



**higher education
& training**

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

**MATHEMATICAL LITERACY
(Second Paper)
NQF LEVEL 3**

(10401023)

**24 February 2020 (X-paper)
09:00–12:00**

Nonprogrammable calculators may be used.

This question paper consists of 10 pages and 1 answer Sheet.

019Q2S2024

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. Clearly show all calculations, diagrams, graphs, etc. you have used in determining the answers.
 5. Diagrams are not necessarily drawn to scale.
 6. Use only a blue or black pen.
 7. Round off the answers to two decimal places where necessary, unless otherwise stated.
 8. Answer QUESTION 3.1.6 on ANSWER SHEET 1. Write your EXAMINATION NUMBER on the ANSWER SHEET and hand it in with your ANSWER BOOK.
 9. Write neatly and legibly.
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QUESTION 1

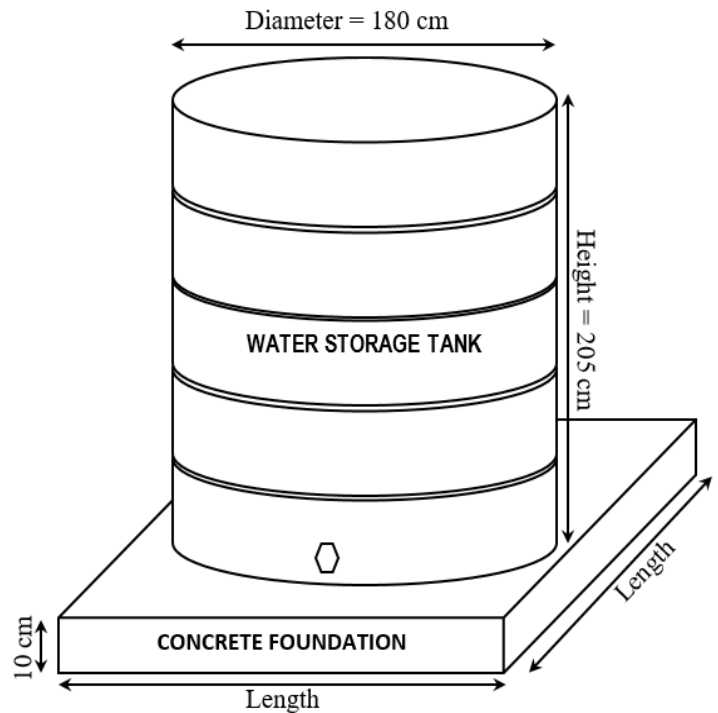
- 1.1 Jomo installs water storage tanks on concrete foundations. The dimensions of one of the tanks and its concrete foundation is shown in the sketch alongside. The water tank has a height of 2 255 mm and diameter of 1 820 mm. The height of the concrete foundation is 100 mm. Use the information, formulae below, and the sketch alongside to answer the questions that follow.

$$\text{Volume} = \pi r^2 h, \text{ where } \pi = 3,14$$

$$\text{Surface area} = 2\pi r h + 2\pi r^2,$$

where $\pi = 3,14$

$$\text{Volume} = \text{length} \times \text{length} \times \text{height}$$



- 1.1.1 Calculate the radius of the water tank. (2)

- 1.1.2 Calculate the volume of the water tank in cm^3 . (4)

- 1.1.3 The manufacturer of the water tank claims that the tank can hold in excess of 5 000 litres of water.

Determine whether this claim is true by converting the volume of the water tank to litres. ▼

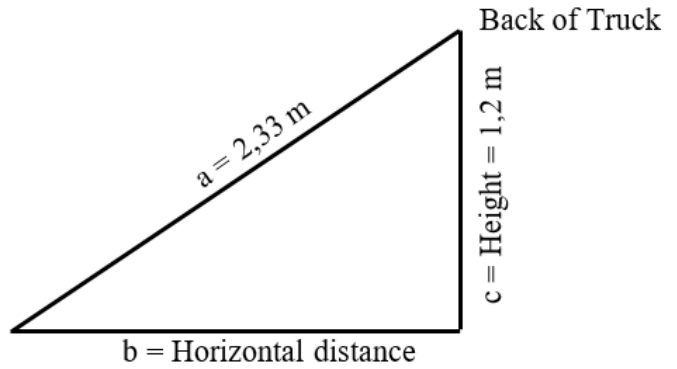
$$1\,000\text{ cm}^3 = 1\text{ litre} \quad (3)$$

