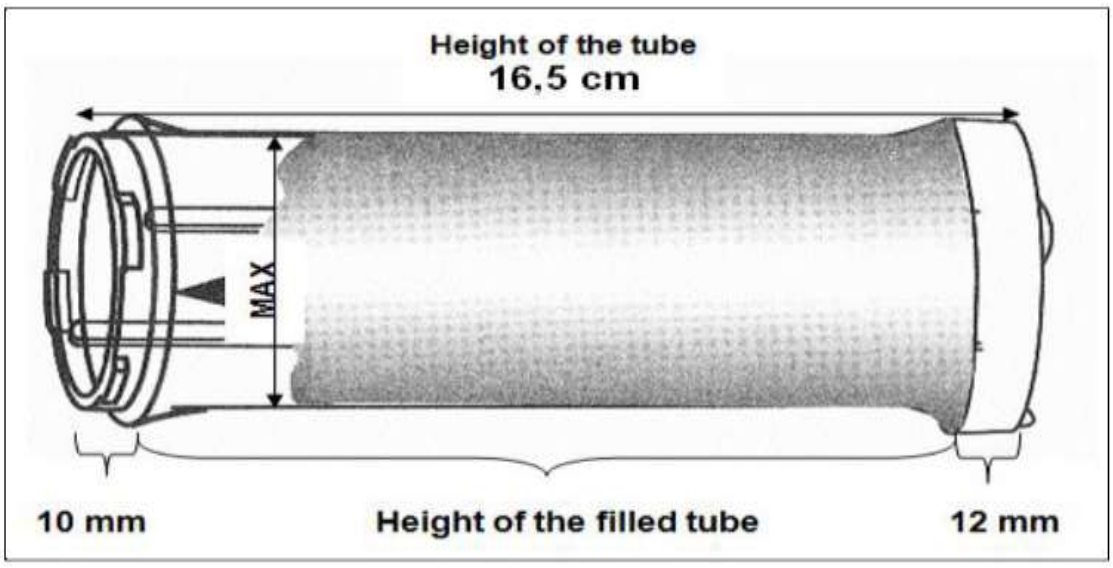
4. Select a disc and place it inside the Tube cover. Then place the Tube into the Tube Cover, turning clockwise until locked.

5. With a spoon or spatula, load the freshly prepared dough into the top of the Tube.

6. Look inside the Tube to see the ridges extending from top to bottom. These ridges align with the outside contours of the 2 Discs. Grasp Tube firmly, join the Body with the filled Tube and turn clockwise until the Tube locks into position. (6)

1.1.2. The introduction to the instructions is that you always have to unplug the biscuit and cookie maker from the outlet before assembly or disassembly of parts.
Explain why this instruction is important? (2)

1.2 The following diagram shows the tube that needs to be filled with prepared dough. (Diagram not drawn to scale.)

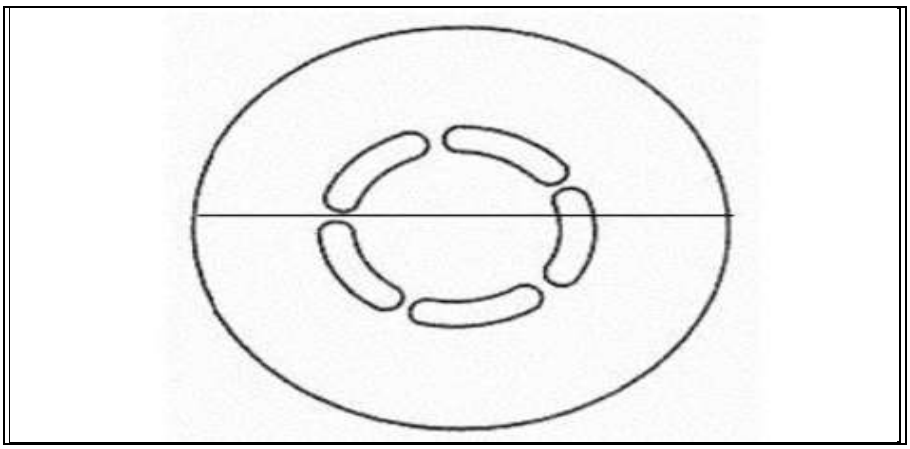


1.2.1 Determine the height of the filled tube. (2)

1.2.2 On the tube there is an indication that the filling must not pass the MAX, fill line. If the height of the filling in the tube must be 76, 9% of the height of the filled tube, calculate the height of the tube that must not be filled. Give your answer to 1 decimal place. (4)

