TELEMATIC SCHOOLS PROJECT

2026 MATHEMATICAL LITERACY Grade 12

$a+b=c$ MATHEMATICAL LITERACY

A joint initiative between the Western Cape Education Department and Stellenbosch University.

Western Cape Government Education FOR YOU

Stellenbosch UNIVERSITY IYUNIVESITHI UNIVERSITEIT

BROADCAST SESSIONS

GRADE 12

DATA HANDLING

GRADE 12

SURFACE AREA AND VOLUME

GRADE 11

LOANS & HIRE PURCHASE

Session	Date	Time	Topic
1	17/03/2026	15h00-16h00	DATA HANDLING
2	19/05/2026	15h00-16h00	SURFACE AREA AND VOLUME
3	25/08/2026	16h00-17h00	LOANS AND HIRE PURCHASE

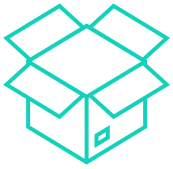
INTRODUCTION AND TOPICS

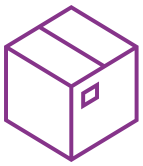
DATA HANDLING



- This will be tested in Paper 1.
- We work with the process of data handling with ALL the interconnected phases.
- Data Handling helps us to turn raw numbers into meaningful insights which we can use to answer questions, see trends and predict future trends.
- A real life example: Businesses use data handling to analyze customer feedback and improve products.

SURFACE AREA AND VOLUME





- This will be tested in Paper 2.
- Forms part of the topic: Measurement
- When we calculate surface area we calculate the total area covering a 3D object.
- When we calculate the volume we determine the space inside a 3D object.
- A real life example: A company calculates the surface area of a box to know how much material is needed for packaging.

LOANS AND HIRE PURCHASE



- This will be tested in Paper 1.
- Forms part of the topic: Finance
- Loans and hire purchase involve borrowing money or paying for goods in installments over time, often with interest. Understanding these helps you make informed financial decisions.
- A real life example**:** Buying a car through hire purchase means paying monthly installments instead of the full price upfront

SESSION 1 | DATA HANDLING

WHAT YOU SHOULD KNOW

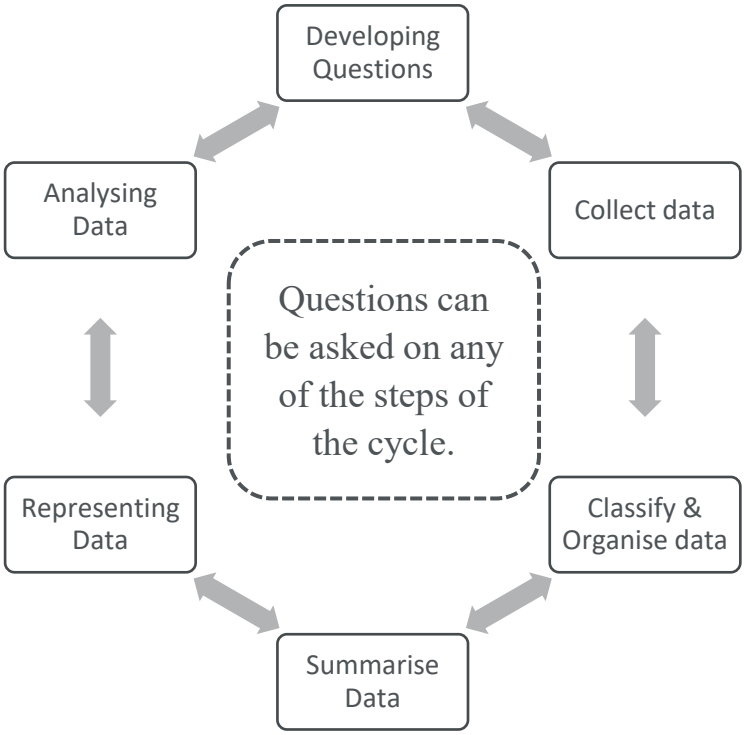
In grade 12 you should be able to:

- Work with multiple data sets.
- Complex data values
- Answer questions on ALL stages of the data handling cycle.
- Identify and describe trends in data
- Investigate how the choice of scale impacts on the representation.

DATA HANDLING

WHAT IS DATA?	WHAT IS DATA HANDLING?
Data is information that has been collected, without any organization or analysis. It is unprocessed.	Data Handling is the process where we work with the 6 steps mentioned below to make sense of our research data.

The data handling cycle:



What is new in Grade 12?

- Summarising data:
  - Quartiles,
  - InterQuartile Range,
  - Percentiles
  - Application of these in:
    - Road to Health Charts
    - Growth Charts
    - Test and Exam Results

SESSION 1 | DATA HANDLING

WHAT YOU SHOULD KNOW

In grade 12 you should be able to:

- Work with multiple data sets.
- Complex data values
- Answer questions on ALL stages of the data handling cycle.
- Identify and describe trends in data
- Investigate how the choice of scale impacts on the representation.

