12

higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

MATHEMATICAL LITERACY
(First Paper)
NQF LEVEL 3

NOVEMBER EXAMINATION

(10401023)

29 October 2013 (X-Paper)
09:00–12:00

Calculators and drawing instruments may be used.

This question paper consists of 11 pages and 1 annexure.

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 9.1 and QUESTION 9.2.5 on the attached ANNEXURE and submit the ANNEXURE with your ANSWER BOOK.
5. Diagrams are not necessarily drawn to scale.
6. Write neatly and legibly.

BODMAS

QUESTION 1

1.1 Calculate each of the following:

1.1.1 $60 + 8 \div 4$ (2)

1.1.2 75% of R250,03 (2)

1.1.3 $\frac{1}{6}(8{,}5 + 3{,}5) \div \frac{1}{10}$ (Show all your calculations) (4)

1.2 Rearrange the following numbers in order from greatest to smallest:
0,155 0,44 0,441 0,4 (2)

1.3 Determine the 5th term in the following arithmetic sequence:
2 ; 36 ; 70 ; 104 ; _____ (2)

1.4 Convert 75 000 grams into tonnes. Show all your calculations.

(1 tonne = 1 000 kg and 1 kg = 1 000 g) (3)

1.5 One lap around an athletics track takes Famida 4 and a half minutes to complete. How many times can she run around the track in 27 minutes? Assume she is running at a constant speed. (3)

1.6 Patricia, a personal assistant stores 2 700 data files. The data files are stored on her computer, DVD and external hard drive in the ratio 1 : 2 : 5. How many data files are stored on Patricia's DVD? Show all your calculations. (3)

1.7 Thembeka made a profit of R450 000 this year. She donated R26 500 to the Msunduzi Hospice Association. She decided to invest three quarters of the balance of the profit. Calculate the value of the investment. Show all your calculations. (4)

1.8 Johnny paid an amount of R520,20 for 45 litres of petrol.

1.8.1 Calculate the cost of petrol per litre. (2)

1.8.2 How much does 50 litres of petrol cost? Show all your calculations. (2)

1.9 A block in the shape of a cube has a length of 62 cm. Calculate the volume of the block.

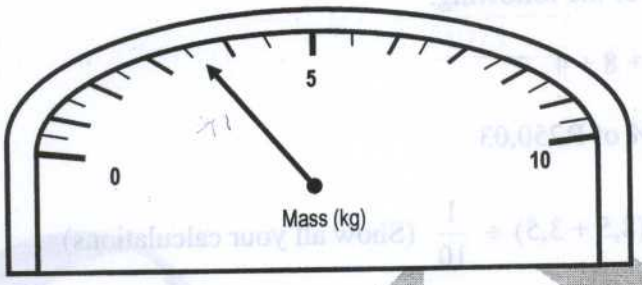
Formulae: $V = l^3$ or $V = l \times l \times l$ (2)

6,75

4 x 27

108,13

1.10 Read and write down the value of the mass in kg as indicated on the scale given below.



(2)
[33]

QUESTION 2

A timetable for movies at a local cinema is shown below. Use the timetable to answer the questions that follow:

Week day	Cinema	Available show times					
		1	2	3	4	5	6
Sunday	2	09:45	12:15	15:00	17:45	20:15	22:45
Monday	2	15:00	17:45	20:15	22:30		
Tuesday	1	09:15	11:45	14:45	17:00	19:30	22:15
Wednesday	1	09:15	11:45	14:45	17:00	19:30	22:15
Thursday	1	09:15	11:45	14:45	17:00	19:30	
Friday	1	09:15	11:45	14:45	17:00	19:30	
Saturday	1	09:15	11:45	14:45	17:00	19:30	22:15

2.1 In which cinema will the movie be shown on Wednesday? (1)

2.2 On which day does the cinema has the least number of shows? (1)

2.3 Write down the day and time of the latest show that a cinema can show. (2)

2.4 What does a blank cell represent in the 'available show times' column? (2)

2.5 On which day(s) of the week is it possible to watch a movie at 3pm? (2)

2.6 Brenda arrived at 19:30 on Monday to watch show 3. Determine how long she will have to wait before show 3 starts. (2)

2.7 Show 2 only plays for 2 hours on Friday. How long after the end of show 2 will show 3 start on Friday? Show all your calculations. (3)
[13]

QUESTION 3

3.1 Study the income and expenditure table of a taxi owner for May 2013 below.

ITEM	INCOME	ITEM	EXPENDITURE
Taxi Private hire	R3 000,00	Maintenance Costs:	
Taxi fare collected	R13 842,00	(a) Fuel	R4 815,40
		(b) Servicing and Repairs	R846,09
		(c) Cleaning	R500,00
		Insurance for the taxi	R305,45
		Taxi monthly licence fee	R400,00
		Taxi drivers salary	R4 210,50
		Taxi association fee	R200,00
TOTAL INCOME		**TOTAL EXPENSES**	

Use the information given in the table and calculate the following:

3.1.1 The total maintenance cost on the taxi. (2)

3.1.2 The total income. (2)

3.1.3 The total expenses. (2)

3.1.4 The net profit/loss. Show all your calculations. (3)

3.2 The taxi owner, in QUESTION 3.1, purchased the service and maintenance items for his taxi as shown in the invoice given below. Study this invoice and answer the questions that follow.

