



Province of the
EASTERN CAPE
EDUCATION

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

SEPTEMBER 2010

MATHEMATICAL LITERACY – SECOND PAPER

MARKS: 150

TIME: 3 hours



This question paper consists of 11 pages and Annexure A.

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. This question paper consists of five questions. Answer ALL the questions.
2. QUESTION 4.3 must be answered on the attached ANNEXURE A. Write your name and examination number in the space provided and hand in the ANNEXURE with the ANSWER BOOK.
3. Number the questions correctly according to the numbering system used in this question paper.
4. An approved calculator (non-programmable and non-graphical) may be used, unless stated otherwise.
5. ALL calculations must be clearly shown.
6. ALL final answers must be rounded off to TWO decimal places, unless stated otherwise.
7. Begin EACH question on a NEW page.
8. Write neatly and legibly.

QUESTION 1

- 1.1 Every business in South Africa has to pay tax on its turnover. (Turnover is the amount of money received from the sale of goods or services rendered.) The South African Revenue Service (SARS) publishes a Small Business Tax Table, which gives the details of the amount of tax that has to be paid on turnover.

Note: For a business to be classified as a small business its turnover must be less than one million rand per year.

TABLE 1: Guide to Small Business Tax

Rand	
Turnover	Tax liability
R 0 – R100 000	0%
R100 001 – R300 000	2% of each R1 above R100 000
R300 001 – R500 000	R4 000 + 4% of the amount above R300 000
R500 001 – R750 000	R12 000 + 5,5% of the amount above R500 000
R750 001 – R1 000 000	R25 750 + 7,5% of the amount above R750 000

(Source: SARS)

In 2006 David Maling started his own business of transporting learners in a minibus(es). He planned for his business to keep growing and hoped to have an annual turnover of R800 000 in six years' time. A summary of David Maling's business turnover is given below.

TABLE 2: Extract of the business turnover in selected years

Year	2006	2007
Turnover	R72 500	R125 786

1.1.1 Use TABLE 1 to answer the following questions:

- How much tax did David Maling pay in 2006? (1)
- How much tax did David Maling pay in 2007? (4)
- How much tax will David Maling have to pay in six years' time if the tax formula stays the same and achieve the expected turnover? (4)
- What can be deduced about the nature of the SARS tax calculations by looking at the tax liability column of TABLE 1 and the answers to the previous questions? (2)

- 1.1.2 Calculate the rate at which David Maling planned for his business to grow from 2006 to 2011, when he hoped for a turnover of R800 000. (4)

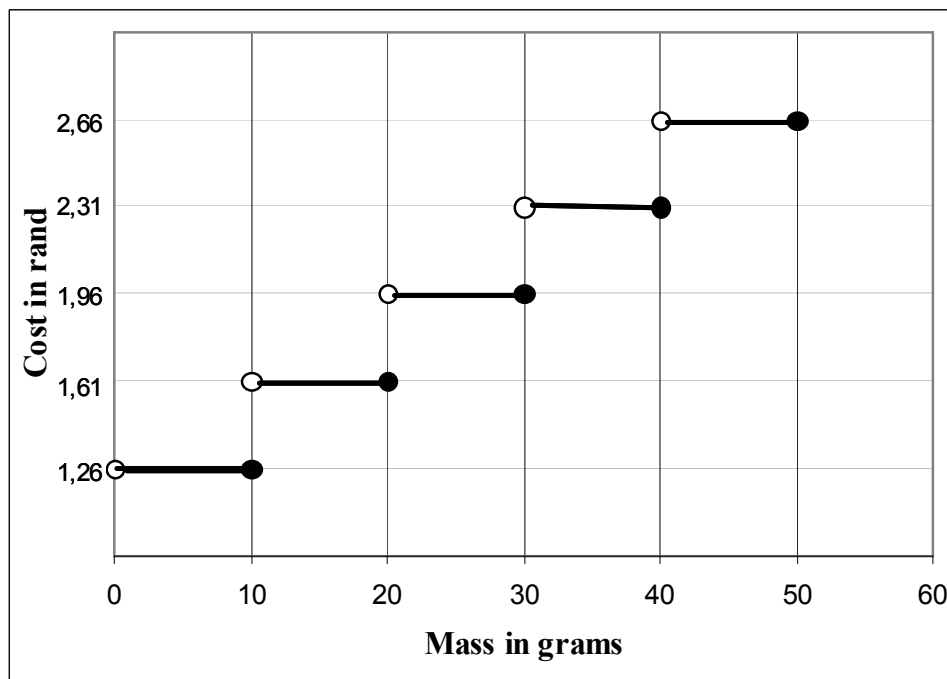
Use the formula:

