

**higher education
& training**

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

MATHEMATICAL LITERACY

(First Paper)

NQF LEVEL 4

NOVEMBER 2012

(10401034)

29 October (Y-Paper)

13:00 – 16:00

REQUIREMENTS: Drawing instruments including rulers, pairs of compasses and protractors may be used.

Calculators may be used.

This question paper consists of 11 pages and an annexure.



TIME: 3 HOURS
MARKS: 150

INSTRUCTIONS AND INFORMATION

1. This question paper consists of NINE questions. 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, et cetera that will be used in determining the answers.
 5. Diagrams are not necessarily drawn to scale.
 6. Write neatly and legibly.
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QUESTION 1

1.1 Simplify the following:

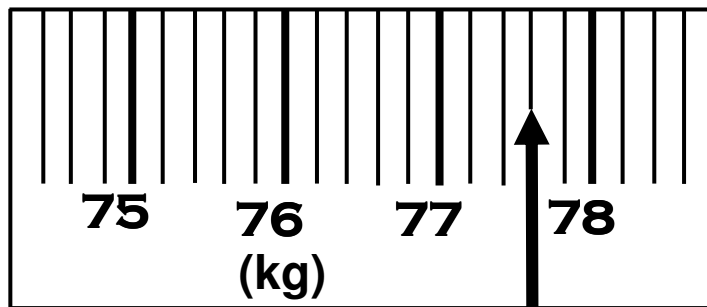
1.1.1 $790 - 39,7 \times 10$ (1)

1.1.2 $\frac{3}{4}$ of $\sqrt{361} - 20$ (1)

1.1.3 $0,5(9,9 + 3,4)^3 - 2,419$ (Correct to three decimal places) (1)

1.1.4 $\frac{1}{2} \left(1\frac{1}{3} + \frac{2}{3} \right) - 1$ (2)

1.2 Determine the mass in kilograms (kg) as shown on the scale.



(2)

1.3 A shop sells muffins for R24,96 per dozen. What is the effective cost of one muffin? (2)

1.4 Diesel costs R9,30 per litre. How much would it cost you to fill up your car with 55 litres of diesel? (2)

1.5 The Springbok rugby squad consists of 30 players. At the recent World Cup 40% of the players became ill before a game. Calculate the number of players who were left to play. (2)

1.6 The Greyhound leaves Scottburgh station at 07:35 and arrives at Pretoria station at 18:20 on the same day. Calculate the duration of the journey in hours and minutes. (2)

1.7 Calculate the volume (in cm^3) of a cylindrical can if its height is 11,5 cm and its diameter is 6,4 cm. (Volume = $\pi \times r^2 \times h$, where $\pi = 3,14$) (3)

1.8 A camera costs €86 if purchased in Greece. In South Africa the same camera costs R900. Where would it be cheaper to buy the camera if R9,87 = €1? Show ALL the calculations. (3)

1.9 A clothing shop offered a discount of 20% on an item of clothing. After the discount the price of the item was R168,00. What was the original cost of the item? (3)



1.10 The preparation guidelines for Oros concentrated juice is as follows:

Shake well and dilute to taste (one part concentrated juice to nine parts water).

If you have 750 ml of concentrated Oros juice, how much water must you add to make a drinkable juice according to the recommended mixture? Convert the answer from ml to litres.

(1 000 ml = 1 l)



(3)

1.11 In a survey that was conducted through a representative sample at your college, it was found that there were 125 students who walked to college, 373 students who travelled by taxi and 212 students who travelled by bus.

1.11.1 What was the sample size?

(1)

1.11.2 If any student is chosen at random, what is the probability that this student travels by bus?

(2)

[30]

QUESTION 2

Lunga started a small business manufacturing teapots. He opened up a small factory with two employees and some machinery and equipment.

Each teapot costs R10 to manufacture.

Fixed costs for running the teapot factory are R5 000 per month.



2.1 Lunga calculated the total monthly expenses of his business as follows:

Total monthly expense = R5 000 + (number of teapots × R10)

Teapots produced	20	60	100	B	140
Total monthly expenses	A	R5 600	R6 000	R6 200	R6 400

2.1.1 Use the formula to calculate the values of **A** and **B**.

(4)

2.1.2 Use the TABLE to draw a straight line graph on the grid provided on ANNEXURE A. Clearly label this graph as **Total Expenses**.

