



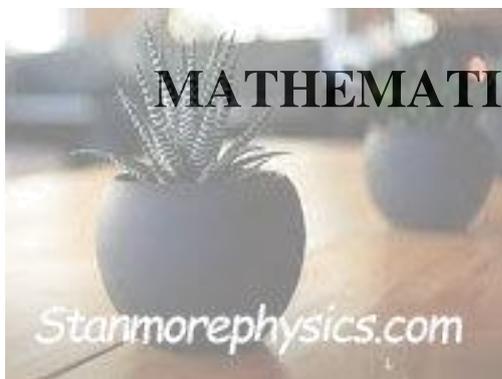
KWAZULU-NATAL PROVINCE

EDUCATION
REPUBLIC OF SOUTH AFRICA

CURRICULUM GRADE 10 – 12 DIRECTORATE

NSC (CAPS) SUPPORT

JUST IN TIME LEARNER REVISION DOCUMENT



MATHEMATICAL LITERACY

GRADE 12

2022

**This document has been compiled by Mathematical Literacy Subject
Advisors together with Lead Teachers.**

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Basic salary is the money/salary that a person gets, excluding overtime and other allowances such as car allowance and housing allowance.

Gross salary is the salary before deductions, which may consist of bonuses, overtime, allowances etc.

Net salary is the salary after deductions.

Variable salary is the paid amount of compensation determined by employee performance, for example.

Fixed salary means that every employee will be paid the same monthly salary.

Quantity is the amount or number of materials.

Profit = Selling price – Cost price

Cost price = Selling price – Profit

Selling price = Cost price + Profit

ACTIVITY 1

Nompilo recently graduated from the University of Witwatersrand (WITS) in May 2022, she was doing a degree in Information Technology (IT) and has been offered jobs in three different companies.

JOB A: Webpage Developer for a computer company

The computer company offered her a basic salary of R6 000, plus R700 per day on weekends and public holidays. She will only get a basic salary if she does not work overtime.

JOB B: Microsoft Cleaner

She will earn R600 per day in the month, including Saturdays and will not work on holidays and Sundays.

JOB C: Copywriter at an advertising agency

The advertising agency offered her a full-time job with a fixed salary of R16 500 per month.

- 1.1
 - 1.1.1 Determine the University that Nompilo went to. (2)
 - 1.1.2 What is the course that Nompilo was doing? (2)
 - 1.1.3 Write down a formula that can be used to determine Nompilo's monthly salary as a webpage developer. (2)
 - Monthly salary (R)=** (2)
 - 1.1.4 Define the term *fixed salary* using the given context. (2)
 - 1.1.5 Use your formula in question 1.1.3 to calculate how much Nompilo will earn in total if she works on two weekends. (3)
 - 1.1.6 The month of April has three holidays (i) Good Friday, (ii) Easter Monday, and (iii) Freedom Day. Calculate which job Nompilo will choose among the three jobs. If Nompilo works for the whole month, including holidays and weekends. (6)
- 1.2
 - Nompilo will get an annual bonus if she chooses to be a copywriter at an advertising agency. The bonus is equivalent to her monthly salary plus 45% of her monthly salary.
 - 1.2.1 Define the term *bonus* in the given context. (2)

- 1.2.2 Simplify the percentage as a decimal. (2)
- 1.2.3 Nompilo claims that she will get more than R40 000 salary, including the bonus. Verify with calculations whether her statement is correct. (4)

[25]

2.1

ACTIVITY 2

Mr Mabaso is an Accountant at Moolas furniture store. He has prepared the income statement.

Amount (R)	QUANTITY	JANUARY 2021 (Thousands)	JANUARY 2022 (Thousands)
Sales	10 000	70	105
Cost price	10 000	30	55
Gross income	-----	40	80
Operating expenses	-----	23,475	30,345
Wages	2 employees	16	19,8
Advertisement	-----	0,95	19
Motor expenses	-----	1,6	0,95
Insurance	-----	1,5	2,3
Water	50 kℓ	0,375	1,5
Electricity	200 KWh	2,4	0,695
Telephone	-----	0,65	2,9
Security	-----	-----	1,5
Net Profit/Loss		16,525	

- 2.1.1 Write down the number of sales in the year 2022 in words (2)
- 2.1.2 Calculate the profit for the year 2021. (3)
- You may use the following formula: **Profit = Sales - cost of sales**
- 2.1.3 Identify the variable expense. (2)
- 2.1.4 Calculate the selling price for each item in January 2022. (2)
- 2.1.5 Show how the net profit for January 2021 was calculated. (3)
- 2.1.6 Why is it important to have insurance in the business? (2)
- 2.1.7 Calculate the percentage change in water. (2)
- Use the following formula:
- $$\text{Percentage change} = \frac{\text{new amount} - \text{old amount}}{\text{old amount}} \times 100$$
- (2)
- 2.1.8 What could be the **TWO** possible reasons for employing the security services in the year 2022? (4)
- 2.1.9 Mr Mabaso predicts that sales amount for January 2023 will increase by 15% per item. The new amount for total sales will be R120 000. Verify with calculations whether his statement is correct. (5)



[25]

There are documents which have financial-related content. These documents include Municipality bills (Water and Electricity), phone bills, till slips and bank statements. Learners should study the documents thoroughly because the questions asked in this section are context-based.

Learners should analyse the financial documents and explain how different cost values on the financial documents have been determined.

Learners should define the key concepts.

COMMON ERRORS

Learners tend to ignore the fine print on financial documents.

Learners struggle to answer questions about the number of days covered by the document.

For example, the bill is dated 25 January 2022 to 15 March 2022; the learners will start counting from the 26th instead of starting from the 25th.

Error January days = (31 – 25) + February days = (28) + March days (15)

The correct method = 31 -26 +1 + 28 + 15

ANNEXURE A SALARY ADVICE

Study the following document and answer the questions that follow.

BOBBY'S TYRES			
Bobby's Tyres			
1 Mercury Crescent		Tel no: 031 703 112	
Mariannridge		Fax no: 031 703	
1931			
Email:admin@bobbystyres.co.za			
Name of Employee		Employee ID	Tax Ref Number
Devon Daniels		8507115428187	1692399018
Appointment Date: 01 January 2015			
Employee Designation	Number	Department	Salary Period
Area Manager	H11015	Stock	01/04/2022
Earnings		Deductions	
Basic Salary	R27 000	P.A.Y.E.	R2 840,52
Travel Allowance	R 5 700	UIF	R 148,72
Housing Allowance	R 2 200	Pension Fund	7,5% of basic salary
		Medical Aid	R4 376,59
Gross Income A	Total Deductions B
Net Salary			

Mr D. Daniels is an employee at Bobby's Tyres. ANNEXURE A shows a copy of his salary advice. Use ANNEXURE A to answer the questions that follow.

- 1.1.1 Explain the term employee. (2)
- 1.1.2 Determine Devon’s age (2)
- 1.1.3 Identify Devon’s position in the company (2)
- 1.1.4 Determine Devon’s employment service in the company (2)
- 1.1.5 Calculate the values of A and B (5)
- 1.1.6 Determine the ratio in its simplest form of Devon’s travel allowance to his basic salary (3)
- 1.1.7 Devon claims his total deductions are more than 30% of his gross salary. Use calculations to verify whether his claim is valid or not. (5)
- 1.1.8 Devon receives a service bonus of 95% of his basic monthly salary. Determine his annual gross salary (including his bonus) (4)

[25]

ACTIVITY 2

Bank account holders can request periodical statements (i.e. monthly or six monthly periods). An STD Bank Prestige Plus current account for the period 09/09/22 to 16/09/22 is shown on ANNEXURE B

ANNEXURE B

Prestige Plus Current Account Statement				
S T D Bank	From: 09/09/2022			
Vilakazi Rock Building	To: 16/09/2022			
Durban				
KZN 4006				
	Account Number: ***** 1719			
Miss T Tenza				
1145 Gemini Street				
Mariannhill 3601				
Details	Debit (R)	Credit (R)	Date	Balance (R)
Balance Brought Forward				354,31
IB Payment to Tuff	20,00		09/09/2022	334,31
Lady Purchase	163,98		13/09/2022	170,33
Salary 9282		582,14	14/09/2022	752,47
Salary 9004		25 695,98	15/09/2022	26 448,45
Salary 9234		391,07	15/09/2022	26 839,52
IB Transfer to Idris	2 400,00		15/09/2022	24 439,52
IB Payment to Naomi	2 000,00		15/09/2022	22 439,52
IB Payment to Nokubonga	1 600,00		15/09/2022	20 239,52

Credit Card	2 561,52	15/09/2022	18 478,00
Insurance 9847	500,00	15/09/2022	17 978,00
Insurance 9140	532,75	15/09/2022	17 445,25
STD Bank Bond	5 569,75	15/09/2022	11 875,50
Insurance 9303	901,23	15/09/2022	10 974,27
Pre-Paid Electricity	100,00	16/09/2022	10 874,27
Vehicle repayment	4 168,79	16/09/2022	6 705,48
##Pre-Paid Electricity	...	16/09/2022	6 204,38
Fee Ladies Fitness	389,00	16/09/2022	5 815,38

NB: Transaction means any debits or credits on the account.

IB > Internet Banking Transactions

These fees are inclusive of VAT at 15%

ACTIVITY 2

MARKS

- 2.1.1 Identify the account holder. (2)
- 2.1.2 Determine the number of IB Transactions (2)
- 2.1.3 Determine the type of account displayed on the statement. (2)
- 2.1.4 Explain the meaning of a debit. (2)
- 2.1.5 Calculate the total amount that was deposited into the account. (2)
- 2.1.6 Calculate the number of days covered by the statement. (2)
- 2.1.7 The account holder bought Electricity on 16/09/22. Calculate the cost of electricity excluding vat (3)
- 2.1.8 Determine the percentage of the total amount deposited into the account paid towards the credit card. (3)
- 2.1.9 Use the following formula to calculate the percentage that the IB values are on the payments on the car and the Bond collectively. Round your answer to the nearest percentage. (4)
- $$\% = \frac{\text{sum of IB values}}{\text{sum of car and bond values}} \times 100\%$$
- 2.1.10 The financial institution will leave certain values out of the account number. Is that a wise idea? Critically comment to answer that question and give two reasons for that step. (5)

[28]

ACTIVITY 1 [VAT & UIF]
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- 1.1 On the 01/04/2018 the VAT rate was increased from 14% to 15%. This had a huge impact on the prices of services and goods in South Africa. Some items are VAT exempt.
- 1.1.1 Write the acronym VAT in full. (2)
- 1.1.2 For how many years has the VAT rate been 15%? (2)
- 1.1.3 Explain the term *rate* as has been used in the context of this question (2)
- 1.1.4 The VAT inclusive price of bread is R15,99. What was the cost of this loaf before VAT was added. (2)
- 1.1.5 Siyabulela claims that the increase in the VAT rate implies that the prices of goods and services increases by one percent. Justify, using calculations and your solution in question 1.1.4 above, to justify whether Siyabulela's statement is VALID or not. (4)
- 1.1.6 Distinguish between a VAT exempt and VAT exclusive item. (4)
- 1.2 Some employees in South Africa have to contribute 1% of their gross salary to the unemployment insurance fund (UIF). The employer also contributes 1% of the employee's gross salary to the fund on behalf of the employee. The employer then pays the total amount to SARS every month on behalf of the employee. The current ceiling gross monthly salary for UIF is R17 712.
- 1.2.1 What is UIF? (2)
- 1.2.2 Determine the total percentage of the employee's gross salary that will be paid to SARS every month. (2)
- 1.2.3 Mr Johnson's monthly gross salary is R22 547. UIF. Verify with calculations that the annual UIF amount that will be paid to SARS on his behalf will be R4 250,88. (6)
- [26]**

Calculating taxable income (if not given)

$$\text{Annual Taxable Income} = (\text{Annual Gross} - \text{Annual Pension Fund}) + \text{bonus}$$

The difference between **REBATE** and **THRESHOLD**

Working with **THRESHOLD** (if given)

Choosing the correct tax bracket.

Subtracting the rebate (s).

Know the difference between a medical tax credit and a medical contribution.

If monthly medical credit is given, multiply it by 12 before subtracting it from the annual tax.

Nomusa is a 65-year-old female educator who earned a gross income of R28 500 per month. A monthly deduction of 7,5% was made from her salary and paid into her pension fund.

Use the 2019/2020 Income Tax table below to answer the questions that follow.

TAX RATES FOR 2019/2020 TAX YEAR (1 March 2019 to 28 February 2020)

TAX BRACKET	TAXABLE INCOME (R)	RATES OF TAX (R)	
1	1 -- 195 850	18% of taxable income	
2	195 851 -- 305 850	35 253 + 26% of taxable income above 195 850	
3	305 851 -- 423 300	63 853 + 31% of taxable income above 305 850	
4	423 301 -- 555 600	100 263 + 36% of taxable income above 423 300	
5	555 601 -- 708 310	147 891 + 39% of taxable income above 555 600	
6	708 311 -- 1 500 000	207 448 + 41% of taxable income above 708 310	
7	1 500 001 and above	532 041 + 45% of taxable income above 1 500 000	
TAX REBATES		TAX THRESHOLD	
	Primary	R14 220	R79 000
	Secondary (65 and older)	R7 794	R122 300
	Tertiary (75 and older)	R2 601	R136 750
MEDICAL TAX CREDIT PER MONTH FOR MEDICAL FUND MEMBERS			
	Main member	R310	
	First dependant	R310	
	Each additional dependant	R209	
<i>SOURCE: www.sars.gov.za</i>			

- | | Marks |
|--|--------------|
| 2.1 Define the term gross salary. | (2) |
| 2.2 What is the maximum taxable income for bracket 4 | (2) |
| 2.3 Determine Nomusa's monthly taxable income. | (3) |
| 2.4 Identify the tax bracket Nomusa falls in based on his annual taxable income | (2) |
| 2.5 Calculate Nomusa's monthly tax in the 2019/2020 tax year. | (5) |
| 2.6 Nomusa stated that if she were 10 years younger, she would have paid R5 502,34 monthly tax. Show with calculations whether Nomusa's statement is valid. | (5) |
| 2.7 Nomusa is considering joining a medical fund. She plans to include his husband and two grandchildren.
Determine the total monthly medical credits she would qualify for if she joined a medical fund | (3) |
| 2.8 Nomusa's brother, who is 45 years old, earned a monthly taxable income of R45 980,17 during the 2019/2020 tax year. He is not a member of any medical scheme.
Show, using calculations, that his monthly tax was R11 024,11 | (8) |

TOTAL

[30]

ACTIVITY 3

Mr Mnyango is a 64-year-old educator at Isolesizwe High School. He earns a monthly gross salary of R36 188 and contributes 7,5% of his gross salary towards GEPF

- | | | |
|-----|--|-------|
| | | Marks |
| 3.1 | What does the abbreviation GEPF stand for? | (2) |
| 3.2 | Determine Mr Mnyango's annual gross. | (2) |
| 3.3 | Calculate Mr Mnyango's annual pension fund. | (2) |
| 3.4 | Determine his annual taxable income. | |
| | You may use the formula: Annual Taxable Income = Annual gross – Annual taxable income | (2) |
| 3.5 | Use the SARS tax table below to answer the questions that follow | |

INDIVIDUAL TAX RATES FROM 1 MARCH 2021 TO 28 FEBRUARY 2022

TAXABLE INCOME (R)	RATES OF TAX (R)
1 -- 261 200	18% of taxable income
216 201 -- 337 800	38 916 + 26% of the taxable income above 261 200
337 801 -- 467 500	70 532 + 31% of the taxable income above 337 800
467 501 -- 613 600	110 739 + 36% of the taxable income above 467 500
613 601 -- 782 200	163 335 + 39% of the taxable income above 613 600
782 200 -- 1 656 600	229 089 + 41% of the taxable income above 782 200
1 656 601 and above	587 593 + 45% of the taxable income above 1 656 600
REBATES	
Primary	R15 714
Secondary (Persons 65 and older)	R8 613
Tertiary (Persons 75 and older)	R2 871
SOURCE: www.sars.gov.za	

- | | | |
|--|---|-----|
| | 3.5.1. How many rebates will Mr Mnyango qualify for? | (2) |
| | 3.5.2 Calculate the monthly tax that Mr Mnyango will pay in the 2021/2022 financial year | (7) |
| | 3.5.3 Mr Mnyango stated that if he was 1-year-older, he would be saving more than R700 in monthly tax. Verify whether his statement is correct. Show ALL your workings. | (5) |
| | 3.5.4 If Mr Mnyango's salary increases by 7%, determine his new monthly taxable income | (3) |

TOTAL [25]

Activity 1

Gugu needs a cellphone with unlimited web browsing. The table below illustrates the cost of two deals from the FONE 4 U network.

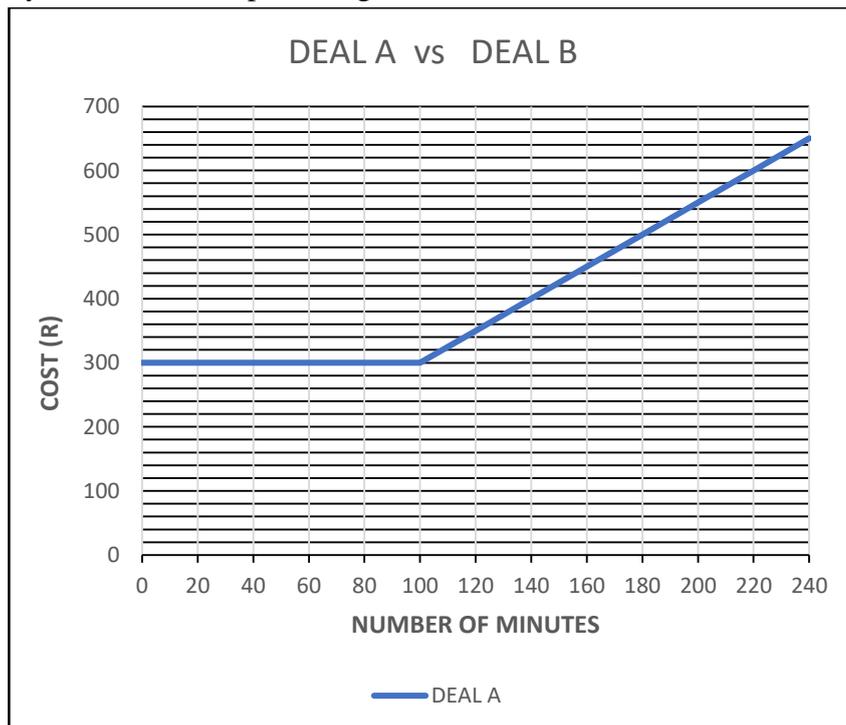
TABLE 1: THE DIFFERENT DEALS FROM FONE 4 U.

DEAL	PHONE AND INTERNET COST	CALL COSTS
A	R300 per month over 24 months.	<ul style="list-style-type: none"> • 100 free minutes • R2,50 per minute for calls after free minutes used.
B	R400 per month over 24 months.	<ul style="list-style-type: none"> • 120 free minutes • R1.50 per minute for calls after free minutes used.

Note: complete package includes phone, internet and call cost

Study the table above to answer the questions that follow:

- 1.1. Describe the difference between a pre-paid and contract phone. (2)
- 1.2. Calculate the range of free minutes in Deal A and B (3)
- 1.3. Determine the equation Gugu will use to determine the cost of the whole package of DEAL B. (3)
- 1.4. Determine which deal is the cheapest over 24 months if Gugu makes an average of 3,5 hours for calls per month using the whole package. Show all the calculations. (8)
- 1.5. The graph for DEAL A has been drawn on the answer sheet. Use the ANSWER SHEET provided below to draw the graph for DEAL B on the same sets of axes. (4)
- 1.6. Which deal is the most expensive if Gugu speaks for 180 minutes per month? (3)
- 1.7. Determine the probability of randomly selecting a deal with more free minutes. Write your answer as a percentage. (2)



The table below shows the Zukuzela local municipality's domestic electricity tariffs during the low season.

TABLE 2: ZUKUZELA LOCAL MUNICIPALITY TARIFF FOR 2020/2021

BLOCK	ELECTRICITY USAGE IN (Kwh)	TARIFF PER KWH EXCLUDING VAT 15%
1.	0 -----50 Kwh	R0, 9015
2.	50,1 -----350 Kwh	R1. 0161
3.	350,1 -----600 Kwh	R1, 3594
4.	600,1 -----1000 Kwh	R1, 6314
5.	Greater than 1000 kWh	R1, 8356

Use the information from the table above to answer the questions that follow:

- 2.1. Write the acronym VAT in full. (2)
 - 2.2. Define the term *tariff* as used in the context. (2)
 - 2.3. Differentiate between VAT-exclusive and VAT-inclusive prices. (3)
 - 2.4. Convert block 2 tariffs into cents. (3)
 - 2.5. Calculate the total amount paid for using 400Kwh of electricity consumed per month. (4)
 - 2.6. Zive paid R700 for using electricity in June. Determine the number of Kwh the family is using in June. (6)
 - 2.7. On average, Zive paid R500 monthly for using electricity in November. Give TWO valid reasons why Zive paid so much in June. (4)
 - 2.8. The projected inflation for 2022 is 5%; how much will be charged in block 3 when inflation is applied? (3)
 - 2.9. Explain with a valid reason why ESKOM charges different tariffs in different blocks. (3)
- Grand Total [30]**

SUMMARY NOTES -BANKING TARIFFS

In the given context: the credit column shows the money deposited into Solly's account (increases the balance). The debit column shows the amount taken out of Solly's account (decreases the balance).

The opening balance indicates the amount brought forward from the previous month's closing balance.

Closing balance indicates the amount (balance) Solly had at the end of his statement period after transactions have been made for the month.

When calculating the bank charges: Note: R0,90 per R100 (or part thereof) means any amount less or equal to R100 will be charged R0,90, as it is considered a part of R100.

ACTIVITY 1 QUESTION 1

- 1.1** Solly banks with Nedsave Bank. He has a Savings Account. Given below is a bank statement for Sully's savings account outlining the transactions for February 2022.

