higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

MATHEMATICAL LITERACY

(First paper)

NQF LEVEL 3

(10401023)

4 November 2024 (X-paper)
09:00–12:00

Non-programmable calculators may be used.

This question paper consists of 12 pages and 1 answer sheet.

007Q1N2404

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DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)
MATHEMATICAL LITERACY
NQF LEVEL 3
(First paper)
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 QUESTIONS 4.2.2, 5.1.4 and 5.1.5 on the ANSWER SHEET (attached). 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

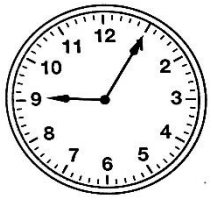
1.1 Calculate each of the following without using a calculator and show all calculations:

1.1.1 $100 - 87{,}23$ (1)

1.1.2 $\left(4600 \div 5^2\right) + \sqrt[3]{125}$ (2)

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

1.2 Sean's interview session will start 3 hours 20 minutes after the time shown on the clock to the right.



1.2.1 Write the time shown on the analogue clock in words. (1)

1.2.2 At what time will Sean's interview session start? (2)

1.3 A town planner recorded the heights of five tallest buildings in metres and completed the table as shown below.

Name of Building	Height in metres
Water Towers	74
Post Office	40
Liberty Palace	58
Monte Square	29
Alpine Centre	34

1.3.1 Which two buildings have a combined height that is the same as Water Towers? (1)

1.3.2 How much taller is Liberty Palace than Monte Square? (2)

1.4 A small farmer has nine cows on her dairy farm. Each cow produces $2\frac{1}{4}$ ℓ of milk per day.

1.4.1 Calculate how much milk (in litres) is produced each day. (2)

1.4.2 Convert the answer to QUESTION 1.4.1 to millilitres (mℓ). (2)

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1.5 There are 2 500 students at your campus. $\frac{2}{5}$ of these students are females.

1.5.1 Calculate the number of males at your campus. (2)

1.5.2 Write the fraction of females as a percentage. (2)

1.6 A courier vehicle travelled 452 km from Giyani Campus to Pretoria West Campus. It took the driver five hours to cover the distance.

1.6.1 Calculate the average speed at which the driver of the courier vehicle was driving. Write down your answer to the nearest km/h.

Formula: $\text{Speed} = \frac{\text{Distance}}{\text{Time}}$ (2)

1.6.2 The average speed of the courier vehicle for the 1st half of the trip (distance travelled) was only 100 km/h while the average speed for the second half was 113 km/h.

Determine the time the driver would arrive at the Pretoria West Campus if the trip started at 08:00 in the morning.

Formula: $\text{Speed} = \frac{\text{Distance}}{\text{Time}}$ (9)

[30]

QUESTION 2

2.1 Indicate whether the following statements are TRUE or FALSE by writing only 'True' or 'False' next to the question number (2.1.1–2.1.5) in the ANSWER BOOK.