(5)



2.2 Lunga plans to sell each teapot for R80. The formula to calculate income is as follows:

$$\text{Income} = \text{number of teapots sold} \times \text{R } 80$$

Teapots sold	20	60	80
Income	R1 600	R4 800	C

2.2.1 Use the formula to find the value of C. (2)

2.2.2 Use the table to draw a straight line graph on the grid provided on ANNEXURE A. Clearly label the graph as **Income**. (5)

2.3 Use the graphs drawn on ANNEXURE A to answer the following questions:

2.3.1 Determine the number of teapots which Lunga must sell in order to break even. (Neither a loss nor a profit) (2)

2.3.2 What profit would Lunga make if he sold 90 teapots? (3)
[21]

QUESTION 3

3.1 Dedekind Butchery provided you with the following TABLE that it uses to buy and sell meat:

PRODUCT	COST PRICE (PER KG)	SELLING PRICE (PER KG)
Lamb chops	R28	R35
Fillet steak	R76	?
Pork chops	R43	R50,74
Chicken	R50	R60



3.1.1 What is the profit on a kilogram of pork chops? (2)

3.1.2 What is the percentage mark-up of lamb chops? (2)

3.1.3 If fillet steak is marked up by 15%, determine its selling price. (3)

3.1.4 A customer buys 1 kg of lamb chops, 0,8 kg of chicken and 0,5 kg of pork chops. How much will he/she pay for his/her purchase? (4)

3.2 Dedekind Butchery has a customer who has moved to South Africa from the USA. In America mass is measured in pounds and ounces instead of kilograms and grams.

He/She wants to buy 8 pounds of lamb chops. Let's help Mr Dedekind to serve his customer. You will need the following conversions:

- 1 kg lamb chops = R35
- 2,2 pounds = 1 kg
- US\$1 = R7,34

3.2.1 Convert 8 pounds to kilograms (kg). (Round off your answer to the nearest kg) (3)

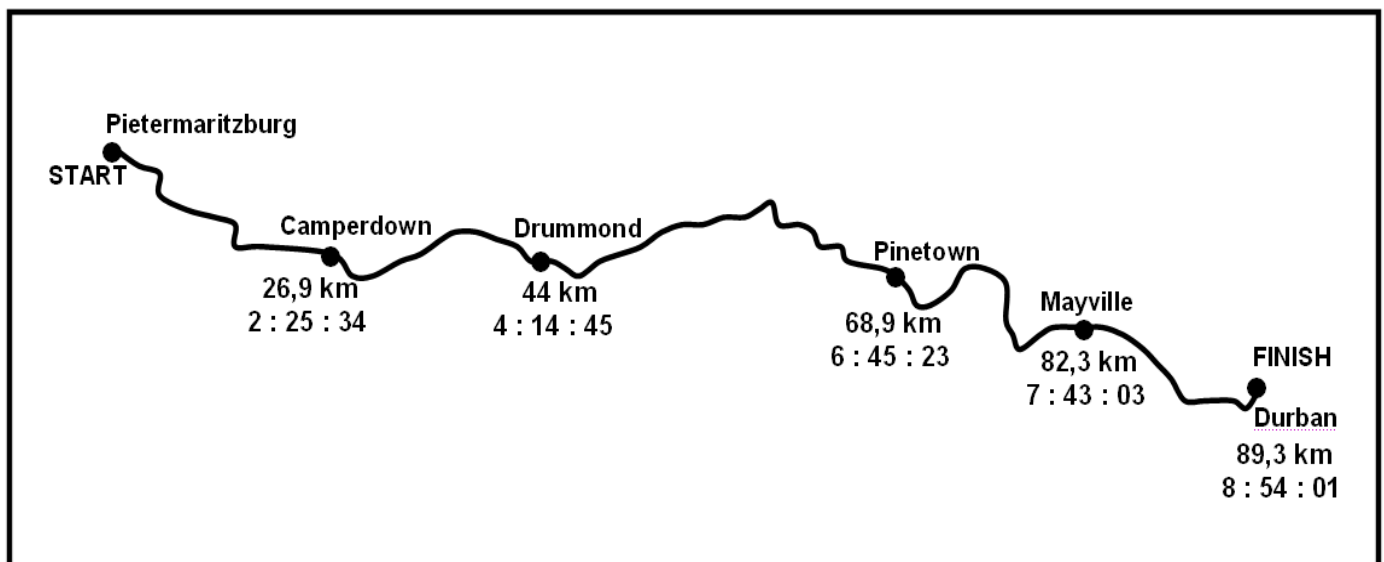
3.2.2 Determine the price of 8 pounds of lamb chops, in rands. (Use your rounded-off answer from QUESTION 3.2.1) (2)