NEDSAVE BANK				
Solly Heerden Flat 3C Ladswood Heights			Statement Date: 28 February 2022 Account No. ****52482189	
Transaction Date	Transaction Details	Credit	Debit	Closing Balance
01/02/2022	Opening Balance			R9 872.50
	Debit Card Purchase-Groceries		R1 516,72	R8355.78
	Transaction Fee		R1,50	R8 354.28
02/02/2022	Stop order -Rental		R3 600,00	R4 754.28
	Transaction Fee		R6,00	R4 754.28
	Debit order- cellphone account		R289,32	R4 458.28
	Transaction Fee		R6,00	R4 452.96
03/02/2022	Debit order - Car insurance		R3 800.96
	Transaction Fee		R6,00	R3 794.96
06/02/2022	ATM Withdrawal		R1 000,00	R2 794.96
	Transaction Fee		R6,00	R2 788.96
10/02/2022	ATM Withdrawal		R880,00	R1 908.96
	Transaction Fee		R6,00	R1 902.96
21/02/2022	Cash deposit at Branch	R325,00		R2 227.96
	Transaction Fee		R5,59
27/02/2022	Electronic Deposit –Salary	R7 675,90		R9 898.27
28/02/2022	Monthly account fee		R8,20	R9 890.07
		Closing balance		R9 890.07

- 1.1.1 Explain the meaning of opening balance in the given context. (2)
- 1.1.2 If Solly has a cellphone contract with a monthly fee of R85,00 per month, how much he spent on calls in February? (2)
- 1.1.3 Calculate the total amount that Solly withdrew from his account through ATM withdrawals. (2)
- 1.1.4 Calculate how much Solly paid for Car Insurance. (2)
- 1.1.5 Determine the closing balance on the 21st of February? (2)
- 1.1.6 Calculate Solly’s total bank charges for the month. (2)
- 1.2 The table below shows the charges for cash deposits at the branch and at the ATM for Nedsave Bank.

TABLE 1: Bank charges for transactions at Nedsave Bank

Transactions	Fees
Cash deposit (At the branch)	R2,50 + 0,95% of value
Cash deposit (At ATM)	R0,90 per R100 (or part thereof)

- 1.2.1 Solly made a deposit of R325,00 at the branch on the 21st of February into his account. Show how the transaction fee of R5,95 was calculated. (2)
- 1.2.2 If Solly had deposit the money at the ATM instead of at the branch, how much would he save on transaction fees? (5)
- 1.3 A financial advisor working for a competitor bank (ABDA bank) stated that Solly will save on transaction charges if he moves to their bank. He provided Solly with the following summary of bank charges:

ABDA BANK Transactional Charges	
Type of Transaction	Transaction Fee
ATM(own) Withdrawal	R2,50 for the first R100 plus R1,10 for ever additional R100(or part thereof)
Debit Order	R5,00
Stop Order	R5,00
Debit Card purchase	R2,30
Cash Deposit At Branch	R2,80+ 0,90% of value
Monthly Service Fee	R6,70

1.3.1 Based on Solly’s transactions for February, verify if the ABDA bank financial advisor’s claim is valid? Show all your working details to support your answer. (6)

[25]

Question 2

Tariffs

A tariff is a rate charged for a service rendered, e.g., water usage, electricity, transport etc. Tariffs often favour consumers who use less; those who use more pay more.

- Learners are expected to compare and analyse the given source (e.g., Statement/sliding scale)
- Learners should be advised to read the given tariff table taking note of the VAT and units (Rands or cents)

2.1 Umngeni Municipality uses the following electricity tariff structure to calculate bills for each household. The 2021/2022 tariffs are given in table 2 below:

Table 2: Showing Umngeni Municipality electricity tariffs

Block	Electricity Consumption	Tariff (cent / kWh excluding 15% VAT)	
		2021	2022
1	0–50kWh	132,26	138,43
2	51–250kWh	143,68	158,75
3	251–400kWh	156,53	162,33
4	401 - 600 kWh	164,91	178,01
5	Above 600 kWh	172,10	195,55

[Source: www.umngeni.gov.za]

- 2.1.1 Write an equation to calculate the cost in Rands of consuming between 0 – 50 kWh of units in 2022. (2)
- 2.1.2 Calculate the number of kWh in block1 and block 2 (2)
- 2.1.3 In June 2021, the Mkhize household received a statement indicating that the previous reading was 125 693 Kwh, and the current reading is 125 996 Kwh. Calculate how many kWh the family will pay for. (2)
- 2.1.4 Use the number of kWh calculated in 2.1.3 above to calculate the total amount that the family will pay, including VAT. (5)
- 2.1.5 State one possible way a household can save electricity (2)

2.2. Zakwe family is travelling from Johannesburg to Cape Town; they plan to travel along the N1 route. The toll road tariff table for different vehicle classes is shown below.

N1: JOHANNESBURG - CAPE TOWN		TOLL FEE PER VEHICLE CLASS			
Tollgate	Route	Class I	Class II	Class III	Class IV
Grasmere	Armadale - Louisrus	R16,00	R48,00	R56,00	R74,00
	Grasmere - Louisrus	R8,00	R24,00	R28,00	R37,00
	Grasmere - Armadale	R8,00	R24,00	R28,00	R37,00
Vaal	Louisrus - Kroonstad	R54,00	R101,00	R122,00	R162,00
Verkeerdevlei	Kroonstad - Bloemfontein	R46,00	R92,00	R139,00	R195,00
Huguenot	Rawsonville - Paarl	R32,00	R89,00	R139,00	R225,00

CLASS DEFINITION

BPCC

Study the table above and answer the following questions:

- 2.2.1 How many different tollgates are there between Johannesburg and Cape Town along the N1 Road? (2)
- 2.2.2 Determine the class where you pay the same amounts more than once (2)
- 2.2.3 If you drove a car towing a caravan, how much would you have to pay at the Verkeerdevlei tollgate? (2)
- 2.2.4 Calculate how much will it cost Zakwe’s family motor car if they travelled a return trip between Louisrus and Paarl. (3)
- 2.2.5 During peak – hour time (16:00 – 18:00), about 240 class 1, 150 class 2, 120 class 3 (3)

and 10 class 4 vehicles pass through 7 tollgate. Calculate the amount in Rands the amount made by this tollgate at this time.

INCOME AND EXPENDITURE

The following concepts/skills are required:

1. Terminologies
 - a. Fixed cost
 - b. Variable cost
 - c. Income
 - d. Expenses
 - e. Break-even
2. Write formulae
3. Drawing and labelling graphs

ACTIVITY 1 QUESTION 1

- 1.1. The Stanger Child Welfare organisation is planning a fund-raiser and intends selling 200 tickets at R150,00 each. The organisers have to choose between the Salt Rock Conference Centre and the Stanger Town Hall as a venue. A musical group has agreed to provide the music for free.

- 1.1.1. The Stanger Town Hall charges basic fees of R3000 and R90 per person.

TABLE 1: The cost of hiring the Stanger Town Hall

Number of tickets sold (n)	0	50	100	B	200
Cost(C) in rand	3 000	7 500	12 000	15 600	21 000

- a) Write the formula that represents the cost (C) of hiring the Stanger Town (2)
 - b) Use your formula to determine the value of **B** (2)
 - c) Use TABLE 1 to draw and label a straight line graph on the answer sheet. (4)
- 1.1.2. The Salt Rock Conference Centre has no basic fee but charges R120 per person.

TABLE 2: The cost of hiring the Salt Rock Conference Centre

Number of tickets sold (n)	0	50	100	160	200
Cost (C) in Rand	0	6 000	12 000	A	24 000

- Calculate the missing value of **A**. (2)
- 1.1.3. Refer to the graphs on the answer sheet and answer the following questions:
- (a) Determine the Income received when 140 tickets are sold. (2)
 - (b) Determine the number of tickets sold if the income received was R24 000. (2)
- 1.1.4. The tickets are sold at R150 each. The graph in Annexure A shows the Income. TABLE 3 shows the number of tickets sold and the income received.

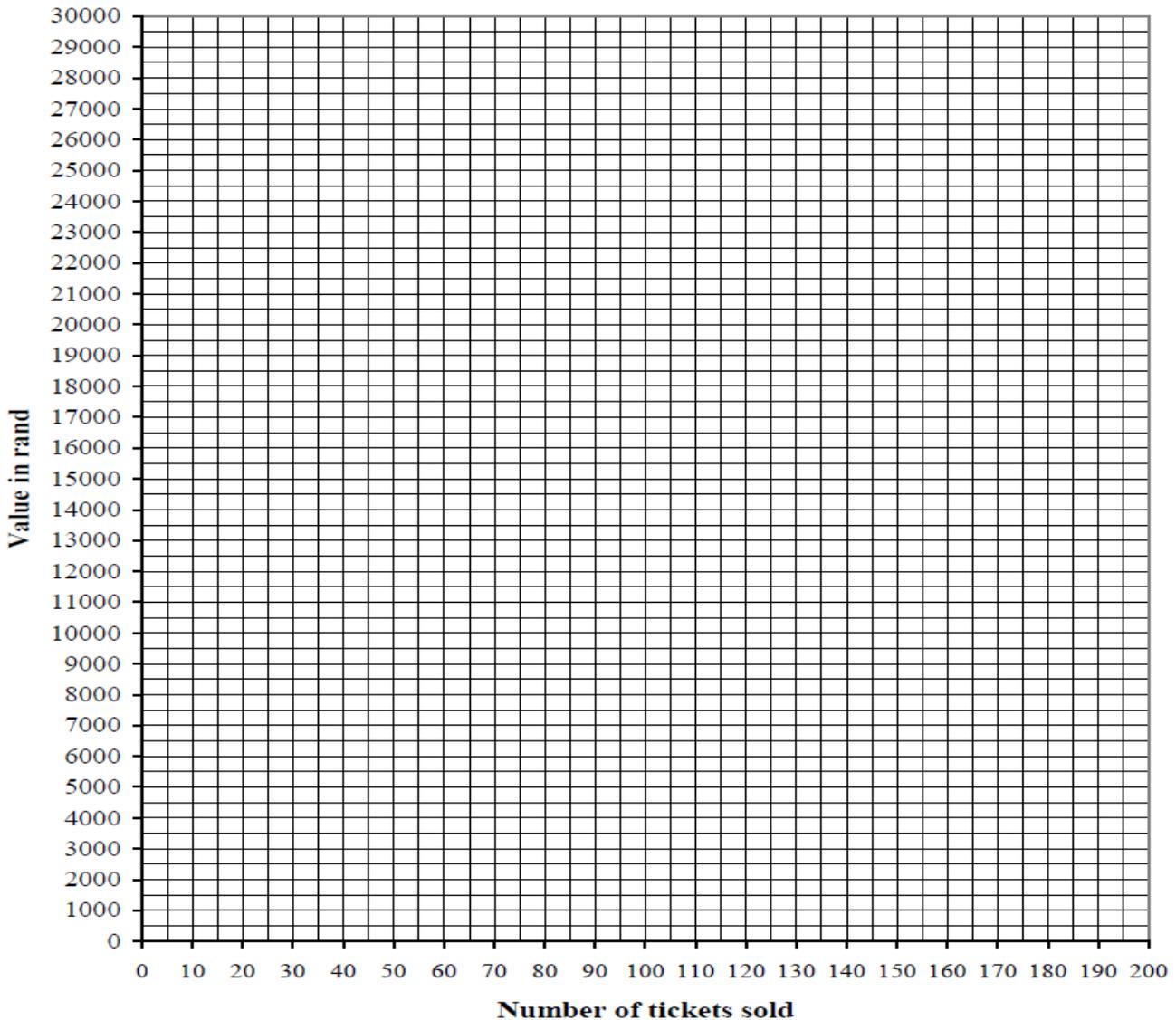
TABLE 3: Income from ticket sales					
Number of tickets sold (n)	0	50	100	150	200
Income (I) in Rand	0	7 500	15 000	D	30 000

- Calculate the value of **D** (2)
- 1.1.5. Use the values in TABLE 1 and TABLE 2 to write down the number of tickets sold when the cost for the two venues is the same. (2)
- 1.1.6. Suppose all the tickets are sold. Use TABLE 1 and TABLE 2 to write down the ratio of the cost for 200 people of hiring the Salt Rock Conference Centre to the cost of hiring the Stanger Town Hall in the simplest form (2)
- 1.1.7. The organisers eventually decided to use the Stanger Town Hall for their function. Use the values in Table 1 and Table 2 to answer the following:
- (a) Determine the number of tickets which must be sold for the organisation to make neither a profit nor a loss. (2)
 - (b) Give one term for the above. (2)
 - (c) What profit did the organisers make from selling 200 tickets, if (2)

$$\text{Profit} = \text{Income} - \text{Costs}$$

TOTAL : 26

Income and Expenses



2.1 During the last budget speech on 28 February 2020, Minister Pravin Gordon released the National Budget for South Africa for the 2017/2018 budget year. Study

TABLE 1 and answer the questions that follow.

TABLE 1: GOVERNMENT EXPENDITURE BY FUNCTION

R (in million)	2016/2017 Estimate	2017/2018 Estimate	2018/2019 Estimate	2019/2020 Estimate
Basic Education	226 643	242 968	261 292	280 139
Health	170 888	187 483	201 377	217 131
Defence, Public Order and Safety	190 036	198 702	210 814	224 956
Post-school Education and Training	68 952	77 550	80 856	89 839
Economic Affairs	201 658	215 047	227 995	244 003
Municipal Infrastructures	179 834	195 751	210 170	226 402
Total General Public Services consisting of:	69 977	70 695	72 462	75 616
• Executive and legislative Organs	12 976	14 340	15 202	16 089
• General public Administration	45 185	43 943	44 584	46 775
• External affairs and foreign Aid	11 816	12 412	12 677	12 752
Agriculture, Land Reform	25 998	26 534	27 923	29 826
Social Protection	164 936	180 046	193 548	209 088
Allocated by function	1 298 923	1 394 776	A	1 597 001

[Source: www.statssa.gov.za]

Use **TABLE 1** above to answer the questions that follow.

- 2.1.1. State the function that was allocated the most money in this budget. (2)
- 2.1.2. Write down the 2019/2020 *estimate allocated by function* in words. (2)
- 2.1.3. Determine the value of *A*, the allocated by function for the year 2018/2019. (2)
- 2.1.4. Write down the ratio of funds allocated for *Basic education* to funds allocated for *Post School Education and Training* for 2016/2017 in the form 1: (2)
- 2.1.5. Show how the projected expenditure of R70 695 million for *General Public Services* were calculated for the 2017/2018 budget year. (2)
- 2.1.6. Calculate the percentage of the expenditures that were allocated to the *Economic Affairs* in the 2016/2017 budget year. Give your answer to *TWO* decimal places (3)
- 2.1.7. Calculate the increase (in Rand) for the estimated expenditures of Basic Education from the 2017/2018 budget year to the 2019/2020 budget year. (3)
- 2.1.8. State *ONE* reason why the budget for Education has increased. (2)

2.1.9. Minister Pravin Gordhan stated that the percentage increase of Basic Education for the year 2018/2019 and 2019/2020 is greater than the percentage increase for Health for 2018/2019 and 2019/2020. Use calculations to verify if his statement is valid. (5)

2.1.10. **Table 2** below shows the tax revenue for 2018/2019 and 2019/20.

Table 2: Tax Revenue (excluding Customs Revenue) for 2018/2019 and 2019/2020

Tax type	Estimate for 2018/2019	Estimate for 2019/2020
	R million	R million
Personal Income Tax	55 4807	529 309
Company Income Tax	23 2940	219 229
STC/DT	31 893	29 144
Domestic VAT	403 210	399 433
VAT Refunds	-233 161	-237 8971
Taxes on property	17 159	16 038
Skills development levy	18 759	18 576
Other taxes and levies	987	826
Total Tax Revenue (excluding customs and excise)	1 029 593	974 659

[Source: www.statssa.gov.za]

Using Table 1 and Table 2, determine whether the National Budget had a *surplus* or *deficit* for the year 2019/2020 (4)
TOTAL : 27

Cost Price and Selling Price

- Cover page – School logo, grade, subject, date, marks, duration and number of pages.
- Instructions and information
- Questions – correct numbering and marks.
-

Activity 1

Marks

1.1 Zanele Mokoena, a grade 11 learner at Umkhumbane Secondary School, sells broken cakes at school and in her neighbourhood to earn an extra income. She orders her stock at the cost of R100 per 5kg from Omans and repackages it into small quantities of 90 units that she sells at R3/unit. She incurs a return taxi fare of R18, and the small plastics she uses to repackage the broken cakes cost her R10 for 50 plastic pockets.

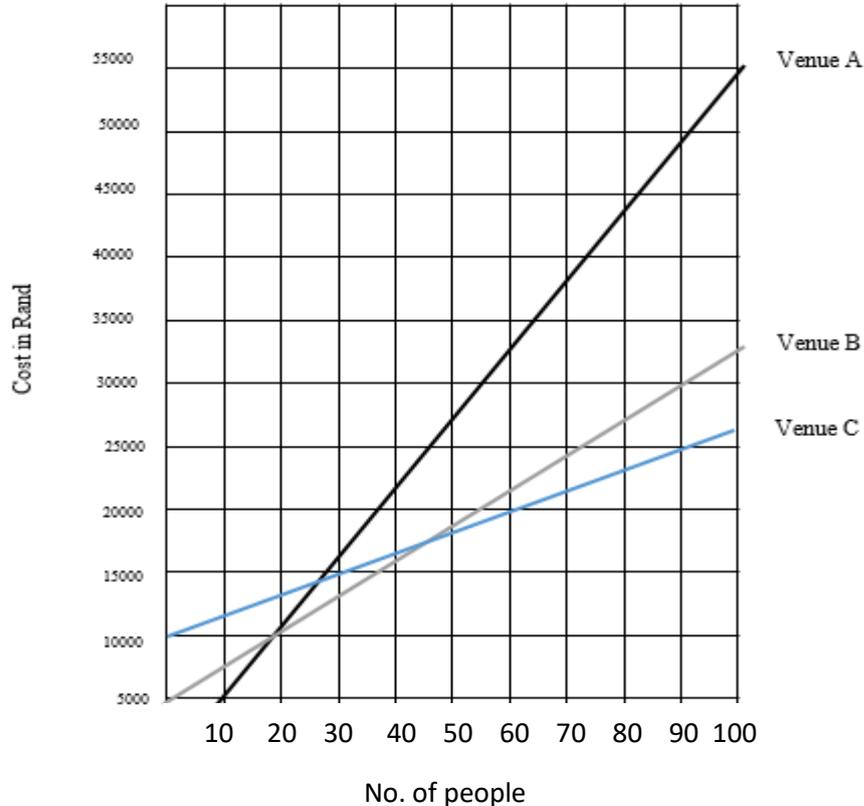
The following table shows the number of units she sold last week.

Days	Monday	Tuesday	Wednesday	Thursday	Friday
No. of units sold	35	45	A	40	B
Revenue (R)	105	135	230	120	90

- 1.1.1 Calculate the total costs she incurred for her initial order. (2)
- 1.1.2 Formulate an equation that can be used to calculate her sales revenue daily. (2)
- 1.1.3 How many units had been sold at the close of business on Tuesday, and when should she order new stock? (4)
- 1.1.4 Explain the meaning of the concept, break-even and determine the number of units she should sell to break-even. (4)
- 1.1.5 Calculate the percentage change in revenue generated from Monday to Tuesday. You may use the following formula:

$$\text{Percentage change} = \frac{\text{new price} - \text{old price}}{\text{old price}} \times 100$$

- 1.2 Below is a graph showing the cost of hiring 3 different venues for a function. Use the graph to answer the questions that follow.



- 1.2.1 Give the above graph a suitable heading (2)

- 1.2.2 Label and write down the values for the break-even point for venues B and C (3)
- 1.2.3 Why do the graphs for venues V and C not start at 0 on the y-axis? (2)
- 1.2.4 Which venue is the cheapest if there are 40 people attending a function? (2)

TOTAL [25]

Activity 2

Marks

- 2.1 Due to persistent hyperinflation, Zimbabwe recently launched (in May 2022) a new gold coin called Mosio-oa-Tuny which can be converted into cash after 180 days. Mr Gobodi, a teacher at Umkhumbane Secondary School from Zimbabwe, decided to acquire it in June for \$1 824 (this price is based on prevailing international market rates for an ounce of gold plus a 5% cost to cover production and distribution expenses), so that he sells it when he goes home in December (180 days). He expects that the value of his coin will appreciate to \$2 354 by then.

Below is a graph depicting the historical gold prices (Rands).



- 2.1.1 Define profit and calculate Mr Gobodi's expected profit. (4)
- 2.1.2 Convert Mr Gobodi's profit to Rands; the Rand currently trades at R16.53 to a dollar. (2)
- 2.1.3 How much does it cost to produce and distribute the gold coins in Zimbabwe? (3)
- 2.1.4 Calculate Mr Gobodi's expected percentage gain from this transaction. Round off to the nearest 10. (3)
- You may use the following formula:
- $$\text{Percentage gain} = \frac{\text{new price} - \text{old price}}{\text{old price}} \times 100$$
- 2.1.5 Estimate cost price (in Rands) per ounce of gold at the beginning of 2020, 2021 and 2022. (3)
- 2.1.6 Calculate percentage changes from 2020 to the beginning of 2021 and from 2021 to 2022. (3)
- 2.1.7 Based on your answer in 2.1.6, describe the trend of the gold price. (2)
- 2.1.8 Approximately how many months is 180 days? (2)

TOTAL [25]



Interest (Calculated manually, not with the formula)

1. Definition of the interest

Defined as a **loan** (the amount borrowed) or **investment (savings)** – (amount placed at the bank or in a financial institution for it to gain interest)

2. Types of interest

Compound (calculated on the current balance) and Simple interest (calculated on the initial balance)

3. How interest is calculated

Monthly

Yearly

Quarterly

Bi-annually / half yearly

4. Difference between the interest rate (%) and interest value (amount)

5. Advantages and Disadvantages of Simple interest and Compound interest.

Simple Interest

Advantage: Loan the interest is less than the Compound

Disadvantage: Investment the interest is less than the Compound

Compound Interest

Advantage: Investment the interest is more than the simple interest

Disadvantage: Loan the interest is more than the simple interest

Examples

Example 1:

Siyabonga invested R2000 at 7% simple interest per annum paid quarterly for two and a half years

1.1 Convert the interest rate into a quarterly rate. (2)

1.2 Calculate the value of the investment at the end of the two and a half years. (2)

1.3 Calculate the interest value over the whole period. (2)

Solution:

$$1.1 \quad \text{Interest rate} = \frac{7\%}{4}$$

$$= 1,75\%$$

$$1.2 \quad \text{Interest} = \frac{7\%}{4} \times R2000$$

$$= R35 \times 10$$

$$= R350$$

$$\text{Investment value} = R2000 + R350$$

$$= R2350$$

$$1.3 \quad \text{Interest} = R2350 - R2000$$

$$= R350$$

Example 2.

