higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

MATHEMATICAL LITERACY

(First paper)

NQF LEVEL 3

(10401023)

8 November 2023 (X-paper)
09:00–12:00

Nonprogrammable calculators may be used.

This question paper consists of 11 pages and 1 answer sheet.

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DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)
MATHEMATICAL LITERACY
NQF LEVEL 3
TIME: 3 HOURS
MARKS: 150

INSTRUCTIONS AND INFORMATION

1. Answer all the questions.
2. Read all the questions carefully.
3. Answer QUESTION 4.2.4 and QUESTION 5.1.4 on the attached ANSWER SHEET. Write your EXAMINATION NUMBER and CENTRE NUMBER on the ANSWER SHEET, detach it from the question paper and hand it in with the ANSWER BOOK.
4. Number the answers according to the numbering system used in this question paper.
5. Start each question on a new page.
6. Clearly show all the calculations.
7. Round off the answers according to the given context. In all cases where the context is not specific, round off the answers to two decimal places.
8. Indicate units of measurement where applicable.
9. Diagrams are not necessarily drawn to scale.
10. Use only a blue or black pen.
11. Write neatly and legibly.

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QUESTION 1

1.1 Calculate each of the following WITHOUT using a calculator. Show all calculations:

1.1.1 $98{,}4311 - 88{,}31 + 54{,}1034$ (2)

1.1.2 $2(9+16)^{\frac{1}{2}} - 5.\sqrt{\frac{1}{25}}$ (2)

1.1.3 $\left(5\frac{1}{2} - 2\frac{4}{5}\right) \times 2\frac{2}{3}$ (3)

1.2 Dina runs a half marathon (21 km) in 2 hours 6 minutes. How long does it take her to run one kilometre? Show all workings. (3)

1.3 Mr Isaacs spends $\frac{1}{2}$ of his salary every month on rent and $\frac{2}{5}$ on petrol. What fraction is left to spend on food and other necessities for the month? Show all workings. (3)

1.4 If $\frac{3}{5}$ of the 2 500 people at the show are female, calculate how many males are there at the show. Show all workings. (3)

1.5 Mapungubwe Game Reserve has 5 000 African elephants at the end of 2021. It is predicted that this number will decrease by 12% each year.

How many African elephants will there be at the end of 2023? Show all workings. (3)

1.6 The Hlongwane family wants to rent a hall to hold a family gathering. They can rent the hall for one night for R3 000. The family members that will join the ceremony will split the costs.

1.6.1 The table below shows the amount that each family member has to contribute. . Find the missing values of *a*, *b* and *c*.

Number of family members	30	50	100	*b*	300
Cost per family member	100	60	***a***	15	***c***

(3)

1.6.2 Some of the family members say that if they have to contribute more than R25 per person, they will not attend the function.

What is the minimum number of family members who should be invited to make the cost R25 per person? (2)

1.7 The price of a pair of sunglasses is R700. Calculate the new price after 20% discount. (2)

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1.8 The college driver together with SRC members covered a distance of 360 km during a trip to Durban. The table below shows the time they would have taken (in hours) to cover the 360 km at different speeds (in km/h).

Speed in km/h	10	20	30	45	**B**	90	100	120
Time in hours	36	18	**A**	8	6	4	3,6	3

Use the given information to determine the missing values of A and B.

Formula: $\text{speed} = \frac{\text{distance}}{\text{time}}$

(2 × 2) (4)

[30]

QUESTION 2

2.1 Choose a description from COLUMN B that matches a term in COLUMN A. Write only the letter (A–G) next to the question number (2.1.1–2.1.5) in the ANSWER BOOK.

COLUMN A		COLUMN B	
2.1.1	Area	A	has faces, edges and vertices
2.1.2	Perpendicular lines	B	a slanted line that goes from corner to corner.
2.1.3	3D object	C	measured in meter cubes
2.1.4	Diagonal	D	meet at a right angle
2.1.5	Parallel lines	E	the measure of the inside of a closed 2D shape
		F	have a constant distance between them
		G	the distance around a lamina

(5 × 1) (5)

2.2 Mrs. Joseph's rectangular garden has an area of 48 m^2. What are the possible dimensions for the sides of the garden provided that none of the sides can be less than 2 m. (4)

2.3 Zodwa has crates that are cubes of equal size. She stacks four crates to make a pile with a height of 92 cm. She then puts an extra crate on top of the pile.