- 1.1.4 Calculate the surface area of the water tank. (6)

- 1.1.5 The length of the concrete foundation is 10 cm longer than the diameter of the water tank. Also, the concrete foundation has a square base. ▼

Calculate the volume of the concrete foundation. (5)

1.2 Jomo uses a ramp to make it easier to load and offload the water tanks onto the back of his truck. The back of the truck is 1,2 m high and the ramp is 2,33 metres in length as shown in the sketch alongside.

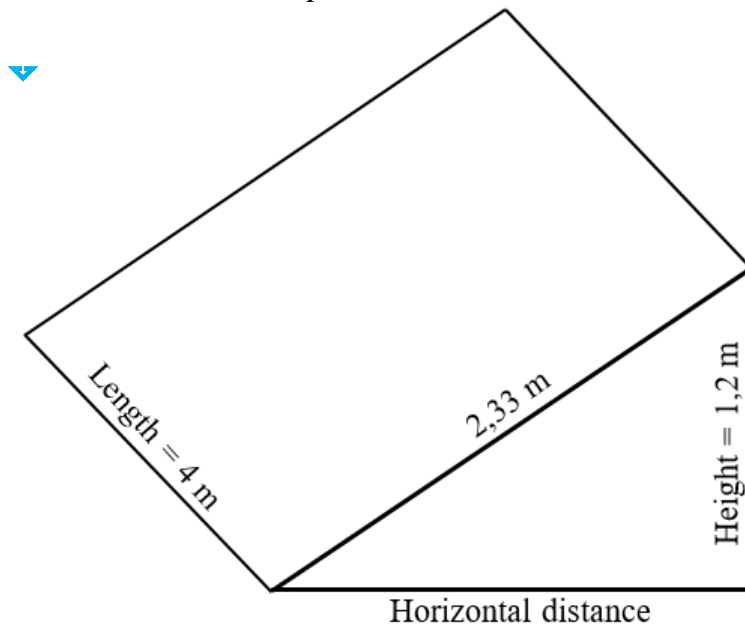


Formula: $a^2 = b^2 + c^2$

Use the theorem of Pythagoras to calculate the horizontal distance of the ramp. Round off your answer to the nearest metre.

(6)

1.3 A 3-D sketch of the ramp is shown below:



Calculate the volume of the ramp.

Formula: $\text{Volume} = \frac{1}{2} \times \text{horizontal distance} \times \text{height} \times \text{length}$

(5)

1.4 Jomo receives a contract to install a water tank at a property that is 36 km from his company's premises. The scale on the road map Jomo is using is 1: 500 000.

Use the scale to determine the map distance between his company and the property. Write down the answer in mm.

(4)

1.5 The distance from Jomo's premises to the client's property is 36 km.


If Jomo travels at an average speed of 90 km/h, calculate the time, in minutes, he will take to reach the client's property.

Formula: $\text{Time (hours)} = \frac{\text{Distance (km)}}{\text{Speed (km/h)}}$



(5)

[40]

QUESTION 2

- 2.1 The income and expenditure statements of a TVET campus cafeteria, for the periods ending 31st December 2018 and 31st December 2019, are presented below. Study the statements and answer the questions. 

Item	31st December 2018	31st December 2019
Income:		
Food Sales	R 247 000	R 215 450
Sale of beverages	R 95 000	R 105 650
Total	R 342 000	R 321 100
Expenses:		
Wages	R 27 000	R 31 500
Rent	R 3 900	R 4 500
Water and Electricity	R 1 500	R 1 900
Cost of Food	R 76 350	R 93 580
Cost of beverages	R 58 000	R 64 500
Advertising	R1 800	B
Fuel	R 8 300	R 10 200
Bank charges	R 900	R 1 100
Tax	R 9 065	R 5 950
Total	A	R 214 430
Profit/Loss	R 155 185	R 106 670