$$i = \sqrt[n]{\frac{A}{P}} - 1$$

P = initial amount at the end of the first financial year
 i = interest rate per year as a decimal
 n = number of years
 A = final amount at the end of term

- 1.2 David Maling's business posts letters to neighbouring countries containing original signed contracts with parents for the transport of their children. The cost in rand of posting a letter depends on the mass of the letter. The graph below shows the costs set by the South African Post Office.

Graph 1: Cost of posting a letter



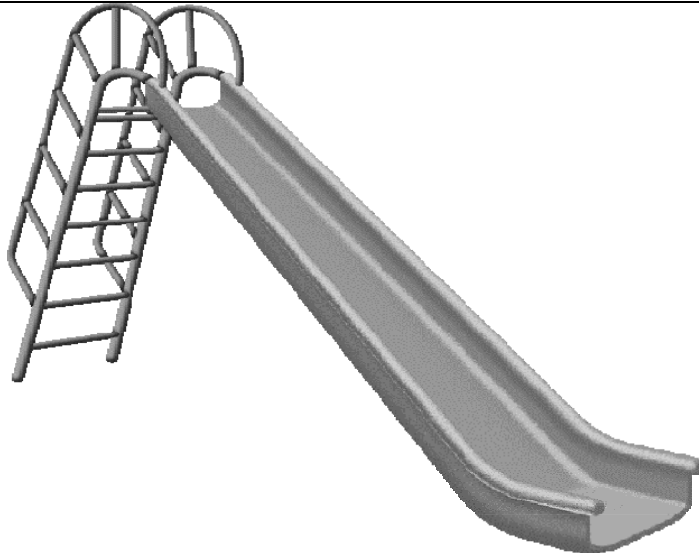
- 1.2.1 How much would it cost to post a 20 g letter to a neighbouring country? (2)
- 1.2.2 What was the mass of each letter if it cost R18,48 to post 8 identical letters? (4)
- 1.2.3 Explain how the costs for the different intervals were calculated. (3)
- 1.2.4 Is it cheaper to post two letters of 7 g and 21 g or one letter with mass 28 g? Use calculations to show how you reached your conclusion. (6)

[30]

QUESTION 2

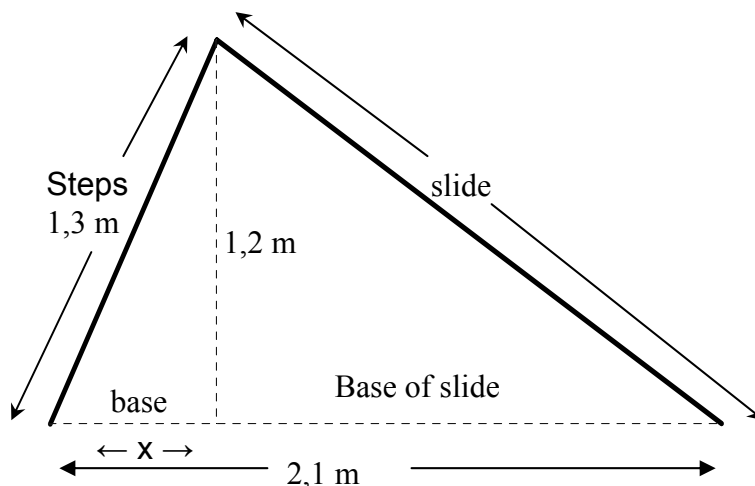
Tikwe Lodge is a favourite holiday destination, with activities for both young and old. For the young ones there is a playground with swings and a slide. For the sporting type they have a swimming pool, tennis court and a soccer field, and for those coming just to relax there are plenty of benches to sit on next to the river.