Compare the following scenarios:

A: R1500, 00 invested for three years at 8% simple interest.

B: R1500, 00 invested for three years at 7,5% compound interest.

- a) Which investment gives a higher return at the end of the period? (9)
- b) Explain why a lower interest rate, which is compounded, could yield more than a higher simple interest rate over the same period. (3)

Solution

$$\begin{aligned} \text{a) Option A} &= \frac{8}{100} \times R1500 \\ &= R120 \end{aligned}$$

$$\begin{aligned} \text{Return} &= R1500 + R120 \\ &= R1620 \end{aligned}$$

Option B

$$\begin{aligned} \text{First year} &= \frac{7,5}{100} \times R1500 \\ &= R112, 50 \end{aligned}$$

$$\begin{aligned} \text{Second year} &= \frac{7,5}{100} \times R1612, 5 \\ &= R120, 9375 \end{aligned}$$

$$\begin{aligned} \text{Third year} &= \frac{7,5}{100} \times R1733, 4375 \\ &= R130 \end{aligned}$$

$$\begin{aligned} \text{Return} &= R1733, 4375 + R130 \\ &= R1863, 44 \end{aligned}$$

Option B has a higher return

- b) Option B always adds interest on the balance with interest, while Option A adds interest on the initial amount.

Banking

1. **Bank Fees** – a cost paid for transactions or services rendered by the bank.
2. **Per and part-thereof**, i.e. R1, 20 per R50 (or part thereof), meaning the bank charges R1, 20 for every R50.
3. **Difference between stop order payment and debit order:** **Stop order** is a method of payment where the account holder makes an arrangement with the bank to pay the third party a regular monthly instalment, and a **debit order** is where the account holder instructs the bank to make regular monthly payments.
4. **Terminology:**

Transaction – movement of money into and out of the account.

Point of sale – Transaction made at the counter

ATM –Automated Teller Machine

Branch- Inside the bank

Electronic Fund Transfer – Transferring funds through a cellphone or bank app

Example 1:

Study the pricing guide for withdrawal charges for a Mvulane A1 credit card and answer the following questions:

MVULANE A1 credit card withdrawal charges

Cash withdrawal fee- own bank ATM	R5,50 for up to R500
	R11,00 for R500,01 to R1000,00
	R16,50 for more than R1001,00
Cash withdrawal fee- other bank ATM	R5,75 + R5,50 for up to R500
	R5,75 + R11,00 for R500,01 to R1000,00
	R5,75 + R16,50 for more than R1001,00
Cash withdrawal fee- own bank branch	R23,50 + 1,10% of value
	Maximum fee R1 500

- What would a Mvulane A1 client with an A1 credit card pay in bank charges to withdraw R1000 from a Mvulane ATM?
- What will a Mvulane client with an A1 credit card pay in bank charges to withdraw R50 from another bank's ATM?
- The formula to withdraw cash over the counter at the bank is given as:
R12, 50 + 1, 1% of the value withdrawn. Use this information to complete the table below:

Amount of money to be withdrawn	R0	R250	R1000
Bank charge			

Solutions

- R11,00
- $R5,75 + R5,50 = R11,25$

c)

Amount of money to be withdrawn	R0	R250	R1000
Bank charge	R12,50	R13,50	R23,50

Example 2.

Zenande has a Mvulane Bank savings account which offers 1,35% p.a. on all credit balances. Her transactions for June are summarised in the table.

Date	Description	Amount	Balance
01/05	Opening balance		15 000,00
01/05	ATM cash deposit	2 000,00	
01/05	Transaction fee		
02/05	ATM withdrawal (own bank)	-1000,00	
02/05	Transaction fee		
07/05	Cash branch withdrawal	-1 880,00	
07/05	Bank fees		
23/05	Electronic transfer	2 800,00	
23/05	Bank fees		

Transaction/banking fees schedule

Savings account:

ATM deposit and electronic transfers:	Free
Own ATM withdrawal:	R3,35 plus R0,95 per R100 or part thereof
Other bank ATM withdrawals:	R8,75 plus R0,95 per or part thereof
Branch withdrawal:	R20,00 plus R1,10 per R100 or part thereof

a) Use the table of banking fees to calculate and fill in all the bank charges for this statement.

Date	Description	Amount	Balance
01/05	Opening balance		15 000,00
01/05	ATM cash deposit	2 000,00	
01/05	Transaction fee	R0,00	
02/05	ATM withdrawal (own bank)	-1000,00	
02/05	Transaction fee	R12,85	
07/05	Cash branch withdrawal	-1 880,00	
07/05	Bank fees	R40,90	
23/05	Electronic transfer	2 800,00	
23/05	Bank fees	R0,00	

b) Use the details given to complete the balance column for the account.

c) Give a reason why savings accounts that allow daily withdrawals and deposits offer a slow-nterest rate.

Solutions

a)

Date	Description	Amount	Balance
01/05	Opening balance		15 000,00
01/05	ATM cash deposit	2 000,00	
01/05	Transaction fee	R0,00	
02/05	ATM withdrawal (own bank)	-1000,00	
02/05	Transaction fee	R12,85	
07/05	Cash branch withdrawal	-1 880,00	
07/05	Bank fees	R40,90	
23/05	Electronic transfer	2 800,00	
23/05	Bank fees	R0,00	

b)

Date	Description	Amount	Balance
01/05	Opening balance		15 000,00
01/05	ATM cash deposit	2 000,00	R17 000,00
01/05	Transaction fee		R17 000,00

02/05	ATM withdrawal (own bank)	1 000,00	R16 000,00
02/05	Transaction fee		R15 987,15
07/05	Cash branch withdrawal	-1 880,00	R14 107,15
07/05	Bank fees		R14066,25
23/05	Electronic transfer	2 800,00	R16866,25
23/05	Bank fees		R16866,25

c) Banks' profit is dependent on the interest rate they charge for loans

ACTIVITY 1 QUESTION 1

1. Lindiwe intends to buy a Camelot Plasma unit advertised below. She can buy the wall unit in cash for R3 499, 95. Alternatively, she could buy it on hire purchase and pay for it in instalments over two years. She will pay monthly interest on the wall unit if she chooses to pay it off in instalments.

CAMELOT PLASMA UNIT



On Promotion: R3 499,95 was ~~R3 499,95~~

Pay as little as: R262*/month for 24 months

Rate: 14,25% Deposit: R350

Use the information above to answer the questions that follow.

- 1.1 Explain the meaning of the word “*deposit*” in the given context. (2)
- 1.2 Calculate the original price of the Plasma Unit before the promotion price. (2)
- 1.3 Calculate what the Plasma unit will cost if it is purchased in instalments
You may use the formula:
Total Cost = Cash deposit + monthly instalments (3)
- 1.4 Calculate the interest Londiwe will pay off for the Plasma Unit if purchased in instalments. (2)
- 1.5 Londiwe claims that the deposit is 10% of the cash price of the Plasma Unit. Use calculations to verify if her claim is correct. (3)
- 1.6 Do you think it is better to save up and buy the Plasma Unit in cash or pay it off over 24 months? Explain your answer. (3)

[15]

QUESTION 2

2.

TABLE 1 below shows bank fees at Safe Bank used by Themba .

TABLE 1: Safe Bank Fees

Safe Bank Account Fees	
Monthly Account Fee	R55,00
Cellphone banking	R0,00
Cash Withdrawals (Safe Bank ATM)	
First R1 500	R0,00
More than R1 500	R15,00 + R1,20 per R50 (or part thereof)
Cash Withdrawals (Other bank ATM)	R15,00

Use TABLE 1 and the information above to answer the questions that follow.

2.1 Write down the monthly service fee for this account. (2)

2.2 Themba was charged R15,00 for making the following withdrawals:

- R1000 at Safe Bank ATM
- R3000 at FNB ATM

Show how this amount was calculated. (2)

2.3 Themba withdraws R1 730 at a Safe Bank ATM.
Calculate what this withdrawal will cost him (3)

2.4 Themba states that the difference between the Monthly Account Fee and Cash Withdrawals (Other bank ATM) is R14. Use calculations to verify if the claim is correct. (3)

[10]

TOTAL: 25

QUESTION 3 (INTEREST)

Mhlaba is planning on doing a baking course. She, therefore, decided to buy a food processor. While browsing the internet, she came across the following special promotions.

PICTURE 2: PICTURE OF A FOOD PROCESSOR ON SALE

Kenwood - Titanium Chef



Special price now: R6 499,00
Was: R7 139,99

Mrs Mhlaba doesn't have enough money to pay cash for the food processor.

She decided to buy it on a hire-purchase deal.

- **15% deposit**
- **18,5% annual simple interest rate on the price less deposit**
- **3 years to repay**

- 3.2.1 Define the term *hire-purchase*. (2)
- 3.2.2 Mrs Mhlaba paid R974,85 as a deposit on the food processor. Show how the deposit was calculated. (2)
- 3.2.3 Calculate the discount percentage offered on the food processor that Mrs Mhlaba wants to buy. (3)
- 3.2.4 Calculate the amount payable after three years, excluding the deposit she already paid. (5)
- 3.2.5 How much was she going to save if she decided to buy the processor cash instead of opting for the hire purchase (2)
- /13/**

3.3

Mr Molopa started saving R800 per month, two years ago so that he can take this money and invest it with a bank in order to put down a deposit when buying a house.

Mr Molopa approached a bank that offered him 12,5 % p.a. compound interest for a period of 2,5 years on the total amount saved.

- 3.3.1 Differentiate between *interest* and the *interest rate* (2)
- 3.3.2 Calculate how much he would be able to invest with the bank if he invests the entire amount (3)
- 3.3.3 Determine how much he will earn at the end of the investment period. (6)
- 3.3.4 Calculate how much interest he will earn at the end of the period. (2)
- /12/**

TOTAL: 25

1. ACTIVITY 2 QUESTION 1

Nomkhosi wants to renovate a 5 – roomed house after their house was damaged by the recent KZN floods. She needs a loan of R20 000. Three options are available to her.

Option 1: JIT Bank offer her R20 000 at 8,8 % per annum, interest compounded yearly to be paid in one lump sum after 2 years.

Option 2: ABCBank offers her R20 000 at a fixed interest of 8,3% per annum, compounded biannually, repayable in one lump sum after 2 years.

Option 3: Her parents offer her a loan of R20 000 at 9,2% per annum simple interest to be paid back in full at the end of 2 years.

- Use the information above to answer the questions that follow.
- 1.1 Explain the meaning of the word “*interest*” in the given context. (2)
 - 1.2 Write Option 2 interest rate per month. (2)
 - 1.3 Mention one advantage of a fixed interest rate. (2)
 - 1.4 Calculate the total amount Nomkhosi will pay back at the end of 2 years for Option 1. (6)
 - 1.5 Nomkhosi claims that Option 1 will be the best compared to the other options. Prove with calculations that her statement is correct. (6)
- [18]**

2

Nomkhosi’s bank, JIT Bank lists the following banking fee:

TABLE 1: JIT Bank Fees

TRANSACTION	FEE
MONTHLY FEES	
Monthly maintenance fee	R5,00
Self-service banking subscription fee	R15,00
DEPOSITS	
Cash (over the counter JIT Bank)	R15,00
Cash (JIT Bank ATM)	R5,00
CASH WITHDRAWALS	
Over the counter	R10,00
JIT Bank ATM	R5,00
Another bank’s ATM	R7,00
POS – cash only	R1,00
POS – cash with purchase	R2,00
ACCOUNT PAYMENT AND PURCHASES	
EFT	Free
Stop order	R5,00
Debit order - internal	R2,50
Debit order – external	R5,00
BALANCE ENQUIRIES	
Over the counter	First free per month, then R10, 00.
JIT Bank ATM	First free per month, then R1, 00.
Another bank’s ATM	R2,00
Self-service banking	Free

***POS – point of sale**

***EFT – electronic funds transfer**

Nomkhosi subscribes to self-service banking and pays a monthly maintenance fee. In the space of a month, Nomkhosi performs the following transactions:

- She deposits R400 in cash at a JIT Bank ATM.
- She withdraws R500 cash at another bank's ATM.
- She withdraws R150 cash over the counter in a JIT Bank branch.

- She enquires twice about her balance in the JF Bank branch over the counter.
- She withdraws cash while buying groceries at a till at her local supermarket.
- She makes 3 electronic account payments to pay her rent, electricity and phone bill.

Use TABLE 1 and the information above to answer the questions that follow.

- 2.1. Define the term “*stop order*” in the given context. (2)
- 2.2 Calculate the total bank charges for these transactions (2)
- 2.3 Suggest three ways in which Nomkhosi could reduce her banking fees (3) [25]

Activity 3

Mr Brendan Steward receives a bank statement on his cheque account every month.

The monthly statement below shows all the transactions that happened in a certain month of the year 2019.

Bank Unlimited

Statement number: 10023		Mr B. Steward			
Statement date: 01/03/2019		3 Geelhout Street			
Account number: 1280159978		Nelspruit			
		1201			
Date	Details	Debit	Credit	Bank Fee	Balance
01/02/2019	Brought forward				5 442,70
03/02/2019	EFT	518,42		1,90	4 922,38
05/02/2019	Markhams 12687	491,19		5,10	4 426,09
				16,5	
07/02/2019	Cash ATM	3 300,00		0	A
08/02/2019	Telkom 21647	431,54		5,10	672,95
16/02/2019	Cash POS	700,00		1,90	-28,95
16/02/2019	Deposit – P. West		B		831,40
20/02/2019	Cash POS	650,00		1,90	179,50
25/02/2019	Salary		12 350,00		12 529,50
22/02/2019	EFT	625,25		1,90	11 902,35
27/02/2019	Cash POS	525,00		1,90	11 375,45
28/02/2019	Interest		6,45		11381,90

[Source: Adapted from www.principalsofaccounting]

NOTE: Service fees are deducted on the same day of the transaction date

- 3.1.1 Identify the month to which the statement belongs. (2)
- 3.1.2 Calculate the total bank fees Brendan paid during the month. (2)
- 3.1.3 Calculate the value of **A** in the statement, show calculations (2)
- 3.1.4 There was an overdraft done during this month; indicate the date and the amount of an overdraft. (2)
- 3.1.5 Calculate how much was deposited in Mr Brendan account on **16/02/2019**, the value of **B**. (3)
- 3.1.6 Determine how much percentage of interest Mr Brendan eared into his account. (3)

- 3.1.7 Mr Brendan claimed that he was overcharged in the biggest withdrawal he made during this month from bank ATM. Verify if his claim is valid or not if Bank Unlimited uses the following tariff structure. (5)

LIMITED BANK ACCOUNT FEES	
Monthly Account Fee	R65,00
Using Cellphone banking app	R0,00
EFT and POS	R1,90
Cash Withdrawals(Bank limited ATM)	R12,00 + 0.09% of the value
Cash Withdrawals (Another bank ATM)	R15,00

- 3.1.8 A competitor bank ABK BANK is trying to convince Mr Brendan to close his account with LIMITED BANK and open an account with them. They provided him with the following summary of bank charges.

ABK BANK	
Type of transaction	Transaction fee
ATM withdrawal	R2,50 plus R1,10 for every R100 (or part thereof)
Debit/stop order	R5,00
Debit purchase	R2,50 per purchase
Monthly service fee	R6,70
Cash deposit(branch)	R2,80 + 0,95% of the amount deposited
Withdrawal POS/EFT	R1,65

Based on his transactions shown on the statement, do you think that Mr Brendan should change to ABK bank? By means of calculations explain your answer. (7)

INFLATION AND EXCHANGE RATES

INFLATION

FACTORS THAT INFLUENCE INFLATION

Economic state of the country.
Political influence

IMPACTS OF INFLATION

Affects the purchasing power of money.

Example: The price of a streetwise 2 in 2018 was R29.99, and now, in 2022, it is R42.99, meaning with the same R29.99, you cannot afford to buy KFC in 2022.



It increases the value of an item over time.

Example: A portion of land that costs R60 000 in 2020 is R87 000 in 2022.

NB: It is compounded depending on the inflation rate of those particular years.

FORMULA

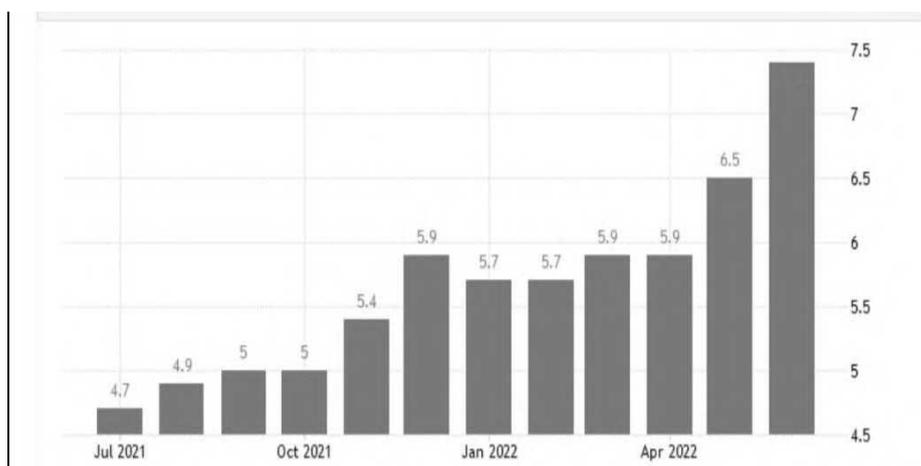
$$\begin{aligned} \text{Price increase/decrease} &= \text{New price} - \text{Old price} \\ \% \text{ increase/decrease} &= \frac{\text{New Price} - \text{Old Price}}{\text{Old Price}} \times 100 \end{aligned}$$

Activity 1

1.1 Statistics South Africa has published its latest Consumer Price Index (CPI), showing that the annual consumer price index has broken through the upper limit of the Reserve Bank target range for the second consecutive month.

Inflation was recorded at 7.4% in June 2022, up from 6.5% in May 2022. The June rate is the highest reading since May 2009(8%), when the economy faced the headwind of currency depreciation during global financial crises.

Below: The Graph below indicates South African inflation data over the last 1 year.



Source: trading economics com| SA STATS

- 1.1.1 Define the term inflation. (2)
- 1.1.2 Name the consecutive month(s) in which there was no change in the CPI. (2)
- 1.1.3 In which month was the CPI 6.5%? (2)
- 1.1.4 Determine the difference between the CPI in April 2022 and May 2022. (3)

- 1.1.5 Calculate the amount of money a trolley of goods that costs R1500 in April 2022 would cost in May 2022. (3)
- 1.2 Vusi is an investor in real estate who owns three houses in Margate (KwaZulu-Natal) that he purchased in March 2022 at a total value of ZAR18 365 000. He states that his total investment amount has increased its value by 10% in April 2022.
- 1.2.1 Verify using calculation that his statement is correct. (4)
- 1.2.2 The value of the first house is one-third of the total value of the house. Calculate the cost of the first house. (2)
- 1.2.3 Calculate the total value of the houses in dollars if the new exchange rate is \$1=ZAR16.46. Round your answer to the nearest dollars. (3)
- 1.2.4 Give the abbreviated word for ZAR. (2)
- 1.3 Determine the third highest CPI in the given graph. (2)
- TOTAL= 25

Exchange Rates

Activity 1

- 1.1 The table below shows the current exchange rates between South Africa and other countries.

Currency	1R is worth	1unit in Rand
US Dollar	0.060773	16.4546633
Euro	0.059433	16.825694
British Pound	0.049792	20.083437
Indian Rupee	4.827048	0.207166
Aus dollar	0.086672	11.537716
Japanese Yen	8.080764	12.850497

Source:// X-rates.com

Use the information above to answer the questions below

- 1.1.1 Define the term exchange rate. (2)
- 1.1.2 Write the symbols for the following currencies
 (a) Dollar
 (b) Euro
 (c) Yen
 (d) Pound (4)
- 1.1.3 Which currency(s) is weaker than the Rand? (2)
- 1.1.4 What country uses Euro as its currency? (2)
- 1.1.5 Determine how the value of 0.060773 dollars was calculated. (2)
- 1.1.6 Convert R15 000 to British Pounds. (2)
- 1.2 Mr Motume owns a mini cafe where he sells muffins(R18.99), sandwiches(R22.99) and coffee(R30) to his clients. Due to the increase in inflation, he had to increase the price of the sandwich to R28.99.
- 1.2.1 Determine the increased amount of the sandwich. (2)
- 1.2.2 Calculate the percentage increase of the sandwich. (3)
- 1.2.3 Determine the current exchange rate of the Rand to the US dollar in the following format: R1 :US dollar. (2)
- 1.3 Describe what happens to the cost of goods when the exchange rate strengthens against the

1.4 Determine the ratio of Indian Rupees to Japanese Yen.

(2)

(2)

TOTAL= [25]

Data Handling

Developing Questions and Collecting Data

DEVELOPING QUESTIONS AND COLLECTING DATA

When evaluating questions, ensure you look if they are:

- * Clear and simple
- * Relevant to the research problem
- * Easy to organise to enable analysis

The defined group related to the data and from which the data is collected is called the population.

When the group (population) is too big, you need to take a sample of the population.

- * For a sample to be representative of the population, everyone must have an equal chance to be chosen; otherwise, the sample will be biased.
- * Biased samples can be taken in the following ways:
 - Convenience sampling: Choose respondents that are easy to include
 - Self-selection sampling: Choose respondents that are willing to participate.
 - Quota sampling: Choose respondents according to prescribed categories.

Data can be collected using the following ways:

- * Questionnaires: set questions with answers that could be
 - * Open-ended questions: not confined to set answers and can give your own thoughts.
Advantage: collect insightful data
Disadvantage: can get biased answers
 - * Close questions: limits the respondents' answers and examples.
 - Yes/no
 - Multiple – choice
 - Scaled – numbers 1 – 2 – 3 etc
 Advantage: Easy to analyse
 - * Focused, straightforward questions are easy to analyse.
 - * Questions should not give unnecessary information or be misleading.
 - * Unsuitable questions can be misleading or unnecessary and might cause bias. Incorrect or false information being connected
- * Interviews: Personal and used when you want to establish what people think.
Advantage: not restricted to short answers.
- * Observation: Researchers study people in their natural settings

To evaluate the questionnaire, observations and interviews, consider the following.