1.2.3 If the height of ONE unbaked cookie is 5 mm, how many cookies can Mrs Letswalo press from ONE filled tube? (4)

1.3 The unbaked cookie has a circumference of 17, 9094 cm. The following diagram is only a representation that is not drawn to scale. (4)



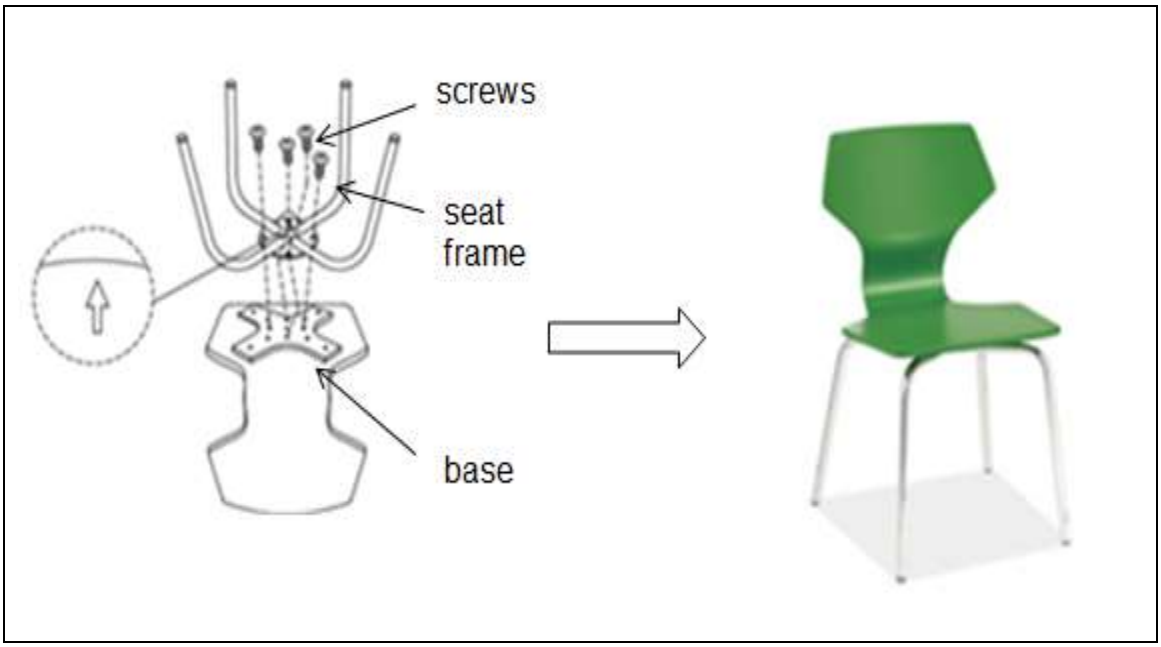
The following formulae should be used:
Area = $A = \pi r^2$
Circumference = $2\pi r$
Use π **as 3,142**

1.3.1 Show with necessary calculations that the radius of the unbaked cookie is 2,85 cm. (4)

1.3.2 Calculate the area of the unbaked cookie. (3)

QUESTION 2

The diagram below shows the process of assembling a chair from its components. Use the names of the components to write down **THREE** assembly instructions for the chair. (6)



4.3 Mrs Naidoo bought a new sewing machine as she had to hire more assistants to help with the order of the 50 bed covers. With the help of the diagrams below, provide instructions in the correct order on how to wind a bobbin of a sewing machine. Write down only the corresponding letter in the correct order.