Quartiles:

Let's look more closely at Quartiles:

Quartiles divide an ordered data set into four quarters.
This is a useful way to summarize & compare data in the form of a box and whisker plot.
You will not be asked to draw a box & whisker plot, but you will need to be able to find important values from this, as well as perform certain calculations.

*The **five** most important values you need to be able to **find** in a box and whisker plot are:*

- *Minimum value (lowest value in the data set)*
- *Maximum value (highest value in the data set)*
- *Quartile 2 (which is the same as the median aka the value in the middle)*
- *Quartile 1 (the median of the bottom half of data)*
- *Quartile 3(the median of the top half of the data)*

The most important **calculations** you will need to be able to perform

- *Calculating the range (max value – min value)*
- *Calculating the Interquartile range*
  (value of Q3 – value of Q1)
- *Determining the quartile values from a data set.*

Let's look at an example:

A sample of 10 packets of chips has these weights (grams):

25; 28; 29; 29; 30; 34; 35; 35; 37; 38

Now we need to find the important values from the data set:

In this example the values are already arranged in ascending order.

Minimum Value:	
Maximum Value	
Median (Quartile 2)	
Lower Quartile (Quartile 1)	
Upper Quartile (Quartile 3)	

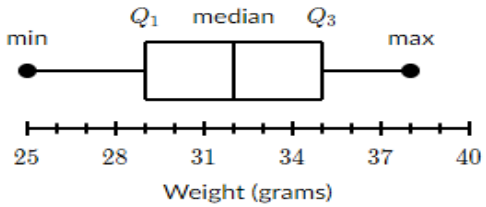
How can we interpret the box and whisker plot?
Remember that the data is basically divided into 4 quarters. This means that:
25% of the packets of chips weighed less than 29 g and 75% of the packets of chips weighed more than 29 g.

Box and Whisker plot:

A box and whisker plot can be used to represent summarized data.
You will not be asked to draw a box & whisker plot, but you will need to be able to find important values from this, as well as perform certain calculations.

Using the example from the previous page:

This is what the box and whisker plot will look like:

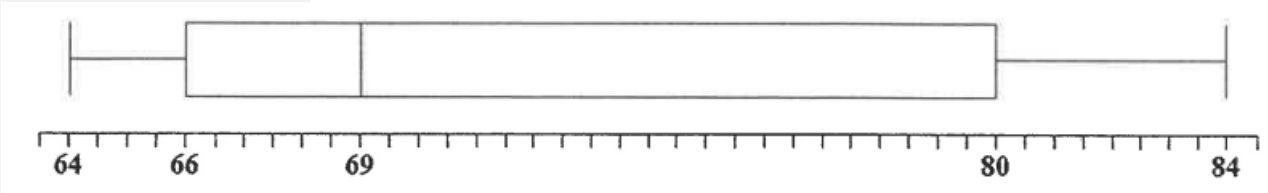


From the box and whisker plot above determine:

Range:	
Interquartile Range:	

Activity 1:

Candidates sat for the National Senior Certificate examinations in November 2018. The diagram below shows the 5 number summary of the average pass percentages for Mathematical Literacy.



DBE P1 Nov 2019

Use the information above to answer the questions that follow:

1.1 Identify the diagram drawn above. (2)

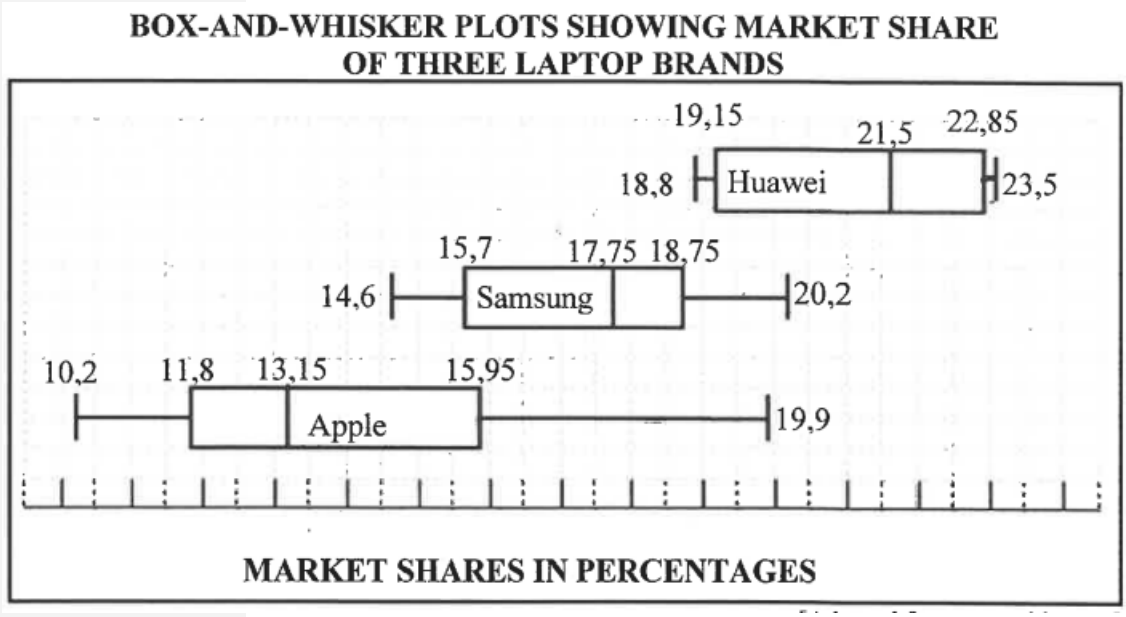
1.2 Write down the pass percentage that represents the following:
a) Median
b) Quartile 3. (4)

1.3 Determine the difference between the highest and lowest pass percentage. (2)

Activity 2:

Marius wants to buy a new laptop. He studied the available data for the three most popular brands of laptops sold in South Africa.