2.1.1 Area is the measure of an open 2D shape and is measured in square units.

2.1.2 All angles in all different types of triangles are equal.

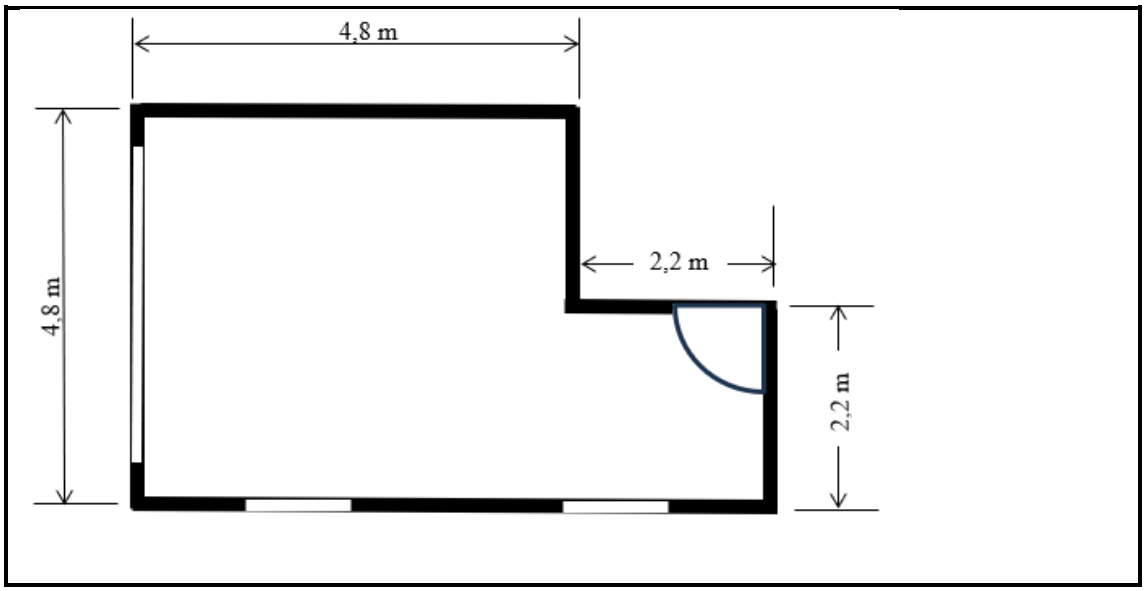
2.1.3 The maximum amount of substance an object can contain is called its capacity.

2.1.4 Hypotenuse is the shortest side of a right-angled triangle.

2.1.5 Volume is the amount of space that an object occupies.

(5 × 1) (5)

2.2 A diagram below shows a floorplan of an office. Use the information provided on the floorplan to answer the questions.

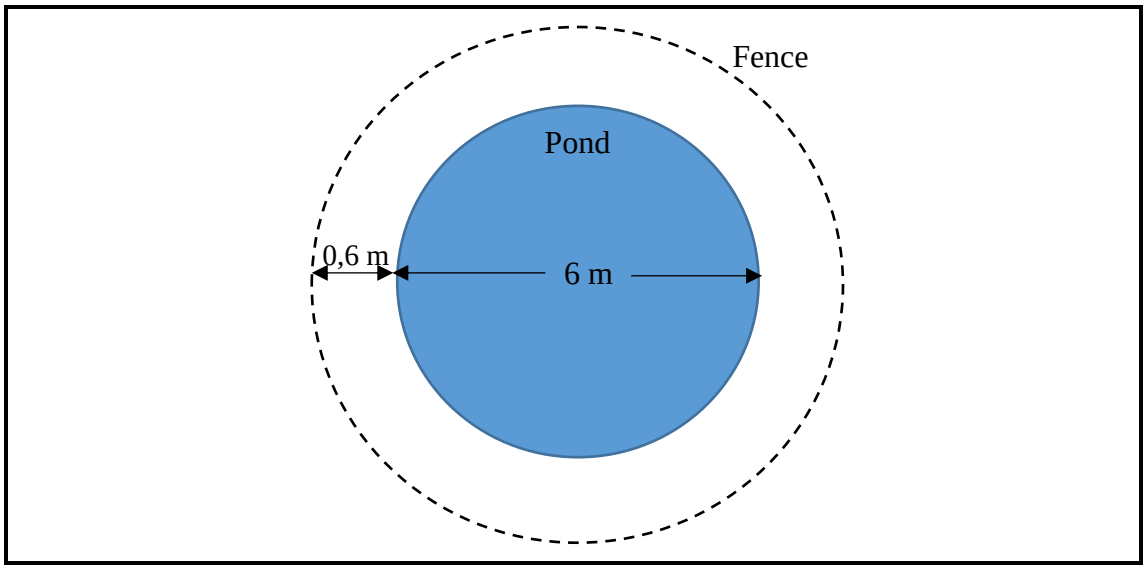


2.2.1 Calculate the perimeter of the office floorplan. (3)

2.2.2 Calculate the area of the office floorplan.

Formula: Area = Length × Breadth (5)

2.3 A landscaper plans to construct a circular pond with a diameter 6 metres. There is a circular fence around the pond that is 0,6 m away from the pond.