Calculate the height of the pile of all the crates. (2)

2.4 John used an actual distance of 400 km and scaled the distance down by drawing a line of 20 cm on a page, write down the scale that he used. (2)

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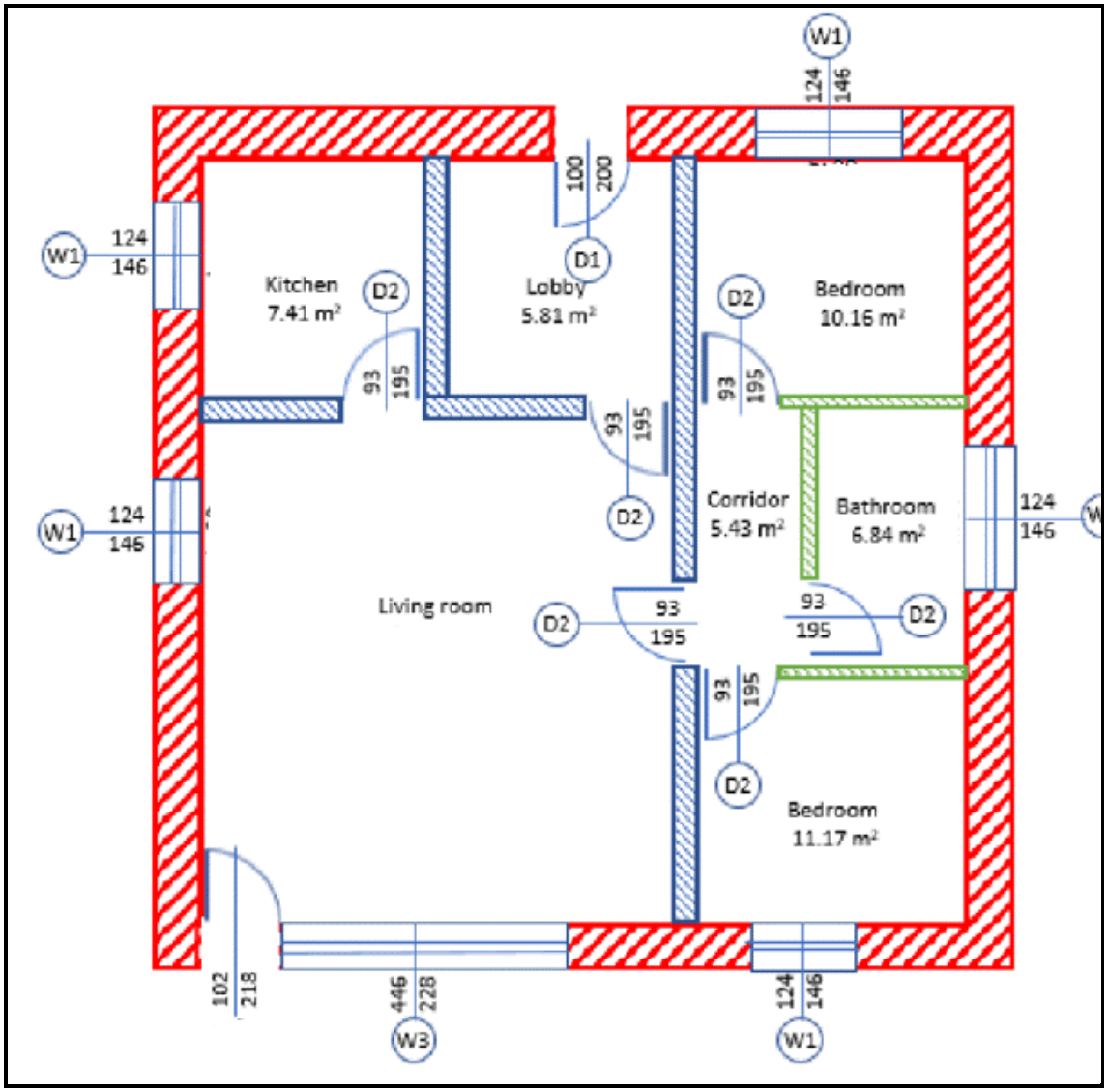
2.5 Study the floor plan below and answer the questions that follow.



