higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

MATHEMATICAL LITERACY

(Second paper)

NQF LEVEL 3

(10401023)

25 November 2022 (X-paper)
09:00–12:00

Calculators and drawing instruments may be used.

This question paper consists of 8 pages and 1 answer sheet.

579Q2N2225

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TIME: 3 HOURS
MARKS: 150

INSTRUCTIONS AND INFORMATION

1. Answer all the questions.
2. Read all the questions carefully.
3. Number the answers according to the numbering system used in this question paper.
4. Answer QUESTION 2.1.4 and QUESTION 3.3.2 on the attached ANSWER SHEET. Write your EXAMINATION NUMBER on the ANSWER SHEET, detach it from the question paper and hand it in with the ANSWER BOOK.
5. Start each question on a new page.
6. Clearly show all calculations.
7. Round off answers according to the given context. In all cases where the context is not specific, round off answers to TWO decimal places.
8. Indicate units of measurement where applicable.
9. Diagrams are not necessarily drawn to scale.
10. Write neatly and legibly.

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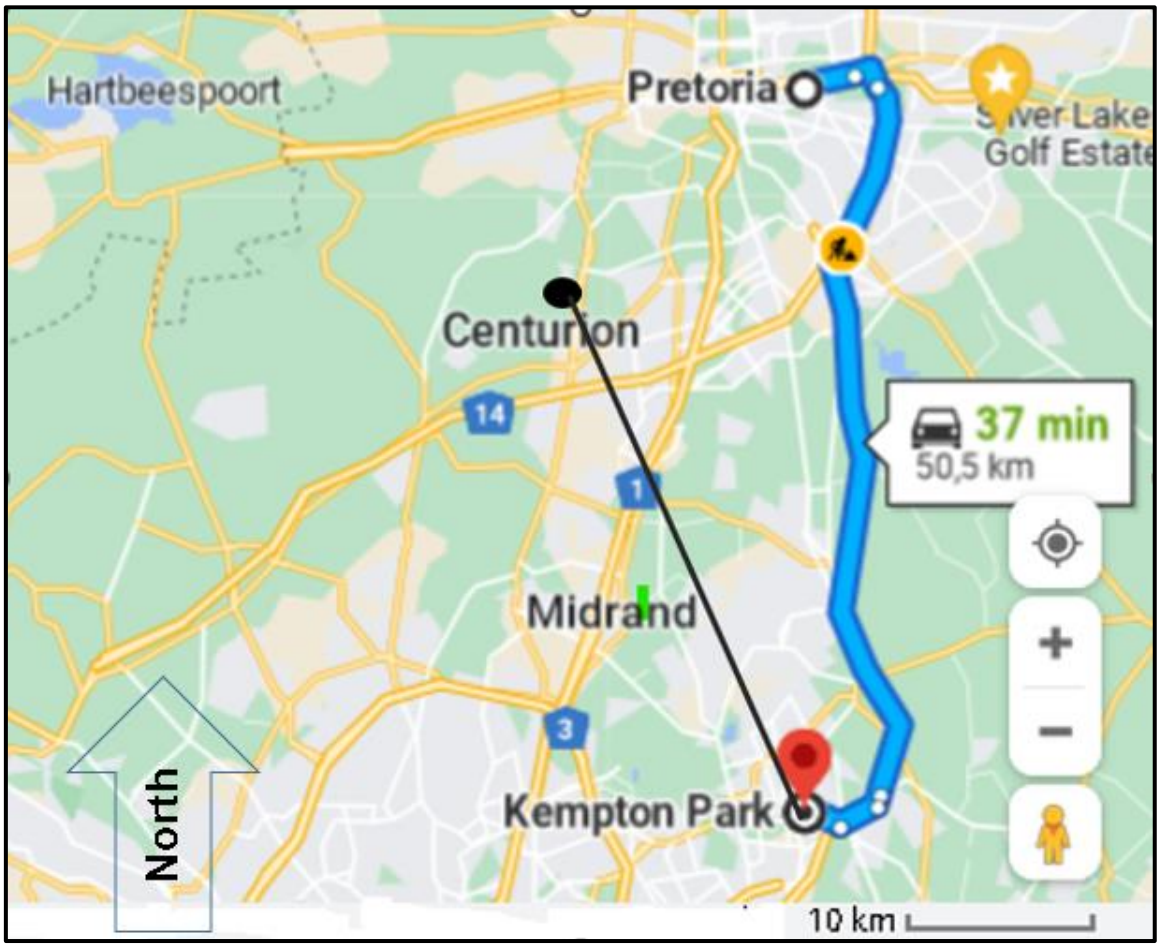
QUESTION 1