The box and whisker plots below show (in percentages) the spread of the market share of the Samsung, Apple and Huawei laptop brands from the fourth quarter in 2019 to the third quarter in 2020.



DBE: NSC P1 2021

Use the information above to answer the questions that follow:

2.1 (a) Write down the name of the most popular laptop brand (2)

(b) Hence, write down the 50th percentile of the brand identified in Question 2.1 a) (2)

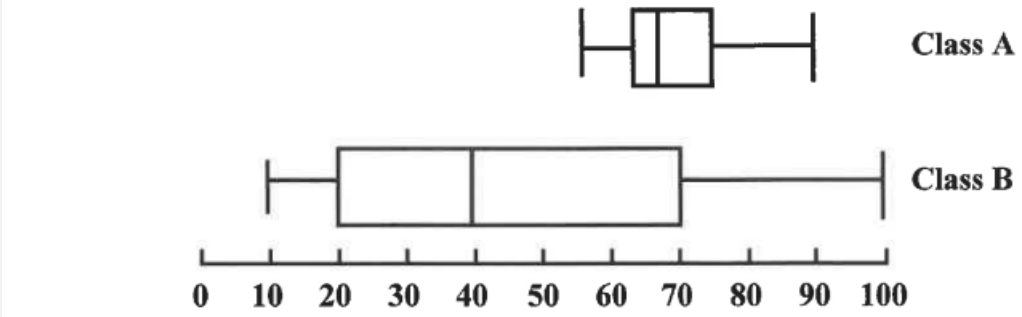
2.2 Calculate the interquartile range (IQR) of the Samsung Brand. (4)

2.3 A data analyst claims that 75% of the dataset of Apple was less than 16%.

Explain whether this statement is valid or not. (2)

Activity 3:

The two box and whisker plots below represent the percentage marks achieved by two Grade 12 classes. Each class consists of 26 learners.



The percentage marks for **CLASS A** arranged in order are given below:

F	58	60	62	62	63	65	65	66
66	66	66	67	69	70	71	73	73
75	75	75	**H**	80	83	85	90	

NOTE:
F is the lowest percentage mark
H is a percentage mark between 75 and 80

DBE: NSC P1 Feb March 2018

Use the information above to answer the questions that follow:

3.1 Which ONE of the following terms best describes the data above:
- Categorical OR Numerical OR Qualitative (2)

3.2 Determine the percentage of data values that lies between the upper and lower quartiles. (2)

3.3 The range of Class A is 34.
Calculate the value of **F.** (3)

3.4 Calculate the median percentage mark for Class A (2)

3.5 Determine the interquartile range for Class B (3)

3.6 Give the modal percentage mark for Class A (2)

3.7 Calculate the missing value H if the mean percentage mark for Class A is 70% (3)

3.8 Determine as fraction, the probability of randomly selecting a learner from Class A who obtained a percentage mark different from any other learner in the class. (3)

Activity 4:

A study relating to the amount of time spent (in minutes) by a selected number of customers in a store was conducted on a particular Saturday. On that Saturday a total of 12 342 customers visited.

12	15	25	25	40	28	18	23
43	15	22	19	15	8	37	9
24	23	15	67	25	29	6	17
15	43	23	27	33	26	127	10

DBE: NSC P1 NOV 2024

Use the information above to answer the questions that follow:

4.1 Write down the number of customers that represent the sample size and the number of customers that represent the population size for this study. (2)

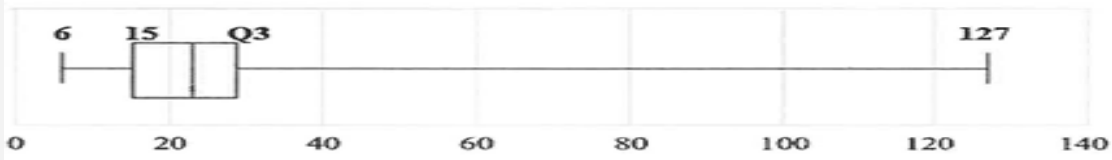
4.2 Choose the correct option (A,B,C,D or E) that represents the stage in the data handling process that uses measures of central tendency and spread:

A) Collecting Data
B) Classifying and organizing Data
C) Summarising Data
D) Representing Data
E) Analysing Data . (2)

4.3 Give a reason why the value of 127 is considered to be an outlier in the data set. (2)

4.4 Shown below, in rank order, is selected data of the time spent by customers in the store and an incomplete box and whisker plot of the same data .