FIGURE A

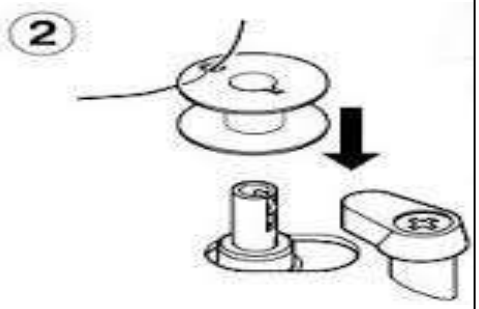


FIGURE B

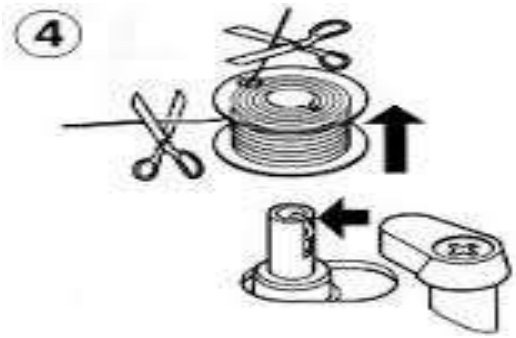


FIGURE C

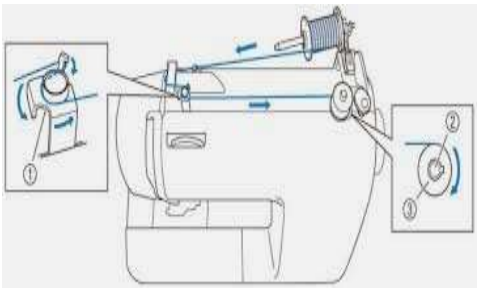
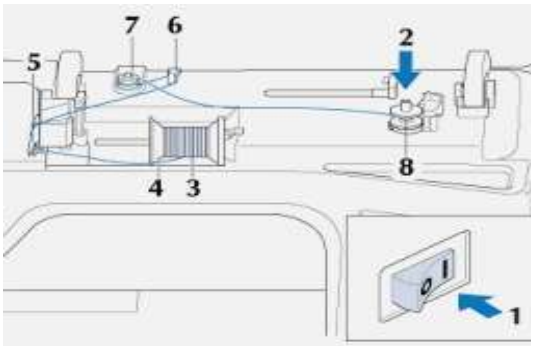


FIGURE D



Instructions to wind a bobbin

A. Guide the cotton thread into the bobbin hole to lock it and then insert the bobbin into the bobbin winder.

B. Remove the bobbin from the bobbin winder and cut off the loose threads.

C. Guide the thread from the bobbin cotton reel through the turner wheel.

D. Turn on the power button and start winding.

SESSION: 3
TOPIC: Probability

QUESTION 1:

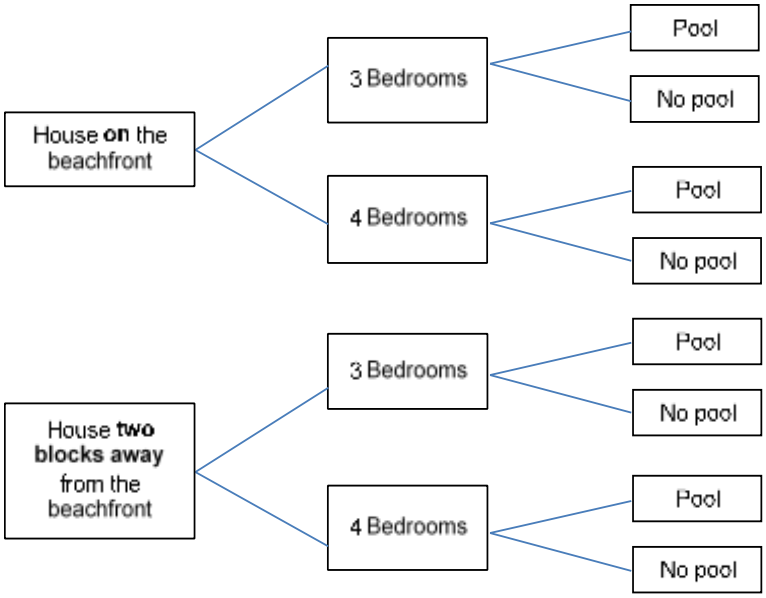
1.1 The medicine box contains FOUR identical smaller boxes. EACH small box contains four different types of pills in cylindrical containers which are labelled **A**, **B**, **K** and **U,** as shown below.

[Source: Forgetting The Pill.com]

Determine (as a decimal fraction) the probability of randomly selecting a type **U** container from the medicine box. (3)

1.2 The tree diagram below shows the choices that a particular group of students have with regards to *RAGE accommodation.

