

**higher education  
& training**

Department:  
Higher Education and Training  
**REPUBLIC OF SOUTH AFRICA**

**NATIONAL CERTIFICATE (VOCATIONAL)**

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

**NOVEMBER 2011**

**(10401023)**

**8 November (X-Paper)  
09:00 – 12:00**

**This question paper consists of 11 pages.**



**TIME: 3 HOURS**  
**MARKS: 150**

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## INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions:

1. Answer ALL the questions.
  2. Read ALL 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. Drawing instruments including rulers, pairs of compasses and protractors may be used.
  6. Diagrams are not necessarily drawn to scale.
  7. Write neatly and legibly.
- 



**QUESTION 1**

1.1 Calculate each of the following:

1.1.1  $725 - 24 \times 3 + 10$  (2)

1.1.2  $0,6 \times 0,6 + \frac{36}{6}$  (2)

1.1.3  $(1\frac{1}{2} + \frac{3}{2}) \times 2^3$  (2)

1.2 1.2.1 Concrete mix is made up of gravel, sand and cement. The mixing ratio is 4:2:1. If I have 2 wheelbarrows of gravel, how many wheel barrows of sand and cement do I need to make a batch of concrete? (3)

1.2.2 What percentage did Mary obtain for her test if she scored 32 marks out of 85? (2)

1.2.3 Convert 4,5 kg to g. (2)

1.2.4 How much will 12 bars of chocolate cost, if 8 bars of chocolate cost R48? (2)

1.3 1.3.1 The price of a toasted cheese sandwich increased from R3,35 to R4,00. Calculate the increase as a percentage. (3)

1.3.2 How much will you pay for a T-shirt if it is priced at R120 and you are offered a 20% discount? (3)

1.4 1.4.1 The table below shows the number of the middle range laptops sold during the first four months.

January	February	March	April
6 000	6 200	7 900	7 300

Determine the mean number of laptops sold per month. (3)

1.4.2 Round off the area of 1999,34 m<sup>2</sup> to the nearest 1000. (2)

1.5 1.5.1 Peter's rectangular bedroom has a length of 4 m and a breadth of 3 m. Calculate the perimeter of his bedroom. (2)

1.5.2 Calculate the volume of a small box with a length of 5 cm, a breadth of 3 cm and a height of 12 cm.

Formula: Volume = length  $\times$  breadth  $\times$  height (2)

**[30]**



**QUESTION 2**

The SRC of an FET College decided to hold their leadership training camp at Kruger National Park in Phalaborwa. Below is the table with rates per person.

<b>Campsite without power at Punda Maria rest camp- Kruger National Park</b>					
Season dates	Price per unit per night	Occupants at unit price	Per extra adult per night	Per extra children per night	Maximum number of persons
2010-11-01 to 2011-10	R100,00	1-2	R40,00	R20,00	6
2011-11-01 to 2012-12	R100,00	1-2	R60,00	R30,00	6

2.1 What is the maximum number of people that can stay over on the campsite? (1)

2.2 What is the cost per night if 2 people stay on the campsite in June 2011? (2)

2.3 From which date does the cost per unit price increase? (2)

2.4 Determine the cost per night if 3 adults and 2 children stay on the campsite in June 2011. (3)

2.5 Jessica is starting work for large company. Her conditions of employment include a starting salary of R82 600 per annum with a guaranteed annual salary increase of 5%. Calculate how much salary she will earn per annum after 10 years.

Use formula:  $FV = PV(1 + i)^n$  where FV = Future value, PV = Present value, i = interest rate and n = number of periods. (3)

2.6 The college invested R100 000 at an interest rate of 12% compounded quarterly. Calculate the value of the investment at the end of the three years.

Use formula:  $FV = PV(1 + i)^n$  where FV = Future value, PV = Present value, i = interest rate and n = number of periods. (4)

**[15]**



**QUESTION 3**

The owner of the spaza-shop received her municipality bill as shown below. Study this bill and answer the questions that follow.