Method	QUESTIONNAIRE	OBSERVATION	INTERVIEW
Advantage	<ul style="list-style-type: none"> • Can complete in own time • Can complete in Privacy 	<ul style="list-style-type: none"> • Affordable • Quick • Can sort data easily while recording 	<ul style="list-style-type: none"> • Can explain questions • Response rate likely to be high • Can note responses in a consistent fashion
Disadvantage	<ul style="list-style-type: none"> • Tedious • Expensive • Respondents can misinterpret questions. • Possible low response rate 	<ul style="list-style-type: none"> • Can easily record data incorrectly • Time of day has an influence on the sample, therefore on the data collected 	<ul style="list-style-type: none"> • Interview expensive • Interviewer can misinterpret questions • Interviewer can give misleading guidance • Time-consuming

Classify

After data is collected, it must be organised or classified to enable us to make comparisons and to choose the best way to summarise and represent it

Data can be categorised as

Numerical (quantitative) - numbers

Categorical (qualitative) – Types (letters that makeup words)

Numerical data

Discrete – quantities that can be counted or have distinct values

Continuous – quantities that are measured

ORGANISE DATA

- * Tallies are made when data is organised in tables by making a small diagonal line / and organising them in bundles of 5 //// and can be counted and written as a number in the frequency table according to groups (interval - where there is a high range of number for outcomes and only single responses to those)

Activity 1

Stats SA calls on all households to ensure that they get counted in the 2022 Census, either online or by fieldworkers, over a certain period. “The country’s socio-economic dynamics have changed a lot since the last census was conducted in 2011. Government and business need accurate information to plan, and the census is the only source of population and housing data at a local level.”

ANSWER SHEET 1 shows a snapshot from the online Census form.

<https://www.statssa.gov.za/?p=15349>

Study the information and Answer Sheet and complete the following questions.

- 1.1 Classify the method used to collect the data in this context. (2)
- 1.2 Define the term *population* in the given context. (3)

- 1.3 Name a possible reason for conducting a census. (2)
- 1.4 Mr C. Chu, previously a Chinese Citizen, wants to complete the Census online. He rents an apartment in Durban. His identification number is 6408210398075 and is married. His wife does not live with him. He usually speaks his home language (Mandarin) but is also fluent in English. Use the information to complete the snapshot on ANSWER SHEET 1. (6)
- 1.5 Evaluate the information shared about Mr Chu in question 1.4 and formulate two possible questions that can be included to capture information related to him. (4)
- 1.6 Critically evaluate the following question with possible responses and provide a comment. Provide a possible solution if necessary.
- Question
Please indicate your child's age in years (if less than a year, record as 1 year) and tick the appropriate box.
- 1 – 5 5 – 10 11 – 20 21 or above (3)
- 1.7 Argue if it will be advisable to identify a sample of the population and conduct the Census only with the sample. (3)
- 1.8 What is the probability that someone completing the online Census will opt for the " IsiZulu " option? (2)

ANSWER SHEET 1

SECTION A: DEMOGRAPHICS – ASK OF EVERYONE LISTED ON THE FLAP																	
P-01 DATE OF BIRTH	P-02 RELATIONSHIP	P-03 MARITAL STATUS	P-04 SPOUSE OR PARTNER	P-05 POPULATION GROUP	P-06 LANGUAGE												
What is (name's) date of birth?	What is (name's) relationship to the head or acting head of the household? The head or acting head is the person listed in row 1 of the first questionnaire, if more than one questionnaire has been completed for this household. 01 = Head/Acting Head 02 = Husband/Wife/Partner 03 = Son/Daughter 04 = Adopted child 05 = Stepchild 06 = Brother/Sister 07 = Parent 08 = Parent-in-law 09 = Grandchild 10 = Son/Daughter-in-law 11 = Brother/Sister-in-law 12 = Grandmother/Father 13 = Other relative 14 = Non-related person	What is (name's) PRESENT marital status? 1 = Married 2 = Living together like married partners 3 = Never Married 4 = Widow/er 5 = Separated 6 = Divorced <i>Write the appropriate code in the box.</i> If 3 – 6, Go To P-05	Who in this household is (name's) spouse or partner? <i>Write the person number of the spouse or partner in the appropriate boxes. If the spouse or partner does not reside in the household, wrote 98.</i> Note: Refer to the person on the flap e.g 02	How would (name) describe him/herself in terms of population group? 1 = Black African 2 = Coloured 3 = Indian or Asian 4 = White 5 = Other <i>Write the appropriate code in the box.</i>	Which two languages does (name) speak most often in this household? 01 = Afrikaans 02 = English 03 = IsNdebele 04 = IsiXhosa 05 = IsiZulu 06 = Sepedi 07 = Sesotho 08 = Setswana 09 = Sign Lang 10 = SiSwati 11 = Tshivenda 12 = Xitsonga 13 = Other <i>Write the appropriate code in the boxes. If no other language, wrote 00 in the second box</i>												
EXAMPLE 19 July 1978 <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>1</td><td>9</td></tr><tr><td>0</td><td>7</td></tr><tr><td>1</td><td>9</td><td>7</td><td>8</td></tr></table>	1	9	0	7	1	9	7	8									
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D	D																
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Data was collected from a question:

“How much peer pressure do you experience at school?” with responses as indicated:

Age	Male/Female	None	A little	A lot	An unbearable amount
13	M	X			
14	M		X		
15	F			X	
16	M				X
17	M		X		
18	F	X			X
14	M			X	
13	F			X	
14	F				X
17	F				X
16	F		X		
14	M			X	
13	M			X	
15	M	X			
16	M	X			
14	F		X		
13	F			X	
14	M		X		
16	M			X	
16	F				X

<https://www.kaggle.com/datasets/devansodariya/student-performance-data>

2.1. Sort the above data in the following table:

	MALE			FEMALE		
	13 – 14	15 – 16	17 – 18	13 – 14	15 – 16	17 – 18
None						
A little						
A lot						
An unbearable amount						

- 2.2 Arrange the ages of the respondents in descending order. (2)
- 2.3 Evaluate whether numerical data are quantitative or qualitative data. (2)
- 2.4 Determine the sample size. (2)
- 2.5 Write down the ratio between males and females that completed the survey. (4)
- 3.6 Identify whether boys and girls experience, according to this survey, “a lot or an unbearable amount of peer pressure” equally or differently. Substantiate your answer using the information in the table. (5)
- 3.7 James commented that “the data is grouped” in the table in question 2.1. Explain why he could make this comment. (2)
- 3.8 Evaluate the responses “None, A little, A lot, an unbearable amount” offered to the question “How much peer pressure do you experience at school? ”. (2)

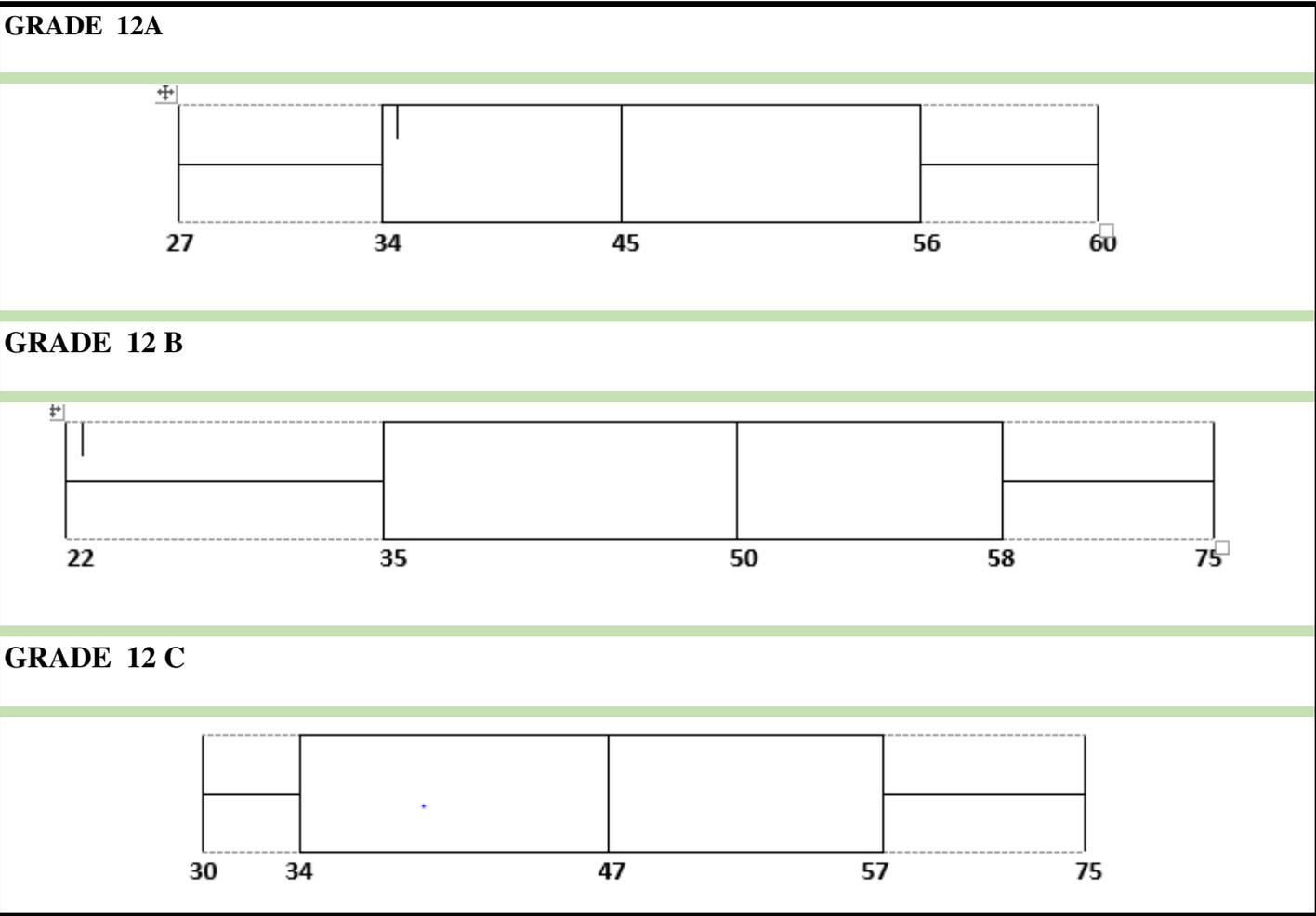
Activity 3

3.1. During the election, the voting percentage in different voting districts in the KZN were as follows:

88	58	74	65	50	44	71
35	46	25	77	28	36	79
41	65	38	65	67	58	52
68	49	65	84	73	76	85

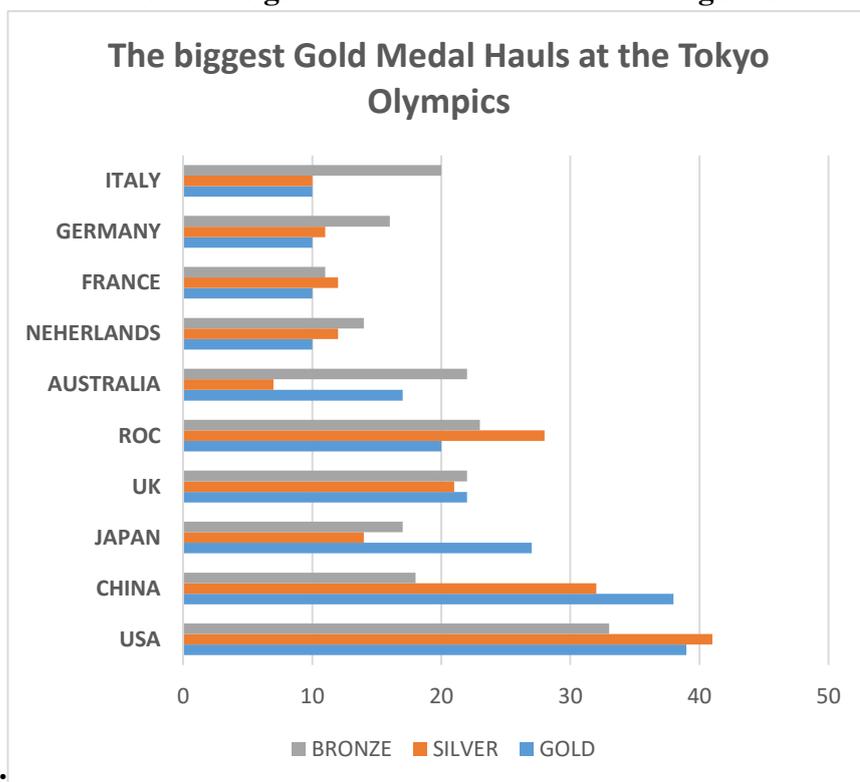
- 3.1.1. Define the term mode in the given context. (2)
 - 3.1.2. Determine percentage occurs most frequent? (2)
 - 3.1.3. How many of these voting districts received a voting percentage less than 65%? (2)
 - 3.1.4. Calculate the range of the given data. (2)
 - 3.1.5. How many voting districts are there in this sample? (2)
 - 3.1.6. Calculate the mean of the set of data. Give your answer correct to the whole percent. (3)
 - 3.1.7. Determine the median of the voting percentage. (2)
 - 3.2. Mr Nyawo is a Mathematical Literacy teacher at Mandisa high school. He represented June controlled exams results of each classes he is teaching on a box and whisker plot as shown in the ANNEXURE A. Use the annexure to answer the question that follows:
 - 3.2.1. Determine the Q2 for grade 12A. (2)
 - 3.2.2. State the grade that has a top learner. Give the reason for your answer. (3)
 - 3.2.3. Using the above spread of marks as shown in the box and whisker plot, comment on grade 12C's overall performance. (2)
 - 3.2.4. Identify with explanation which grade 12 class performed the best. (3)
 - 3.2.5. Calculate the inter-quartile range (IQR) for 12B. (2)
- TOTAL [27]

ANNEXURE A



4.1. The Olympics are held every 4 years. The last Olympics games were held in Tokyo in 2021. Athletes receive medals.

The number of medals certain countries gets the winner in different categories is shown in the



graph below:

Source: Olympics.com

- 4.1.1 Determine the minimum and the maximum number of bronze medals. (2)
- 4.1.2 Calculate the mean of gold medals. (3)
- 4.1.3 Determine the range of the given silver medals. (2)
- 4.1.4 Determine the median of given bronze medals. (3)
- 4.1.5 State the modal of gold medals. (2)
- 4.2 Mrs Nyawo was given a growth chart after the birth of their son. She can use it whenever she goes to a clinic or hospital to check the child's physical development. Use ANNEXURE A to answer the following questions.
- 4.2.1 Determine the weight at birth. (2)
- 4.2.2 Determine the length at 3 years old. (2)
- 4.2.3 Determine the following percentile and explain what each percentile mean: (2)
 - (a) A 33-month old boy who weighs 15kg. (2)
 - (b) A 2-year-old boy with a length of 92cm. (3)
- 4.2.4 Calculate the inter-quartile range for a weight of a 20-month-old boy. (3)

TOTAL 25

Summarising and Representing Data

It is the third stage of the statistical process. Done after data has been classified and organised.

We use measures of central tendency and measures of spread to summarise the data.

When performing calculations using measures of central tendency, learners must be able to find values that may be missing in the given data without a given formula.

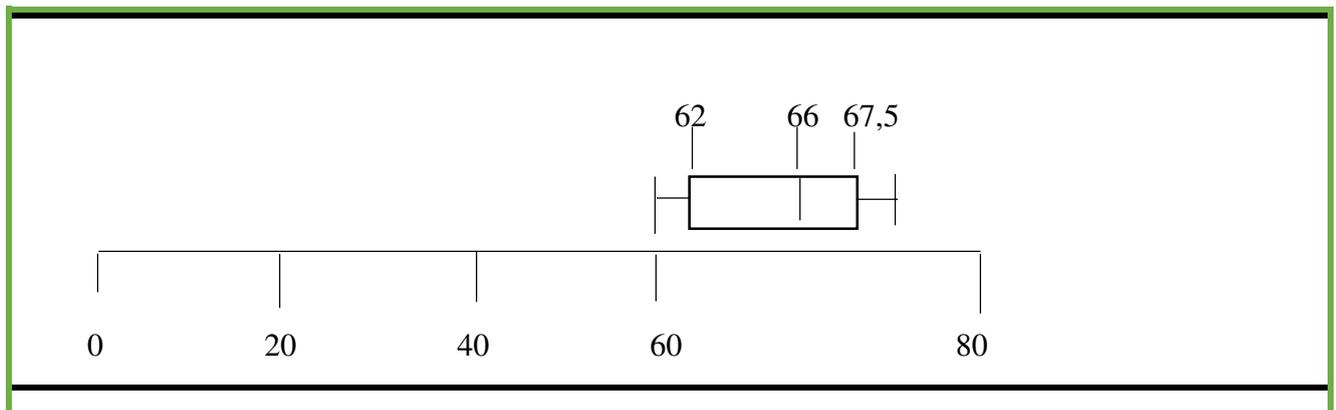
Activity 1

1. The grade 12A and 12B classes were given a Mathematical Literacy test out of 100 marks last week.

The results are shown below :

<u>12A</u>	57	41	51	55	50	42	54	50	56	23
<u>12B</u>	A	69	67	66	65	66	68	61	60	

- 1.1 Calculate the following:
- 1.1.1 The Mean mark for 12 A (3)
- 1.1.2 The mean for 12B is **65**. Calculate the missing value A (5)
- 1.1.3 The Median for 12 A and 12 B (6)
- 1.1.4 Mode for 12 B (2)
- 1.2 Determine Quartile 3 for 12A above (2)
- 1.3 The interquartile range for 12 A is 13; calculate Quartile 1 (5)
- 1.4 Study the box and whisker diagram of 12 B below and answer the questions that follow



- 1.4.1 Identify Q1, Q2 and Q3 (3)
- 1.4.2 Which class performed the best 12A or 12B based on the range? State a reason for your answer. (3)

Activity 2

Mr Sam has recorded the gender, age and height of ten learners in his class, in the table below

2.

<u>Name</u>	<u>Gender</u>	<u>Age</u>	<u>Height (metres)</u>
1. Sibonelo	M	A	1.6
2. Jabulile	F	15	1.5
3. Siyanda	M	13	1.4
4. Indran	M	17	1.5
5. Pamela	F	18	1.7
6. Yolanda	F	17	1.7
7. Julius	M	16	1.5
8. Nompumelelo	F	14	1.6
9. Nobuhle	F	15	1.4
10. Lindile	M	15	1.5

- 2.1 Name the youngest learner of the class? (2)
- 2.2 Identify the data in the table that is categorical? Explain. (3)
- 2.3 Is the data about heights of learners discrete or continuous? Explain. (3)
- 2.4 Give the sample size of the data? (2)
- 2.5 Determine the modal height of the learners in this class? (2)
- 2.6 Determine Sibonelo's age, the oldest learner in the class. The range of the ages is 6. (3)
- 2.7 Determine the mean age of learners in the class. (3)
- 2.8 Arrange the ages in descending order. (2)
- 2.9 Calculate the median for the heights of the learners. (2)
- 2.10 Mr Sam says that 75% of his learners are not more than 17 years old. Verify whether his statement is valid. (3)

[25]

Conversions and Time

QUESTION 1

MARKS

1.

Netball is a popular sport in South African schools. It is a team sport of 7 players a side, played by two teams on the court. The objective is to drive the ball to the hoops and score goals. The ball is passed from the centre circle and thrown to team players until it can be passed through the hoop.

Hillgrove Secondary School learners enjoy the game of netball. In April the school hosted a netball match between two schools, Hillgrove Secondary and Welabasha High School, from Empangeni.

A NETBALL COURT



- 1.1 Convert the radius of the semi-circle on the netball court to centimetres. (2)
- 1.2 The diameter of the centre circle is 900 mm. Convert the diameter to metres. (2)
- 1.3. The starting time for each match was displayed on an electronic board.
- 1.3.1 State the time of the last match displayed on the clock face below. Give your answer as a digital, 24 – hour time format. (2)



- 1.3.2 Each match was played for 40 minutes. The match paused at halftime for a ten-minute break. Calculate the time that the last match ended if the teams did not go into overtime play. (3)
- 1.4 Determine the perimeter of the semi-circle shown in the diagram of the netball court dimensions in Annexure A. Give your answer in metres. (3)
You may use the formula: $C = 2 \times \pi \times r$

- 1.5 A netball court is divided into three equal parts along the length. Show by calculation that the length of each third of the court is 10,167m. (2)
- 1.6 During practice sessions, a typical warm-up session for the players consisted of players running 5 laps around the netball court (in the obstacle-free run zone). This was followed by a sprint up and down the length of the court once. Determine the minimum distance that each player ran during this warm-up routine. Convert your answer to kilometres. (4)
- 1.7 On the day of the tournament, the visiting team, Welabasha Secondary, arrived at Hillgrove Secondary school promptly at 7:00. They travelled a distance of 220 km. Their school bus travelled at an average speed of 80km per hour without any rest stops along the way. The netball coach at Hillgrove Secondary claimed that the visiting team must have left their school by the latest time, being 5:00, to be able to arrive at 7:00. Use calculations to verify that the claim by the Hillgrove Secondary School coach was valid. (5)
- You may use the formula: $Speed = \frac{Distance}{Time}$

TOTAL [23]

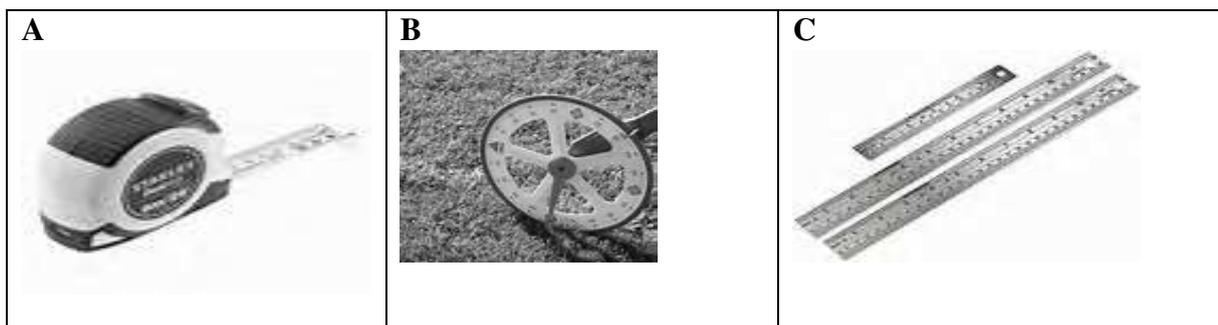
LENGTH, DISTANCE AND TIME

CONCEPTS/ SKILLS/KNO WLEDGE	<ol style="list-style-type: none"> 1. Complete ALL conversions, when necessary, before substituting into the formula for each question. 2. You must ensure that when you work with time, you bring the units to the correct decimal values and vice versa. 3. Use the given formulae to work out your answer. 4. Round off your answers to the given context in the question or stated otherwise. Rounding must only be done in the final step of your answer. 5. Make use of the calculator where necessary.
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ACTIVITY ONE:

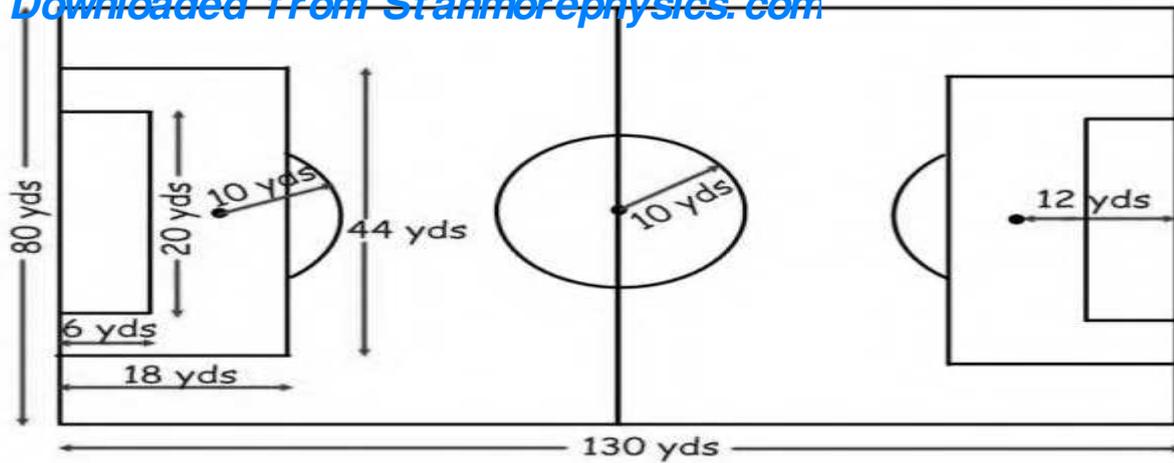
Marks

- 1.1.1. Three measuring instruments are pictured below. Choose the most appropriate instrument that can be used to measure the length and breadth of your school soccer field. Write down only your answer.