6	8	9	10	12	15	15	15	15	15	17
18	19	22	23	23	23	24	25	25	25	26
27	28	29	33	37	40	43	43	67	127	



a) Calculate the value of the upper Quartile (Q3) (3)

b) Vuyo stated that if the outlier was removed from the data set, the new Interquartile range value would be 13.

Verify if the statement is valid, showing ALL calculations. (5)

SESSION 2 | Surface Area and Volume

WHAT YOU SHOULD KNOW

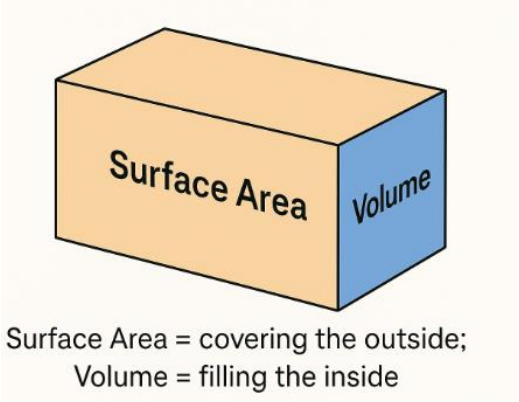
By the end of the session learners should be able to

- Calculate Surface Area and Volume.
- Substitute values into formulae
- Change the subject of formulae
- calculating appropriate quantities of materials/components needed to complete a task
- calculating the cost of materials/components needed to complete a task

Surface Area and Volume

What is the difference?

- Surface area is the total area covering the outside of a 3D object, like the wrapping paper needed for a gift box.
- Volume is the amount of space inside the object, like how much water the box could hold if it were a container.



Surface Area = covering the outside;
Volume = filling the inside

What is this linked to?

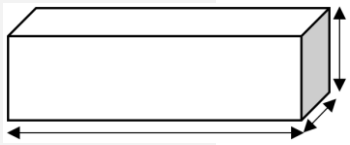
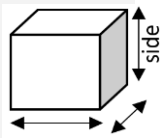
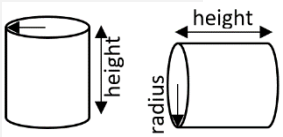
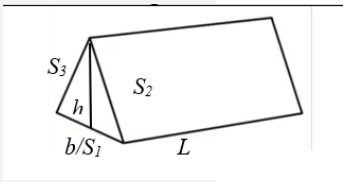
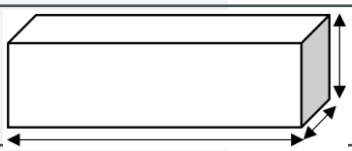
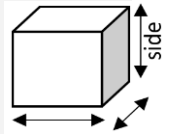
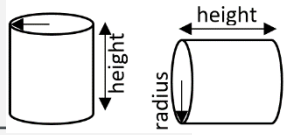
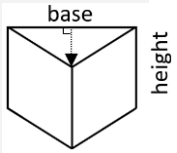
- Conversions.
  - Remember you need to be able to convert all measurements to the same unit.
  - You also need to be able to convert in more than one dimension (e.g cm^2 to m^2)
  - You need to be able to convert between metric and imperial system.
- Cost calculations
  - You need to be able to calculate the cost of materials using measurements / calculations.
  - You need to be able to identify the most cost effective option.

In Assessment Tasks the formulae will be provided. You must be able to USE them.

You need to be able to identify the correct formula from a list of formulae.

SESSION 2 | Surface Area and Volume

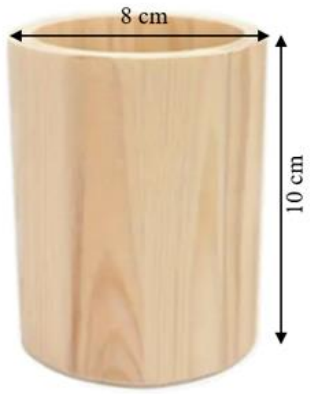
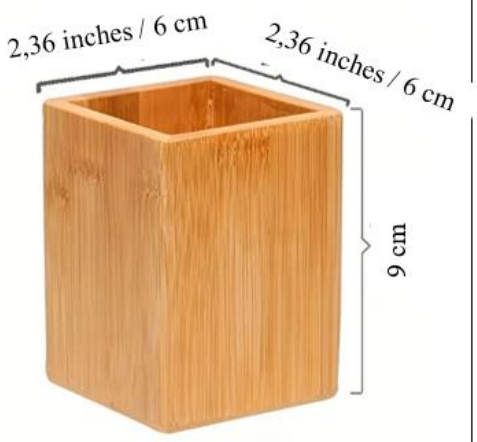
What are the Standard formulae?