1.1 The google map below shows the distance and the estimated time to drive from Pretoria to Kempton Park.



Use the information on the map to answer the questions that follow:

1.1.1 What is the direction of Centurion as seen from Kempton Park? (2)

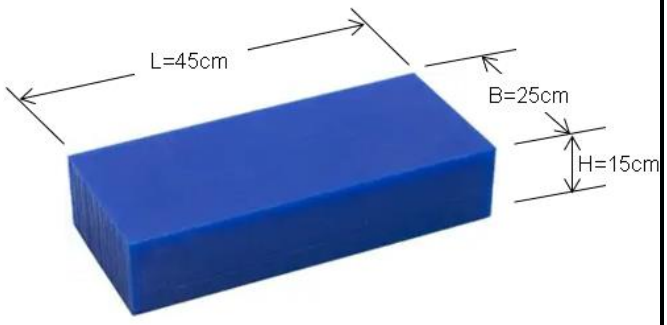
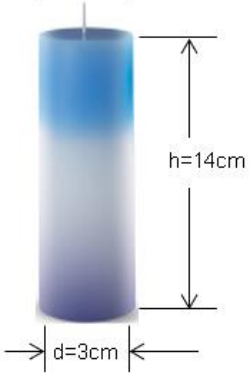
1.1.2 Use the scale on the map to determine the distance of the straight line between Centurion and Kempton Park. (2)

1.1.3 Calculate the estimated average speed in km per hour (km/h) for travelling by car from Pretoria to Kempton Park.

Formula:
Speed = Distance ÷ Time (3)

1.2 The scale of a map is 1:25 000 000. The distance between Durban and Cape Town is 3 cm apart on the map. Determine the distance between the two cities in km. (4)

1.3 An entrepreneur manufactures round candles out of a block of wax as shown in the pictures below.

A rectangular block of wax with a length of 45 cm, a width of 25 cm and a height of 15 cm.	A round candle with a diameter of 3 cm and a height of 14 cm.
	
Formulae: Volume = L× B × H Surface area = 2(LB + BH + HL)	Formulae: Volume = πr^{2}h where π = 3,14 Surface area =$2\pi rh + \pi r^2$

Use the information on the pictures to answer the questions that follow:

1.3.1 Calculate the volume of a block of wax. Write down your answer in m^3. (6)

1.3.2 If a block of wax was melted down to produce candles, how many round candles can be made from it? (6)

1.3.3 The block of wax is wrapped in a sticky plastic. The plastic wrap required to cover the entire surface area of a block will include 20% of overlap.

(a) Calculate the area of the plastic which will be required. (9)

(b) If a plastic wrap is sold at R1,20/m^2, Determine the total cost of plastic required. (3)

1.3.4 If a candle is covered in a cover paper. Calculate the area of the paper which will cover the bottom and the entire height of the candle. (5)

[40]

QUESTION 2

2.1 The table below gives the number of males and females who were successful in a Mathematics competition over eight countries.

	Canada	Venezuela	Brazil	Sweden	Portugal	South Africa (SA)	Egypt	USA
Female	2	5	5	8	4	2	2	2
Male	1	4	6	4	4	7	3	2

Use the information in the table to answer the questions that follow:

2.1.1 Calculate the difference between the mean values of the number of females and males. (8)

2.1.2 Calculate the median of the number of males. (3)

2.1.3 Find the mode of the number of females. (2)

2.1.4 Draw a double-bar graph on ANSWER SHEET (attached) that shows the number of males and females over the eight countries. (10)

2.1.5 Calculate the range of both the males and females. (4)

2.2 How many candidates were successful in this maths competition? (2)

2.3 If a female is selected at random, what is the probability of selecting someone from Brazil? Express the probability as a percentage. (3)

2.4 If a candidate is selected from the whole group, what is the probability of selecting a male from South Africa (SA)? (3)

[35]

QUESTION 3

3.1 A publisher is supplying books for the colleges around the country. The Mathematical Literacy book costs R105 to produce. Their utilities every month cost them around R1 200 and each book is sold at R150. The table below shows the income and expenditure of the publisher.

No. of books	0	10	20	40	80	160	**D**	**E**
Expenses	1 200	2 250	**A**	5 400	9 600	**C**	34 800	68 400
Income	0	1500	3 000	**B**	12 000	24 000	48 000	96 000

Use the information in the table to answer the questions that follow:

3.1.1 Write down the formulae to calculate the income and expenditure. (5)

3.1.2 Complete the table by writing only the value next to the letter (A–E) in the ANSWER BOOK. (1 × 5) (5)

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3.2 A college wants to hire buses for an educational tour. A bus company charges a fixed amount of R500 plus R100 per passenger. One bus can only carry 30 passengers.