- 2.1.1 Is rent a fixed or variable expense?  (1)
- 2.1.2 Calculate the rent per month for the year 2019. (2)
- 2.1.3 Income from food sales decreased between 31st December 2018 and 31st December 2019.
Calculate the percentage decrease. Show all working. (4)
- 2.1.4 Give TWO possible reasons why income from food sales decreased in 2019.  (2)
- 2.1.5 Determine the value of **A**, the total of expenses for year ending 31st December 2018. Show all calculations. (3)

- 2.1.6 Determine the value of **B**, the amount spent on advertising for year ending 31st December 2019. Show all calculations. (4)
- 2.1.7 The owner of the cafeteria set a profit target of R12 600 per month. In which year did the cafeteria exceed the target? Show all calculations. (4)
- 2.1.8 Provide TWO ways in which the cafeteria can increase its profit margin. (2)
- 2.2 The manager of the cafeteria started purchasing items from a new wholesaler. He received a cash slip for items purchased from the wholesaler. Below is an incomplete example of the cash slip:


NorthCity Wholesalers 084 777 0847		Date: 10/01/2020	
Item	Price per Unit (VAT inclusive)	Quantity	Price
Take-away containers (125 per unit)	R116,10	A	R4 644,00
Plain 1 Ply serviettes (3 000's)	B	12	R1 380,00
Plastic Spoons (1 000's)	R156,77	5	C
		VAT (15%)	E
		Total	D

Use the above cash slip to answer the following questions:

- 2.2.1 Calculate the cost of a single take-away container in cents. (4)
- 2.2.2 Calculate the value of **A**, the quantity of take-away container sets. Show all calculations. (3)
- 2.2.3 Calculate the value of **B**, the price per unit of plain 1 Ply serviettes. Show all calculations. (3)
- 2.2.4 Calculate the value of **C**, the price of 5 units of plastic spoons (2)
- 2.2.5 Calculate the value of **D**, the total price of Items purchased. (2)
- 2.2.6 Calculate the value of **E**, the amount of VAT that is included in the total price. (4)




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QUESTION 3

- 3.1 Simphiwe was recently employed by an insurance company. She receives a salary and she also earn commission for every new client she introduces per month. The table below shows Simphiwe's total commission based on the number of new clients. 

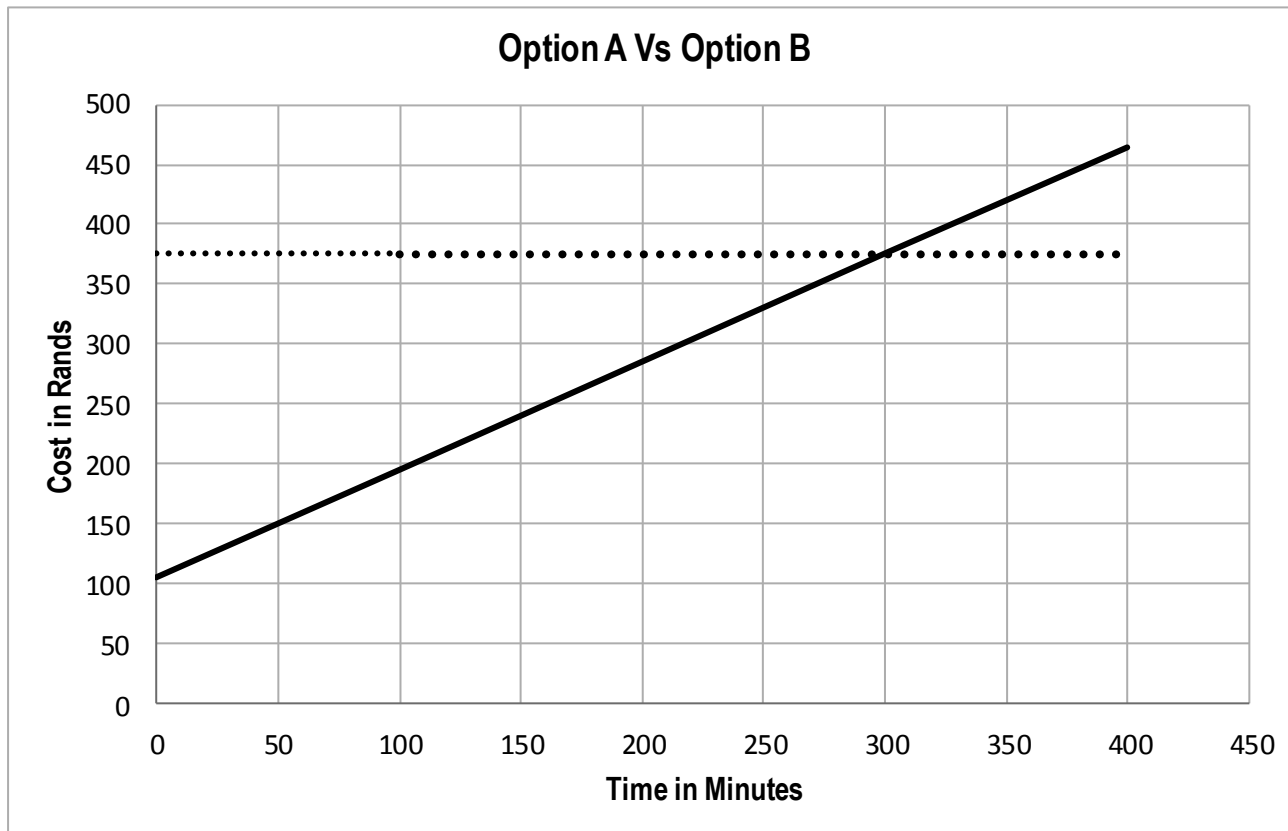
Number of new clients	5	10	15	20	25	B
Total commission in Rands	525	1 050	1 575	2 100	A	3 150