Shape:	Formula:	Where :
	Surface Area = $2(l\times b) + 2(l\times h) + 2(b\times h)$	l = length, b = breadth and h = height $\pi = 3.142$
	Surface Area = 6 (side × side)	
	Surface Area = $2\pi r^2+2\pi rh$ or $2\pi r(r + h)$	
	Surface area= Perimeter of the base × Length of the prism) + (2 × Base Area) = (S1 +S2 + S3)L + bh	h = height, b/S_1 = breadth and L = length S_1 = a side of triangle which can be the base in relation to the perpendicular height, S_2 = second side of triangle and S_3 = third side of triangle
	Volume = length × width × height	
	Volume = side × side × side	
	Volume = $\pi\times$ radius^2 × height	
	Volume = ½ base × ⊥height × height	

SESSION 2 | Surface Area and Volume

Activity 1:

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.

A: CYLINDRICAL PENCIL HOLDER	B: RECTANGULAR PRISM PENCIL HOLDER
	

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 = length × width × 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

Use the information above to answer the questions:

1.1 Determine the radius in cm of the cylindrical holder (2)

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

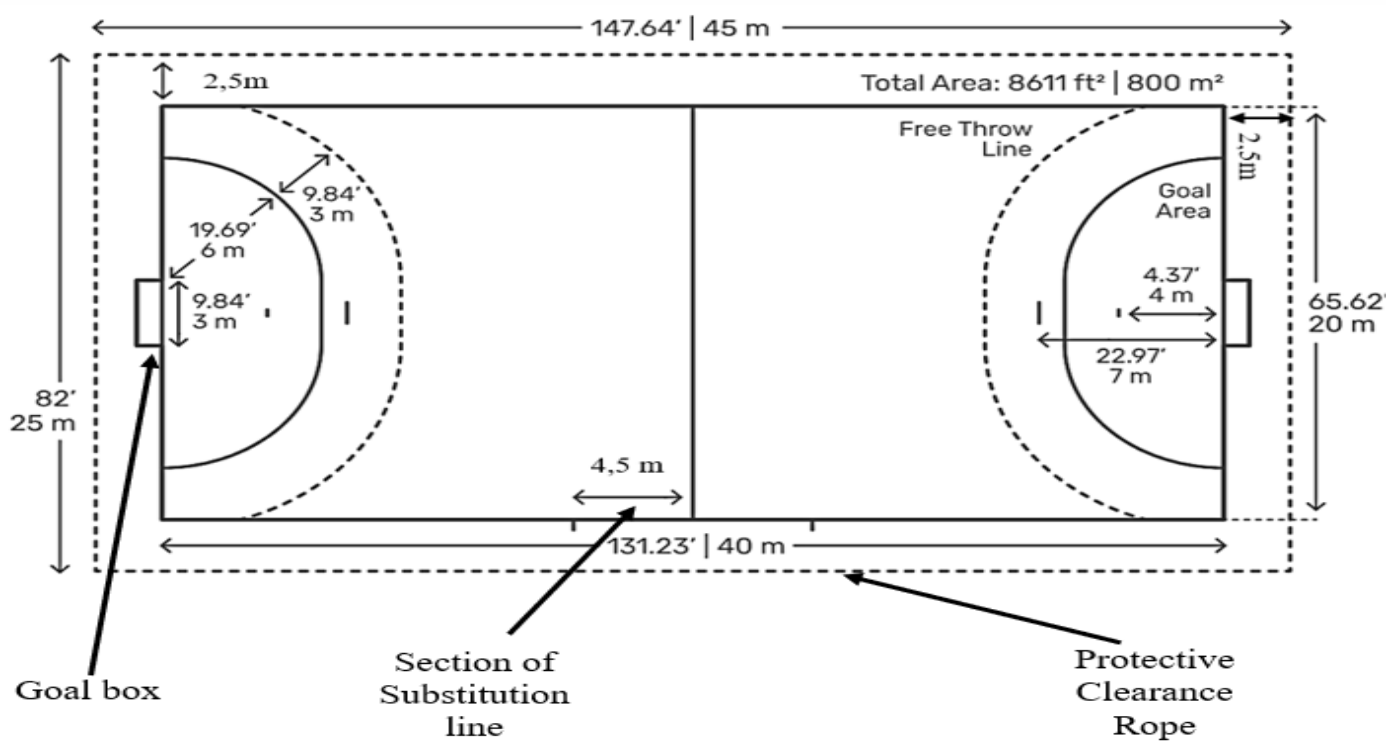
1.3 A decorative ribbon will be tied around the rectangular prism pencil holder.
Calculate the total length of the ribbon if an extra 8 cm is added for a bow. (3)

1.4 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. (5)

SESSION 2 | Surface Area and Volume

Activity 2:

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

Use the information above to answer the questions:

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

2.2 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)

2.3 The total volume of one Handball goal box is 6 000 000 cm³.
The depth of the goalbox is 1 m.
Determine the height of the goalbox in metres.
You may use the following formula: Volume = Height × Width × Depth (5)