Invoice No: 201305-173 **TAX INVOICE** 31/05/2013

Item	Quantity	Unit price	Amount
Engine Oil (500 ml)	5	R 29,50	**3.2.1**
Oil filter	1	R 109,99	R 109,99
Air filter	**3.2.2**	R 139,50	R 139,50
Spark plugs	4	**3.2.3**	R76,00
Petrol filter	1	R 78,50	R 78,50
Total (Excluding VAT)			**R 551,49**
VAT @ 14%			**3.2.4**
Total (Including VAT)			**3.2.5**

3.2.1 Calculate the total cost of engine oil purchased before VAT. (2)

3.2.2 Determine how many air filters were purchased. (1)

3.2.3 Calculate the cost of one spark plug before VAT. (2)

3.2.4 Determine the total VAT amount. Show all your calculations. (3)

3.2.5 Calculate the total cost including VAT (2)

[19]

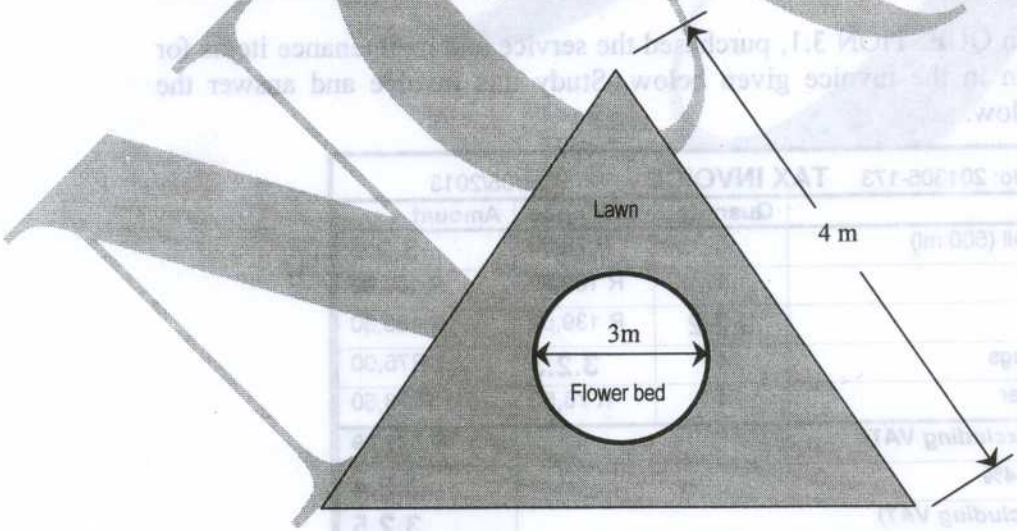
QUESTION 4

4.1 Match the description in Column B with the item in Column A. Write down the answer (A – F) next to the question number (4.1.1 – 4.1.5) in your ANSWER BOOK.

COLUMN A		COLUMN B	
4.1.1	Area	A	it is a distance around a flat object, regardless of the shape
4.1.2	Perimeter	B	it is the amount of space it occupies, to the amount of space it contains
4.1.3	Volume	C	total surface of any flat, curved or irregular region of a 2-dimensional figure
4.1.4	Square	D	it is the physical size of an object in relation to space
4.1.5	Rectangle	E	all four sides are equal
		F	a parallelogram having four right angles

(5 × 2) (10)

4.2 Mr Moshoeshoe, a landscaping artist, created a circular flower bed in a triangular lawn as shown in the sketch given below. The triangular lawn has equal sides.



Study the sketch and calculate the following:

4.2.1 The area of the flower bed. Round your answer off to TWO decimal places. Formula: Area = πr^2, where $\pi = 3{,}14$ (3)

4.2.2 The perimeter of the triangular lawn.
Formula: Perimeter = 3 × length of side (2)

[15]

QUESTION 5

Contact crime in South Africa is nearly a third of all serious crime. The data on contact crime is shown in the table given below.

