



education

Department:
Education
REPUBLIC OF SOUTH AFRICA

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

MATHEMATICAL LITERACY P2

NOVEMBER 2009

MARKS: 150

TIME: 3 hours

This question paper consists of 13 pages, 1 annexure and 1 answer sheet.

INSTRUCTIONS AND INFORMATION

1. This question paper consists of FIVE questions. Answer ALL the questions.
2. QUESTION 3.4 must be answered on the attached ANSWER SHEET. Write your examination number and centre number in the spaces provided on the ANSWER SHEET and hand in the ANSWER SHEET with your ANSWER BOOK.
3. Number the answers correctly according to the numbering system used in this question paper.
4. Start each question on a NEW page.
5. An approved calculator (non-programmable and non-graphical) may be used, unless stated otherwise.
6. ALL the calculations must be shown clearly.
7. ALL the final answers must be rounded off to TWO decimal places, unless stated otherwise.
8. Units of measurement must be indicated, where applicable.
9. Write neatly and legibly.

QUESTION 1

1.1

During 2007, Statistics South Africa surveyed a sample of households in each province in order to determine cellphone and computer usage. The table below shows the results of the survey.

**TABLE 1: Cellphone and computer usage by households
(Household Survey 2007)**

PROVINCE	% CELLPHONE USAGE	% COMPUTER USAGE	NUMBER OF HOUSEHOLDS
Eastern Cape	61,2	7,5	1 586 739
Free State	68,3	11,1	802 872
Gauteng	80,3	24,2	3 175 578
KwaZulu-Natal	71,9	11,7	2 234 129
Limpopo	70,4	6,7	1 215 936
Mpumalanga	77,4	10,7	
North West	70,9	9,1	911 118
Northern Cape	61,8	13,2	264 654
Western Cape	78,2	30,1	1 369 181

Use TABLE 1 to answer the following questions. Round off the answers to the nearest unit, where applicable.

- 1.1.1 Identify the TWO provinces that show the greatest percentage difference in their computer usage and then calculate this difference. (3)
- 1.1.2 Calculate the actual number of households in North West that did NOT use a computer. (3)
- 1.1.3 Calculate the difference between the number of cellphone and computer users in the Northern Cape. (3)
- 1.1.4 If the mean (average) number of households surveyed per province was 1 388 957, calculate the actual number of households surveyed in Mpumalanga. (5)
- 1.1.5 Identify possible relationships or trends, if any, between the cellphone and computer usage of households in South Africa. (4)

1.2

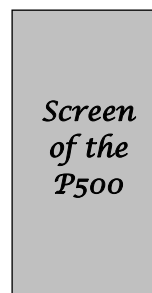
The following table lists the monthly sales of two types of cellphone models, P500 and Q600, at a cellphone shop over a period of five months during 2007:

TABLE 2: Monthly sales of cellphone models P500 and Q600 from April to August 2007

	April	May	June	July	August
P500	980	1 200	1 350	1 470	1 520
Q600	600	750	980	1 230	1 500

1.2.1 Which cellphone model showed the greatest increase in sales during this period? Show ALL your calculations. (3)

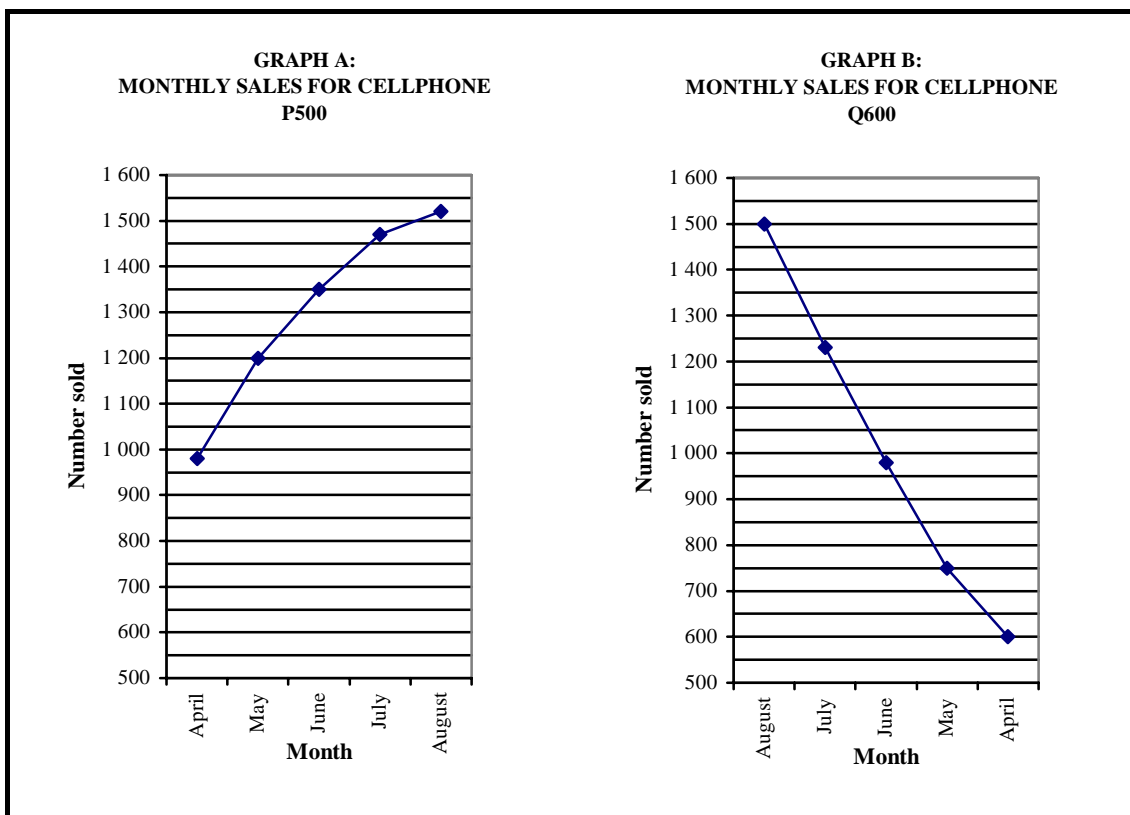
1.2.2 A scale drawing of the screen of cellphone P500 according to scale 2:5 is given alongside. The cellphone screen is rectangular in shape.