TAX INVOICE					
BIG CITY Metropolitan Municipality Box 162 BIG CITY			No. 59898 VAT Reg. No.: 6632195		
<b>NAME</b> Ward No.		<b>Maseko B</b> 3	<b>Account No.</b>	1234567	
		<b>Date</b>	2008/06/19		
<b>Amounts in Rand</b>					
	<b>DATE</b>	<b>Details</b>	<b>Charge</b>	<b>VAT Amount</b>	<b>Charge (VAT incl.)</b>
	2008/05/19	Balance b/d	813,42	113,88	927,30
	2008/05/19			Payment	<b>930,00 –</b>
				<b>Closing Balance</b>	<b>2,97 –</b>
	2008/06/19	Electricity	439,81	61,57	501,38
	2008/06/19	Waste removal	46,34	<b>(a)</b>	52,83
	2008/06/19	Water service	131,35	18,39	149,74
	2008/06/19	Sewerage	<b>(b)</b>	6,71	54,63
30 days			<b>TOTAL</b> <b>(c)</b>	<b>TOTAL</b> <b>(d)</b>	<b>TOTAL CHARGE (VAT incl.)</b> <b>(e)</b>
		Due date	2008/7/15	Amount payable	R754,64

- 3.1 Use the information on the given invoice and list TWO services offered by the municipality. (2)
- 3.2 What does the symbol '-' represents on the invoice? (2)
- 3.3 Use the information on the invoice to calculate the missing values:
- (a) VAT (Value Added Tax) amount on waste removal. (2)
  - (b) Original charge before VAT on sewerage. (2)
  - (c) Total charge without VAT. (2)
  - (d) Total VAT amount. (2)
  - (e) Total charge for the whole month. (2)
- 3.4 Show that the total amount payable on this invoice is equal to R754,64. (2)
- 3.5 Show that VAT is charged at 14%. (2)

**[18]**

**QUESTION 4**

The clinic at the rural village uses three water tanks as shown below to store water for the day-to-day running of the clinic.



Height = 188,325 cm  
Diameter = 130 cm

- 4.1 Determine the radius of the tank. (1)
- 4.2 Calculate the volume of one tank in  $\text{cm}^3$ .  
Formula:  $V = \pi r^2 h$  where  $V = \text{Volume}$ ,  $r = \text{radius}$ ,  $h = \text{height}$  and  $\pi = 3,142$  (3)
- 4.3 Show that each water tank has a capacity of 2 500 litres.  
NOTE: 1 litre = 1 000  $\text{cm}^3$ . (2)
- 4.4 If only two-thirds of the tank is filled with water, calculate the amount of water in the tank in litres. (3)
- 4.5 Calculate the amount of water in litres used if 6,5 water tanks were consumed by the clinic in one month. (2)
- 4.6 Calculate the height of a rectangular tank with a capacity of 2 500 litres. The rectangular tank has a length of 125 cm and a breadth of 100 cm.  
Formula:  $\text{Volume} = \text{Length} \times \text{Breadth} \times \text{Height}$  (3)
- [14]**

**QUESTION 5**

- 5.1 The data as shown below was recorded at the Pretoria Zoo by a researcher. It shows the litres of water consumed at a time by an elephant.

Elephant	Litres of water drunk at a time
Elephant 1	250
Elephant 2	300
Elephant 3	350
Elephant 4	320
Elephant 5	300
Elephant 6	320
Elephant 7	150

- 5.1.1 Determine the average (mean) amount of litres of water drunk by an elephant at a time. (3)
- 5.1.2 What is the amount of litres that represents the median? (2)
- 5.1.3 Find the modal litres of water. (mode) (2)
- 5.1.4 Find the range of litres of water drunk by the elephants. (3)
- 5.2 The following artists were awarded certificates for performing arts. They were called to the stage at random to receive their certificates for various categories of performances.

Given below is an incomplete frequency table showing the number of times when each artist was called to the stage receiving their certificates.

Item/Artist	Frequency	Tally
Seiphemo Rapulana	(a)	
Leon Schuster	(b)	
David Kau	5	

- 5.2.1 Determine from the frequency table how many times each of the following artists were called on stage to receive certificates. (1)
- (a) Seiphemo Rapulana (1)
- (b) Leon Schuster (1)
- 5.2.2 If the artists were called to the stage at random; what is the probability of David Kau being called to the stage? (3)

[15]



**QUESTION 6**

A hair stylist works for a large company and receives a basic wage of R160 per day plus a commission of R40 for each customer she styles. Below is the formula to calculate her wages.