2.3.1 Calculate the length of fencing required in metres. Round off the answer to the nearest metre.

Formula: Circumference = $2\pi r$ where $\pi = 3,14$ (3)

2.3.2 Calculate the diameter of the fence. (2)

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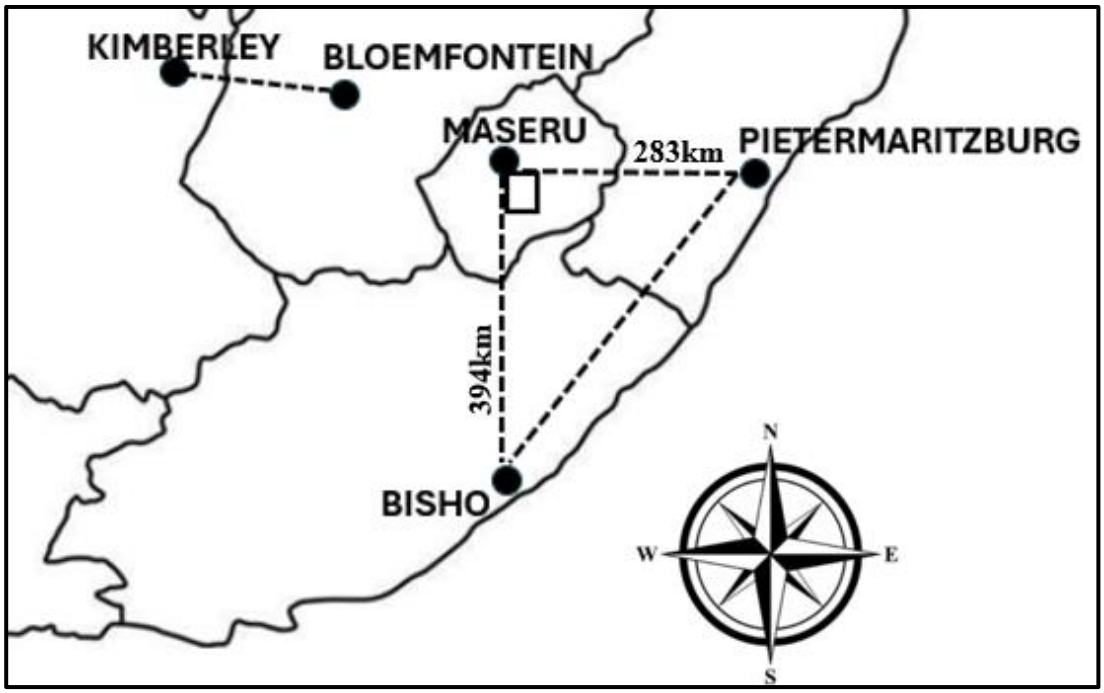
2.3.3 Calculate the area of the pond.

Formula: Area = πr^2 where $\pi = 3,14$ (4)

2.4 An image below shows an extract from a South African Map that include Lesotho. Use the information provided on the map to answer the questions.



2.4.1 What is the direction of Bisho as seen from Pietermaritzburg? (1)

2.4.2 A flight distance between Kimberly and Bloemfontein measures 15 mm on the map. Calculate the actual flight distance in km.

Scale of 1 : 10 000 000 (2)

2.4.3 A pilot flies for 394 km from Bisho to Maseru in Lesotho, and proceed to fly to Pietermaritzburg which is 283 away from Maseru. These three cities are in a form of a right-angled triangle on the map.

Calculate a flight distance between Bisho and Pietermaritzburg. Round off the answer to the nearest km.