Use accurate measurements and the given scale to determine the actual measurements of the screen of cellphone P500 in millimetres.

(5)

1.2.3 The salesman for cellphone P500 claimed that the monthly sales for cellphone Q600 were decreasing while the sales of cellphone P500 were increasing. To support his claim, he used the two graphs below.



The manager of the cellphone shop noted that one of the graphs was misleading. Identify the misleading graph and explain why it is misleading.

(3)

[29]

QUESTION 2

2.1

The following information about the Free State was given in the 2007/2008 South African Yearbook:

Capital: Bloemfontein

Home languages: Sesotho: 64,4%
Afrikaans: 11,9%
IsiXhosa: 9,1%

Population: 2 965 600 (mid-year population estimates in 2007)

Area: 129 480 km²

Percentage of total area of South Africa: 10,6%

Gross domestic product (GDP) in 2004 (latest figure available): R75 827 million

Percentage of South Africa's GDP in 2004: 5,5%

- 2.1.1 Calculate the number of people in the Free State whose home languages were NOT Sesotho, Afrikaans or isiXhosa during the period 2007/2008. (4)
- 2.1.2 If a person is randomly selected from the Free State, determine the probability that the home language of the person is NOT Afrikaans or isiXhosa. (3)
- 2.1.3 Surveys have shown that 60% of the inhabitants of the Free State are employable. This means that the workforce is 60% of the total population of the Free State.
- (a) Identify any TWO possible reasons why 40% of the inhabitants are not employable. (2)
- (b) According to the Labour Force Survey of March 2007, the official unemployment rate in the Free State was 26,4% of the workforce.
- Calculate the number of unemployed people in the Free State at the time of this survey. (5)

2.2

TABLE 3 shows the area, the population, and the gross domestic product (GDP) per province in South Africa during 2007/2008.

TABLE 3: Area, population and GDP per province during 2007/2008

PROVINCE	AREA (in km ²)	POPULATION	GDP (in millions of rand)
Western Cape	129 370	4 839 800	199 412
Eastern Cape	169 580	6 906 200	112 908
KwaZulu-Natal	92 100	10 014 500	231 616
Northern Cape	361 830	1 102 200	30 087
Free State	129 480	2 965 600	75 827
North West	116 320	3 394 200	87 127
Gauteng	17 010	9 688 100	462 044
Mpumalanga	79 490	3 536 300	94 450
Limpopo	123 910	5 402 900	93 188

2.2.1 Give TWO possible reasons why Gauteng has the highest GDP in South Africa. (2)

2.2.2 According to the Agricultural Research Council, 80% of South Africa's land surface area is used for farming. However, only 11% of the farming land is suitable for the planting of crops (arable land). 3,2 million hectares of the farming land in the Free State is suitable for the planting of crops (arable land).

(a) Calculate the total area (in km²) of land that is used for farming in South Africa. (4)

(b) Calculate the percentage of land in South Africa suitable for planting crops (arable land) that is found in the Free State.

1 hectare (1 ha) = 0,01 km² (5)

2.2.3 Population density is calculated by using the following formula:

$$\text{Population density} = \frac{\text{Total population}}{\text{Area occupied by the population (in km}^2\text{)}}$$

Tumelo states that the province with the smallest land surface area has the lowest population density.