(2)

- 1.1.2 Give the appropriate unit of length that can be used to measure the school soccer field (2)
- 1.2 The following diagram is the soccer field that your school wants to mark for the soccer fixtures they are planning to have for the pupils of the school. Study the diagram and answer the questions that follow. **Note: 1yard = 0,9144m**



- 1.2.1. Define the term **perimeter** in context. (2)
- 1.2.2. Convert the length of the soccer field to metres. (2)
- 1.2.3. Calculate the circumference of the centre circle in metres.
You may use the following formula: $C = 2\pi r$ and where $\pi = 3,142$ (3)
- 1.2.4. One bag of lime covers 200m to mark the field. The sports master said that 2 bags of lime would be sufficient to outline the perimeter of the soccer field. Verify if this statement is correct.
You may use the following formula: $P = 2(L + B)$ (4)

1.3. Loyiso participates every year in the Oakland Marathon in San Francisco. He takes a flight from his hometown to San Francisco and travels a distance of 5 222,086 miles. The table below gives Loyiso an idea of the conversion between metric and imperial units of length.

MILES	YARDS	KILOMETRES	METRES
1	1 760	1,609	1609
0,6215	1 093,84	1	1000
	1		0,9144

- 1.3.1. (2)
 - 1.3.2. Convert 1000 metres to miles. (3)
 - 1.3.3. What is total distance Loyiso travelled in kilometres to participate in the race? Round off your answer to the nearest 100. (5)
- Loyiso sees the flag of San Francisco draped at the finish line. He was told that the flag is 5,5yards in length and 2,5 yards in width. Calculate the perimeter of the flag in metres, rounded off to ONE decimal place. [25]

1.1. Below is a tide chart for the Provincetown and Wellfleet harbour in the USA. Study the tide chart and answer the questions that follow.

TIDE CHART

Provincetown and Wellfleet Harbors

Thursday, Feb. 6–Wednesday, Feb. 12, 2020

		High tide				Low tide				The Sun	
		A.M.	ft.	P.M.	ft.	A.M.	ft.	P.M.	ft.	Rise	Set
Thu	P'town	8:28	9.8	9:08	8.6	2:11	1.1	2:54	0.0	6:46	5:02
	Wellfleet	8:40	10.5	9:21	9.2	2:41	1.2	3:24	0.0	6:50	5:05
Fri	P'town	9:21	10.3	10:00	9.1	3:03	0.6	3:45	-0.6	6:45	5:03
	Wellfleet	9:32	11.1	10:12	9.7	3:34	0.7	4:15	-0.6	6:49	5:06
Sat	P'town	10:12	10.8	10:50	9.6	3:55	0.1	4:35	-1.1	6:44	5:05
	Wellfleet	10:22	11.7	11:01	10.3	4:25	0.1	5:04	-1.2	6:48	5:08
Sun	P'town	11:04	11.2	11:39	10.1	4:47	-0.4	5:24	-1.5	6:43	5:06
	Wellfleet	11:12	12.1	11:48	10.8	5:15	-0.4	5:52	-1.7	6:47	5:09
Mon	P'town	11:54	11.4	—	—	5:38	-0.9	6:12	-1.7	6:42	5:07
	Wellfleet	—	—	12:02	12.4	6:05	-0.9	6:39	-1.9	6:46	5:10
Tue	P'town	12:28	10.5	12:45	11.4	6:29	-1.1	7:00	-1.8	6:40	5:09
	Wellfleet	12:36	11.2	12:52	12.4	6:55	-1.2	7:27	-1.9	6:44	5:12
Wed	P'town	1:17	10.7	1:37	11.2	7:21	-1.2	7:50	-1.6	6:39	5:10
	Wellfleet	1:24	11.5	1:43	12.1	7:47	-1.3	8:16	-1.7	6:43	5:13

Full Moon Sunday; moonrise at 5:37 p.m.

Source: USHarbors.com

- 1.1.1. Write down the date in full for Saturday for the tide table above. (2)
 - 1.1.2. Give the day and time for the full moon and moonrise for this tide table. (2)
 - 1.1.3. What is the duration between the morning (A.M) high tide and the morning (A.M) low tide for Monday at Provincetown harbour? (3)
 - 1.1.4. Convert the sun rise for Provincetown on Friday to hours. (2)
 - 1.1.5. A fisherman was convinced that the difference between the morning high tide and morning low tide in Wellfleet, on 6th February 2020 is exactly 6 hours. Verify if this statement is true. (4)
 - 1.1.6. Convert the second-high tide for Friday to the nearest metre for the Wellfleet harbour. (3)
- Note: 1 ft = 0,3048m**

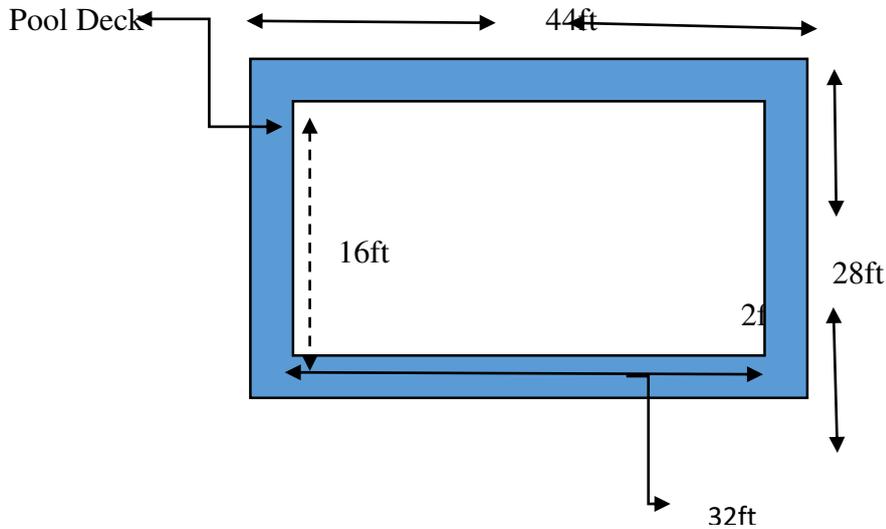
- 2.1. A train time-table is displayed below for passengers travelling from Johannesburg and Durban via the different towns.
Study the time-table and answer the questions that follow.

Trans-Natal					
Johannesburg - Ladysmith – Durban					
Frequency: Wednesday, Friday, Sunday					
Durban - Ladysmith - Johannesburg					
Frequency: Wednesday, Friday, Sunday					
STATIONS		TRAIN 76009	STATIONS		TRAIN 67010
JOHANNESBURG	D	17:30	DURBAN	D	19:15
GERMISTON	A	18:23	PIETERMARITZBURG	A	21:44
	D	18:43		D	22:04
STANDERTON	A	21:42	ESCOURT	A	00:38
	D	22:07		D	00:48
NEWCASTLE	A	00:58	LADYSMITH	A	03:14
	D	01:23		D	03:34
LADYSMITH	A	03:41	NEWCASTLE	A	05:56
	D	04:06		D	06:16
ESCOURT	A	05:17	STANDERTON	A	08:47
	D	05:37		D	09:07
PIETERMARITZBURG	A	08:21	GERMISTON	A	11:38
	D	08:51		D	11:58
DURBAN	A	11:59	JOHANNESBURG	A	12:36

www.shosholoza-meyl.travelsa

- 2.1.1. Identify the train number that goes from Durban to Johannesburg. (2)
- 2.1.2. Write the departure time in analogue format for the train departing from Johannesburg. (2)
- 2.1.3. The distance from Pietermaritzburg to Durban is 78km. Use the time from the table above to calculate the speed(km/hr) at which the train travelled to reach its destination. Round off your answer to the nearest kilometre.
You may use the following formulae: $\text{Speed} = \frac{\text{Distance}}{\text{Time}}$ (5)
- [25]

3.1 The swimming pool shown below has a concrete deck with a uniform width around it. The inner length is 32ft and a width of 16ft. The outer dimensions are $L = 44\text{ft}$ and $W = 28\text{ft}$.



**Note: $1\text{m} = 3.280839895\text{ft}$
 $1\text{m} = 100\text{ cm}$**

- 3.1 Determine the conversion equation in the form $1\text{ft} = \dots\dots$ (3)
- 3.2 Hence, use the equation in 3.1 to calculate:
- 3.2.1 Inner dimensions of the pool (in metres) deck to the nearest to the first decimal place. (3)
- 3.2.2 Outer dimensions of the pool deck to the nearest metre. (2)
- 3.3 Determine the uniform width of one side of the pool deck. (3)
- 3.4 Calculate the total area that is covered by the concrete deck. (6)
- 3.5 The volume of the pool is $960\,400\text{cm}^3$.
- 3.5.1 Express this volume in cubic metres. (3)
- 3.5.2 Hence, calculate the water height in m. (4)

/24/

Surface Area, Mass, Volume and BMI

General Tips to answer the question

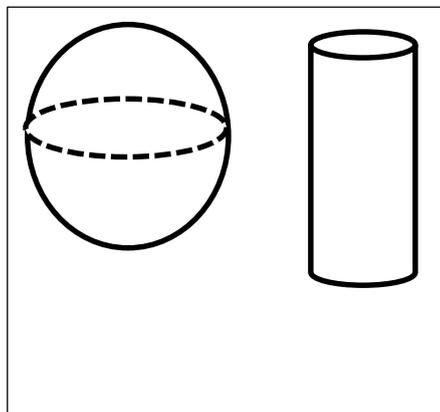
- Be able to choose the correct relevant formula from the pool of formulae based on the shape dealt with
- Do conversions where necessary before substitution
- Mind the units of measurement on your answers
- Remember that height, depth and thickness mean the same thing
- For cylindrical containers make sure you determine the radius before substituting into the formula since most formulae require the radius.
- Substitute into the formula as required
- Units of measurement must be the same before substitution into formulae

Pick n pay supermarkets clean and recycle water using spherical and cylindrical aqua cleaning containers like the one shown below. The water is fed into the spherical container which is then stored into the cylindrical storage silver container. Both the containers are of the same volume. The water is then sold to the customers using 500mℓ; 1,5ℓ; 2ℓ; and 5ℓ bottles.

Picture of the containers



Diagrams of the containers



Volume of sphere = $\frac{4}{3}\pi r^3$

radius of the sphere = 70,2cm

Surface Area of Sphere = $4\pi r^2$

$\pi = 3,142$

Surface area of cylinder = $2\pi r(r+h)$

volume of cylinder = $\pi r^2 h$

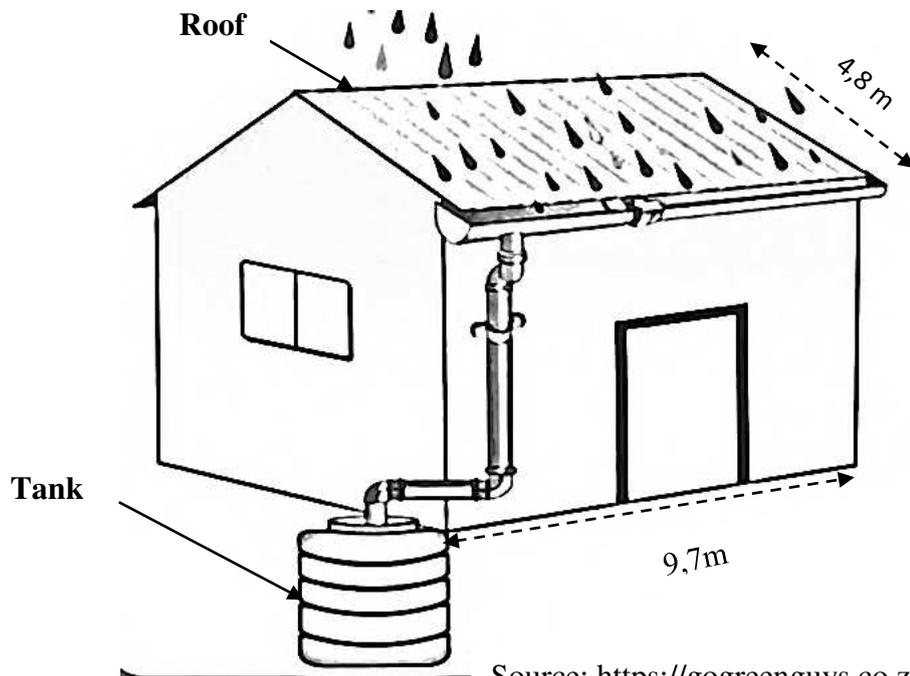
Height of cylindrical container = 120 cm

Use the information above to answer the questions that follow.

- 1.1 Determine the diameter of the spherical water container. (2)
- 1.2 Calculate the volume of the spherical water container to the nearest 10 litres.
Hint: 1 litre = 1000cm³ (5)
- 1.3 Convert 500 mℓ into litres (2)
- 1.4 Determine the number of half-litre (500m ℓ) bottles that can be filled from the spherical water container if it is in full capacity. (2)
- 1.5 Calculate the surface area (in m²) of the spherical water container. (4)
- 1.6 If the two tanks have the same volume, determine the radius (in cm) of the cylindrical water container. (5)
- 1.7 Mr Naidoo, the store manager of Pick n Pay Dundee, stated that the spherical water container used more material to make compared to the cylindrical water container. (5)
Verify, using calculations whether his statement is valid.

[26]

Mr Naidoo saves water by harvesting rain water from the roof of his house into a tank as shown below;



Source: <https://gogreenguys.co.za>

Area of rectangle = Length x Breadth

Volume of rectangular prism = Length x breadth x height

Volume of cylinder = $\pi r^2 h$

$\pi = 3,142$

$1\text{m}^3 = 1\,000$ litres

Source: <https://gogreenguys.co.za>

Use the information above to answer the questions that follow.

- 2.1 On a particular Wednesday after a rain shower, 12mm of rain fell on the roof of mr Naidoo's house. Convert 12 mm to metres. (2)
- 2.2 The tank receives the rain water from both sides of the gabled house roof. Calculate the area of both sides of the gabled roof. (3)
- 2.3 Use the answer calculated from 2.1.1 and 2.1.2 to calculate the volume (in litres) of rain water that fell on the house roof. (5)
- 2.4 The radius of the water tank next to the house is 65cm. Calculate the height (in metres) that the rain water will reach in the tank (5)

Mrs Naidoo has a 9-year-old daughter. When she visits the Doctor, she carries with her the daughter's growth chart as shown on ANNEXURE A. Below is the Body Mass Index classification table to determine the health status of patients.

Table 1: Health Status Classification table

Weight status	Percentile range position on the growth chart
Underweight	Less than the 5 th percentile
Healthy weight	$\geq 5^{\text{th}}$ percentile and $< 85^{\text{th}}$ percentile
At risk of overweight	$\geq 85^{\text{th}}$ percentile and $< 95^{\text{th}}$ percentile
Overweight	$\geq 95^{\text{th}}$ percentile

Use the information and annexure A to answer the questions that follow

- 2.5.1 Mrs Naidoo's daughter weighs 30kg and has a height of 125cm. Determine her body mass index (BMI) and use ANNEXURE A and TABLE 1 to classify her health status.

You may use the following formula;

$$\text{BMI} = \frac{\text{weight (in Kg)}}{(\text{Height in metres})^2} \quad (6)$$

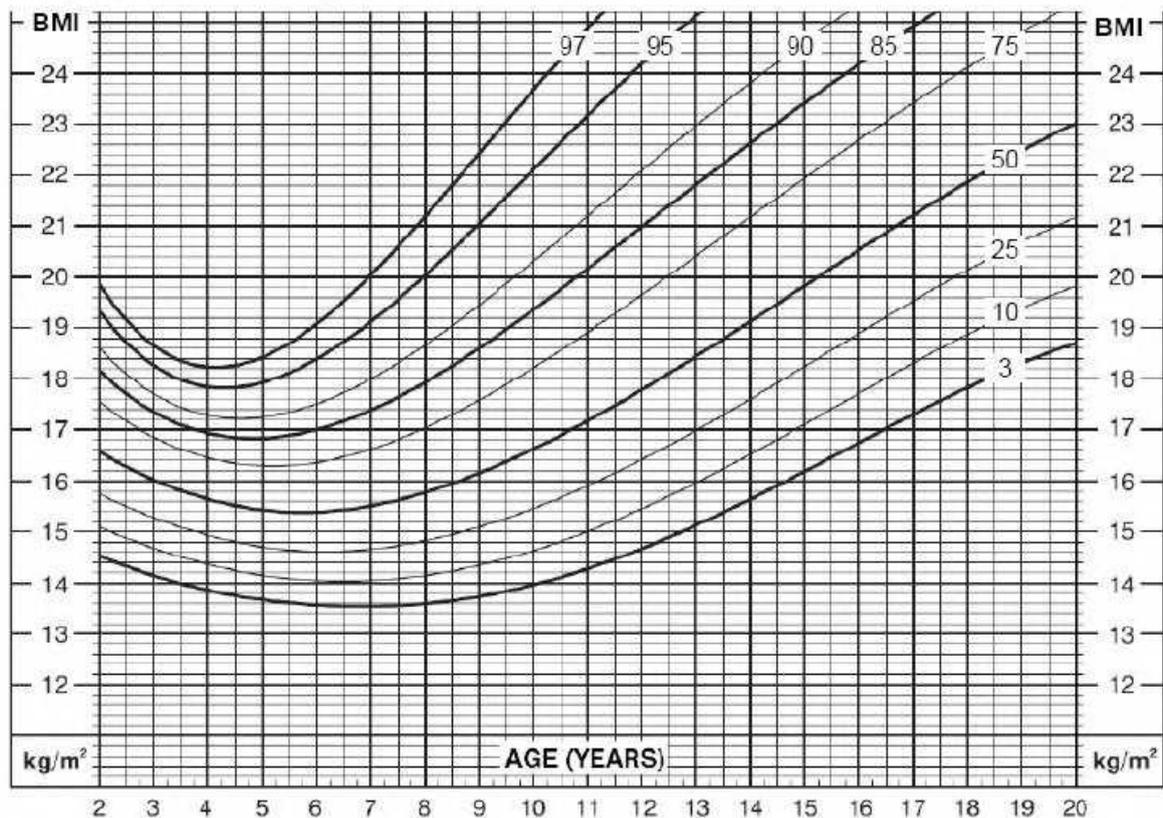
- 2.5.2 Name any two ways which Mrs Naidoo can do to help her daughter to maintain a healthy status. (4)

[25]

(BMI) is a number calculated from a person’s mass and height. BMI number is plotted on the CDC BMI-for-age growth charts (for either male or female) to obtain a percentile ranking. BMI-for-age weight status categories and the corresponding percentiles are shown in the following table.

Weight Status Category	Percentile Range
Underweight	Less than the 5th percentile
Healthy weight	5th percentile to less than the 85th percentile
At risk of overweight	85th percentile to less than the 95th percentile
Overweight	Equal to or greater than the 95th percentile

2 to 20 years: Boys
Body mass index-for-age percentiles



Use the information above to answer the questions that follow.

- 3.1.1 Write down BMI in full. (2)
- 3.1.2 State the range of ages accommodated in this growth chart? (2)
- 3.1.3 A boy is at risk of being overweight, between which percentile curves would he fall? (2)
- 3.1.4 Would this growth chart be used to determine the weight status category for girls? Give a reason for your answer. (3)

- 3.0.5 If Juanita is a 5-year-old boy with a BMI on the 75th percentile curve, explain what does this mean? (3)
- 3.1.6 Identify the percentile curve for an 8 year old boy with a BMI of $17\text{kg}/\text{m}^2$. (2)
- 3.1.7 Determine the BMI of a 5-year-old boy if his BMI places him on the 90th percentile? (2)
- 3.1.8 BMI is calculated using the formula $= \frac{\text{mass in (kg)}}{\text{height in (m}^2\text{)}}$
Calculate the following by using the above formula.
- (a) Determine the weight status of an 18-year-old boy who is 1,86m tall and weigh 80kg? (5)
- (b) How heavy would a 12-year-old boy be if he is 1,65m tall and his BMI is $21\text{ kg}/\text{m}^2$. (3)
- 3.2 Megan uses a recipe that requires a can of fine pineapple to make a pie. Below is a picture of the can.



