



Province of the
EASTERN CAPE
EDUCATION

**NATIONAL
SENIOR CERTIFICATE**

GRADE 11

**MATHEMATICAL LITERACY – SECOND PAPER
NOVEMBER 2009**

MARKS: 100

TIME: 2½ hours

This question paper consists of 8 pages.

INSTRUCTIONS AND INFORMATION

1. This question paper consists of FIVE questions. Answer ALL the questions
2. Number the answers correctly according to the numbering system used in this question paper.
3. An approved calculator (non-programmable and non-graphical) may be used, unless stated otherwise.
4. ALL the calculations and steps must be clearly shown.
5. ALL the final answers must be rounded off to TWO decimal places, unless stated otherwise. Do NOT round off until you get to the answer.
6. Start EACH question on a NEW page.
7. Write neatly and legibly.

QUESTION 1

Mrs Ntaka is the Operations Manager at Mtika Hardware Stores. The following table shows the salary advice for Mrs Ntaka for the month of June 2009.

Earnings (R)		Deductions (R)	
Salary	20 044,14	Income Tax (PAYE)	3532,04
Allowance (taxable)	1 000,00	Bond Payment to bank	2182,00
Retirement contribution by employer	3 407,62	Retirement Fund payment	4859,73
Unemployment Insurance Fund contribution by employer	Unemployment Insurance Fund payment	249,56
Group Life Insurance contribution by employer	87,60	Group Life Insurance payment
Total Earnings	24 704,14	Net income (pay)

Please note:

- **All employees at Mtika Hardware Stores contribute the same amount as the company towards Unemployment and Group Life Insurance Funds.**
- **Retirement Fund contributions and Insurance Fund contributions are not taxable.**
- **One month’s basic salary (no other allowance and contributions) is paid as bonus during the month in which the employee was born.**

- 1.1 Calculate the contribution by the employer towards the Unemployment Insurance Fund for Mrs Ntaka. (2)
- 1.2 Calculate the deduction for the Group Life Insurance payment. (2)
- 1.3 Calculate Mrs Ntaka’s annual contribution towards the retirement fund. (4)
- 1.4 Calculate the total deductions from Mrs Ntaka’s earnings. (3)
- 1.5 Calculate Mrs Ntaka’s net income. (2)
- 1.6 Mrs Ntaka complains that the amount (R24 704,14) shown as her total earnings in the salary advice slip is not correct. Motivate using calculations whether you agree with Mrs Ntaka. (4)
- 1.7 Mrs Ntaka’s salary increases by 8,5% in July. What will her new salary be? (2)
- 1.8 What average percentage of her taxable earnings does Mrs Ntaka pay as income tax? (Give the answer correct to 2 decimal places). (4)

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QUESTION 2

Mr Ngece is in charge of sports at Mount Ridge High School with 450 learners. He is also a member of the finance committee of the school. In 2008 the school charged each learner a fee of R2 250,00 per term. Each learner should pay for 4 terms. For the last 5 years the school received 90% of the total fees. The school has a policy of increasing the fees by 10% per annum to meet inflation. Every year the school keeps the number of learners constant at 450.

- 2.1 Determine the annual fees a learner has to pay at Mount Ridge in 2010. Give the answer to the nearest hundred rand. (4)
- 2.2 Every year the school allocates 5% of the income from the fees for sports activities. How much will you be able to budget for sports activities at the school in 2010? (Use the approximated value from QUESTION 2.1 above). (4)
- 2.3 The school bought a rugby kit for R25 000,00 in 2007. The kit is replaced every 3 years. How much must Mr Ngece budget to replace the kit in 2010 if the price of sports equipment increases by 8% per annum? (Give your answer to the nearest **hundred** rand.)
Use the formula: $A = P(1 + i)^n$ (5)

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QUESTION 3

The following is a drawing of the hockey field at a certain school. Hockey is played on a field with area of $5\,027\text{ m}^2$. At each end there is a goal area $2,14\text{ m}$ high and $3,66\text{ m}$ wide, and a semi-circle $14,63\text{ m}$ from the goal known as the shooting circle. The breadth of the field is 55 m .