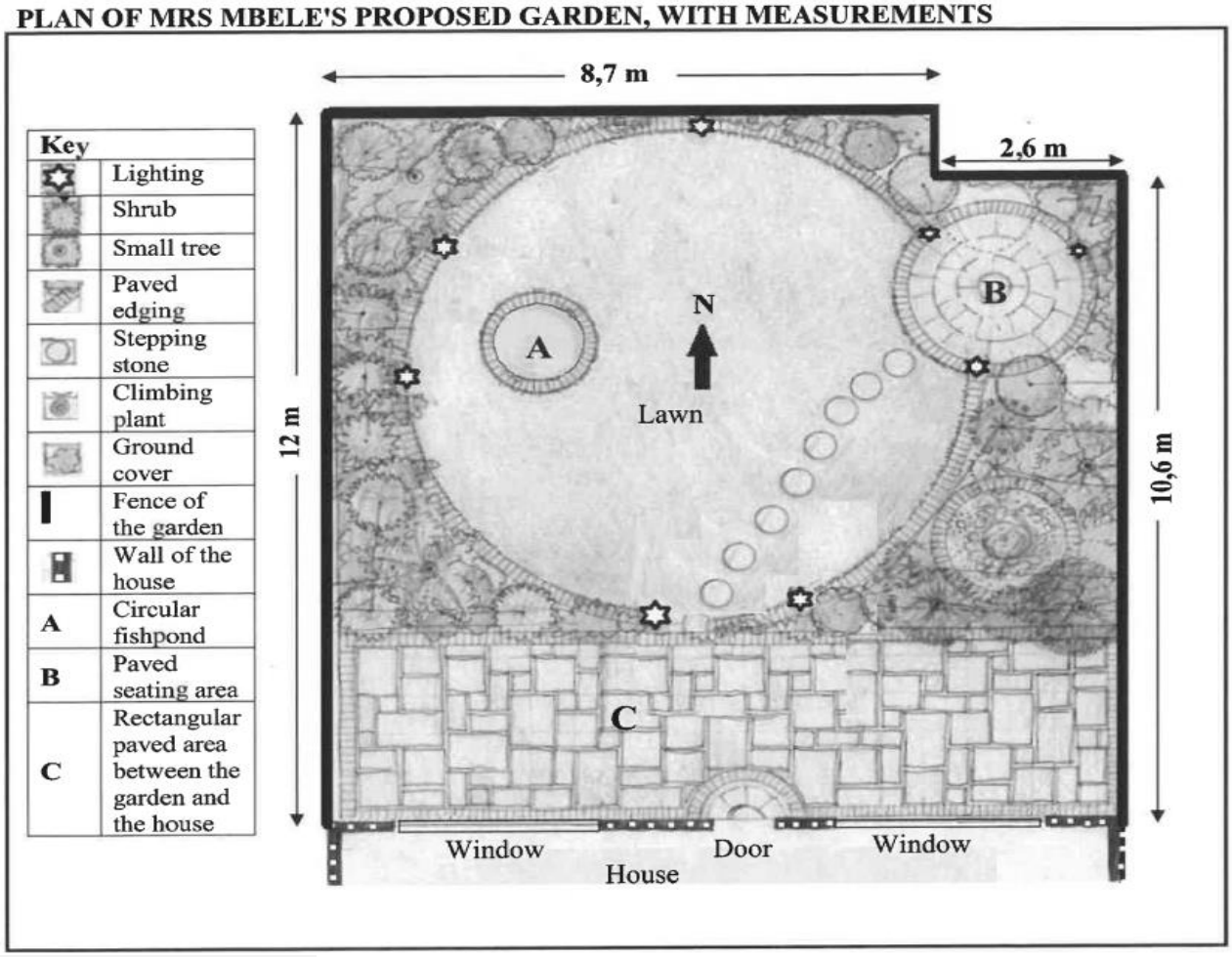
2.4 The goal area will need to be painted a different colour. The total area to be painted is 113,112 m². The paint is sold in 20litre tins at R2 608 with a spread rate of 1,5 m² /ℓ.
Khanya claims the cost will be less than R 10 000

Verify, showing all calculations if the statement is valid. (7)

Activity 3:

A garden landscaper is helping Mrs Mbele to plan a garden behind her house. There will be paving bricks laid between the house and the garden. The front of the garden will have the house as one of its boundaries, while the rest of the outer boundaries of the garden will have wire fencing.

PLAN OF MRS MBELE'S PROPOSED GARDEN, WITH MEASUREMENTS



NSC June 2025 P2

Use the information above to answer the questions:

3.1 Calculate the total length of the wire fencing needed to fence the outer boundaries of the garden, including the paved area. (3)

3.2 The circular fishpond (**A**) has a diameter of 120cm and a depth of 0,5m.

(a) Calculate in cm^3 the volume of the fishpond.

Use the formula:
Volume of cylinder = 3,142 × radius² × depth

(4)

(b) Surrounding the circumference of the fishpond is a row of paving bricks. Each paving brick is 20 cm long.
Determine the circumference of the paved outer edging of the fishpond.

Use the formula:
Circumference of a circle = 3,142 × diameter

(3)

Activity 3 (continued):

3.3 The rectangular paved area (**C** on the plan) between the garden and the house is 36,16m².

(a) Calculate the width of the paved area between the garden and the house.

Use the formula: **Area of rectangle = length x width** (4)

(b) 118 wheelbarrows of gravel are needed for 10 m³ of gravel.
Thabang stated that more than 65 wheelbarrows of gravel are needed to place a 150mm layer of gravel under the paved area.