2.1



The length of the steps of the slide is 1,3 m and the distance between the bottom of the steps and the bottom end of the slide is 2,1 m. The top of the steps is 1,2 m above the ground.

You may use the following diagram to help you solve the questions that follow.



2.1.1 Calculate the distance on the ground (base of steps -x) from the bottom of the steps to the top of the steps.

$$\text{Base} = \sqrt{(\text{length of steps})^2 - (\text{height})^2} \quad (3)$$

2.1.2 Calculate the distance on the ground from the top of the slide to the bottom of the slide (base of slide). (2)

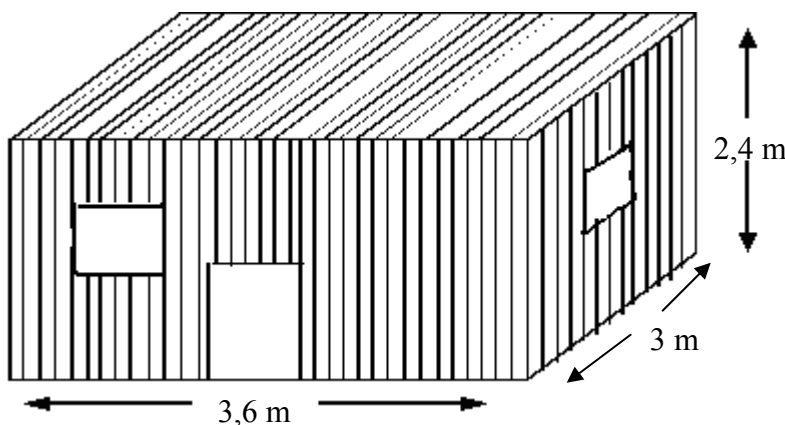
2.1.3 What is the length of the slide down which the children slide?
(Length of Slide)² = (Base of slide)² + (height)² (4)

2.1.4 Suppose a child takes 0,76 seconds to slide down the slide. Use the formula

$$\text{distance} = \text{speed} \times \text{time} \quad (3)$$

to calculate the speed of the child in metres per second.

2.2 The flat-roofed garden shed at Tikwe Lodge is made of sheets of corrugated iron and management wants to renovate it. It has the following dimensions: 3,6 m long; 3 m wide and 2,4 m high. The area covered by the door and windows is 3 m².



2.2.1 The corrugated iron sheets of the roof need to be replaced. When building with corrugated iron it must be remembered that the sheets have to overlap and overhangs are needed all around to cope with rain. This overlapping causes 10% of the width of each sheet to be lost. How many corrugated iron sheets will be needed for the roof of the shed if one sheet is 925 mm wide and 3,3 m long? (7)

2.2.2 Calculate the outside surface area of the garden shed, excluding the area covered by the door and windows.
Formula:
Total surface area = $2 \times \text{length} \times \text{height} + 2 \times \text{breadth} \times \text{height} + \text{length} \times \text{breadth}$ (6)

2.2.3 The total outside surface area of the garden shed needs to be painted with 2 coats of paint. One litre of paint covers 5 m². The paint is available in 5-litre buckets at R143 each and 1-litre cans at R35 each. Calculate the cost of painting the shed if the cost must be kept as low as possible. (7)

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QUESTION 3

- 3.1 Members of the Masakhane cricket team are selected from a group of registered players participating in the Matjhabeng cricket league before they can participate in provincial tournaments. The following TABLE shows the statistics of potential Masakhane cricketers as derived from community WARDS at their local town for a period of four years. Data from the Sports Council Report indicates paid-up members only.