Formula: $C^2 = A^2 + B^2$ (3)

2.4.4 The Flying time between Bisho and Maseru is 0 Hours 27 minutes. If a pilot maintains the same speed, calculate time in minutes required to fly from Maseru to Pietermaritzburg (2)

[30]

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QUESTION 3

3.1 An entrepreneur student at your campus is selling airtime and data to other students and lecturers. A table below shows the entrepreneur student's income and expenses for February and March 2024. Use the information provided to answer the questions.

INCOME AND EXPENDITURE STATEMENT FEBRUARY AND MARCH 2024		
	February	**March**
Total Income	**R9 800**	**A**
Data Sales Airtime Sales	R4 000 R5 800	R7 400 R7 700
Total Expenses	**R10 000**	**R11 300**
Stock Cost Vendor Machine Cost Other	**B** R1 500 R500	R9 000 **C** R850
Nett Income	**– R 200**	**D**

3.1.1 Calculate the values of A – D in the income and expenditure statement**.** (8)

3.1.2 What does a negative value on Nett Income mean? (2)

3.1.3 Write down an equation that shows the relationship between income, expenses and Nett Income. (3)

3.1.4 Use the equation you have provided in question 3.1.3 to calculate the expenses amount if Income is R8 200 and Nett Income is – R400 (2)

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3.2 The municipality has proposed the new water and sanitation tariff structure for domestic customers as shown in the table below. All households and dwellings connected to the municipality water and sanitation network are subjected to a fixed monthly Network availability Charge of R130,00. All amounts and tariffs are VAT exclusive.

FIXED		TARIFF	FREQUENCY
1	Network availability Charge	R130,00	per month
USAGE		TARIFF PER kℓ	FREQUENCY
2	0 – 9 kℓ	R0,00	per month
3	10 – 18 kℓ	R24,35	per month
4	19 – 30 kℓ	R32,96	per month
5	31 – 42 kℓ	R37,94	per month
6	43 – 60 kℓ	R40,60	per month
7	More than 60 kℓ	R43,47	per month

3.2.1 Calculate the monthly cost if water was not used at all for the entire month. (1)

3.2.2 Calculate the monthly cost if 11 kℓ of water was used for the entire month. (3)

3.2.3 Calculate the VAT to be charged for Network availability Charge if VAT is charged at 15%. (3)

3.2.4 Calculate the monthly cost if 23 kℓ of water was used for the month. (6)

3.2.5 Give one reason why do municipalities use a sliding scale tariff to charge for water. (2)

[30]