Verify, with calculations, whether this statement is valid.

Use the formula: **Volume of rectangular prism = Area of rectangle × depth** (6)

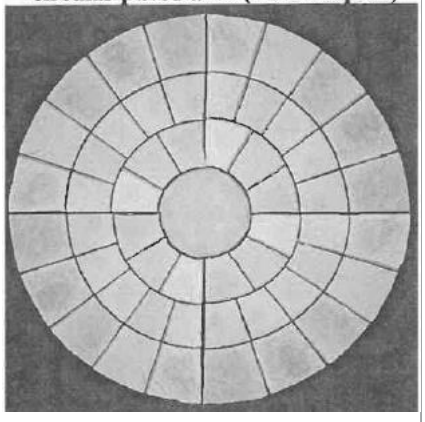
The paved seating area (**B** on the plan) alongside, is located at the eastern side of the garden. This area has a circular paving brick in the middle, surrounded by custom-made pavers (irregularly shaped paving bricks) to form the circular paved seating area.

The custom-made pavers are sold in packs of 13, which covers exactly a quarter of the full circular seating area, excluding the middle paver.

The cost of the pavers, excluding 15% VAT are shown below

Materials:	Cost:
Middle Paver	R125,80
Pack of 13 custom-made pavers	R657,40
Other materials	R1 250,00

Picture of the layout of the circular paved area (B on the plan)



Use the information above to answer the questions:

3.4 Determine the total number of paving bricks in the first row, closest to the middle circular paver. (2)

3.5 Calculate the total cost, including VAT, of the materials required to pave the entire seating area **B.** (5)

Loans and Hire Purchase

Can you explain the difference between Simple and Compound interest?

Loans and Hire Purchase:

- **Loan**: A loan is money borrowed from a bank or lender. You agree to pay it back in monthly instalments, plus **interest** (extra money charged for borrowing).
- **Hire Purchase**: This is when you buy an item by possibly paying a deposit first, then monthly payments until it's fully paid off. You only own the item after the last payment.

Both options make big purchases possible, but they also cost more than paying cash because of interest and fees. Understanding how these work helps you make smart financial decisions

Let's look at some important terminology

Borrower	The party that receives the money with the obligation to repay it with interest.	**Repayment**	A series of regular, scheduled payments over a set period. Often made monthly, It is designed to gradually settle the debt until the loan is fully repaid, including the original loan amount, interest and other costs.
Lender	The entity that provides the money at an agreed upon interest rate	**Loan term**	The length of time over which a borrower agrees to repay a loan. It is the period during which you make regular payments to pay back the principal amount borrowed plus interest.
Interest rate	The percentage used to calculate the interest amount. Can be calculated using simple or compound interest.	**Interest**	The amount of money paid or earned as a cost for borrowing or a reward for saving. This can be calculated in different agreed upon time periods.
Deposit	An initial upfront payment made by a borrower towards the total purchase price of an asset, covering a portion of the price, reducing the total amount of money that needs to be borrowed from the lender.	**Total cost**	The entire amount you will pay over the loan term, calculated by adding together the principal amount borrowed, all interest charges, and any additional fees and charges.

Activity 1:

A generator is a useful device that can be used to provide an alternate source of electricity during a power outage.
Shown below is different payment options:

PAYMENT OPTIONS OF A GENERATOR

Cash Price	Hire-Purchase	Online credit (via Mobicred)
R10 999 (Incl 15% VAT)	**Deposit**: 10% of full cash price **Instalment:** R534,14 pm x 24 months **Interest rate**: 14,75%	**Instalment:** R 1 006pm x 12 months **Interest Rate** ; 9,67%

Adapted from: DBE June 2023 P1

Use the information above to answer the questions:

1.1 Give TWO payment options for this generator. (2)

1.2 Define hire-purchase in the given context. (2)

1.3 Write down the interest rate if the generator was bought on hire-purchase. (2)

1.4 Calculate the total cost of the generator using Mobicred (2)

1.5 A 12,5% discount is given on the cash price.

Calculate the amount of discount offered on the cash price. (2)

1.6 Name the type of interest charged if the generator is bought on hire-purchase. (2)

1.7 Calculate the total amount payable if buying the generator using Hire Purchase. (4)

1.8 A customer stated that a person will save more than R800 if they choose to buy the generator using Online credit rather than Hire Purchase.

Verify, showing ALL calculations whether this statement is valid. (3)

Activity 2:

Mrs Smith would like to buy a car but does not have the full cash amount. She downloaded TWO payment options for TWO different cars as shown in the table below

PAYMENT OPTIONS FOR TWO DIFFERENT CARS

ITEM	FORD FIGO	VW POLO
Retail price/Cash Price (incl VAT)	R215 100	R220 300
Deposit	5%	0%
Monthly Instalment	R2 999,00	R3 345,00
Residual Value	30%	R116 759
Monthly admin fee (not included in monthly instalment)	R69,00	2,08% of the monthly instalment
Term agreement	72 months	48 months
VAT	15%	15%

PLEASE NOTE: RESIDUAL VALUE IN THIS CASE IS THE LAST MONTH'S PAYMENT.