TABLE 3: Number of registered cricketers per local ward

Year	Ward 1	Ward 2	Ward 3	Ward 4	Ward 5	Ward 6	Ward 7	Ward 8	Ward 9
2006	3	8	7	18	20	16	8	16	25
2007	7	13	9	20	27	23	8	17	18
2008	5	16	10	23	33	30	12	23	21
2009	7	18	10	28	33	27	11	24	23

Source: Matjhabeng Sports Journal

- 3.1.1 Which ward shows the highest increase of cricket players between 2006 and 2009? (5)
- 3.1.2 Which ward shows an average decline from 2006 to 2009 in the number of cricketers? (1)
- 3.1.3 Calculate the mean number of cricketers in each year and explain the pattern observed. (6)
- 3.1.4 One could conclude that the number of cricketers in two wards was stable in 2008 and 2009. Mention the wards and support this statement with a mathematical calculation. (4)
- 3.2 In cricket a player's batting average is the total number of runs he has scored divided by the number of times that he has been out. Masakhane cricket team has recorded the batting average of its batsmen (A to T) as follows:

TABLE 4: Batting averages of Masakhane cricket team

A = 53,8	B = 42	C = 54,6	D = 58,7
E = 79	F = 55,6	G = 43,4	H = 61,3
I = 59,9	J = 62,8	K = 43	L = 52
M = 43,1	N = 42,9	O = 54,4	P = 70,3
Q = 43	R = 43,3	S = 59,4	T = 56,6

- 3.2.1 What is the median of their batting average? (4)
- 3.2.2 Explain what this median tells us. (3)
- 3.2.3 The lower quartile of the above batting average is 43,2. What percentage of batsmen scores above this batting average? (1)
- 3.2.4 Which players have a batting average below the lower quartile? (2)

- 3.3 Mpho and Mathapelo are volunteers who manage the office of the Masakhane Cricket Team. At the end of every year they prepare and present the financial report to relevant stakeholders, such as the local sport council and interested parties. This gives participants and relevant stakeholders information on how the team works.

Study the financial report in the table below to answer the questions that follow.

TABLE 5: Financial report

Masakhane cricket team's financial report for January 2008 – December 2008	
ITEM	AMOUNT (R)
Registration fee (players)	91 517
Municipal subsidy	A
Donations	34 000
Total income	170 637
Salaries	32 000
Team Registration	10 000
Transport	14 400
Expert training	29 141
Field maintenance	30 000
Telephone	7 240
Bank fees	1 900
Stationery	4 000
Account fees	1 200
Uniform	40 039
Total expenditure	169 920

- 3.3.1 Calculate the value of A in the table 5 above to determine the amount of municipal subsidy the team received. (2)
- 3.3.2 What is the main source of income of this team? Explain. (2)
- 3.3.3 Did the team run at a loss in the year 2008? Explain (3)
- 3.3.4 What was the full amount each member paid for registration in 2008? (5)

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QUESTION 4

Tsietsi and Thabo work for a courier company that offers an overnight service. This means they promise to have the items that they deliver at the destination by 8 o'clock in the morning. They both travel from Jacobsdal to Cape Town in two different delivery vans of the same model and engine capacity to deliver packages. The table below shows the distance travelled by each over time.