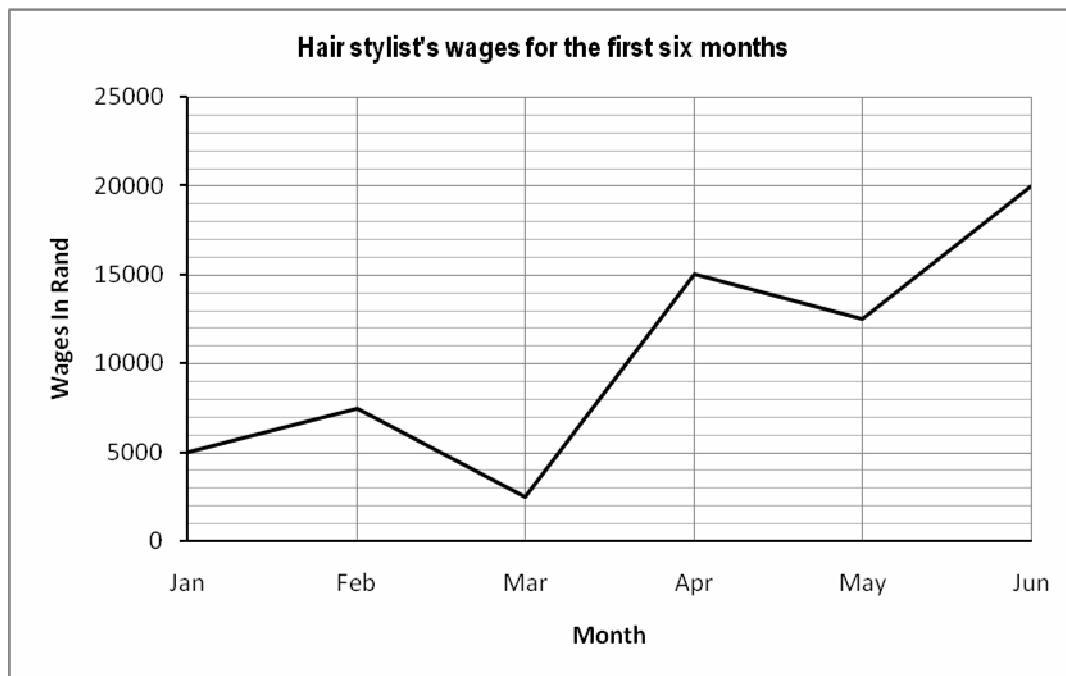
Formula: wages =  $160 + 40n$      $n$  = number customers she styled.

6.1 Calculate the following:

6.1.1 How much money will she earn per day if she styles only 3 customers? (3)

6.1.2 How many customers must she style on a day to earn R360 per day? (3)

6.2 The wages of the hair stylist for the first six months are provided on the graph given below.



6.2.1 During which month did the hair stylist earn the most? (2)

6.2.2 How much did the hair stylist earn during the month of March? (2)

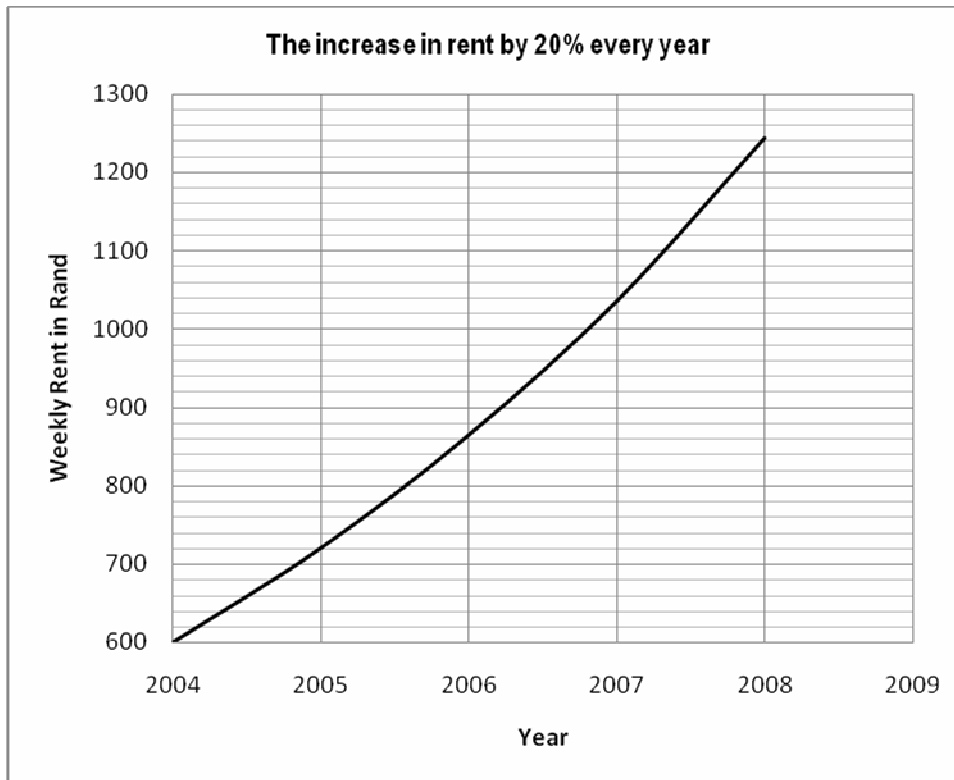
6.2.3 During which month did the hair stylist earn the least? (2)