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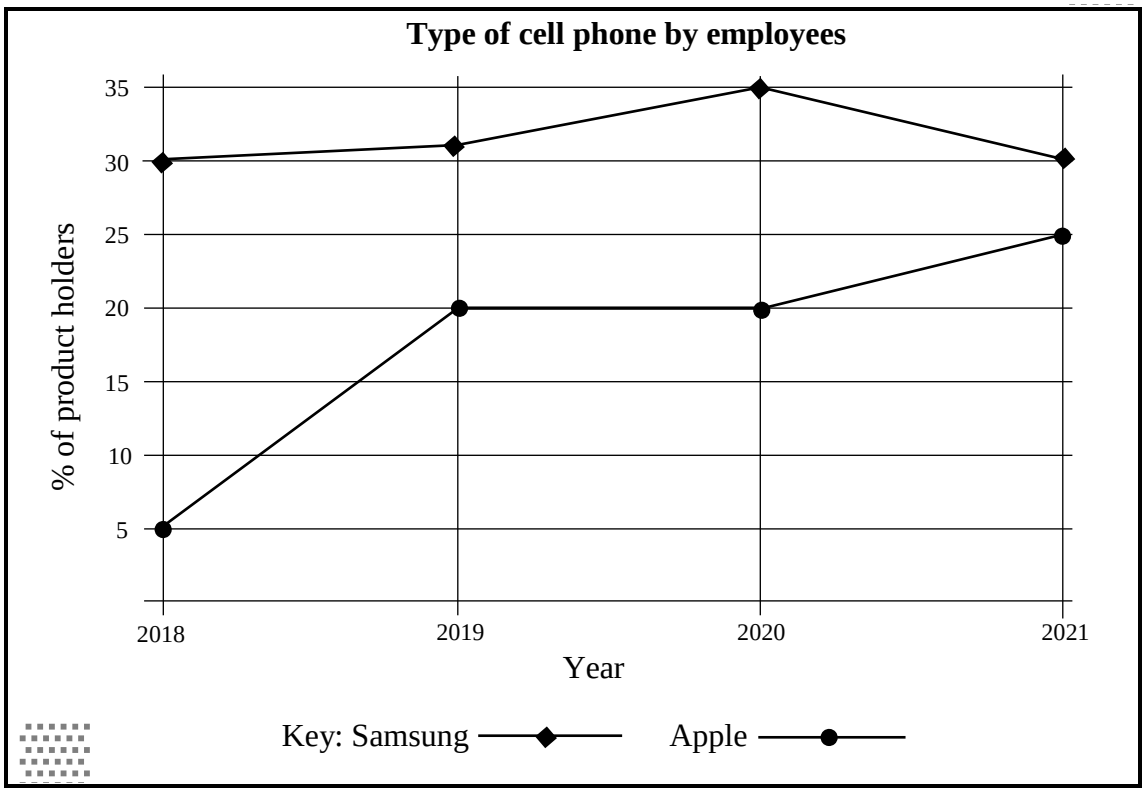
QUESTION 4

4.1 The graph below shows the number of cell phones (as a percentage) used by employees of a small company over a period of four years. Use the information provided on the graph to answer the questions.



4.1.1 What percentage of employees owned a Samsung and Apple respectively in 2018? (2)

4.1.2 During the period 2018 to 2021, which phones were more popular? How is this shown on the graph? (3)

4.1.3 What is the percentage of employees that owned neither a Samsung nor an Apple phone in 2020? (2)

4.1.4 Over which period is the Samsung graph decreasing? (2)

4.1.5 If the company has 120 employees, how many of them owned an Apple phone during 2021? (3)

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4.2 The relationship between distance (d) and time (t) is described by the following equation:

$$d = \frac{13}{2}t$$

4.2.1 Complete the table below by calculating the value of *a*, *b* and *c* that will satisfy the equation.

t	0	*b*	4	6
$d = \frac{13}{2}t$	*a*	13	*c*	39

(3)

4.2.2 Draw a line graph that represents the table in QUESTION 4.2.1 on the ANSWER SHEET (attached). (5)

4.2.3 Which is the dependant and independent variable for the table in QUESTION 4.2.1? (2)

4.2.4 Is the pattern above a constant difference or constant ratio? Explain the answer. (3)

4.3 Palesa wants to develop a formula for the cost of buying picture frames. She has the following information:

The number of picture frames she buys every month is *n* and the price of each picture frame is R120. The cost of all the picture frames together is represented by *c*.

4.3.1 Derive the formula used to calculate the cost (*c)*. (2)

4.3.2 If Palesa is buying seven picture frames every month, calculate how much she will spend buying picture frames in three months. (3)

[30]

QUESTION 5

5.1 The Royal Council wants to determine the number of people (aged 30–35) who were employed by the PYEI (Presidential Youth Employment Intervention) from April to September 2023. The information in table below represents the responses from a sample of 25 employees who were hired during that period.