TABLE 6: Journey of two delivery vans to Cape Town

Time	00:00	01:00	02:00	03:00	04:00	05:00	06:00	07:00	08:00
Thabo	0	100	200	300	400	500	600	700	800
Tsietsi	0	0	120	240	360	480	600	720	840

4.1 Use the table to answer the following questions:

- (a) Did the two vans leave the starting point at the same time? Give a reason for your answer. (2)
- (b) At what time(s) were the two delivery vans 40 km apart? (2)

4.2 Calculate the average speed of each delivery van.

$$\text{Total distance travelled} = \text{average speed} \times \text{total time taken} \quad (6)$$

4.3 Represent the information in the table above by drawing two separate line graphs on the same system of axes, using ANNEXURE A attached. Label your graphs clearly. (8)

4.4 At what time did Tsietsi pass Thabo? Explain where on the graph this value can be found. (3)

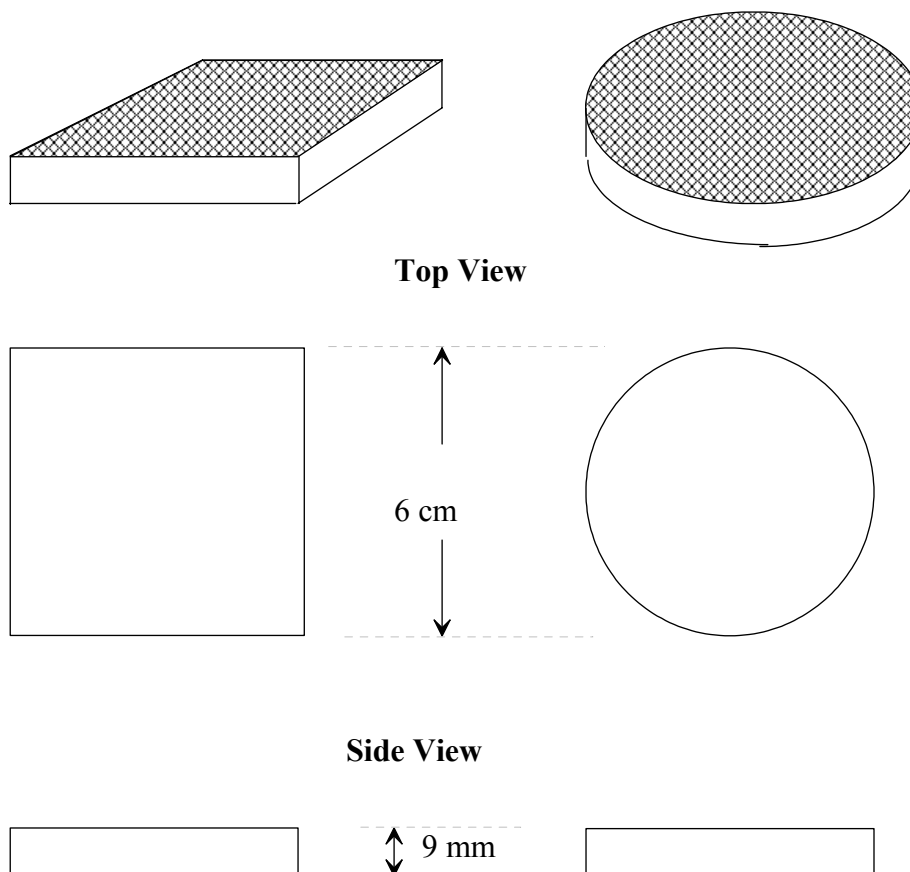
4.5 At the end of the journey Tsietsi and Thabo reported the fuel consumption of their vans as follows: Thabo said his van travelled 12 km on each litre of petrol, while Tsietsi said he used 12,5 litres of petrol for each 100 km that he travelled. Whose van used the most petrol for this journey? Show how you arrived at the answer. (4)

4.6 Give a possible reason why Tsietsi travelled further than Thabo. (2)

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QUESTION 5

- 5.1 Star Allied Bakery bakes a variety of biscuits. They want to find out whether the shape of the biscuit and the type of package influence their customers' buying patterns.
Using the same ingredients they baked square and round biscuits to test the market.



Note: The volume of the unbaked dough and that of the baked biscuits of this recipe do not differ.

- 5.1.1 Calculate by how much the volume of a round biscuit is less than that of a square biscuit.