Use the above information to answer the questions.

- 3.1.1 Name the independent variable in the table.  (1)
- 3.1.2 Is the above information an example of a direct proportional relationship or an inverse proportional relationship? Give a reason for your answer. (3)
- 3.1.3 Calculate Simphiwe's commission per new client. (2)
- 3.1.4 Write a formula that can be used to calculate Simphiwe's Total commission
-  Formula: **Commission** = ... (2)
- 3.1.5 Calculate the missing values of **A** and **B**. (4)
- 3.1.6 Use the above table to plot and draw a line graph on the grid found on the ANSWER SHEET (attached). Label the horizontal and vertical axes and provide a suitable heading for the graph. (7)
- 3.1.7 If Simphiwe reaches a target of 50 new clients, the company doubles her commission for every new client. 
- Calculate the total commission that she will earn if she manages to sell policies to 58 new clients in one month. (5)

3.2 Simphiwe wants to take a cellphone contract. She wants to choose between the following two options:

Option A	Option B
A flat rate of R375 per month for unlimited cellphone calls only. (simcard only)	A flat rate of R105 per month plus R0,90 per minute for cellphone calls only.



Use the above table and graph to answer the questions.

- 3.2.1 Write down a formula that represents the information for Option B in the table. (3)
- 3.2.2 Which option does the dotted line graph represent? Give a reason for your answer. (2)
- 3.2.3 Which option does the solid line graph represent? Give a reason for your answer. (2)
- 3.2.4 Determine the difference in cost if Simphiwe makes calls for 100 minutes. Show all calculations. (3)
- 3.2.5 Under what conditions should Simphiwe choose option A? Give a reason for your answer. (1)

[35]

QUESTION 4

4.1 Two bakeries claim that their muffins weigh 50 grams each. If the average weight of a sample of muffins is found to be less than 50 grams, the bakeries can be fined. A quality control official weighed a sample of the muffins from each bakery to test their claim.