April	**August**	**May**	**June**	**April**
July	**May**	**August**	**May**	**September**
September	**June**	**April**	**July**	**June**
August	**September**	**September**	**July**	**September**
May	**July**	**September**	**April**	**September**

5.1.1 Write down the modal month (mode) for this data. (1)

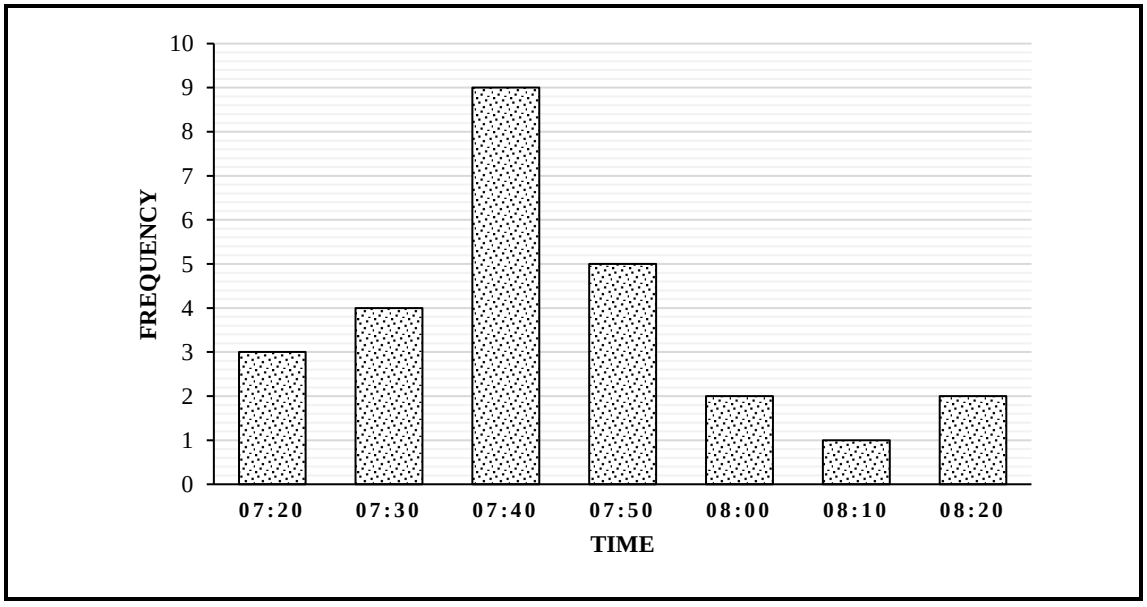
5.1.2 What is the frequency of this mode? (1)

5.1.3 During which month were the most employees employed? (1)

5.1.4 Use the given information to complete the tallies for June, July and September in the tally table on the ANSWER SHEET (attached). (3)

5.1.5 Use the tally chart in QUESTION 5.1.4 to construct a bar graph on the ANSWER SHEET (attached). (5)

5.2 At a TVET campus, lessons start at 08:00. The graph below shows the distribution of the times lecturers arrive for work.



5.2.1 How many lecturers arrive:

a) Before 07:30? (1)

b) Between 07:30 and 08:00 (1)

5.2.2 Calculate the total number of lecturers employed the TVET campus. (2)

5.2.3 What is the modal of the arrival time? (1)

5.3 The mean of a set of four numbers, namely 123, 186, 7 and x is 94. Determine the value of x.

Formula: Mean = $\frac{\text{The sum of all values}}{\text{The total number of values}}$ (4)

5.4 Themba sold a single ticket in a raffle, and he knew that five of the 2 000 tickets that have been sold will be winning tickets (1st; 2nd; 3rd; 4th and 5th prizes).

5.4.1 What is the probability that the buyer of the ticket will win the first prize? (1)

5.4.2 Write the answer to QUESTION 5.4.1 in the form of a decimal fraction. (2)

5.4.3 What is the probability that buyer of the ticket will win any prize? Write the answer as a common fraction in the simplest form. (3)

5.4.4 Convert the answer to QUESTION 5.4.3 to a percentage. (2)

5.5 One fair die is thrown.

What is the probability of getting an odd number? Write the answer in its simplest form. (2)

[30]