3.2.3 Convert the answer obtained in QUESTION 3.2.2 into dollars. (2)

[18]

QUESTION 4

The strip map below shows the running times and distances of Goodman Dube at certain points on the route of the Comrades marathon. The times are given in hours, minutes and seconds and the distances are given in kilometres.



Study the above strip map and answer the questions that follow. Show all working.

4.1 Determine the time it took Goodman to complete the marathon. (1)

4.2 The Comrades marathon starts at 05:30. Determine the time at which Goodman completed the race. (3)

4.3 Calculate the distance from Camperdown to Pinetown. (3)



4.4 Calculate the time it took Goodman to run from Camperdown to Pinetown. (Round off your answer to the nearest minute) (3)

4.5 Calculate Goodman's average speed from Camperdown to Pinetown.

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

(4)
[14]

QUESTION 5

The ages (in years) of patients treated for tuberculosis (TB) at two different clinics during the month of January 2011 were recorded as follows:

Tongaat	6	9	11	19	24	24	32	46	52	63
Umzinto	35	30	19	54	45	57	36	40	26	34

Use the above TABLE to answer the questions that follow:

5.1 What is the mode of the ages of the patients at the **Tongaat** clinic? (1)

5.2 Determine the average/mean of the ages of the patients at the **Tongaat** clinic. (Rounded off to the nearest year) (3)