**[12]**



**QUESTION 7**

The graph below shows the weekly rent increase by 20% every year. Study this graph and answer the questions that follow.

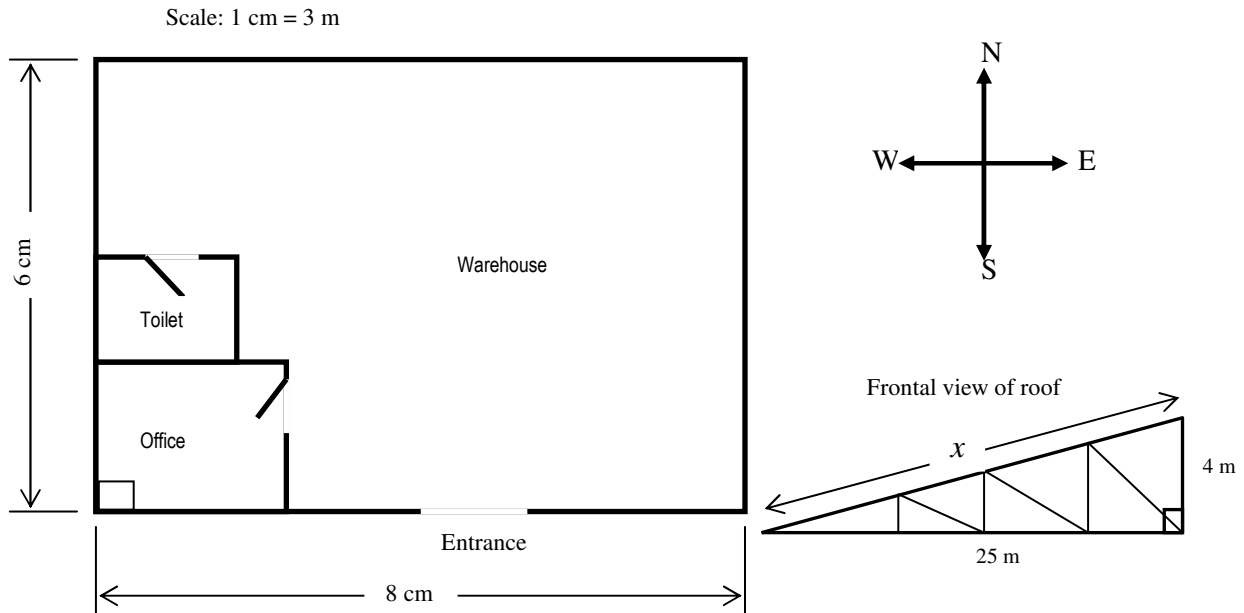


- 7.1 How much is the weekly rent in 2004? (1)
- 7.2 How much is the weekly rent in 2005? (2)
- 7.3 How much was the increase in rent from the year 2004 to 2005. (2)
- 7.4 Describe the trend in the graph by completing the sentence: 'As the number of years increases; the weekly rent '.....' (2)
- 7.5 Determine the total cost in rent for the whole year in 2005. (3)
- Hint: One year = 52 weeks.
- 7.6 Use the information for 2004 and 2005 to show that the increase in rent was at 20%. (3)
- 7.7 Calculate how much will the weekly rent be in 2009. (3)
- Use formula:  $FV = PV(1 + i)^n$  where  $FV$  = Future value,  $PV$  = Present value,  $i$  = interest rate and  $n$  = number of periods.

**[16]**

**QUESTION 8**

Given below is the floor plan of a warehouse. Study the floor plan and answer the questions that follow.