Tebogo states that the province with the smallest population has the lowest population density.

(a) Calculate the population density of the province with the smallest land surface area. (3)

(b) Hence, compare, with supporting calculations, the statements of Tumelo and Tebogo and determine which ONE of the two was correct. Justify your answer. (6)

QUESTION 3

The Royal Bafokeng Stadium is one of the stadiums that will be used during the 2010 Soccer World Cup. It has a seating capacity of 42 000.



The stadium will be used for five first-round matches and one second-round match.

Seating categories are based on the position of the seat in the stadium. Category 1 seats have the best view of the soccer field, as indicated in the diagram alongside.



Layout of the different categories of seating

3.1

The table below gives the ticket prices for South African residents for the various types of matches and categories of seating.

TABLE 4: Ticket prices in South African rand (ZAR)

TYPE OF MATCH	CATEGORIES OF SEATING			
	1	2	3	4**
Opening	3 150	2 100	1 400	490
First round	1 120	840	560	140
Second round	1 400	1 050	700	350
Quarter-final	2 100	1 400	1 050	525
Semi-finals	4 200	2 800	1 750	700
3 rd /4 th place	2 100	1 400	1 050	525
Final	6 300	4 200	2 800	1 050

** Wheelchair-bound spectators pay Category 4 prices.

TABLE 4 is also given on ANNEXURE A.

3.1.1

Write down a formula in the form

"Total income = ..."

that can be used to calculate the total income from ticket sales for a second-round match.

(3)

- 3.1.2 The following table shows the expected number of tickets to be sold in each category for the second-round match at the Royal Bafokeng Stadium:

TABLE 5: Expected number of tickets to be sold for the second-round match

Category 1	Category 2	Category 3	Category 4
12 425	8 672	4 546	14 424

TABLE 5 is also given on ANNEXURE A.

- (a) Calculate the Royal Bafokeng Stadium's expected income from the sale of these tickets. (3)
- (b) To ensure that the stadium (which has seating for 42 000 people) is filled to capacity for the second-round match, the organisers decide to offer all the unsold tickets at a reduced price to a mining company who will distribute the tickets to schools in the area.

The organisers and the mining company agree that the reduced ticket price should be 48% of the average (mean) ticket price of a Category 3 and Category 4 seat for the second round.

Calculate the additional income that could be obtained from the sale of these tickets. (7)

- 3.2 Mr Buyapi would like to attend all the 2010 Soccer World Cup matches scheduled to be played at the Royal Bafokeng Stadium. He decides that he wants to purchase Category 1 tickets for all of these matches.

- 3.2.1 Calculate the total cost of his tickets. (3)

- 3.2.2 Mr Buyapi wants to purchase all his tickets on 1 January 2010. He started saving for the tickets on 1 November 2008. He decided to deposit an equal amount at the beginning of each month into a special Target Save account at an interest rate of 7% per annum, compounded monthly.

The formula:
$$x = \frac{F \times i}{[(1 + i)^n - 1]}$$

is used for calculating the equal monthly deposits to be made, where:

- x** = equal amount to be deposited each month
F = total cost of tickets
i = monthly interest rate
n = number of monthly deposits

- (a) Calculate the percentage monthly interest rate, rounded off to TWO decimal places. (2)
- (b) Determine the number of monthly deposits to be made by Mr Buyapi. (1)
- (c) Calculate the equal amount that Mr Buyapi should deposit each month so that he would have enough money to purchase his tickets on 1 January 2010. (4)

3.3

A soccer fan from Russia wants a Category 2 ticket for the second-round match at the Royal Bafokeng Stadium. The cost of the ticket is 150 US dollars.

1 US dollar = 0,72025 euro

1 Russian rouble = 0,0230344 euro

Calculate the cost of the ticket in Russian roubles using the given exchange rates.

(4)

3.4

One of the qualifying countries for the 2010 Soccer World Cup promises their soccer squad a bonus of 3,6 million dirham if they reach the second round. There is generally a minimum of 18 players and a maximum of 40 players in a soccer squad.

The formula that will be used to calculate the amount of money to be received by each player is:

$$\text{Amount per player (in dirham)} = \frac{\mathbf{3\ 600\ 000\ dirham}}{\mathbf{\text{Number of players in the squad}}}$$

Use the formula to draw a line graph that represents the above information on the grid provided on the attached ANSWER SHEET.