5.3 Arrange the ages of the patients at the **Umzinto** clinic in ascending order. (1)

5.4 Determine the following for the ages of the patients at the **Umzinto** clinic:

5.4.1 The median (Quartile 2) (3)

5.4.2 Lower quartile (Quartile 1) (2)

5.4.3 Upper quartile (Quartile 3) (2)

5.5 Draw a box-and-whisker plot that represents the ages of the patients at the **Umzinto** clinic. (5)
[17]



QUESTION 6

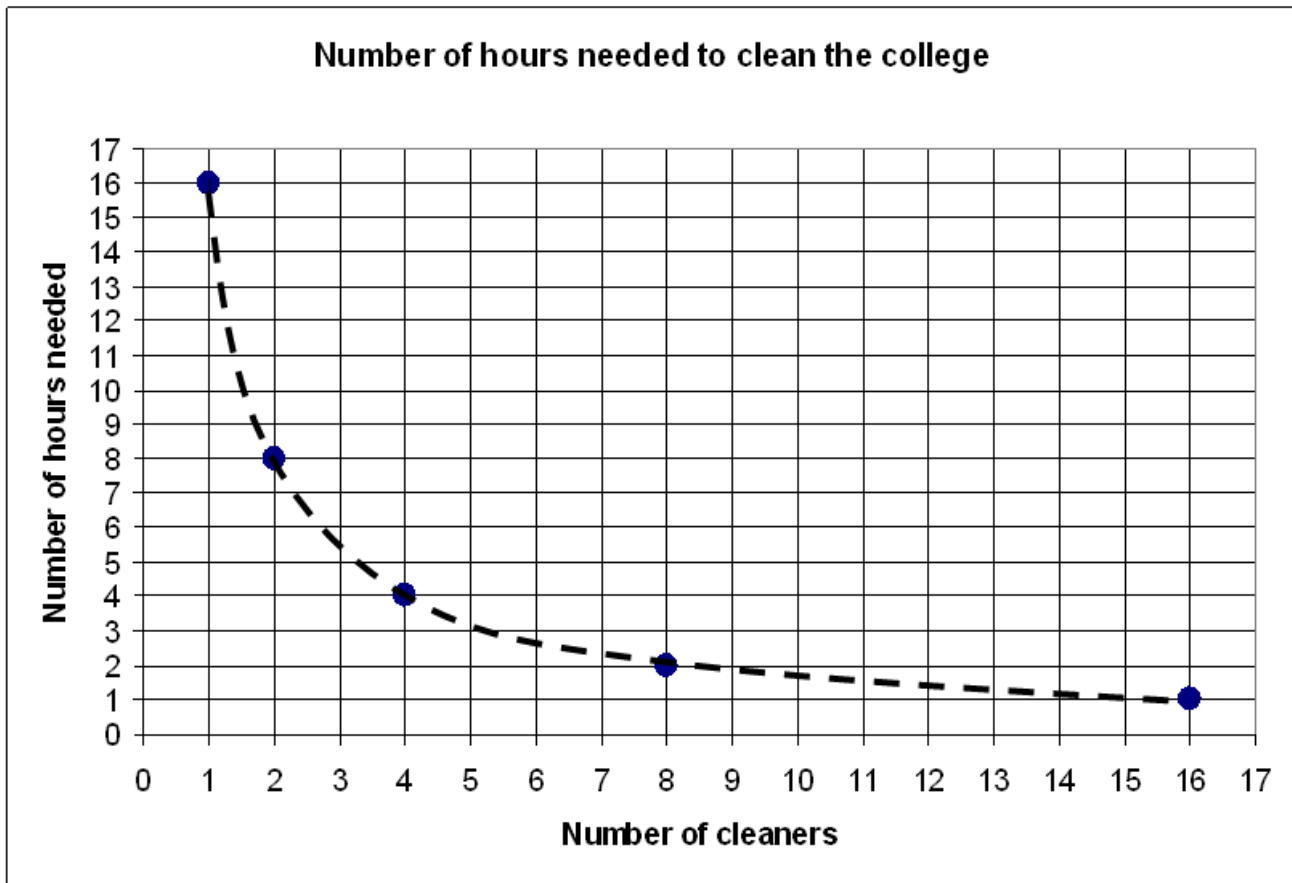
A college hires a cleaning service called Clean-rite to clean the college buildings. It takes 16 hours for one cleaner to clean the college every day. However, this is not practical as it is too much work for one person. The TABLE below shows the number of cleaners and the number of hours it will take to clean the college:

Number of cleaners	1	2	4	A	16
Number of hours needed to clean the college	16	B	4	2	1



6.1 Calculate the values of **A** and **B** by using the information given in the table. (4)

6.2 The graph below illustrates the information in the TABLE. Use the graph to answer the questions that follow:



6.2.1 Why is the graph represented as a dotted line? (1)

6.2.2 Determine approximately how long it will take five cleaners to clean the college. (2)



- 6.2.3 How many hours will it take 32 cleaners to clean the college? (2)
- 6.2.4 What type of proportion does this graph represent? (1)
- [10]**

QUESTION 7

Given below is a bank statement for Megan's bank account for the month of February. Study the bank statement and answer the questions that follow:

<u>FRAUD BANK</u>			
Bank statement – Cheque account			
Customer name: Megan de Fundi			
Statement date: 1 February 2012 – 29 February 2012			
Cheque account No: 165400054779			
Date	Description	Amount	Account balance
1	Opening Balance		R7 282,57 Cr
1	Debit Card purchase @ Pick n Pay	R2 114,72	R5 167,85 Cr
1	Transaction fee	R3,50	R5 164,35 Cr
2	Debit order – rent	R2 600,00	R2 564,34 Cr
2	Transaction fee	R6,00	R2 558,35 Cr
2	Debit order – cell phone	R269,32	R2 289,03 Cr
2	Transaction fee	R6,00	R2 283,03 Cr
3	Debit order – car insurance	A	R1 933,03 Cr
3	Transaction fee	R6,00	R1 927,03 Cr
8	ATM withdrawal	R250,00	R1 677,03 Cr
8	Transaction fee	R6,00	R1 671,03 Cr
13	ATM withdrawal	R1 000,00	R671,03 Cr
13	Transaction fee	R6,00	R665,03 Cr
20	Cash deposit @ branch	R400,00	B Cr
20	Transaction fee	R9,00	R1 059,03 Cr
28	Magtape credit - salary	R7 675,90	R8 734,93 Cr
29	Monthly account fee	R98,20	R8 636,73 Cr
		Final balance	R8 636,73 Cr