The correct formula to calculate surface area of can is

- (a) $2\pi r^2 + 2\pi r h$
- (b) πr^2
- (c) $\pi r^2 \times h$
- (d) $2\pi r$ (2)
- [26]

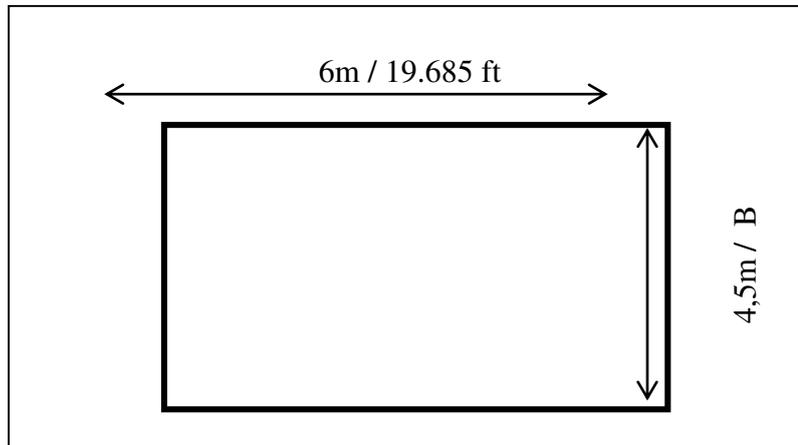
Activity 4

MARKS

Mary wants to renovate her dining room. The sketch of the renovated dining room is shown in Annexure A. The floor plan of Mary's renovated dining room is also shown in Annexure B. Annexure C shows the renovator's time schedule for the additional building.

Hint: Renovation means a process done to improve on a building such as extending it, changing it, improving the style, etc.

FLOOR PLAN OF MARY’S DINING ROOM – INNER DIMENSIONS

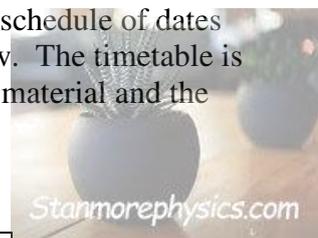


Conversion factor: 1 foot = 0,3048m

- 4.1 State the length of the floor shown in the plan in metres. (2)
- 4.2 Convert the width of the floor to metres. (3)
- 4.3 Write the width of the room (in metres), to the height of the room (in metres), as a ratio. (3)
- 4.4 Study the sketch of the dining room inner wall and the elevation plan shown in Annexure B. The windows have the same width and height.
- 4.4.1 The height of the window is two thirds the height of the wall. Determine the height of the window. (3)
- 4.4.2 Calculate the distance (A) between the edge of the window and the edge of the wall. (5)
- 4.5 The length of the room shown in the floor plan is the increased length. The original length was 4.5m. According to Mary, the old length was increased by more than 30%. Verify if Mary is correct. (4)
- 4.6 The renovator in charge of extending the dining room provided a schedule of dates showing the possible time frames for the renovation, shown below. The timetable is subject to change depending on the factors such as availability of material and the weather conditions. The renovators work 7 days a week.

RENOVATOR’S SCHEDULE OF WORK

DAY	PROCESS
1 - 3	Site preparation
4 - 10	Extending foundation
4 - 10	Framing. Building of walls
11 - 13	Flooring and painting
14 - 16	Plumbing and electrical work



- 4.6.1 How many days will the renovators take to prepare the site? (2)

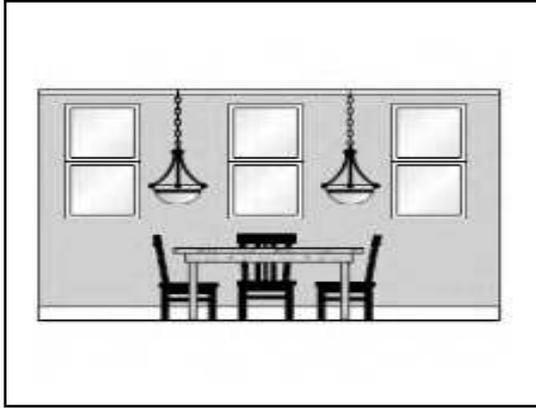
4.6.2 If the renovators start work on 1st August 2022, determine the date of completion of the project. State the day, month and year. (2)

4.6.3 On which days do the renovators plan to work on flooring and painting? (2)

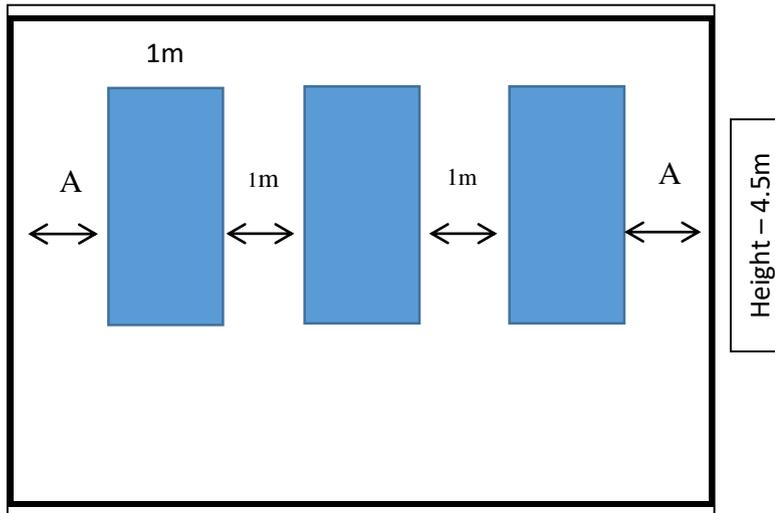
TOTAL [26]

ANNEXURE B

SKETCH OF MARY'S DINING ROOM - ELEVATION



ELEVATION PLANS OF DINING ROOM WALL



Note : The elevation plan is not drawn to scale.

Scales and Plans

ACTIVITY 1

<p>Concepts/Skills</p>	<ul style="list-style-type: none"> • Conversion (Metric units) • Time (Time Calculation, 12 & 24-hour format, Digital Time, Calendar) • Terminology (Scale, Maps & Plans) • Area • Scale (Types of scale, calculating actual distance using the scale) • Direction (Compass directions & detailed directions)
------------------------	--

- 1.1 Robert's father decided to pay for the couple's honeymoon and booked a trip on a cruise ship from Durban to the Portuguese Islands in Mozambique. The couple will fly from Johannesburg to Durban and board the cruise ship in Durban. They will spend five days and four nights on the ship. The cruise will depart on Tuesday, 14 December 2021 at 10:00AM.



NOTE: The front of the ship lies at the port facing north.

Use the given information above to answer the questions that follow.

- 1.1.1 The ship leaves Durban on Tuesday, write down the day and date that the ship will return to the Durban harbour. (2)
- 1.1.2 If the flight from Johannesburg arrives at 08:15 at King Shaka Airport in Durban, calculate the time, in hours and minutes, that Robert and Mary will have to travel to the Durban harbour. (3)

1.2

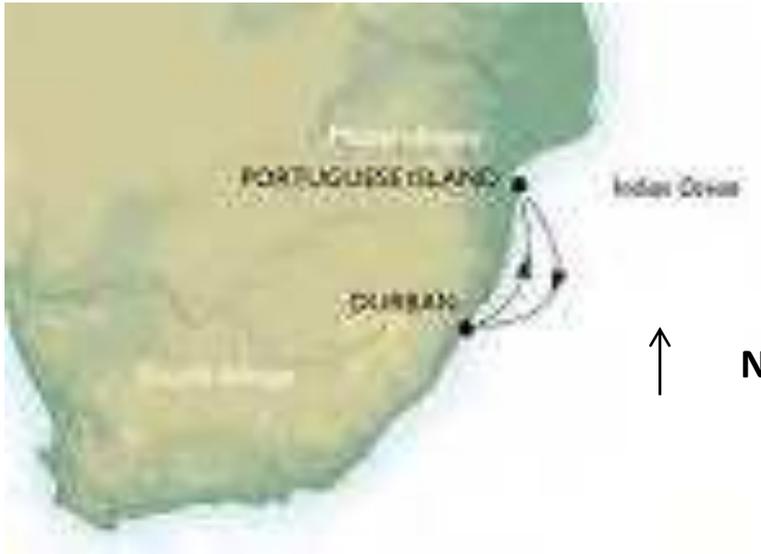
The floor plan below shows the MSC Yacht Club Owner's Suite. Study the floor plan and the given information below. Use the floor plan and the information to answer the following:

NOTE:

- Floor area 98 m², balcony 25 m²
- Large balcony with private whirlpool bath and outdoor living area
- Separate living area and dining room
- Panoramic glass wall

- Can accommodate up to a maximum of 5 people

- 1.2.1 Explain the meaning of the term floor plan in the given context. (2)
- 1.2.2 Calculate the total floor area of the Yacht Club Owners Suite including the balcony. (2)
- 1.2.3 Write down the maximum number of people that can be accommodated in the above suite. (2)
- 1.2.4 Explain the purpose of the panoramic glass wall. (2)



The map above indicates the route the ship will follow from the port of Durban to the Portuguese Islands in Mozambique, a distance of 2 150 km. On the return trip the ship sails in curve further into the sea and then covers a distance that measures 3,7 cm on the map. The scale on the map is 1:100 000.

Use the information above to answer the following:

- 1.3.1 Explain what the scale of 1:100 000 means. (2)
- 1.3.2 Calculate the actual distance in metres (m) the ship will sail on the return trip to Durban. (6)
- 1.3.3 Give a possible reason, why the ship had to sail a further 3,7 cm on the return trip. (2)

1.4 *Downloaded from Stanmorephysics.com*

The map below shows the route Robert and Mary will follow from Magaliesburg to the O.R. Tambo International Airport.



- 1.4.1 Give detailed directions of the route the couple will follow from Magaliesburg to the O.R. Tambo International Airport (3) [25]

SCALE

SCALE

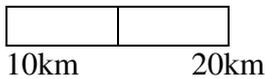
Refers to the relationship between distance on the map or diagram and distance on the ground

Related concepts:

- Paper/diagram/map/plan
- ground/actual/reality

Type of scales

BAR SCALE



NUMBER SCALE

1:200 000

ADVANTAGES

- quick and easy to use.
- it does not involve calculations to determine the actual scale.

DISADVANTAGES

- Bar scale may still require calculations
- measurements obtained using ruler bar scales are not always accurate.

ADVANTAGES

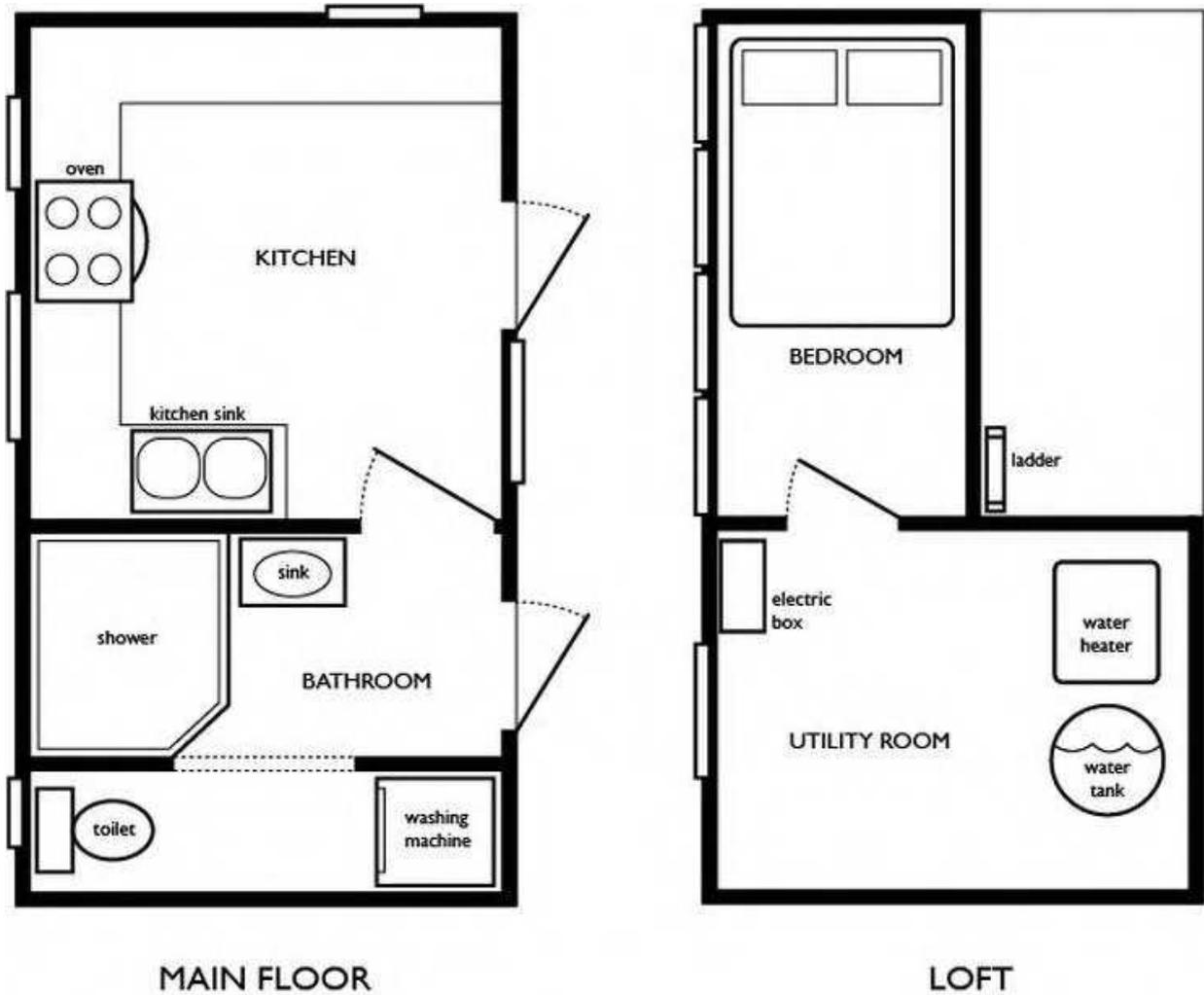
- Number scales are more accurate than bar scale
- number scales are more convenient to use when working with small scales

DISADVANTAGES

- Number scale requires calculations to in determining actual distance
- with digital printing, number scales become inaccurate and useless if there is resizing of the map

Activity 1

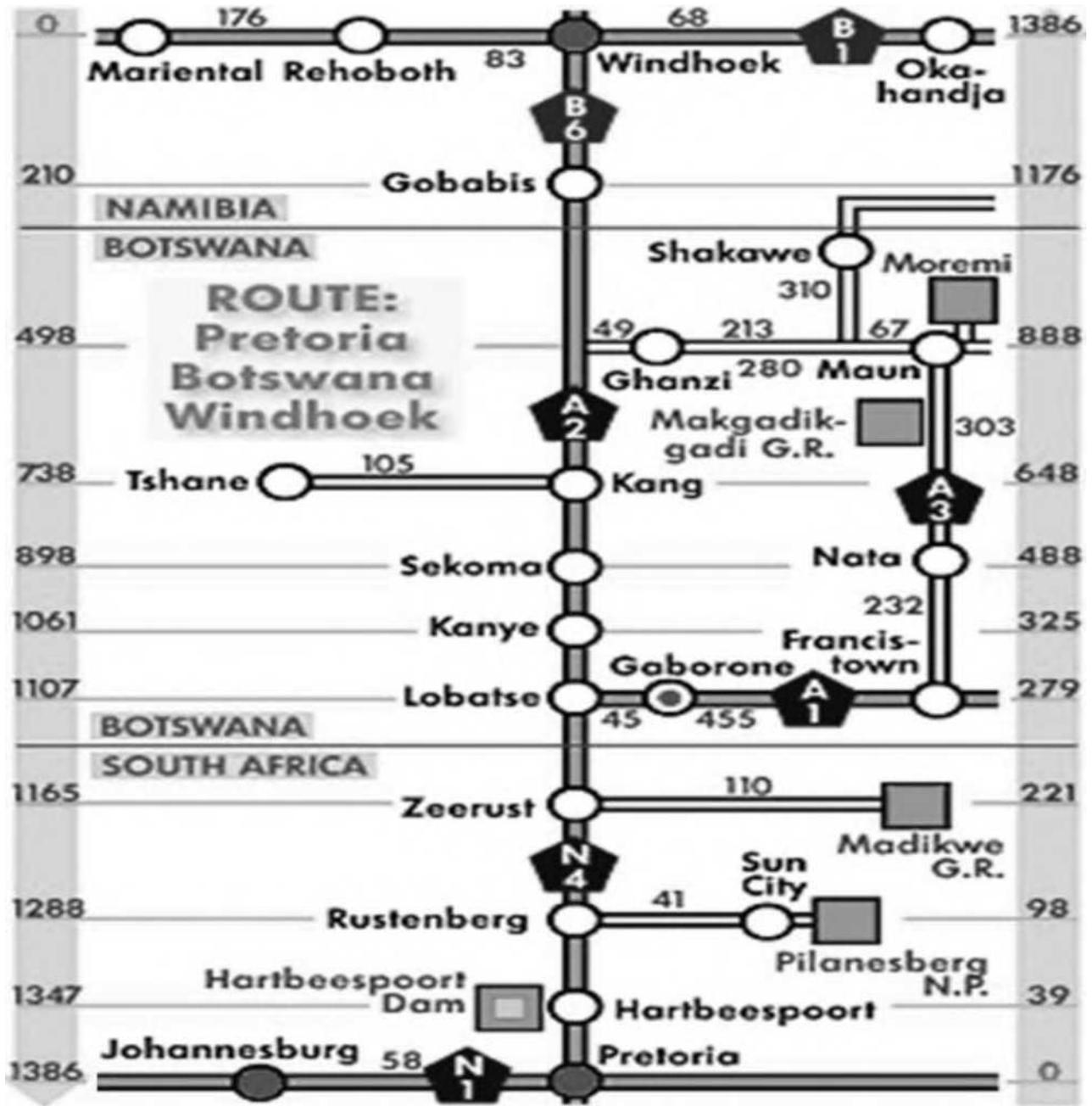
1.1 Study the floor plan of the house below and answer the questions that follow.



SCALE 1:200

- 1.1.1 Identify the scale of the floor plan. (2)
- 1.1.2 Explain the meaning of the scale given (2)
- 1.1.3 Determine the ratio of the outside doors to the inside doors of the plan in simplified form (2)
- 1.1.4 Justify why the kitchen has more windows than other rooms (4)
- 1.1.5 Use the given scale to determine the actual length and breadth of the utility room. (4)

1.2 Study the map below and answer following questions



- 1.2.1 Identify the type of the map above (2)
- 1.2.2 Calculate the distance between Rustenberg and Zeerust, then determine the scale used to draw the strip chart (5)
- 1.2.3 Determine the total distance from Johannesburg to Windhoek (4)
- TOTAL= [25]

Activity 2

The University of Limpopo students are undertaking a trip from Polokwane to Middelburg for in-service training. They have hired a bus from Mayi's Luxury Bus Company. Professor Du Toit and Dr Nkomo are academic organizers for this in-service training. Study the map below and answer the following questions.



- 2.1.1 Determine the national roads found on this map (3)
- 2.1.2 Write the name of the town where two national roads intersect. (3)
- 2.1.3 Identify the type of scale given (2)
- 2.1.4 What is the general direction of Middelburg from Polokwane? (2)
- 2.1.5 Explain two advantages of using national roads (4)
- 2.1.6 Describe a detailed set of direction, mention directions en route they will take to travel from Polokwane to Middelburg, using national roads. (5)
- 2.1.7 Use the bar scale on the map to calculate the actual distance they travelled from Polokwane to Middelburg, as the crew flies. **Write your answer in miles if 1 mile = 1,61 km** (6)

TOTAL= 25

SCALE and MAPS

Key concepts

Maps and plans are visual representations of the real world around us - for example a school, a town, a movie theatre or a shopping centre. They are tools that can help us find our way around a new environment, or find a particular place, like one shop in a shopping centre or your seat in a sports stadium.

Note the following:

- Use the number scale and the bar scale, and understand the advantages and disadvantages of both and what happens when we resize maps.
- Estimate actual distance or length when given a scale map and calculate scaled measurements when given the actual distance or length.

- Read maps and seating plans in order to describe the position of an object in relation to surrounding objects.
- Find locations and follow and develop directions for travelling between two or more locations.

Scale

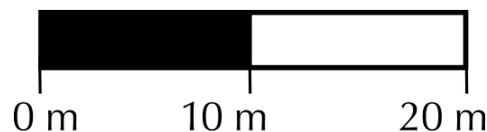
The scale of a map is a ratio of the distance on the map to the actual distance on the ground or in real life. *for example, a number scale of 1: 100 means that 1 unit on the map represents 100 units on the ground or in reality (so 1 cm on the map = 100 cm = 1 m on the ground).*

Number and bar scales

The two kinds of scale we will be working with in this chapter are the number scale and the bar scale.

The number scale is expressed as a ratio like 1: 50. This simply means that 1 unit on the map represents 50 units on the ground. So 1 cm on the map will represent 50 cm on the ground, or 1 m on the map will represent 50 m on the ground. To use the number scale, you need to measure a distance on a map using your ruler, and then multiply that measurement by the “real” part of the scale ratio (50) given on the map, in order to get the real distance.

The bar scale is represented like this:



Each piece or segment of the bar represents a given distance, as labelled underneath. To use the bar scale, you need to measure how long one segment of the bar is on your ruler. You must then measure the distance on the map in centimetres; calculate how many segments of the bar graph it works out to be (the total distance measured; divided by the length of one segment); and then multiply it by the scale underneath. So, if 11 cm on the bar represents 10 mm on ground, and the distance you measure on the map is 33 cm ($33 \text{ cm} \div 11 \text{ cm length of segment} = 3 \text{ segments}$) then the real distance on the ground is $3 \times 10 \text{ mm} = 30 \text{ mm}$.

ACTIVITY 1

1.1 Mpho and his colleagues decided to participate in the Buffalo Marathon. The route map of the marathon is indicated in ANNEXURE A.

Study the map and answer the following questions.