*RAGE *is the name given to the celebration holiday that some Matriculants have once they have written their last examination paper.*



1.2.1 How many different accommodation options are available to this group of students? (2)

1.2.2 How many different accommodation options are available if the students want to stay in a house with four bedrooms? (2)

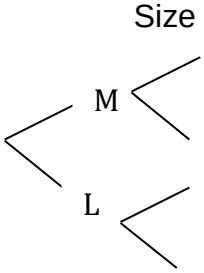
1.2.3 List any TWO accommodation options with a pool that the students could choose. (2)

QUESTION 2: 18 minutes

One of Nhlakanipho's favorite foods is pizza. When ordering pizza for himself and some friends, Nhlakanipho is given the following pizza choices:

SIZE	CRUST	INGREDIENT
Medium (M)	Regular (R)	Sausage (S)
Large (L)	Thick (T)	Ham & Pineapple (P)
		Ham & Mushroom (M)

A tree diagram showing all the available options was begun below:



2.1 Copy and complete the tree diagram above, showing all the possible outcomes and using the symbols in brackets. (9)

2.2 How many possible outcomes are there? (3)

2.3 What is the probability that a pizza with ham on it will be ordered? (3)

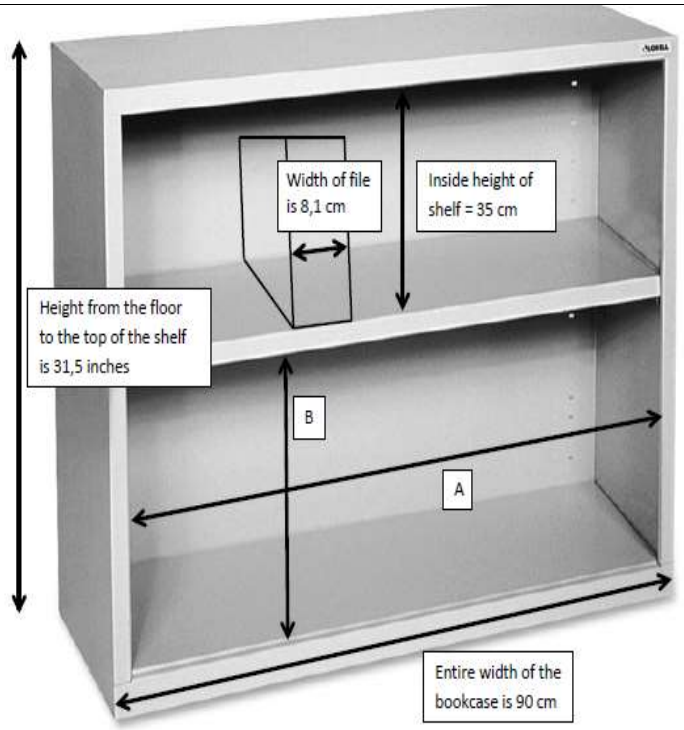
SESSION: 4
TOPIC: PACKAGING
TERMINOLOGY: Ratio, Perimeter, Surface Area and Volume, Diameter and Radius

By the end of this session, learners should be able to:

- Define area, perimeter, volume, radius, volumes etc.
- Perform preliminary calculations to determine dimensions required in perimeter, area, volume, radius etc. then calculate perimeter/area/volume
- Express the probability of an event using fractions, percentage and decimal notation.
- Convert between matric and imperial system

QUESTION 1 (Adapted from IEB)

A student wants to build a bookcase to store his files. He decides to buy a basic bookcase with two shelves as illustrated below:



Width = 8,1cm

1.1. Determine A, the inside length of the shelf, if the thickness of the wood on both sides of the shelf is 1 cm each.

1.2. The base of the bookcase is made from wood that is 2 cm thick. The middle shelf and the top piece of wood is 1 cm thick. Determine B, the inside height of the bottom shelf.

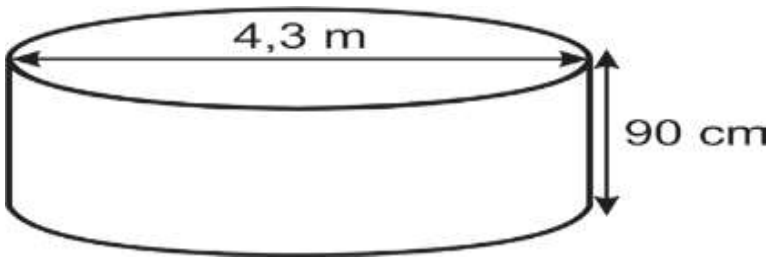
1.3. If 1 inch = 2,54 cm, convert the height 31,5 inches to the nearest centimetre.

