higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

MATHEMATICAL LITERACY
(Second Paper)

NQF LEVEL 2

(10401012)

6 November 2018 (X-Paper)
09:00–12:00

Calculators and drawing instruments may be used.

This question paper consists of 9 pages and 3 addenda.

Copyright reserved

TIME: 3 HOURS
MARKS: 150

INSTRUCTIONS AND INFORMATION

1. Answer ALL the questions.
2. Read ALL the questions carefully.
3. Clearly show ALL calculations, diagrams, graphs, et cetera that will be used in this paper.
4. Number the answers according to the numbering system used in this question paper.
5. Round off ALL final answers according to the given context, unless stated otherwise.
6. Drawing instruments, including rulers, pairs of compasses, and protractors may be used.
7. Diagrams are not necessarily drawn to scale.
8. Answer QUESTION 2.2.1 on ADDENDUM A, QUESTION 3.1.3 on ADDENDUM B and QUESTION 4.1.6 on ADDENDUM C. Detach the ADDENDA and hand them in together with the ANSWER BOOK.
9. Indicate units of measurement where applicable.
10. Write neatly and legibly.

Copyright reserved

QUESTION 1

1.1 The local municipality built a playground to encourage children to play outdoors. The playground consists of section A, section B and section C.
The width of the playground is 55 m and the length 105 m.

1.1.1 Name the shapes represented by **A** and **B**. (2)

1.1.2 Calculate the perimeter of the playground in m.

FORMULA: Circumference of circle = $2 \times \pi \times r$, where $\pi = 3{,}14$ (7)

1.1.3 Calculate the cost of fencing the playground if fencing costs R50 per metre. (3)

1.1.4 Calculate the area of the playground. Round your answers off to two decimals.

FORMULA: Area of circle = $\pi \times r^2$, where $\pi = 3{,}14$ (6)

1.1.5 The town map has a scale of 1 : 10 000. The actual distance between the playground and the municipal library is 500 metres.

Determine the map distance between these two places in mm. Show all your calculations.

HINT: 1 m = 1 000 mm (6)

1.2 The municipality provides juice for the school children. The juice is served from cartons into polystyrene cups. Each polystyrene cup can hold 125 cm^3 of juice. Study the diagrams below and answer the questions.

CARTON OF JUICE	POLYSTYRENE CUP
	Volume of cup = 125 cm^3

1.2.1 Name the three-dimensional shape of the juice carton. (1)

1.2.2 Calculate the volume of the carton of juice.

FORMULA: Volume = length × breadth × height (5)

1.2.3 Approximately how many polystyrene cups can one carton of juice fill? (3)

1.3 A cyclist began cycling at 08:45 and took 4 hours and 30 minutes to cover a distance of 65 km.

1.3.1 At what time did he complete the race? (2)

1.3.2 Convert 4 hours and 30 minutes to hours only. (2)

1.3.3 Calculate the cyclist's average speed in kilometres per hour (km/h).

FORMULA: Average speed = distance ÷ time (3)

[40]

QUESTION 2

2.1 Sipho wants to buy a cellphone. He wants to choose one of the two prepaid call charge options shown below.

Option A			
Peak voice calls Monday–Friday 7:00–20:00	Off-peak voice calls Monday–Friday 20:00–7:00	SMS peak	SMS off-peak
R2,55/min	R1,40/min	80 cents	35 cents

Option B		
Peak and off-peak voice calls	SMS peak	SMS off-peak
R2,70 for the first minute thereafter R1,55/min	80 cents	35 cents

2.1.1 If Sipho had to make a call for 10 minutes at 16:00 on option A, how much will it cost him? (3)

2.1.2 If Sipho had to make a call for 10 minutes at 22:00 on option A, how much will it cost him? (2)

2.1.3 Will it be cheaper for Sipho to talk for 5 minutes at 10:00 on a week day on option A or option B? Show ALL your calculations. (5)

2.2 Brian had a part-time job. He kept record of all his earnings and all the payments he made during the month of September 2018.

Salary	R4 500
Rent from roommate	R700
Rent paid to landlord	R1 300
Water and electricity	R370
Taxi and bus fare	R400
Groceries	R2 095
Telephone bill (landline)	R435,05
Entertainment	R150
Clothing and toiletries	R300
Bank charges	R50
School fees	R155

2.2.1 Use ADDENDUM A (attached) to complete Brian's income and expenditure statement. (10)

2.2.2 Use Brian's completed income and expenditure statement, in QUESTION 2.2.1, and show by means of a calculation whether he had a surplus or deficit. (2)

2.2.3 If Brian wants to improve his financial position, on which TWO items do you think he could spend less money? Explain your answer. (3)

2.2.4 Brian receives an increase of 8% on his salary. His expenses on rent increases by 10%. All other expenditures stay the same.