- 1.1.1 Where does the Buffalo Marathon end? (2)
- 1.1.2 What is the distance between MacLeantown and the dairy farm? (2)
- 1.1.3 Ayanda started the race at 05:00 and reached Python Park at 08:45.
Determine the time taken to reach Python Park in hours. (3)
- 1.1.4 Determine Ayanda’s average speed from the starting point to Python Park in km/h.
You may use the following formulae:
Distance = Average speed \times Time (3)
- 1.1.5 Why is there a cut-off time for runners who are participating in the full marathon? (2)
- 1.1.6 State ONE advantage of taking part in a marathon. (2)
- 1.1.7 Determine the half marathon distance in km. (2)

1.2 The distance map below is showing distances (in km) between some towns in South Africa. Answer the questions based on the distance map below.

										Pretoria	
										1120	
									Polokwane	1393	273
								Nelspruit	320	1373	342
							Mafikeng	589	565	1122	292
						Kimberley	360	832	805	752	532
				Johannesburg	467	273	358	331	1062	58	
		East London	992	750	1029	1214	1323	300	1050		
	Durban	667	598	842	859	689	929	927	656		
Cape Town	1660	1042	1402	960	1320	1779	1736	756	1463		
Bloemfontein	998	667	575	417	175	427	771	748	635	475	

Distances given are by the best and most practical routes from centre to centre, and not necessarily the shortest

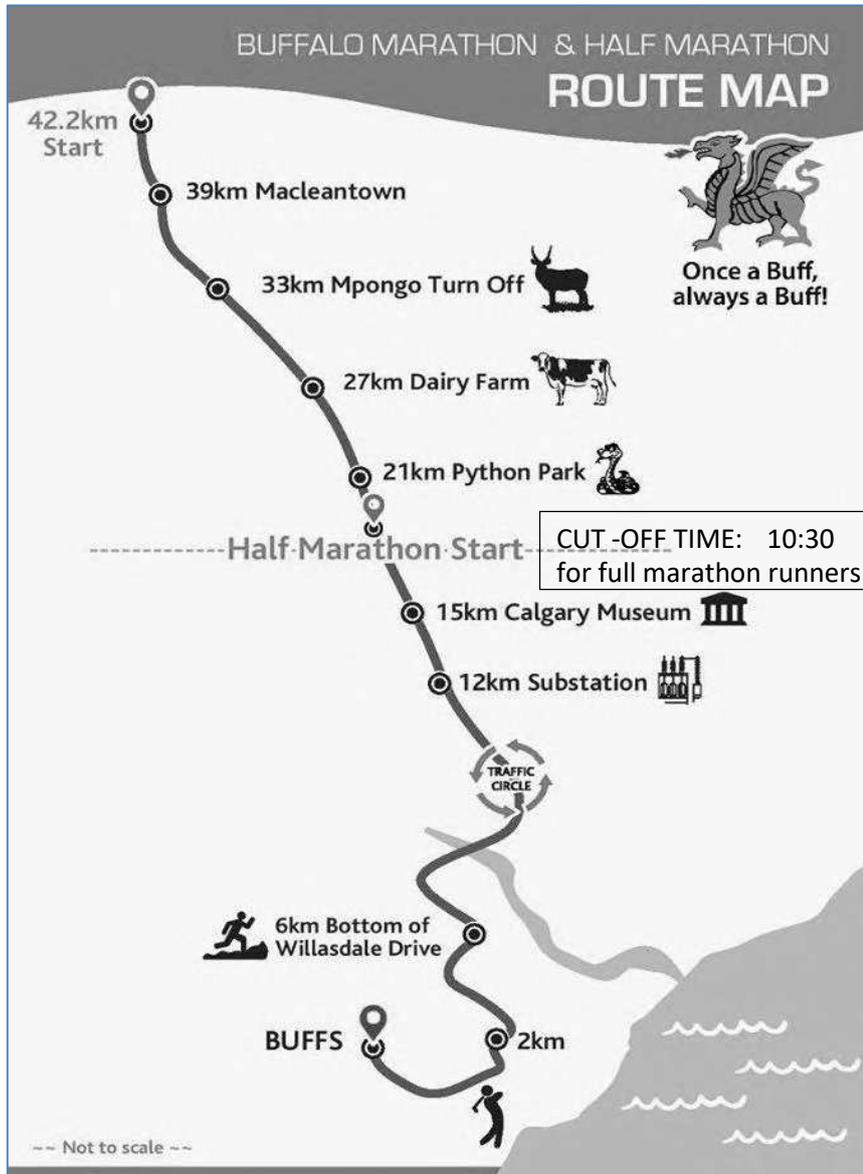
[Source: <https://www.aroundaboutcars.com/more-info/south-african-road-distances.>]

1.2.1 What is the distance in metres between East London and Mafikeng? (3)

1.2.2 A family travels from Cape Town to Johannesburg and then proceeds to Bloemfontein. The family claims that the total distance travelled is 40 km more than the distance between Cape Town and Nelspruit.

Verify, showing ALL calculations, whether their claim is valid or not. (6)
[25]

ROUTE MAP OF BUFFALO MARATHON AND HALF MARATHON



[<https://www.hoohlr.co.za/search?q=maps+of+buffalo+marathon+florida+42+km>]

ACTIVITY 2

2.1 The map on ANNEXURE C shows part of Mpumalanga and will help you answer the following questions.

- 2.1.1 What is the grid reference for Belfast? (2)
- 2.1.2 Name TWO Provincial roads that are on route between Graskop via Hazyview to Belfast. (2)
- 2.1.3 In which general direction is Belfast from Graskop? (2)
- 2.1.4 Name TWO towns on the route between Ohrigstad and Belfast when taking the shortest route. (2)

2.2 Kruger National Park, in Mpumalanga South Africa, is one of Africa's largest game reserves. Satara Rest camp is one of many camps in Kruger National Park.

Below is the travelling time to Satara rest camp from Crocodile Bridge and Gate.

DISTANCE FROM GATES TO CAMP		
SATARA REST CAMP		
	Distance	Time
Crocodile bridge and gate	127 km	5 hours 5 minutes

[Source: www.sanspark.org]

IMPORTANT INFORMATION:

- Recommended speed 25km/hour for game viewing.

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

- 2.2.1 A tourist wants to travel from Malelane gate to Phabeni gate.
Direct the tourist to Phabeni gate. (3)
- 2.2.2 The time taken to travel from Crocodile Bridge and gate to Satara Rest Camp is 5 hours and 5 minutes. Show how this time was calculated. Round off your answer to the nearest minute. (4)
- 2.2.3 Convert the bar scale of this map to a number scale in the form 1:
Show your workings. (5)
- NB: Round off your number scale to the nearest whole number.** (5)
- 2.3 Khulekani travelled from his home directly to a bank 34 km away. He travelled at an average speed of 85 km per hour and arrived at the bank at 12:10.

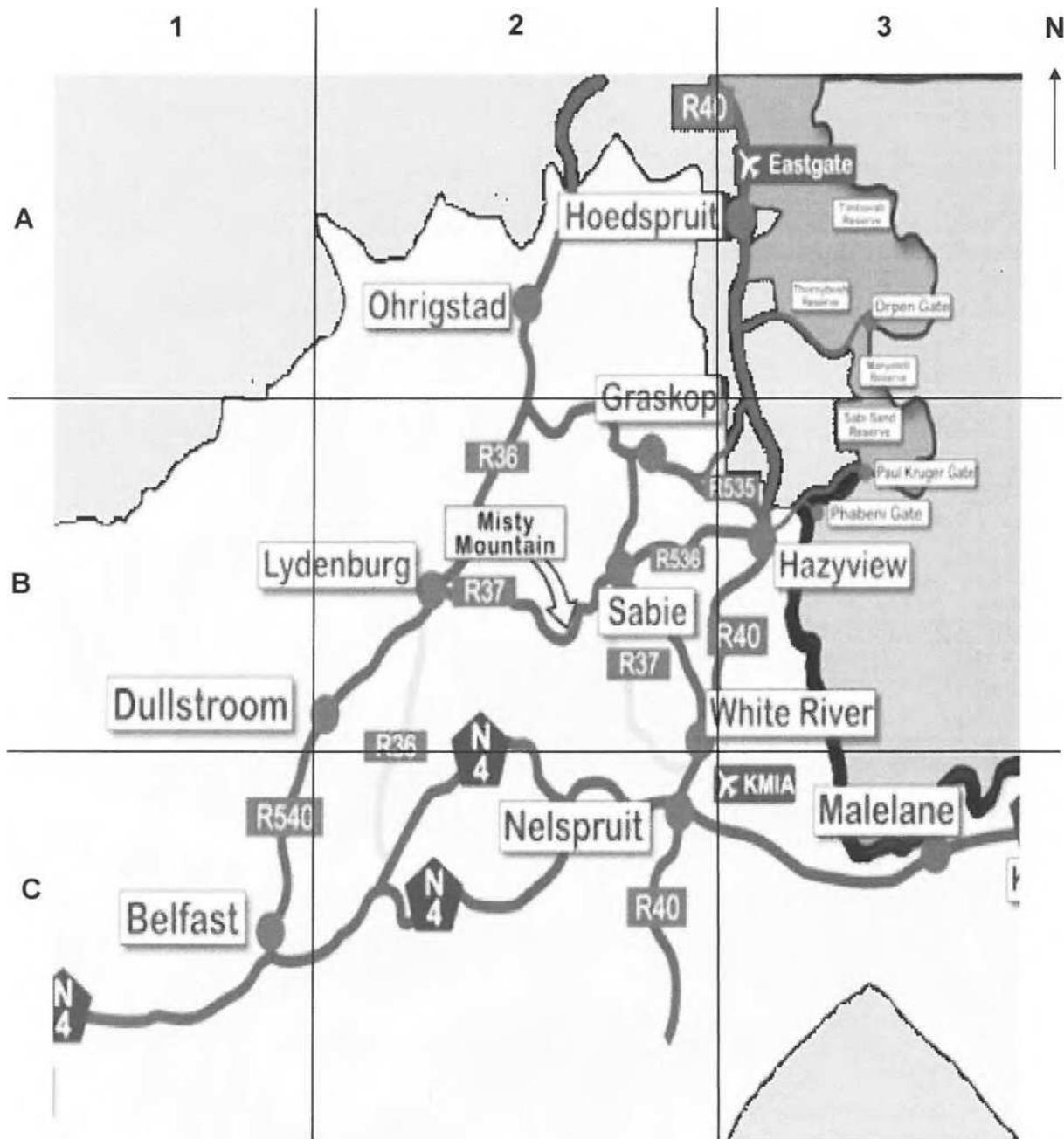
Verify, showing ALL calculations, whether Khulekani left his home at exactly 11: 40.

The following formula may be used:

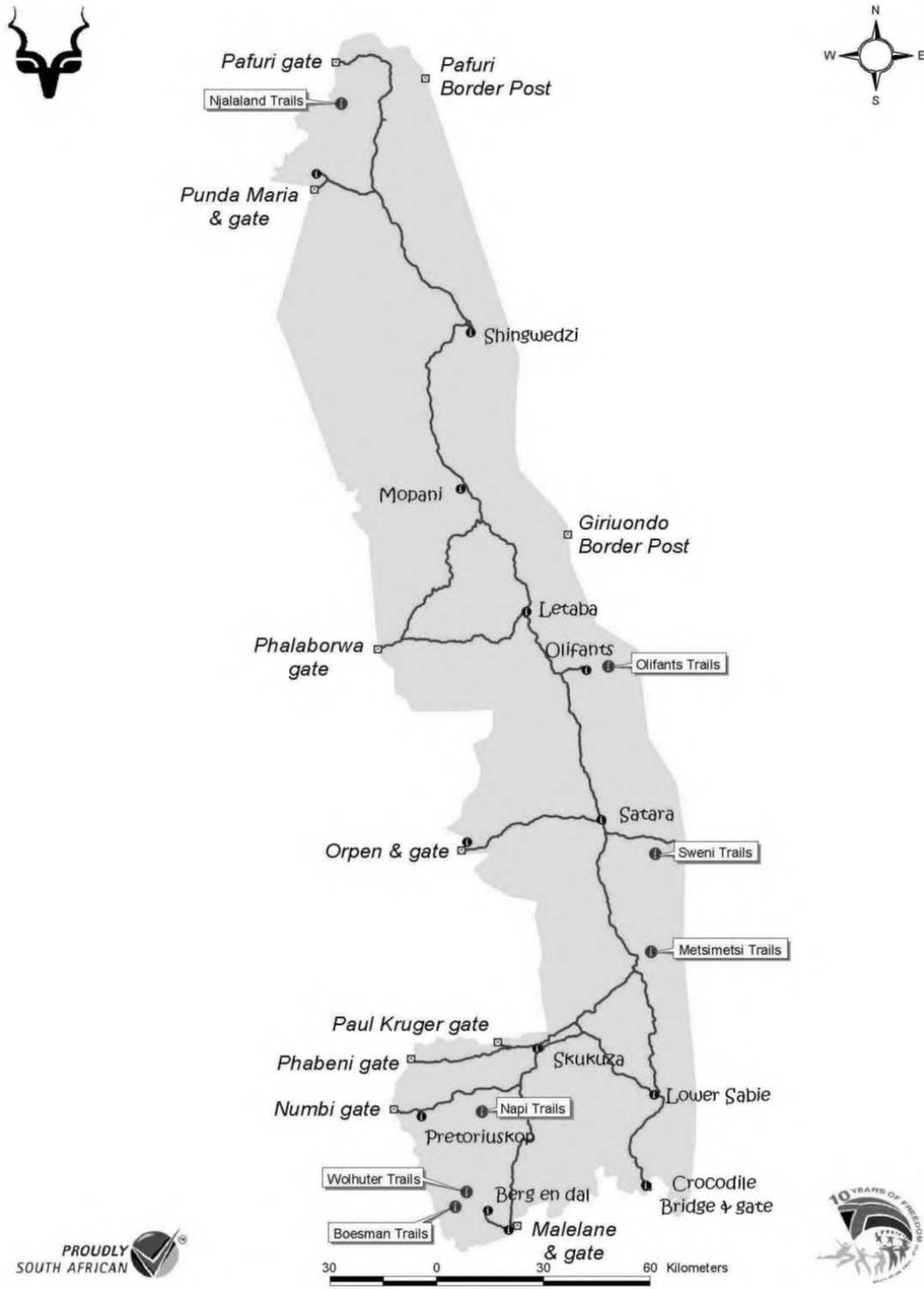
$$\text{Distance (km)} = \text{average speed (km/h)} \times \text{time (hours)} \quad (5)$$

[25]

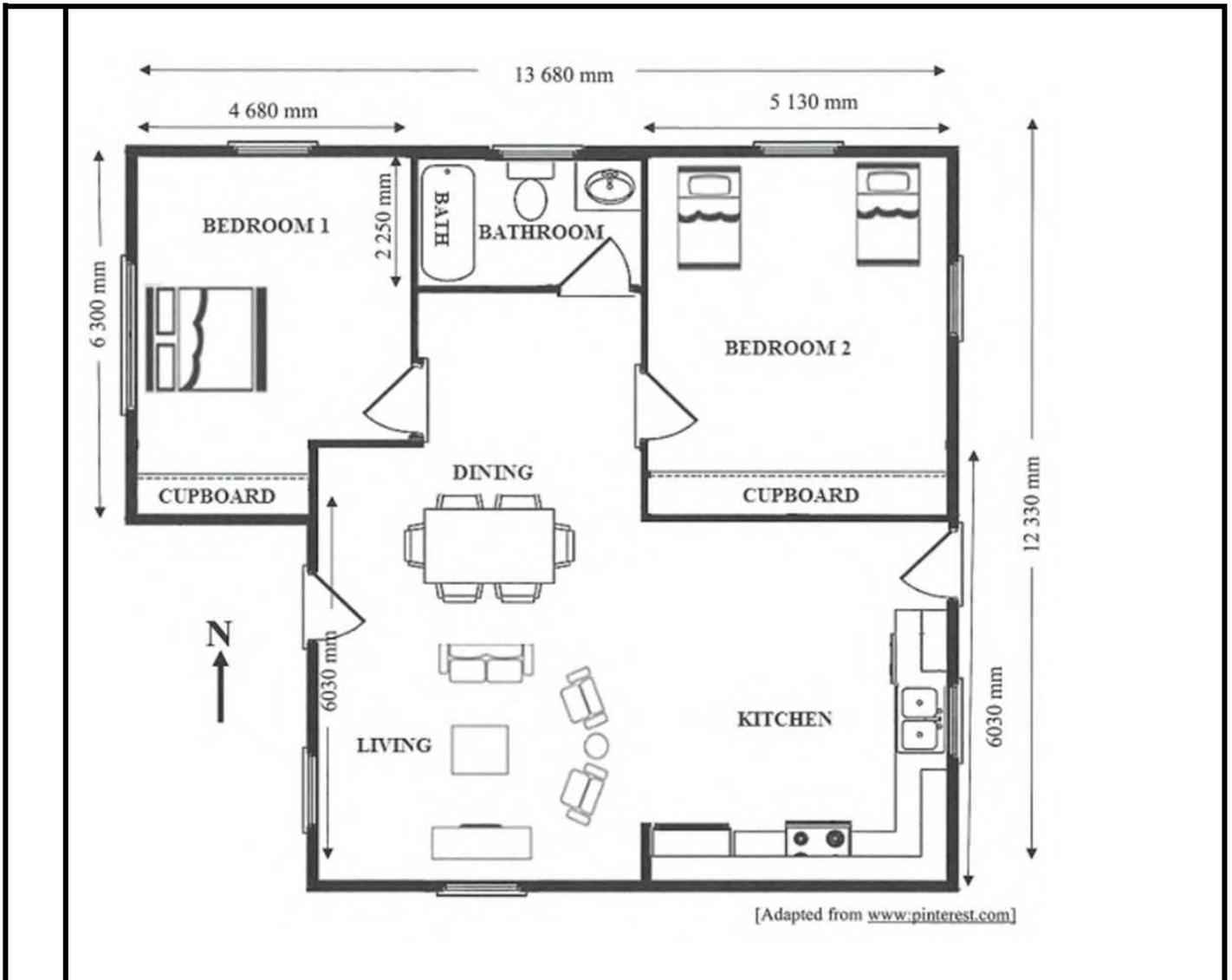
MAP: A MAP OF MPUMALANGA PROVINCE.



LAYOUT MAP FOR ENTRANCE KRUGER NATIONAL PARK GATES AND REST CAMPS



3.1 The floor plan below shows a drawing of a house. Study the floor plan and answer the questions that follow.



- 3.1.1 Identify the feature you will find when entering the bathroom. (2)
- 3.1.2 Write down the number of windows facing southwards (2)
- 3.1.3 Determine the length of the interior bathroom wall (excluding the door) that is not given, if the door takes a take space of 860 mm (6)
- 3.2 The kitchen and the bathroom should be tiled. The floor tile dimension is 500mm by 500mm. when purchasing tiles, you need to buy 5% more to cater for breakages. A tiling company charges R8 180,00 for labour and can supply the tiles for R 249,00 per box.

NOTE:

- Area = Length x Width
- All items like the bath, stoves ,cupboard are movable items and tiling will be done on the spaces where they will be placed.

Refer to the information above to answer the questions that follow.

- 3.2.1 Calculate the total area that must be tiled in metres(m). (8)

3.2.2 The building manager made a statement that 500 tiles are needed to complete the tiling for the kitchen and bathroom. Verify with calculations whether this statement is valid or not.

(7)

TOTAL

[25]

Models

Topic:	MAPS, PLANS AND OTHER REPRESENTATION OF THE PHYSICAL WORLD.	
Section	Models	
CONCEPT/ SKILLS	<ul style="list-style-type: none"> • Interpret instructions and assembly diagrams • Arrange instructions given (order of steps) to complete diagrams • Understand the symbols and notations used. • Practical method and mathematical method when packaging • Packaging shapes/arranging shapes. • Difference between volume and capacity. • Scaled model • Spread rate 	

1 Mrs Coup use storage containers to package cylindrical gas bottles. She transports these gas bottles using truck. The dimensions of the 14,2kg cylindrical gas bottle are given below.

Picture of cylindrical gas bottle

Diameter: 315 mm



[source: <http://.www.google.com/images>]

Study the picture and the information above and answer the questions that follow.

1.1 Write down the simplified ratio of the diameter to the height of the bottle. (2)

1.2 Mrs Coup intends to package 48 bottles using a four-by-four arrangement in each layer on the truck.

Determine the number of layers she will stack on the trailer using this arrangement. (2)

1.3 The gross weight of the 14,2kg gas bottle is 29,5kg. The content capacity of the bottle is 33,3 litres.

1.3.1 Determine the content capacity of gas in kilograms. (2)

1.3.2 Show that the content capacity is $1\text{kg} = 2,18\text{L}$ (2)

1.3. The floor of the trailer has drainage holes of 30mm. Give ONE possible reason of placing small drainage holes on the trailer.

(2)

1.4 The cylindrical gases are transported using the Open-Air Gas Cylinder Storage Shipping Containers as shown in the picture below.



[Source: <https://portshippingcontainers.com.au/>]

Dimensions: **length** = 5,9m, **width** = 2,4m and **height** = 2,2m

NOTE: Diameter of EACH gas cylinder is 315mm and height of 850mm

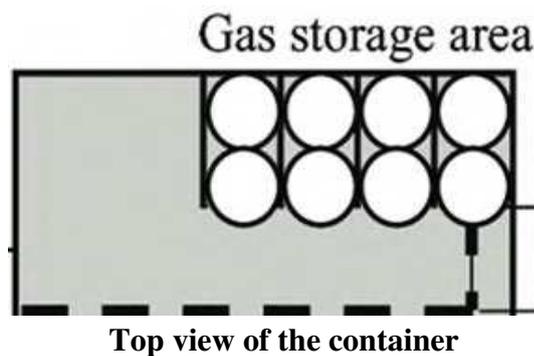
: 29,5kg gross weight.

: **1 tonne = 1000kg**

1.4.1 Mrs Coup states that ALL gas cylinders must be packed upright, secured and NOT be transported with an enclosed container.

Critically comment on this statement by giving ONE possible reason.

1.4.2 The truck driver indicates that the gross weight of ALL cylindrical gas that can be packed in one container is a little more than 7 tonnes. Verify this statement by showing all calculations. If they are packed using the arrangement in the picture alongside.