(7)

[34]

QUESTION 4

- 4.1 All the members of the debating club at Mount Frere High are in Grades 10, 11 or 12. The number of learners belonging to the debating club is given in the table below:

TABLE 6: Number of members in the debating club

	Grade 10	Grade 11	Grade 12	TOTAL
Girls	33	77	0	110
Boys	132	0	60	192
TOTAL	165	77	60	302

Use TABLE 6 to determine the probability of randomly choosing a member of the debating club who is:

- 4.1.1 A boy in Grade 12 (2)

- 4.1.2 A learner who is not in Grade 10 (3)

- 4.2 Naidu's Transport Company hires buses out to schools for transport. The following table shows the cost for hiring a bus with a seating capacity of 50:

TABLE 7: Cost of hiring a 50-seater bus from Naidu's Transport Company

Return distance travelled	Cost of a return trip
Up to and including 50 km	R600
Between 50 km and 100 km	R800
100 km and more	R800 + R5 for each km over 100 km

Use TABLE 7 to answer the following questions:

- 4.2.1 Calculate the cost of a return trip if:

- (a) The one-way distance is 45 km (2)

- (b) The return distance is 136 km (3)

- 4.2.2 Complete the formula below which can be used to calculate the cost in rand for a return trip greater than 100 km.

Cost (in rand) = ... (3)

- 4.2.3 Using the above formula, calculate the distance travelled for a return trip costing R1 650. (4)

4.3 The debating club has to transport 77 of its members to a debate that is to be held 20 km away from the school. The club has the option of hiring buses from Naidu's Transport Company or using minibuses from a taxi company.

The taxi company charges R14,00 per head, as long as there are at least 10 passengers in the minibus. Each minibus can accommodate a maximum of 15 passengers.

4.3.1 (a) Analyse the information and determine the minimum number of minibuses that would be needed to transport the 77 members of the debating club. (2)

(b) Hence, name ONE possible way that the 77 members of the debating club can be divided among these minibuses. (2)

4.3.2 Identify the cheaper option of transporting the 77 members. Show ALL your calculations. (5)

4.4 A bus tyre has a diameter of 120 cm. The ratio of the diameter of a bus tyre to the diameter of a minibus tyre is 12:7.

Calculate the distance travelled by the minibus (rounded off to the nearest km) if the minibus's tyre rotated 1 862 times during the journey.

The following formulae may be used:

Circumference = $2 \times \pi \times r$ where r = radius and using $\pi = 3,14$

Number of rotations = $\frac{\text{Distance travelled}}{\text{Circumference of tyre}}$

(6)
[32]

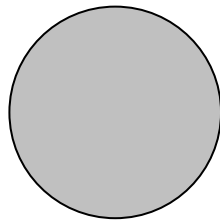
QUESTION 5

5.1

Ronwyn and Bronwyn are twins. They plan to celebrate their 21st birthday by having a big party. Ronwyn has decided that she wants a round cake, while Bronwyn has decided to have a ring cake, as shown in the pictures below.

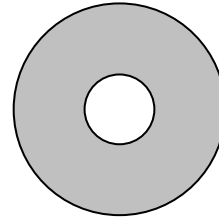


The dimensions of each cylindrical cake is as follows:



RONWYN'S ROUND CAKE

Diameter of 50 cm and a height of 15 cm



BRONWYN'S RING CAKE

An outer diameter of 56 cm, an inner diameter of 18 cm and a height of 14 cm

The following formulae (using $\pi = 3,14$) may be used:

Volume of a cylinder = $\pi \times (\text{radius})^2 \times \text{height}$

Volume of a cylindrical ring = $\pi \times (\mathbf{R}^2 - \mathbf{r}^2) \times \text{height}$
where **R** = outer radius and **r** = inner radius

Total outer surface area of an open cylinder = $\pi \times (\text{radius})^2 + 2 \times \pi \times \text{radius} \times \text{height}$

- 5.1.1 Using the volume of each cake, determine which of the two cakes is better value for money if the costs of the two cakes are the same. Give a reason for your answer, showing ALL your calculations. (10)
- 5.1.2 Ronwyn decides that her round cake will be a fruit cake. The cake will be covered with marzipan icing on the top of the cake as well as around the sides. Determine the total outer surface area of the cake that the marzipan icing will cover. (6)

5.2 The twins can choose from the following two options for the catering for their party:

OPTION 1: R120 per head, which includes the payment for the venue, but excludes the 14% value-added tax (VAT).

OPTION 2: R3 200 for the hire of the venue and then R80 per head for catering, which includes the 14% VAT.

Analyse the two options and determine which ONE would be the cheaper option if 100 people in total will attend the party. Show ALL calculations.

(5)
[21]

TOTAL: 150

ANNEXURE A

QUESTION 3.1

TABLE 4: Ticket prices in South African rand (ZAR)

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** Wheelchair-bound spectators pay Category 4 prices.

TABLE 5: Expected number of tickets to be sold for the second-round match

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CENTRE NUMBER:

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EXAMINATION NUMBER:

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ANSWER SHEET

QUESTION 3.4

PLAYERS' SHARE OF THE BONUS OF 3,6 MILLION DIRHAM