8.1 Use the scale given on the floor plan and convert the:

8.1.1 Length of the warehouse to metres. (2)

8.1.2 Breadth of the warehouse to metres. (2)

8.2 Calculate the area of the warehouse (office and toilet included) and write down the answer in  $m^2$ . (3)

Formula of rectangle:  $A = l \times b$

8.3 Calculate the monthly cost to rent the warehouse if it is charged at R70,00/ $m^2$ . (3)

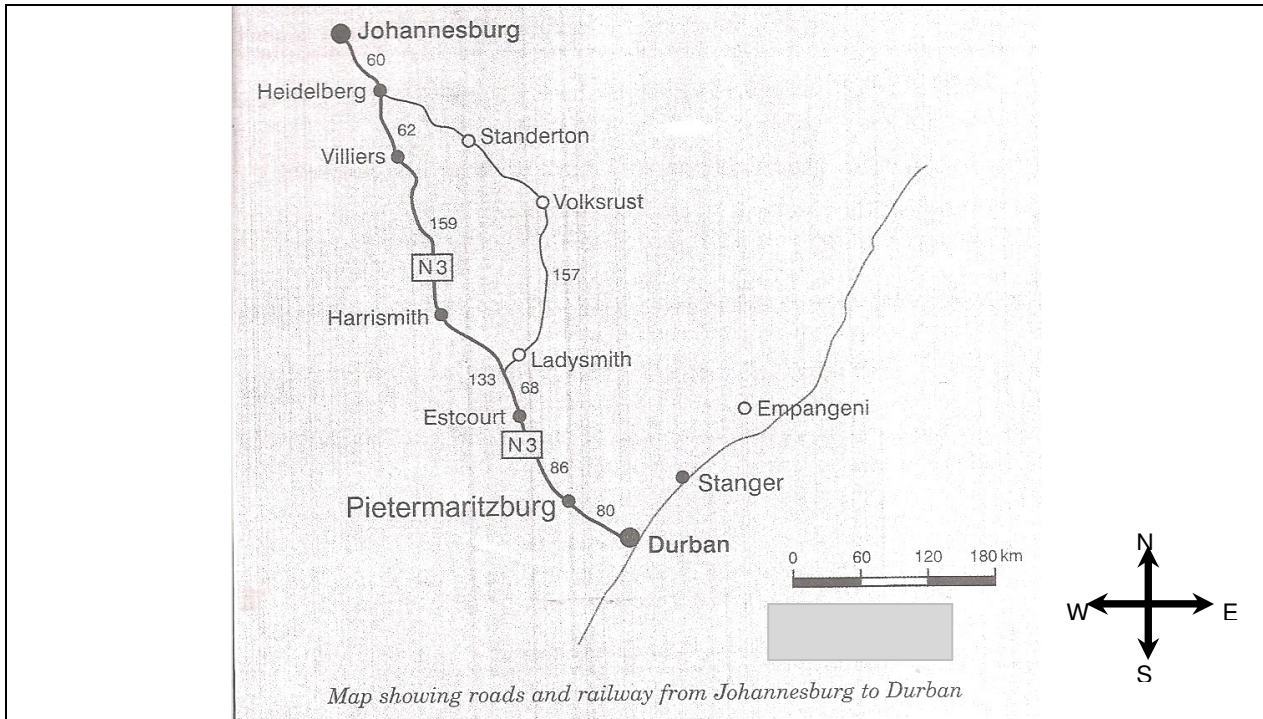
8.4 Study the information given on the roof structure and determine the length marked with  $x$ .

Formula:  $x = \sqrt{a^2 + b^2}$  (3)

**[13]**

**QUESTION 9**

9.1 Harris and Tom own a transport company. The company must move goods from Johannesburg to Durban. Study the map and answer the questions that follow.



- 9.1.1 What is the scale of the map? (2)
- 9.1.2 Use the map and its scale to determine the distance between Standerton and Volksrust. (2)
- 9.1.3 Determine the distance between Harrismith and Pietermaritzburg. (2)
- 9.1.4 What is the direction from Volksrust to Harrismith? (2)

9.2 During Tom's journey by motor car, the time and the odometer readings were recorded as shown in the table below. The journey started at 14:00 and ended at 16:30.

<b>Time of the day</b>	14:00	16:00	16:30
<b>Odometer (km)</b>	99 108	99 332	99 388

- 9.2.1 How far did Tom travel between 14:00 and 16:00? (2)
- 9.2.2 Determine the distance travelled from the start to the end of the journey. (2)
- 9.2.3 How much time was taken for the total journey? (2)
- 9.2.4 Calculate the average speed of the car for the whole journey. Give your answer in kilometres per hour. **Formula:**  $Speed = \frac{Distance}{Time}$  (3)

[17]

**TOTAL: 150**