1.4.3 Calculate the Total Surface Area of the rectangular container in square metres. You may use the formula: $TSA = 2 \times (l \times w) + 2 \times (l \times h) + 2 \times (w \times h)$

1.4.4 The container will be spray painted with TWO coats of paint with a spread rate of 1,5litres per $4m^2$. 60% of area of the container will be painted because of the side wire openings. Determine the number of litres required to paint the container

2.

Delta tile company stores pallet of tiles in a 4m by 4m storeroom that has the adequate height to stack FIVE pallets.

Note: **dimensions of ONE pallet**

Length: 1 200 mm

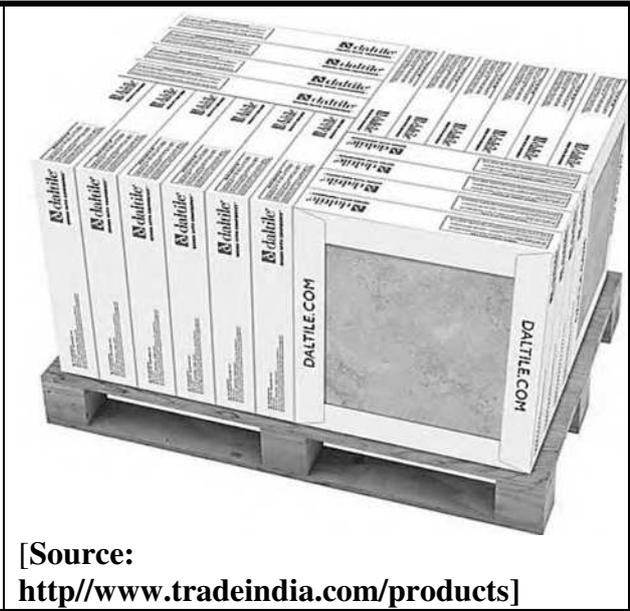
Width : 1 000 mm

Height: 150 mm

Dimensions of ONE tile

45cm by 45cm

One pallet can pack 20 boxes of tiles with 4 tiles per box



[Source: <http://www.tradeindia.com/products>]

Study the diagram and the information to answer the questions that follow.

2.1 Determine the number of tiles packed in ONE pallet. (2)

2.2 Calculate the perimeter of the pallet in metres. (4)
You may use the formula: **Perimeter of rectangle = 2 × (length +width)**

2.3 Show by calculations that the minimum height of the storeroom to pack FIVE stacked pallet boxes is 3 000mm (3)

2.4 Mr Robo states that the storeroom can pack a maximum number of 6 240 tiles, verify his statement by showing ALL calculations. (8)

2.5 The boxes of tiles on a pallet are tripled wrapped with the pallet wrap that is 0,45m by 250m. The length of around the boxes is 3,6m

2.5.1 Give TWO possible reasons why boxes are wrapped with plastic before they are packed into a pallet. (4)

2.5.2 The picture along the side indicates a worker wrapping the boxes of tiles in a pallet.



State whether the pallet is wrapped on clock-wise or anti-clock-wise direction.

[source: <https://www.tiger-supplies.co.uk/>]

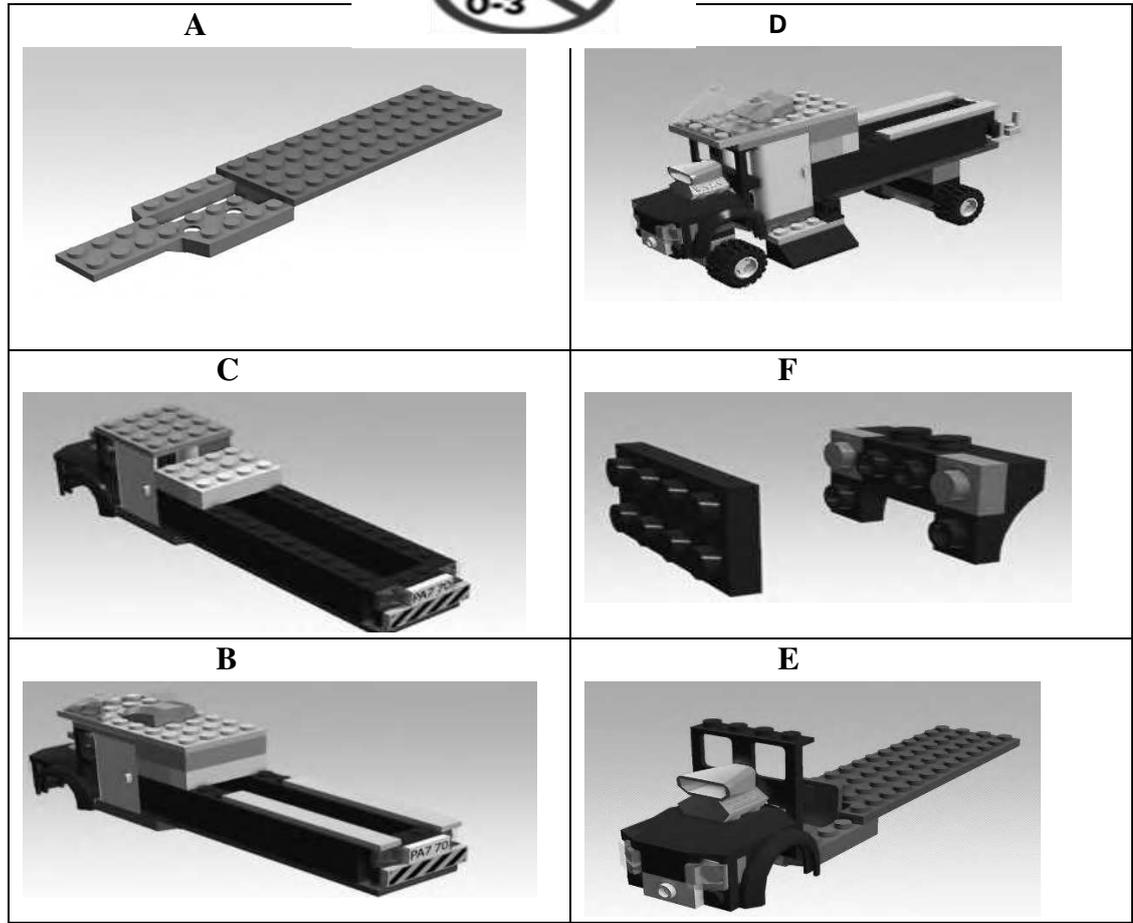
2.5.3 Determine the number of pallets that can be wrapped from ONE pallet wrap (2)

that is 250 m (5)

[28]

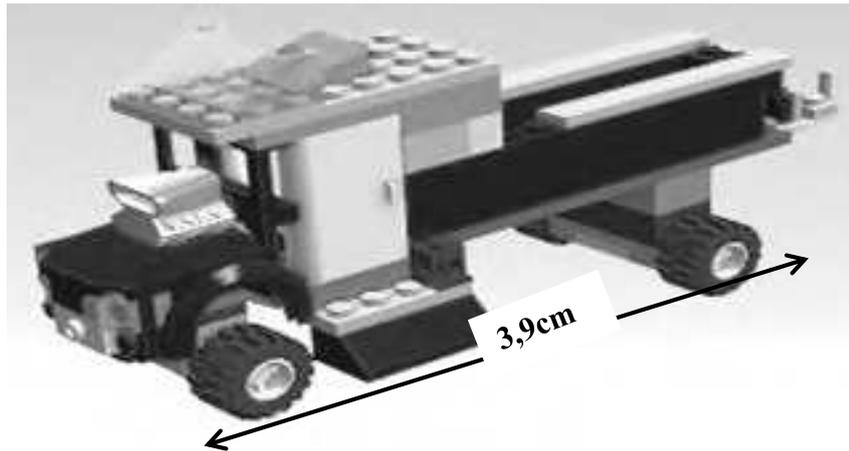
QUESTION 3

The diagrams below show a set (6 out of 14) of labelled assembly instructions to build a truck with Lego blocks.



Study the study the diagrams above and answer the question that follow.

- 3.1 Give ONE possible reason why assembly diagrams come in pictures and written instructions. (2)
- 3.2 Determine the probability as percentage that the step chosen is NOT part of the diagrams above. (3)
- 3.3 Write the correct order of the assembly instructions to build the Lego truck, using the letters A, B, C, D, E and F. (3)
- 3.4 Which letter A, B, C, D, E or F fits the instructions, “attach the roof of the truck”? (2)
- 3.5 Give ONE possible reason why the circular sign on top of the diagram can be displayed on the box containing Lego blocks. (2)
- 3.6 Diecast Car Model Miniature Vehicle toys for children or collection as gifts. The scaled model truck below was constructed using a scale of **1: 150**



[Source//: <http://www.wikihow.com/scaled-model>]

1:150

3.6.1 Identify the type of scale and explain the meaning of the scale according to the given context. (3)

3.6.2 The length of the truck in the picture is 3,9cm. however the picture was reduced to 65%.

The manager from Diecast car states that the actual length of the truck is 9m. Verify showing ALL calculations whether his statement is valid or invalid (5)

3.6.3 If the actual width of the truck is 2,1m, determine showing ALL calculations, which ONE of the two scales (1:6 or 1:7,5) should be used so that the width of the model truck will fit on the A4 paper that is 296 mm. (5)

[25]

PROBABILITY

- Probability refers to the chance or likelihood of an even occurring.
- An event is one or more possible outcomes in which you are interested.

or

Event is something that happens.

- An outcome is a possible result from a single trial of an experiment

or

Outcome is a result of an experiment

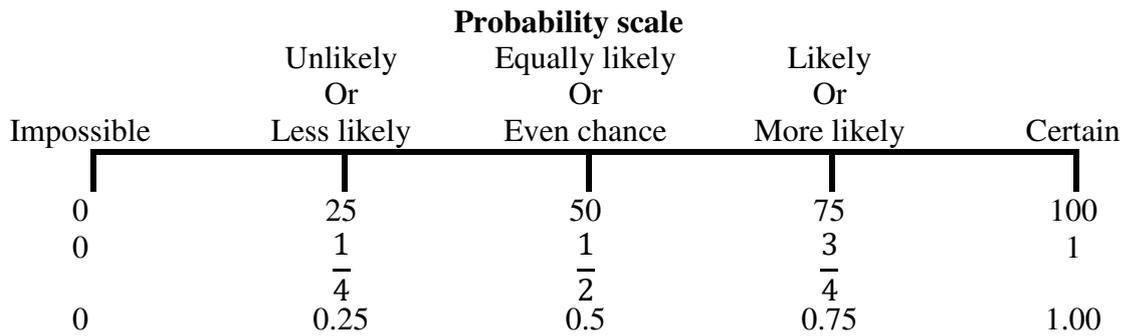
$$\text{Probability} = \frac{\text{the number of favourable outcomes}}{\text{the number of total possible outcomes}}$$

- There are three ways of expressing a probability
 - Fraction e.g. $\frac{1}{2}$; $\frac{5}{7}$; $\frac{9}{20}$
 - Decimal e.g. 0.5; 0.9; 0.259
 - Percentage e.g. 50%; 25%; 16%

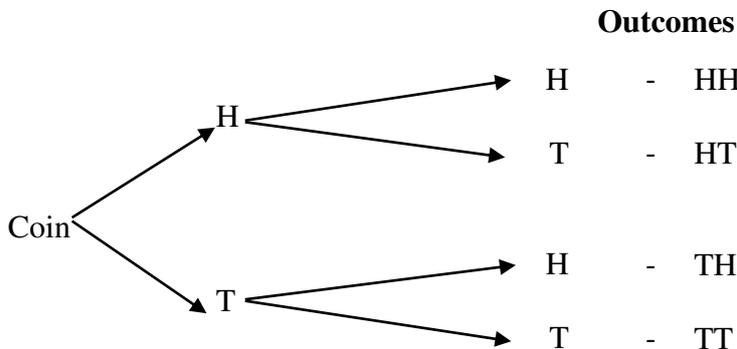
- The table below shows events and the different ways of writing probability

Events	Fraction	Decimals	Percentage
Probability of flipping a coin and having heads facing up: P(Heads)	$\frac{1}{2}$	0.5	50%
Probability of the traffic lights been green: P(Green)	$\frac{1}{3}$	0.33	33.33%
Probability of rolling a 7 on a single normal dice: P(7)	$\frac{0}{6} = 0$	0.0	0%

- All probability will lie between 0% (impossible) and 100% (certain). So, all probability can be expressed using a scale that ranges between 0% and 100%.



- Tree diagram is a visual way to express outcomes of an event, particularly when there are more than two variables or events.



- Two- way table (also known as a contingency table) works in a similar way to a tree diagram but the outcomes of one event are in rows and the other outcomes of the other events are in columns.

	H	T
H	H;H	H;T
T	T;H	T;T

NOTE

OR = Addition

AND = Multiplication

In probability if the question consists of “**OR**” the probability of the two events must be **ADDED** and if the question has “**AND**” the probability of the event must be **MULTIPLIED**.

PROBABILITY																									
ACTIVITY 1 [25 MARKS]																									
<p>1. Mana High School is a school in Amajuba district with an enrolment of 1200 learners. The table below shows the breakdown of gender, grades, and learners per grade. Study the table and answer the questions that follow.</p> <p style="text-align: center;">ENROLMENT OF MANA HIGH SCHOOL (2022)</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">GRADES</th> <th style="text-align: center;">BOYS</th> <th style="text-align: center;">GIRLS</th> <th style="text-align: center;">TOTAL</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">8</td> <td style="text-align: center;">82</td> <td style="text-align: center;">93</td> <td style="text-align: center;">A</td> </tr> <tr> <td style="text-align: center;">9</td> <td style="text-align: center;">98</td> <td style="text-align: center;">100</td> <td style="text-align: center;">198</td> </tr> <tr> <td style="text-align: center;">10</td> <td style="text-align: center;">114</td> <td style="text-align: center;">B</td> <td style="text-align: center;">326</td> </tr> <tr> <td style="text-align: center;">11</td> <td style="text-align: center;">138</td> <td style="text-align: center;">147</td> <td style="text-align: center;">285</td> </tr> <tr> <td style="text-align: center;">12</td> <td style="text-align: center;">95</td> <td style="text-align: center;">121</td> <td style="text-align: center;">216</td> </tr> </tbody> </table>		GRADES	BOYS	GIRLS	TOTAL	8	82	93	A	9	98	100	198	10	114	B	326	11	138	147	285	12	95	121	216
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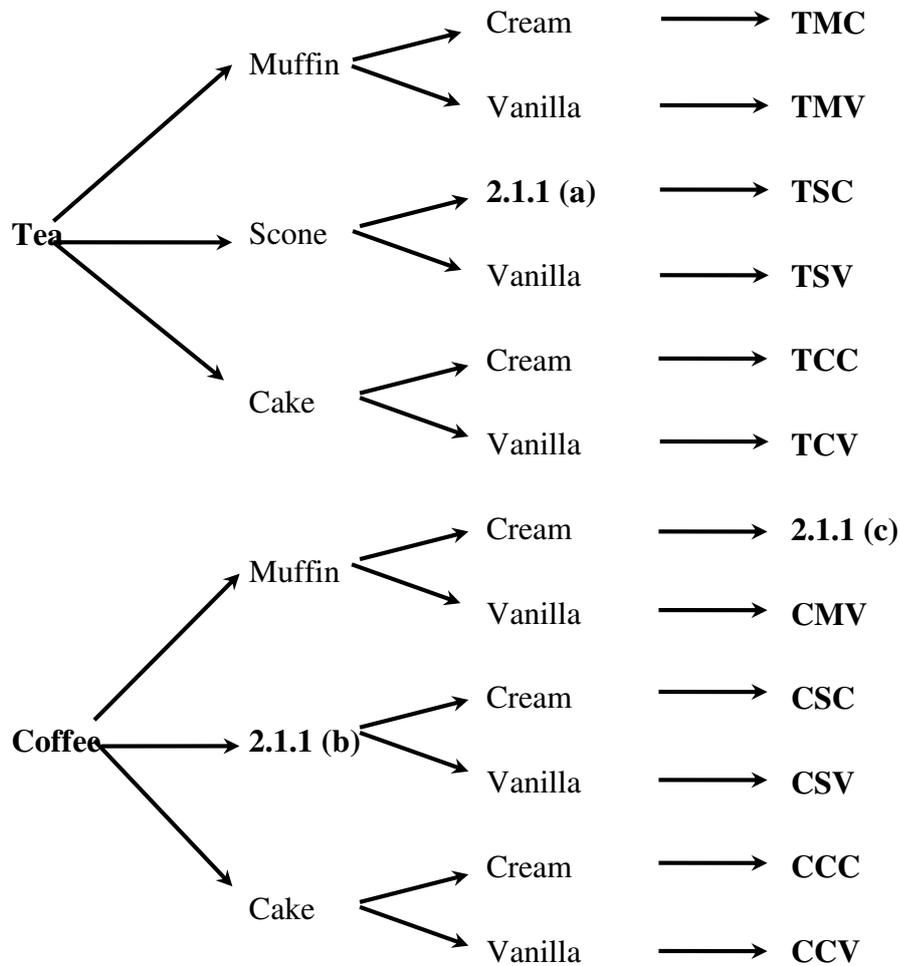
- 1.1.1 Calculate the value of A and B in the table. (4)
- 1.1.2 Write down the probability of getting a boy learner in Mana High School? (2)
- 1.1.3 Determine the probability of randomly choosing a girl learner in grade 9 class? (3)
- 1.1.4 Calculate the probability of selecting a girl learner in matric class as a percentage.? (3)
- 1.1.5 Calculate the probability of a learner in grade 10 in the school as a decimal and interpret it using probability scale (3)
- 1.1.6 Determine the probability of getting a learner in grade 8 and grade 11 as a simplified fraction.? (4)
- 1.1.7 Work out the probability of getting a grade 12 or a grade 9 in the school as a fraction.? (3)
- 1.1.8 Mrs Sokhela stated that the probability of girls in the school is more than $\frac{1}{2}$ of the enrolment, justify if her statement is correct (3)

[25]

ACTIVITY 2 [25 MARKS]

2.1.1 A restaurant offers a special of tea (T) or coffee (C) with a muffin (M), scone (S) or cake (C) with a topping of cream (C) or vanilla (V)

The tree diagram below represents the different choices for this special.



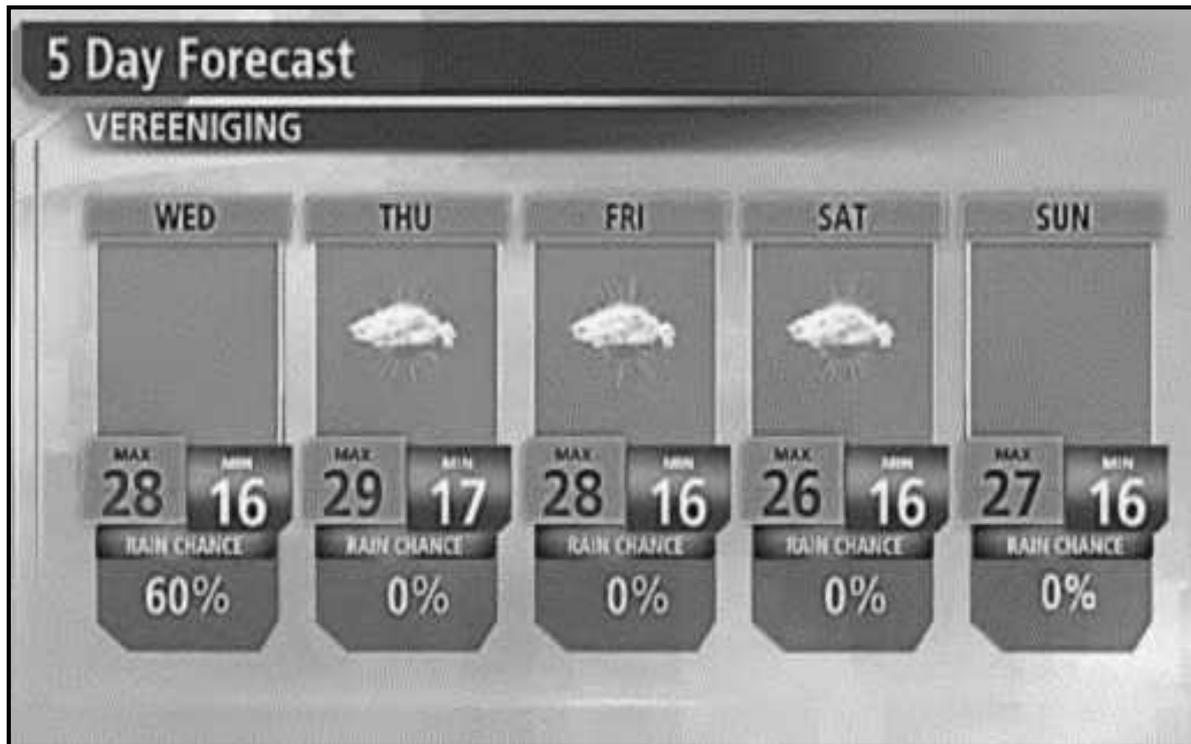
Use the information above to answer the questions that follow.

- 2.1.1 Write down the missing values (a), (b) and (c) (3)
- 2.1.2 Determine how many different combinations a person has to choose from (2)
- 2.1.3 Write down the probability of a customer randomly choosing coffee with a muffin and a cream? (2)
- 2.1.4 A customer remarked that the probability of choosing a cream and a vanilla is the same. Critically comment on the customer's remark. (3)
- 2.1.5 Make a prediction of how many choices will a customer have if a strawberry option is added to the topping. (2)
- 2.2 Joel has 8 blue balls, 12 yellow balls, 10 white balls and 20 black balls in his room.

- 2.2.1 Calculate the probability of randomly selecting a yellow ball as a simplified fraction from his room (2)
- 2.2.2 Write down the probability of getting a green ball in his room (2)
- 2.2.3 If Joel loses all the yellow balls, the rest of the balls can be termed as more likely in probability scale. Verify if this is true. (3)

The picture below shows a 5-day weather forecast for Vereeniging. It shows the minimum and maximum temperatures in Degrees Celsius (oC) and the chances of rain.

Study the information in the picture and answer the questions



- 2.2.4 What is the probability that it will rain in Vereeniging on Wednesday? (2)
- 2.2.5 Determine the probability of rain on Friday and Sunday? (2)
- 2.2.6 If the probability of rain for Sunday increases by 10% for the next day, what will the new probability for rain be? (2)

[25]