CRIME CATEGORY	NUMBER COMMITTED
Assault GBH	198 602
Common assault	185 891
Murder	15 940
Attempted murder	15 493
Sexual offences	66 196
Aggravated robbery	101 463
Common robbery	54 883

Study the table and determine the following:

5.1 The total number of contact crimes committed. (2)

5.2 The median on the contact crimes committed. (2)

5.3 What is the probability that a South African citizen can be a victim of common robbery among all other contact crimes? (2)

5.4 The range on the contact crimes committed. Show all your calculations. (3)

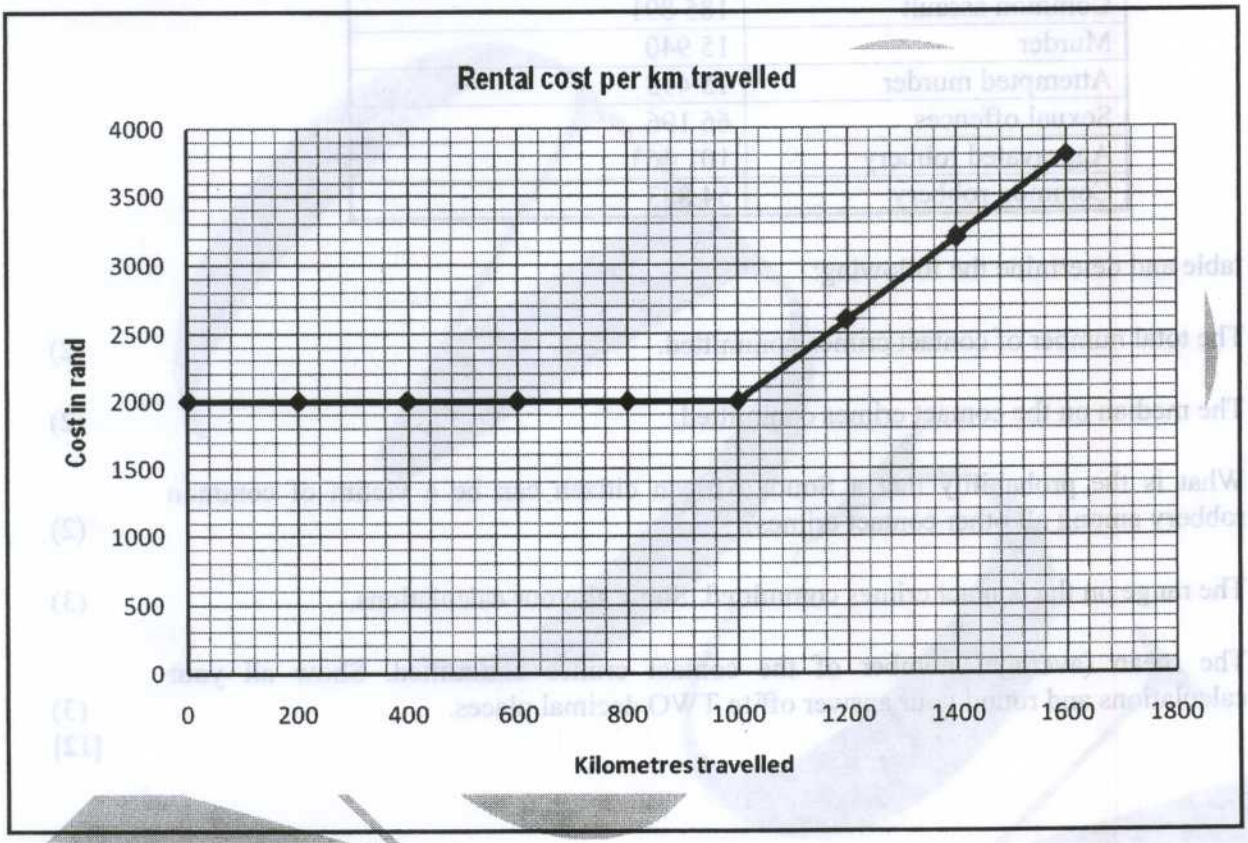
5.5 The mean (average) number of the contact crimes committed. Show all your calculations and round your answer off to TWO decimal places. (3)

[12]

QUESTION 6

Lorraine hires a car for a business trip. The car-hire company charges a flat rate of R2 000,00 for the initial 1 000 km and R3,00 per km travelled thereafter.

The graph given below shows her rental cost per km travelled. Study the graph and answer the questions that follow.



6.1 Why is the graph 'flat' from 0 km to 1 000 km? (2)

6.2 Why does the graph increase after 1 000 km? (2)

6.3 Write down the total rental cost if Lorraine travels 950 km. (1)

6.4 Write down the formula to calculate the cost of travelling. (2)

6.5 Use the formula in QUESTION 6.4 and calculate the following:

6.5.1 The cost for travelling 1 300 km. Show all your calculations. (2)

6.5.2 The distance travelled if Lorraine paid R5 000 in rental costs. Show all your calculations. (2)

6.6 If Lorraine travelled 1 400 km and the fuel consumption of the car is 10 km/litre, calculate her petrol bill for the journey if the price of petrol is R12,00 per litre.