Formula: Cost = R500 + R10 × Number of passengers

3.2.1 Calculate the total cost to hire one bus full of passengers. (4)

3.2.2 Calculate the loss in income for the bus company if only 22 passengers will hire a bus. (4)

3.2.3 Determine the number of buses required to transport 102 passengers. (3)

3.3 A long-distance taxi driver is responsible to manage speed and time spent on the road to reach various destinations. The table below shows the speed of the taxi against time travelled to destinations.

Speed (km/h	20	40	60	80	100	120
Time (h)	24	12	8	6	5	4

Use the information in the table to answer the questions that follow:

3.3.1 Describe the relationship between the speed and the time taken. (2)

3.3.2 Use the information in the table and the grid provided on the ANSWER SHEET (attached) to draw and label a line graph. (6)

3.3.3 What type of proportion does the graph represent? (2)

3.3.4 Read from the graph and calculate the distance that the taxi driver will cover at a speed of 20 km/h?

Formula: Distance = speed × time (3)

3.3.5 Read from the graph and estimate how long it will take the driver to complete the trip at a speed of 120 km/h. (1)

[35]

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QUESTION 4

4.1 The table below shows the variance between the projected and actual income and expenditure of a small business selling masks and sanitisers.

Formulae:

Variance on Income = Actual – Planned
Variance on Expenses = Actual – Planned

Complete the missing values on the table using the formulae provided. Please do not copy the table. Write only the value next to the letter (A–I) in the ANSWER BOOK.

2021/2022 BUDGET FOR MASK AND SANITIZER BUSINESS SALES (ENDING 31 MARCH 2022)					
	Item No:	Planned (Projected)	Actual (Realised)	Variance	
INCOME:		**Rand**	**Rand**	**Rand**	
Sales of Masks	1	700 000	810 610	110 610	
Sales of Sanitizers	2	550 000	500 130	***A***	(1)
TOTAL INCOME	3	**1 250 000**	***B***	60 740	(2)
EXPENSES:		**Rand**	**Rand**	**Rand**	
Stock: Masks	4	295 000	300 000	-5 000	
Stock: Sanitizers	5	310 230	280 000	***C***	(1)
Rent	6	60 000	61 000	***D***	(1)
Salaries	7	240 000	220 940	19 060	
Electricity	8	9 000	***E***	-130	(2)
Transport	9	46 000	***F***	6450	(2)
Other	***G***	45 000	31 000	14 000	(1)
TOTAL EXPENSES	11	***H***	***I***	**63 610**	(4)
SURPLUS/DEFICIT	12	**244 770**	**369 120**		

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4.2 The table below shows the electricity tariffs in cents for the Municipality.

Usage	Energy charge (c/kWh) excluding VAT in cents
Block 1: (≤ 50 kWh)	62,95
Block 2: (> 50 – ≤ 350 kWh)	85,19
Block 3: (> 350 – ≤ 600 kWh)	125,85
Block 4: (> 600 kWh)	135,50

Use the information in the table to calculate how much the business will be pay for electricity if 450 kWh of electricity was used including 15% VAT. (7)

4.3 A small business owner want to buy new offices in town at a price of R 900 000. The bank requires a deposit of 10% to qualify for the loan.

The table below shows the information to calculate the monthly payment for the loan. This information excludes all other hidden costs such as transfer costs, credit administration fees, etc.

Monthly payment per R 1000 of a property loan - interest is compounded monthly		
Interest Rate	**10%**	**11%**
20 years	R 9, 65	R 10, 32
25 years	R 9, 09	R 9, 80
30 years	R 8, 78	R 9, 52

The loan was approved at an interest rate of 10 percent and a 20-years repayment period.

Use the information provided above and answer the questions that follow:

4.3.1 Use calculations to show that the business owner will borrow R 810 000 from the bank if the loan was approved at an interest rate of 10%. (3)

4.3.2 Use the information in the table to show that the monthly repayment will be R 9 721, 00 if a monthly credit administration fees of R71, 00 was included. (5)