Adapted from: DBE Nov 2021 P1

Use the information above to answer the questions:

2.1 State the type of payment option shown in the table above. (2)

2.2 Calculate the deposit amount for the Ford Figo. (2)

2.3 Write down in simplified form, the ratio of the term agreement of the Ford Figo to the VW Polo. (2)

2.4 Which one of the two vehicles will be more cost effective in terms of the monthly budget? (2)

2.5 The monthly instalment remained the same throughout the contract period, except for the final payment..
Calculate the total cost of:
a) The VW Polo
b) The Ford Figo (14)

SESSION 3 | Loans and Hire Purchase

Activity 3:

Financial institutions granting home loans use a loan factor table to determine the monthly repayment on a home loan.

The Table below is a loan factor table that shows the monthly repayments per R1 000 on a home loan with interest rates ranging from 14,25% to 16% per annum, over 15, 20, 25 or 30 years.

Annual Interest Rate	LOAN FACTOR			
	15 years	20 years	25 years	30 years
14,25%	13,49	12,62	12,23	12,05
14,50%	13,66	12,80	12,42	12,25
14,75%	13,83	12,98	12,61	12,44
15,00%	14,00	13,17	12,81	12,64
15,25%	14,17	13,35	13,00	12,84
15,50%	14,34	13,54	13,20	13,05
15,75%	14,51	13,73	13,39	13,25
16,00%	14,69	13,91	13,59	13,45

The monthly repayment can be calculated using the following formula:

Monthly repayment (in rand) = (loan amount ÷ 1 000) × loan factor

DBE Feb/March 2014

Use the information above to answer the questions:

3.1 Pragashni is planning to buy a house and has a disposable income of R17 550 per month.
Calculate the maximum loan amount she qualifies for if she wants to take out a loan over 25 years at an interest rates of 15,25% per annum. (4)

3.2 Give TWO possible reasons why it would not be advisable for her to take the full maximum loan amount that she qualifies for (4)

Activity 3 (continued):

Pragashni has home loan options from EP Bank and STL Bank. To make a comparison, she summarised the two options in the table below:

Comparison of home loan options

	EP BANK	STL BANK
Loan amount	R 1 100 000	R 1 100 000
Loan period in years	25	20
Annual interest rate	15,25%	16%
Total repayment	R4 290 000	…

Use the information above to answer the questions:

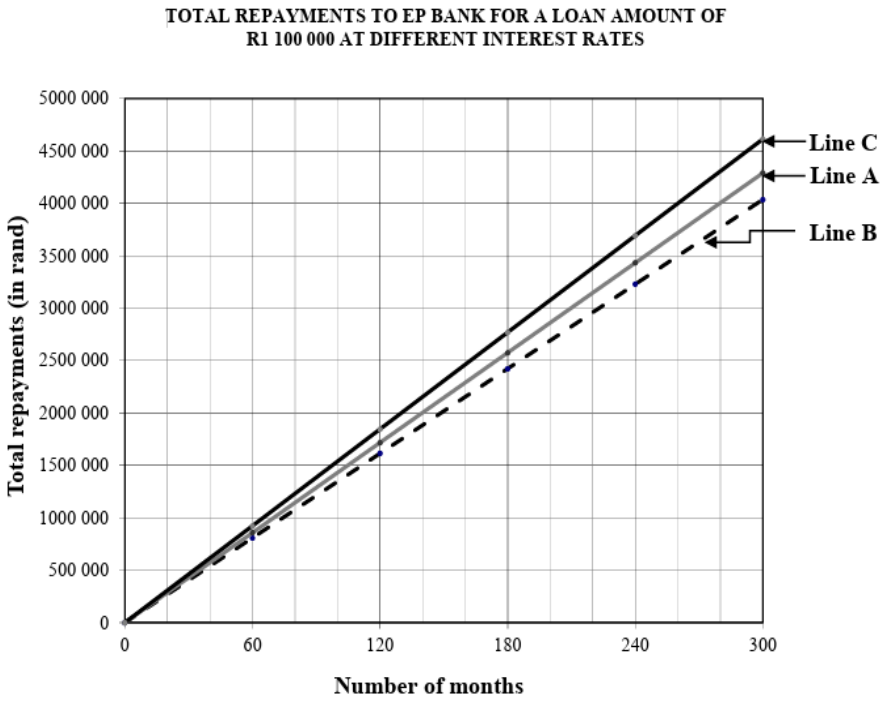
3.3 Determine, showing ALL calculations, which home loan option will be advisable for her to choose.

Give ONE reason for this choice. (8)

3.4 She can afford a maximum of R13 255 for her monthly repayments.

Determine, showing ALL calculations, the period and interest rate that will best suit her needs. (5)

Line A in the graph alongside shows the loan option that was offered to Pragashni byEP Bank at an interest rate of 15,25% per annum.



3.5 Identify the line that shows a loan option at 14,25% and the line that shows a loan option at 16%. Give a reason for your answer. (4)