TOTAL: 150

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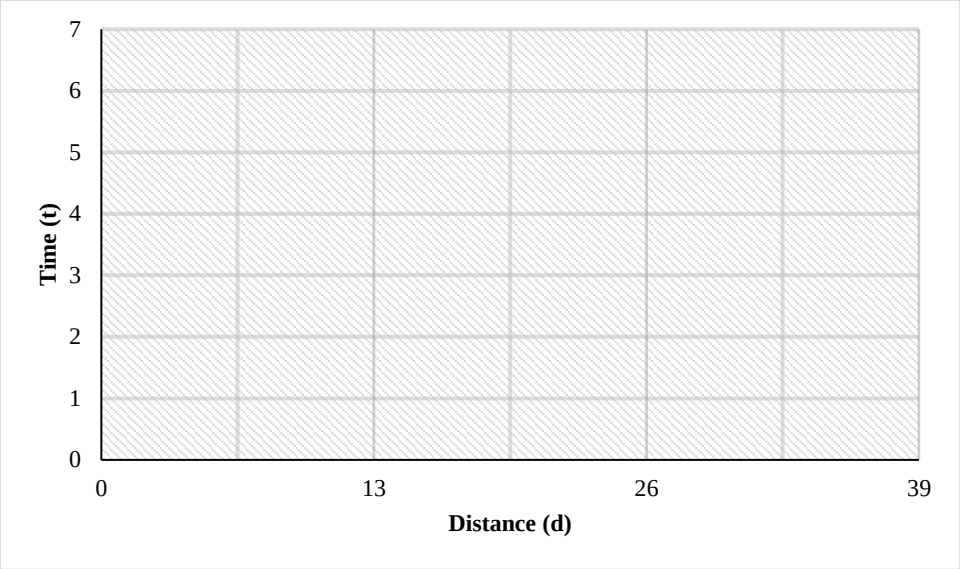
ANSWER SHEET EXAMINATION NUMBER:

4.2 4.2.2



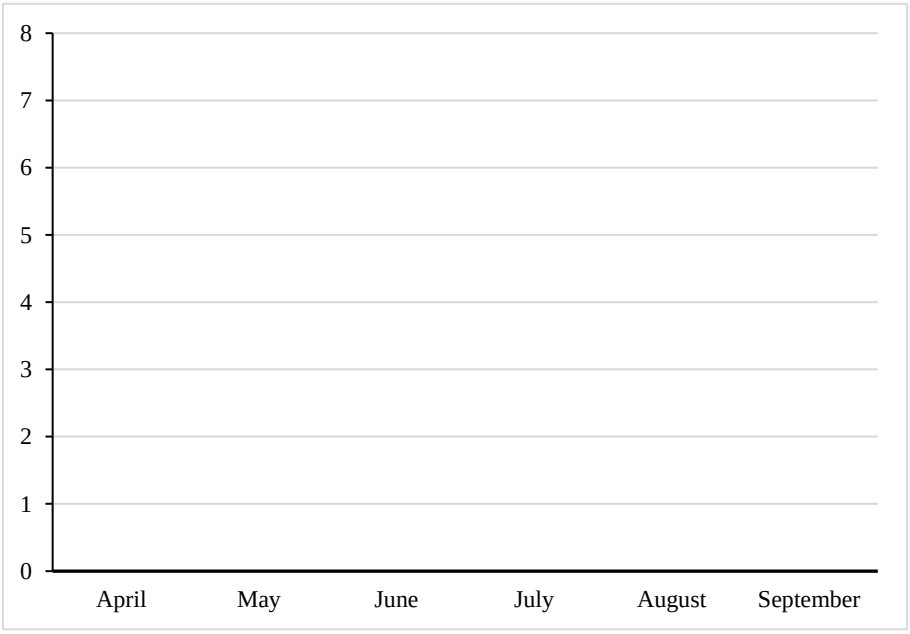
(5)

5.1 5.1.4

Month	Tally
April	////
May	////
June	
July	
August	///
September	

(3)

5.1.5



(5)

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