4.3.3 Calculate the total cost of the loan if a monthly credit administration fees of R71, 00 was included. (4)

4.3.4 Calculate the total interest paid towards the loan including the administration fees. (3)

4.3.5 Express the interest paid towards the loan to a percentage. (4)
[40]

TOTAL: 150

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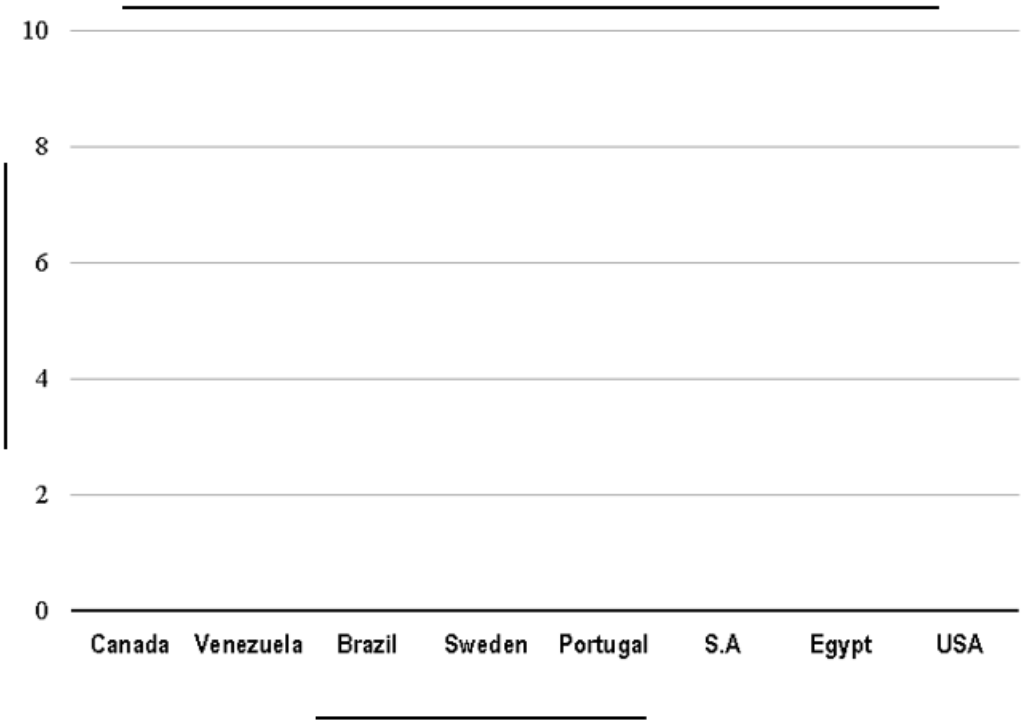
ANSWER SHEET EXAMINATION NUMBER: | | | | | | | | | | | | | |

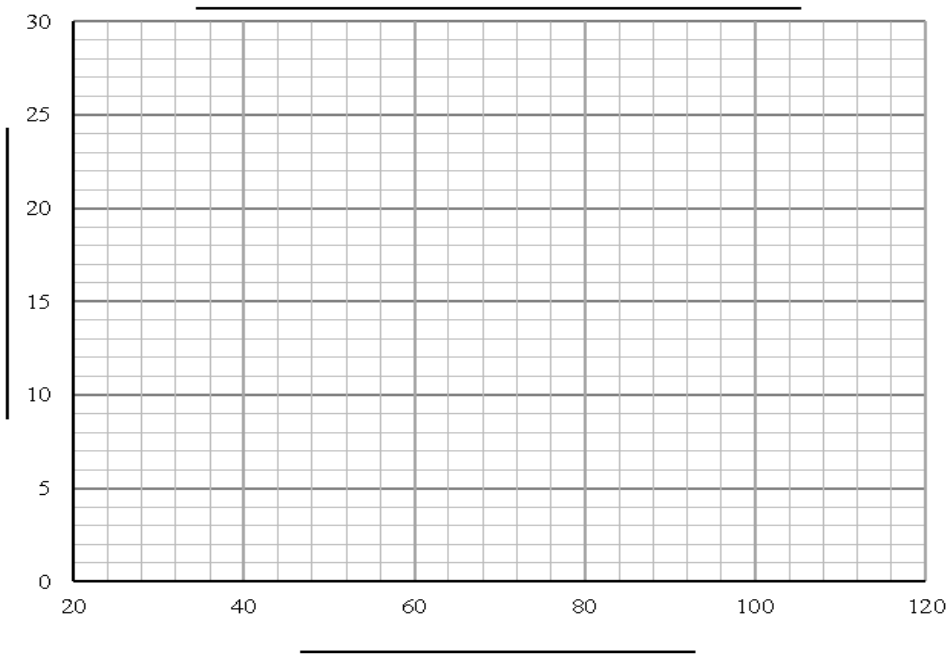
QUESTION 2

2.1.4



QUESTION 3

3.3.2



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