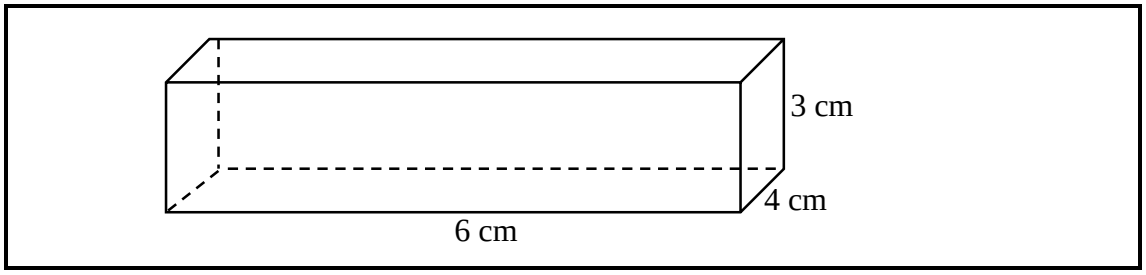
2.5.1 What is the area of the lobby? (1)

2.5.2 From the plan, how many windows does the house have? (1)

2.5.3 Are all the windows the same size? Explain your answer. (2)

2.5.4 If the total area of the house is 80,46 m^2, determine the area of the living room. (3)

2.6 The container shown below has a length of 6 cm, a width of 4 cm and a height of 3 cm.



2.6.1 Mondi plans to paint the outside of the container. Calculate the external surface area of the container in cm^2.

Formula: $A = 2(lh + lw + wh)$ (3)

2.6.2 Convert the answer in QUESTION 2.6.1 to square metres. Note that $1\ cm^2 = 0{,}01\ m^2$ (2)

2.7 A caterer has cylindrical glasses that are 18 cm tall with a diameter of 5 cm. He will serve 50 people and he estimates that each person would have 3 glasses of cooldrink.

If cooldrinks are sold in *2 litre* bottles calculate how many *2 litre* bottles must he buy to serve 50 people.

Formulae: $V = \pi r^2 h$, where $\pi = 3{,}14$ and 1 litre = 1 000 cm^3 (5)

[30]

QUESTION 3

3.1 The table below represents an income and expenditure statement of a small company Study the income and expenditure statement and answer the questions that follow:

Total Income	**A**	**Total Expenses**	**R28 200**
Consultancy	R25 000	Printing	R1 200
Trainings	R17 500	Telephone	R2 000
		Office suppliers	R3 500
		Wages	R18 000
		Water and electricity	**B**
Taxable profits			**R 14 300**

3.1.1 Calculate the value of A (the total income). (3)

3.1.2 Calculate the value of B (Expense on water and electricity). (3)

3.1.3 Name the highest and the lowest expense items. (2)

3.1.4 Show by means of calculations that the taxable profits are R14 300,00. (2)

3.1.5 If the total income of the company were Value Added Tax (VAT) inclusive of 15%, calculate the value of VAT that should be paid to South African Revenue Services (SARS) by the company. (5)

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3.2 The table below shows the charge for pre-paid and post-paid electricity. The meter reading of the company office for this month is 41 135 kWh while the meter reading for last month's reading was 39 712 kWh.

Tariff system	Ampere charge per month (Amp/Month)	Charge per kWh consumed
Pre-paid	Nil	R0,545
Post-paid	R3,10	R0,221

3.2.1 Calculate the amount of kWh used for this month. (1)

3.2.2 The formula to determine the cost of post-paid electricity is given below.

Cost = (Amp/Month × Size of Circuit Breaker) + Cost of kWh consumed

If the office uses a 30 Amp circuit breaker, use the formula provided to calculate the cost of post-paid electricity for this month. (5)

3.2.3 Calculate the cost of pre-paid electricity for the same number of kWh consumed for this month. (2)

3.3 Given below is Mr Dimeko's payslip. Study the payslip and answer the questions that follow:

EKHAYA COLLEGE
91 Samoosa Street, Pretoria
www.ekhayacollege.edu.za

Payment advice for 15 April 2022 to 15 May 2022
Employee: Arnold Dimeko
Employee number: 85142558
Payment details: Small Bucks Savings Account 65897823141
Date of payment: 15 May 2022

GROSS		**DEDUCTIONS**	
Basic earnings	15 721,85	PAYE	1 476,10
Travel allowance	741,90	UIF	**A**
		Pension fund	627,82
		Medical aid	652,57
Gross salary	**16 463,75**	Loan	210,55
		Garnishee order	175,65
Net salary	**B**		

3.3.1 UIF is calculated at 1% of his basic earnings. Calculate his monthly UIF contribution (value of A). (3)

3.3.2 Calculate the Net salary (value of B). (4)

[30]