1.4. The average width of a file when placed on the shelf (see picture) is 8,1 cm. Determine the maximum number of files that could fit on one shelf.

QUESTION 2

Jack last successful project was to dig a cylindrical hole to secure a Trampoline for his children.

The dimensions of the hole he dug



Although Jack has reused some of the excavated (dug up) sand, he still has two-thirds of the sand left over. A company is prepared to collect the

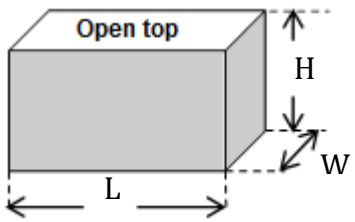
sand free of charge provided it is more than 5 m^3.

2.1 Calculate the area of the base of the hole in m^2, rounded off to 2 decimal places and π = 3,14 (3)

2.2 Determine, showing all calculations, whether there is enough sand for the company to come and collect free of charge. **Volume = Area of base × height** (5)

QUESTION 3 (NSC 2017 JUNE)

3.1 Rian has a factory that manufactures rectangular plant boxes with different sizes.

PICTURE OF RECTANGULAR PLANT BOXES	DIAGRAM OF THE BOX
	

A table showing boxes with different sizes (all external dimensions in mm):

TYPE OF PLANT BOX	LENGTH (L)	WIDTH (W)	HEIGHT (H)
A	325	325	225

B	325	325	325
C	600	325	600
D	1 200	325	462,5
E	1 500	475	462,5

You may use the following formulae:
Area of a rectangle = length × width
Volume of a rectangular prism = length × width × height

3.1 Write down the letter (A – E) of the type of plant box that is a cube. (2)

32 Calculate the area (in cm^2) of the base of box **D**. (4)

3.3 The area of the base of box **A** is 1 056,25 cm^2.
Determine the total area (in cm^2) needed to store 24 of these boxes if they are stacked on top of each other in a double layer. (3)

3.4 Determine, for box type **C**, the ratio of the length of the box to the width of the box in simplified form. (3)

3.5 A municipality bought 148 type **E** boxes. The inside volume of a type **E** box is approximately 0,299 m^3.They also ordered compost to fill these boxes. The compost is delivered in 6 m^3truckloads.

(a) The inside volume of a box is 9,36% less than the outside volume. Show how the approximated inside volume was calculated. (5)

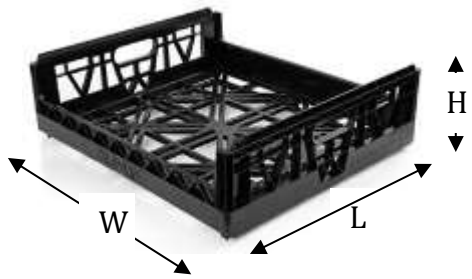
(b) Calculate the number of boxes that can be filled with 6 cubic metres of compost. (3)

(c) Determine the minimum number of truckloads of compost required to fill ALL the boxes. (3)

QUESTION 4 (NSC 2017 JUNE)

A Supermarket buys bread for resale directly from the bakery. The bread is stacked in crates when transported.

PICTURE OF A RECTANGULAR BREAD CRATE	PICTURE OF STACKED BREAD CRATES

	
L (length) = 690 mm W (width) = 445 mm H (height) = 180 mm	A maximum of 9 crates may be stacked vertically on top of each other.
[Source: www.alibaba.com and www.rehrigpacific.com]	

The manager had one delivery consisting of 80crates.

Use the information above to answer the questions that follow.

4.1 Calculate the volume (in mm^3) of each crate.

The following formula may be used:

Volume of a rectangular prism = length × width × height (3)

4.2 The manager stated that all 80 crates can be packed in a 2m × 2m area in the store room. (Assume that the height of the store room is adequate for 9 stacked crates.)

Verify if this statement is CORRECT. Show ALL calculations (7)