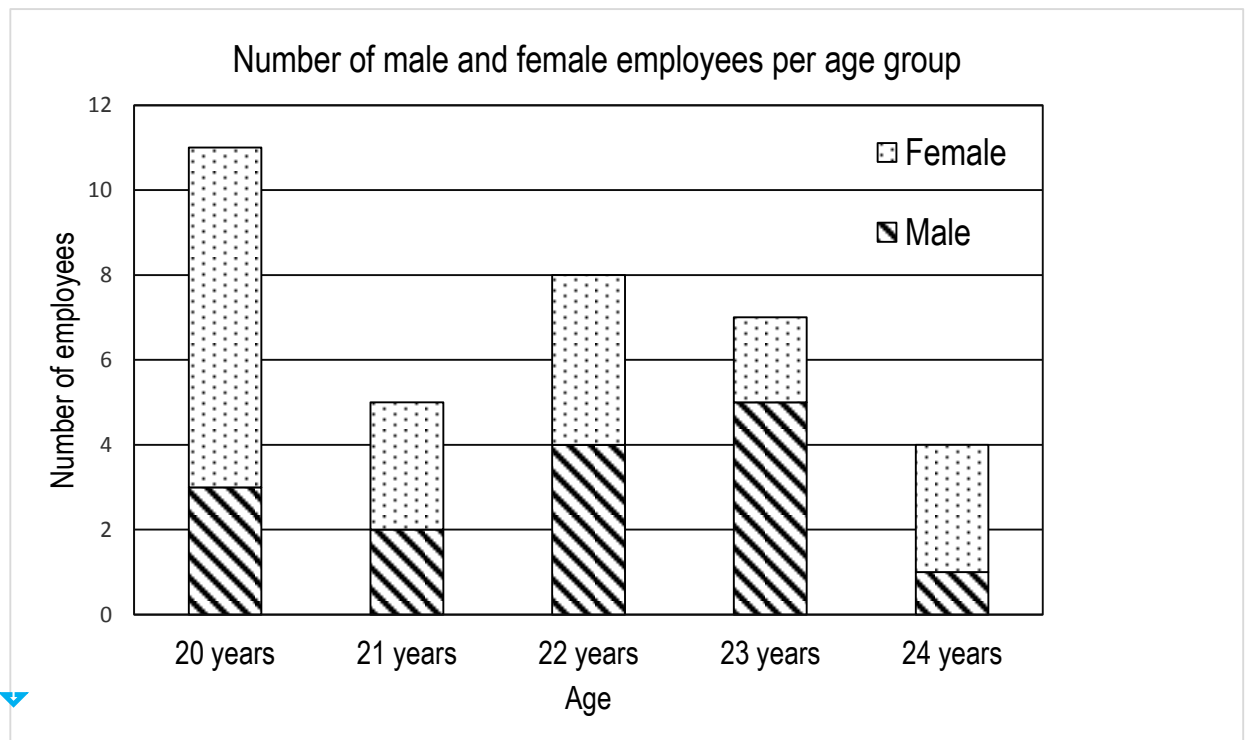
Bakery A	51	51	49	48	49	50	49
Bakery B	52	50	53	49	55	51	54





Use the above information to answer the questions that follow:

- 4.1.1 How many muffins, altogether, were under the legal weight? (2)
 - 4.1.2 Calculate the mean of the weight of muffins from Bakery A and the mean of the weight of muffins from Bakery B. Write down which bakery is defaulting. (5)
 - 4.1.3 Determine the range of the weight of all the muffins in the sample. (3)
 - 4.1.4 Determine the median of the weight of all the muffins in the sample. (4)
 - 4.1.5 Determine the modal value/s of the weight of all the muffins in the sample. (2)
- 4.2 The graph below shows the distribution of 35 male and female employees, between the ages of 20 and 24 years, who work for a small business company.

Study the graph and answer the questions.



- 4.2.1 Name the type of graph represented above? (2)
- 4.2.2 Which age group has the same number of males and females? (2)
- 4.2.3 How many male employees are between the ages of 20 and 24? Show all calculations.  (3)
- 4.2.4 How many 20 year old females work for the company? Show all calculations. (3)
- 4.2.5 Write down the ratio of the number of male employees to the number of female employees in its simplest form. (3)
- 4.2.6 What is the probability that an employee chosen at random from this sample will be a male? Give the answer as a percentage.  (3)
- 4.2.7 What is the probability that an employee chosen at random will be a 21 year old female? Give the answer as a fraction in its simplest form. (3)
- [35]**
- TOTAL: 150**