Show by means of calculations how much his surplus will be. (6)

2.3 The table below shows a part of Brian's Telkom bill for his landline telephone account.

Telkom	
Invoice	September 2018
Rental	R 317,54
Usage	R 92,15
Discounts	R 28,07 CR
Subtotal	**R 381,62**
VAT 14%	R xxxxx
TOTAL (this invoice)	R435,05

2.3.1 Show how the subtotal value of R381,62 was determined.

2.3.2 In South Africa 14% VAT was charged in 2017. Use this percentage to calculate the VAT on R381,62.

2.3.3 Show how the total value of R435,05 was calculated.

(3 × 3) (9)

[40]

QUESTION 3

3.1 Nkosinathi decided to change from the municipality electricity billing system to the metered prepaid electricity system. The cost of electricity is approximately R0,70 per unit of electricity.

Electricity (units)	0	10	20	30	**B**	100
Cost (Rands)	0	**A**	14	21	35	70

HINT: Cost of electricity = R0,70 × units

3.1.1 Calculate the value of **A**. (2)

3.1.2 Calculate the value of **B**. (2)

3.1.3 Use the table to draw a straight-line graph on the grid on ADDENDUM B (attached). Give the graph a suitable heading. Label the axes correctly. (9)

3.1.4 During a certain month Nkosinathi bought prepaid electricity for R175. How many units of electricity did he receive?

FORMULA: Units of electricity = Amount paid for electricity ÷ cost per unit of electricity (3)

3.2 Nkosinathi bought a season ticket for R580 to watch soccer at the Peter Mokaba stadium. The relative cost of attending a soccer match at the stadium depends on the number of matches attended during the season.

Relative cost per match = R580,00 ÷ number of matches attended

3.2.1 Determine the relative cost per match if Nkosinathi plans to attend 10 matches during the season. (3)

3.2.2 People who do not buy a season ticket pay R72,50 to attend a match. If Nkosinathi attended 10 matches during the season, determine how much he saved by purchasing the season ticket.

FORMULA:
Total Cost of single tickets = R72,50 × number of matches attended (3)

3.2.3 Explain why the relationship between the number of matches attended and the relative cost per match is inversely proportional. (2)

3.3 Six months after knee surgery, Rajen's trainer tells him to return to a light jogging programme. He suggests that Rajen starts jogging 12 minutes each day for the first week. Each week thereafter he must increase the time by 6 minutes per day.

Week number	1	2	3	4	5
Minutes of jogging per day	12				

3.3.1 Copy and complete the above table in the ANSWER BOOK. (4)

3.3.2 Determine the number of minutes that Rajen will run per day in week 9. (2)

3.3.3 If Rajen runs for 5 days in a week, calculate the total time that he will run in the first 3 weeks. Give your answer in hours. (5)

[35]

QUESTION 4

4.1 The table below shows the percentage scores that the female students of a level 2 class group achieved for a Mathematical Literacy test.

48	32	54	56
60	62	66	70
70	70	37	49
50	66	46	66

4.1.1 Determine the modal value(s) of the test scores. (2)

4.1.2 Calculate the range of the test scores. (3)

4.1.3 Calculate the mean (average) for the test scores. (3)

4.1.4 Determine the median of the test scores. (5)

4.1.5 Draw and complete the following frequency table of the female student test scores in your answer book

MARK INTERVAL	NUMBER OF STUDENTS
0–29%	
30–39%	
40–49%	
50–59%	
60–69%	
70–79%	
80–100%	0
TOTAL	

(7)

4.1.6 Draw and label a histogram of the examination results on the grid on ADDENDUM C (attached). Provide a suitable heading for the graph and label the axes. (9)

4.1.7 Does the histogram represent discrete or continuous data? (2)

4.2 The pie chart below shows the percentage increase of the price of brown bread, white bread and whole-wheat bread.

Identify two errors on the pie chart.

(4)
[35]

TOTAL: 150

Copyright reserved

ADDENDUM A **EXAMINATION NUMBER:**

QUESTION 2.2.1

INCOME	**AMOUNT IN RANDS**
Salary	R4 500
TOTAL INCOME	
EXPENSES	
Rent paid to landlord	R1 300
Water and electricity	R370
TOTAL EXPENSES	

ADDENDUM B **EXAMINATION NUMBER:**

QUESTION 3.1.3

ADDENDUM C **EXAMINATION NUMBER:**

QUESTION 4.1.6

Copyright reserved