- 7.1 What does 'Cr' in the account balance column stand for? (1)
- 7.2 What was the closing balance on 2 February? (1)
- 7.3 How much money did Megan withdraw on 13 February? (1)
- 7.4 On what date of each month does Megan pay her rent? (1)
- 7.5 Calculate the total amount that Megan withdrew from her account using an ATM (Automatic Teller Machine). (2)
- 7.6 If Megan had a cellphone contract with a subscription fee of R135 and insurance of R17, how much did she spend on calls during January? (3)

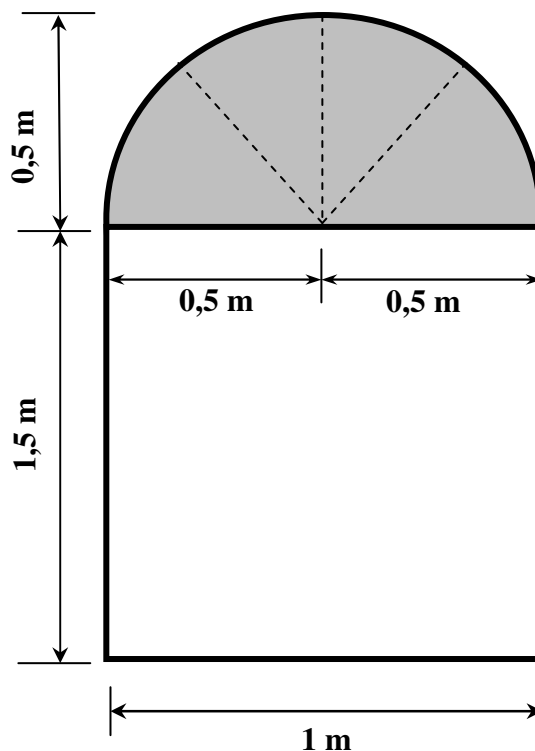


7.7 Calculate how much Megan pays for her car insurance (A). (2)

7.8 Calculate the missing balance (B) for 20 February. (2)
[13]

QUESTION 8

A manufacturer produces windows with the shape as shown below. The semi-circular part contains stained glass with a radius of 0,5 metres and the rectangular glass is made of clear glass with length = 1,5 metres and breadth = 1 metres.



Study the sketch of the glass given above and answer the questions that follow:

8.1 Calculate the total surface area of the stained glass.

Formula: Total surface area = $\frac{1}{2} \times \pi r^2$ and $\pi = 3,14$ (3)

8.2 Calculate the total surface area of the clear glass. (2)

8.3 The stained glass costs R65 per m^2 and the clear glass costs R45 per m^2

8.3.1 Calculate the cost of stained glass needed for one window. (2)

8.3.2 Calculate the cost of clear glass needed for one window. (2)

8.4 If the dotted line represents lead strips used to strengthen the stained glass, calculate the total length of the strips needed for one window. (2)

8.5 The outside of the entire window and the part which joins the two shapes are bound by a wooden frame. Calculate the length of the wood needed for one window. Use

the formula: $\text{Perimeter} = \frac{1}{2} \times \pi d + 2(l + b)$, where d is the diameter and $\pi = 3,14$

(3)
[14]

QUESTION 9

The ages and qualifications of 3 054 college lecturers in South Africa were surveyed. The TABLE below shows the findings of the survey.

QUALIFICATIONS	AGE GROUPS				Totals
	<30	30-39	40-49	>50	
National Diploma in Mechanical Engineering	15	152	102	221	490
National Diploma in Electrical Engineering	43	337	311	166	857
National Diploma in Civil Engineering	A	121	127	37	297
National Diploma in Business Studies	211	578	298	145	1 232
National Professional Diploma in Education	33	75	45	25	B
Totals	314	1 263	883	594	3 054

Use the contingency TABLE given above to answer the questions that follow:

9.1 Calculate the values of A and B. (4)

9.2 If a lecturer is chosen at random:

9.2.1 What is the probability that the lecturer is over the age of 50? (3)

9.2.2 What is the probability (as a percentage) that the lecturer has a National Diploma in Business Studies, in the age category 40 to 49? (3)

9.2.3 What is the probability that the lecturer is under the age of 40? (3)

[13]

TOTAL: 150



ANNEXURE A

EXAMINATION NUMBER:

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QUESTION 2.1.2 and 2.2.2