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QUESTION 4

4.1 The table below shows the cost to company on a number of stock items purchased.

Number of Stock Items	1	2	3	4	5	6	7
Cost in rand	R250	R500	R750	R1000	R1250	R1500	R1750

4.1.1 What is the dependent variable? (1)

4.1.2 What is the independent variable? (1)

4.1.3 What rule can you use to determine the amount the company spent in relation to the number of stock items bought? Let cost in rand be y and the stock items be x. (2)

4.1.4 Explain in words why the relationship between the number stock items bought and the cost in rand are in direct proportion. (2)

4.1.5 If you represent the information above on a graph, what type of graph will you get? (2)

4.2 A technician uses the following equation to calculate how much she should charge her customers: $C = 450 + 4h$, where h represents the number of hours she spends on the job.

4.2.1 How much will she charge for a job which takes 2 hours? (2)

4.2.2 She gives a 10% discount on any job that is under an hour, calculate how much she will charge for a job that takes 45 minutes. (3)

4.2.3 Calculate the number of hours taken on a job which costs R462. (3)

4.2.4 Use the given equation to complete the table provided in the attached answer sheet. (4)

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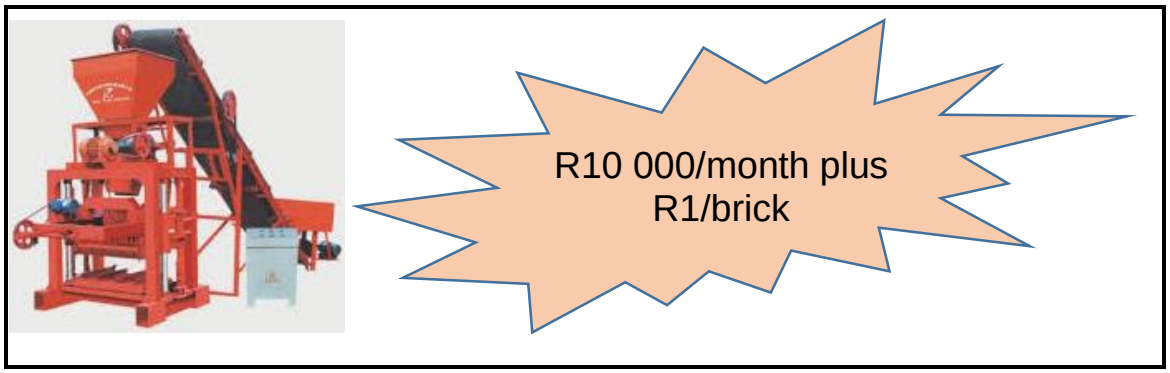
4.3 The cost of hiring a brick making machine is R10 000 per month and an additional of R1 per brick as shown by the advert below.



www.bing.com

4.3.1 Construct a table to represent the relationship between number of bricks and the cost. The table must have the total monthly cost to make 0; 20; and 50 bricks. (3)

4.3.2 What will be the total monthly cost for 200 bricks? (2)

4.4 The following number pattern is given:

$\frac{1}{3}$; $\frac{2}{3}$; $1\frac{1}{3}$; ...

4.4.1 Calculate the constant ratio. Show all calculations. (3)

4.4.2 Write down the fourth term of the pattern. (2)

[30]

QUESTION 5

5.1 The Department of Social Development provides social assistance to people in need. The table below shows both the number and the percentage of beneficiaries allocated to each type of grant during 2020 and 2021.

Allocation of grants during 2020 and 2021

Type of grant	**2020**		**2021**	
	Number of beneficiaries	**%**	**Number of beneficiaries**	**%**
Old-age pensioners	2 097 723	22,3	2 190 686	18,2
Child support	5 662 911	60,2	7 908 138	65,7
Disability	1 307 549	13,9	1 420 335	**B**
Social service grant	338 646	3,6	517 580	4,3
Total	**9 406 829**	**100**	**A**	**100**

5.1.1 What percentage of the grants allocated during 2021 was for old-age pensioners? (1)

5.1.2 Calculate the difference between the number of beneficiaries who received child support grants during 2020 and 2021. (2)

5.1.3 Calculate the values of A and B in the table. Show your calculations. (5)

5.1.4 Given in the attached ANSWER SHEET is a single bar graph that shows the percentage (rounded off to whole numbers) of the total number of beneficiaries for each type of grant during 2020. Use the the grid provided in the ANSWER SHEET to complete the bar graph for 2021 in order to become a double bar graph. (4)

5.2 Students from Tshwane TVET college entered the first round of the Maths Olympiad. Their lecturer finds that the number of girls who entered the first round of the Olympiad is three times the number of boys. The table below shows the number of boys as compared to the number of girls who entered the Olympiad.