Volume of square prism = $side \times side \times height$

Volume of cylinder = $\pi \times (radius)^2 \times height$

Remember $\pi = 3,14$

(7)

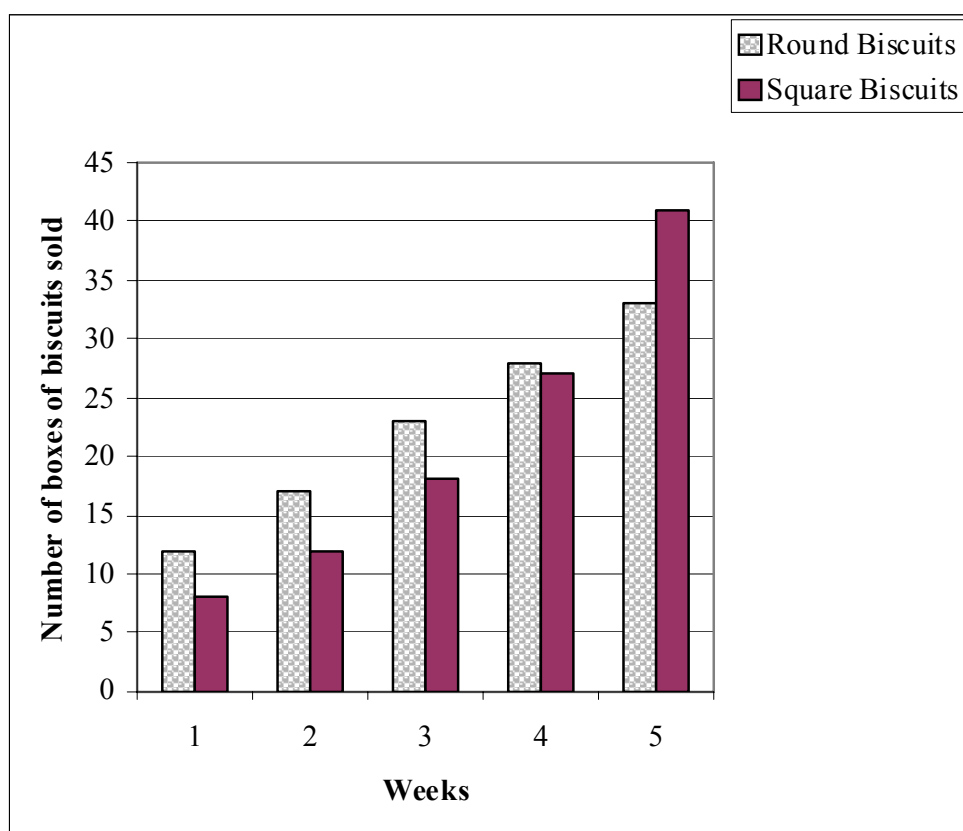
5.1.2 Which of the following mixing bowls would be the best to use when mixing the dough for a batch of 100 square biscuits: 1 ℓ ; 5 ℓ or 20 ℓ ? Justify your answer by showing the necessary calculations.
Note: 1 ℓ = 1 000 cm³ (3)

5.1.3 How many biscuits can be packed in a 25 cm high packet? Show your calculations. (4)

5.1.4 Will a packet of round biscuits and a packet of square biscuits with the same mass have the same height? Explain your answer. (3)

5.2 Data was collected over a period of 5 weeks from the sale of boxes of biscuits and it was summarised in the following graph:

GRAPH 2: Sale of boxes of biscuits



Use the graph to answer the following questions:

5.2.1 Describe the trend that can be observed in the sale of the round biscuits. (2)

5.2.2 Predict how many boxes of square biscuits will sell during the 6th week. (2)

5.2.3 What can Star Allied Bakery conclude about how the shape of the biscuit influences potential customers? (2)

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TOTAL: 150

NAME / EXAMINATION NUMBER: _____

ANNEXURE A
QUESTION 4.3