Use the following formula:

$$\text{Petrol Bill} = \frac{\text{Kilometres travelled}}{\text{Fuel consumption}} \times \text{Cost of 1 litre of petrol}$$

(3)
[14]

QUESTION 7

Bonekile invests R1 000,00 at an annual interest rate of 12% for a period of 6 years. Interest is compounded annually. The table below is a statement of the investment account.

	INTEREST CREDITED	BALANCE
Opening balance		R1 000,00
End year 1	R120,00	R1 120,00
End year 2	R134,40	R1 254,40
End year 3	R150,53	R1 404,93
End year 4	R168,59	R1 573,52
End year 5	R188,82	(a) R1 762,34
End year 6	~~R1 762,34~~ (b) R211,47	(c)

7.1 Calculate the values of (a), (b) and (c). (6)

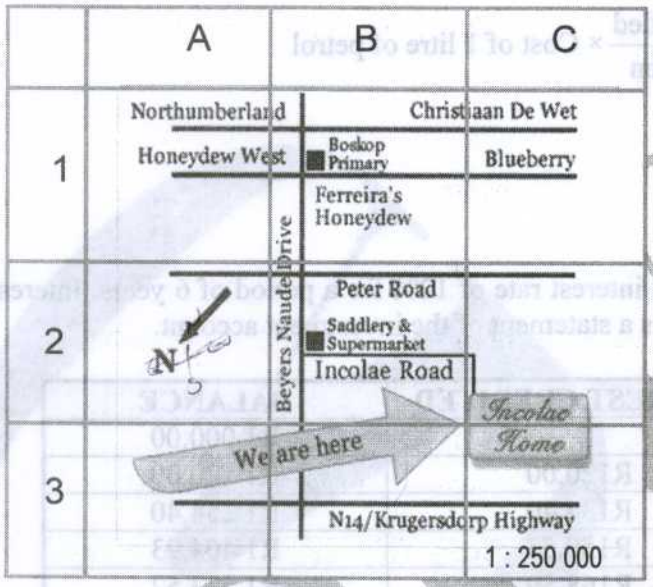
7.2 How much interest did the person earn over the 6 year period? (3)

7.3 Express the amount of interest earned over the 5 year period as a percentage. Give your answer to the nearest TWO decimal places. (3)
[12]

16, 128

QUESTION 8

Given below is the strip map that shows the directions to Incolae Home. Study the map and answer the questions that follow.



8.1 If Boskop Primary is found in cell B1, then write down the cell location of the following:

8.1.1 Supermarket (2)

8.1.2 Incolae Home (2)

8.2 The arrow 'N' represents the northerly direction on the compass. What is the compass direction of Incolae home as seen from the supermarket? (2)

8.3 The distance on the map from the Supermarket to Incolae Home is 28 mm. Use the scale to determine the actual distance in kilometres from the Supermarket to Incolae Home. Show all your calculations. (4)

8.4 Calculate the time it will take a motorbike, travelling at a speed of 70 km/h, to travel from the Supermarket to Incolae Home. Give your answer in minutes.

Formula: $\text{Time} = \frac{\text{distance}}{\text{speed}}$ (4)

[14]

QUESTION 9

The student support services office at your college conducted a survey amongst students using the survey questionnaire shown in ANNEXURE A.

The focus of the survey questionnaire was to gather data on the following aspects:

- Gender
- Age in years
- The frequency on which students are visiting the library

9.1 Andile is a 17 year old boy who visits the college library once per week.

Show, by completing the questionnaire in ANNEXURE A, how Andile would complete his questionnaire. (4)

9.2 The student support officer has summarised the data from all the completed survey questionnaires in the table below. Use the summary to answer the questions below.

	GENDER AND AGE CATEGORIES			
	Male		Female	
	16 – 18	19 – 21	16 – 18	19 – 21
None	4	1	5	4
At least once a month	9	4	7	4
At least once a week	1	3	3	6
Everyday	3	0	2	4
Total	(a)	8	17	(b)

9.2.1 Determine the values of (a) and (b). (2)

9.2.2 How many males and how many females participated in the survey? (2)

9.2.3 How many students in total participated in the survey? (2)

9.2.4 What is the probability that a student in a survey was a female? Show all your calculations and give the answer in the simplest form. (3)

9.2.5 Consider only the male category between the ages 19 – 21 years old and complete and label a pie chart that shows the proportion on how frequent the students visit the library.

Complete the pie chart provided on ANNEXURE A. (5)
[18]

TOTAL: 150