Number of boys	3	50	**B**
Number of girls	**A**	150	180

5.2.1 Use the given information to determine the values of A and B in the above table. (4)

5.2.2 If 2 550 boys entered the first round of the Olympiad, calculate the total number of learners who entered for the first round of the Olympiad. (3)

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5.3 Abu and Amanda wrote some Olympiad practice tests at the college. Below are their marks expressed as a percentage.

Abu	48	48	48	53	58	62	70	72	80	86
Amanda	36	42	48	58	60	61	62	76	86	

5.3.1 Calculate Abu's median mark. (2)

5.3.2 Calculate the difference in the mean marks for Abu and Amanda. Round off to one decimal place. (5)

5.3.3 Calculate the range of Abu's mark. (2)

5.3.4 Abu stated that she did better in the practice tests than Amanda.

Give TWO reasons to support Abu's claim. (2)
[30]

TOTAL: 150

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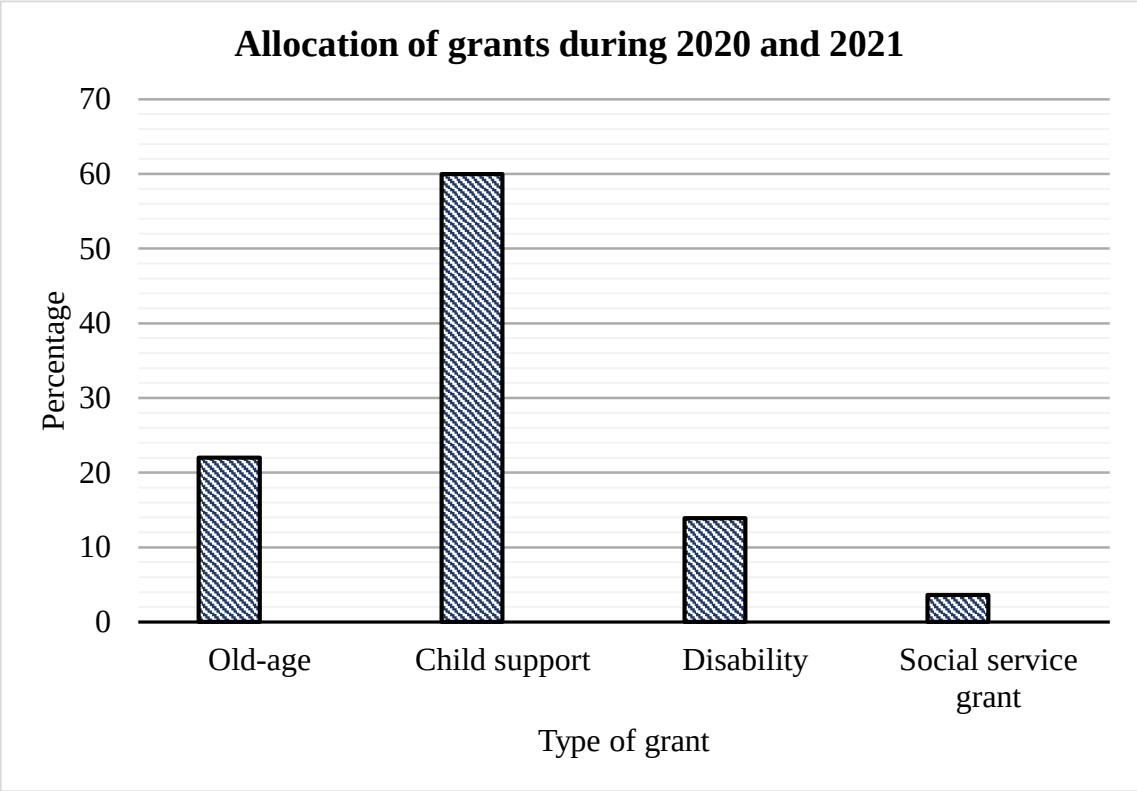
ANSWER SHEET **EXAMINATION NUMBER:** | | | | | | | | | | | | |

4.2.4

Number of Hours Spent	1		5	
Cost in rand		R458		R474

5.1.4



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