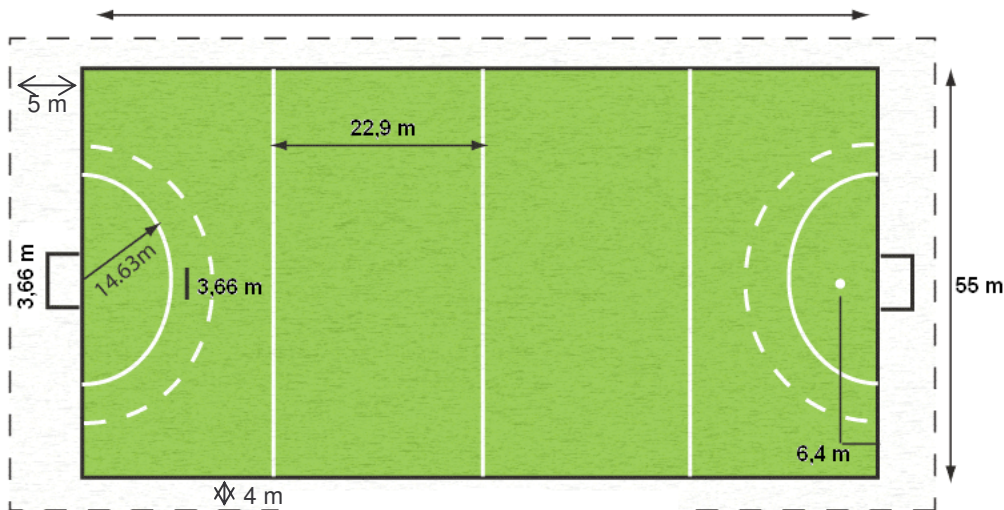


Diagram 1

- 3.1 Determine the length of the field if the area of the field (rectangle) is $5\,027\text{ m}^2$.
($Area = l \times b$) (3)
- 3.2 Determine the distance from the centre line to the back of the field. (2)
- 3.3 The school will be hosting a hockey tournament soon and needs to upgrade the field. The school decides to place a fence around the field. The recommended run-offs are 4 m on each of the sidelines (length) and 5 m on each back-line (breadth).
- 3.3.1 Determine the dimensions of the perimeter fence. (4)
- 3.3.2 Make a scale drawing of the field and the perimeter fence showing the run-offs. Clearly show all the measurements.
NB: Use the scale $10\text{ mm} = 10\text{ m}$ (4)
- 3.3.3 Use the formula **$Perimeter = 2(l + b)$** to determine the total quantity of fencing needed to the nearest metre. (2)

- 3.4 The governing body of the school decided to convert the original grass turf field into a synthetic turf. These are commonly known as astro-turf pitches, some being water-based and others being sand-based (water-free). The surface chosen by the Governing Body is a water-free synthetic turf. The playing field and the run-offs consist of different colours. The playing field in green and the run offs in red.
- 3.4.1 Determine how much of the synthetic turf is needed to cover the run-offs right around the field. (Rounded off to the nearest metre). (4)
- 3.4.2 Why do you think these two sections are marked in different colours? (1)
- 3.4.3 Do you think the Governing Body's choice of a water-free based surface is wise? Give a reason for your answer. (2)
- 3.5 Lines indicating the perimeter of the field, the semi-circles, goal areas as well as the demarcation lines dividing the field into sections are marked using white paint. Determine the following:
- 3.5.1 The perimeter of the semi-circle drawn in the figure (solid line) above. NB: (Circumference = $2\pi r$); Take $\pi = 3,14$ (3)
- 3.5.2 Determine the length of the radius of the larger semi-circle, drawn using a dotted line (in Diagram 1), if the circumference of the semi-circle is approximately 61,64 m. (3)
- 3.6 The lines on the field need to be painted with white paint. Use all the measurements you determined above together with the sketch given to show that the total amount of square metres (m^2) to be painted in white will be approximately $55 m^2$ rounded off to the nearest square metre. (Use only the solid lines having a width of 10 cm). (6)
- 3.7 How many litres of paint will you need in order to paint these lines on the hockey field if 5 litres of paint covers $23 m^2$? (2)

[36]

QUESTION 4

During the September Trial Examination the following means for Mathematics and Mathematical Literacy were recorded for 10 different schools in the same cluster group:

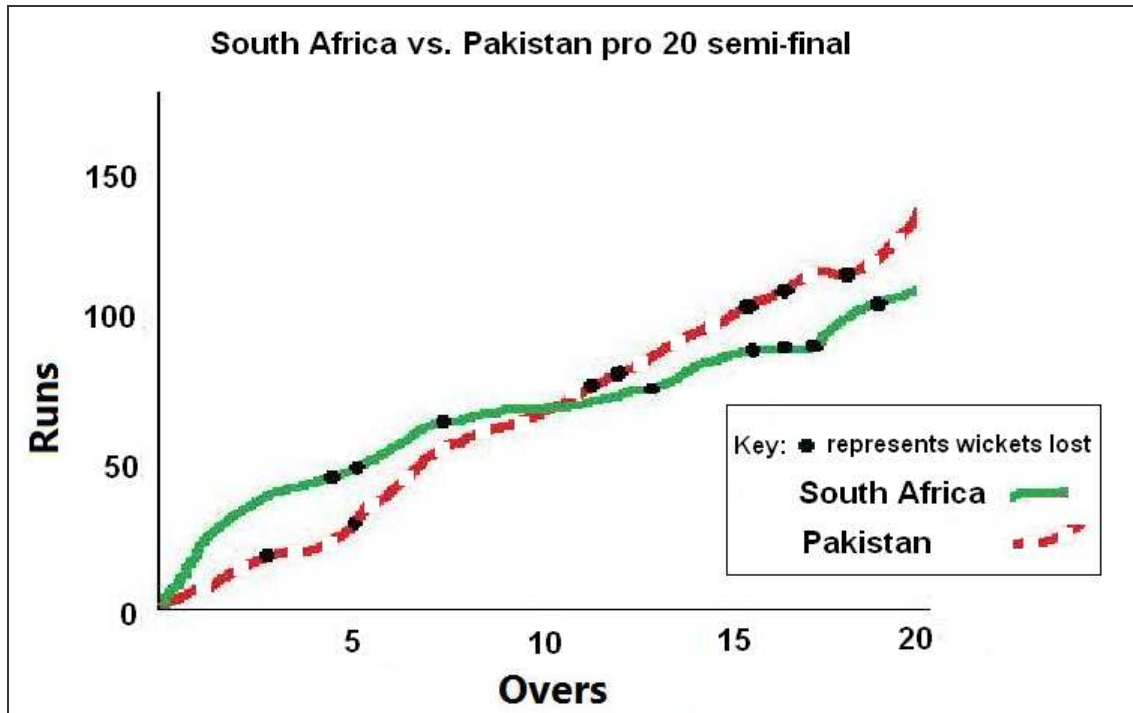
School	A	B	C	D	E	F	G	H	I	J
Mathematics	54	57	59	55	56	61	63	54	56	62
Mathematical Literacy	67	63	61	69	66	65	64	69	70	62

- 4.1 Determine by calculation which subject has the better mean. (3)
- 4.2 Determine for each set of data the following:
- 4.2.1 The median (5)
- 4.2.2 The mode (2)
- 4.3 In which subject did all schools perform better? Give a reason for your answer. (2)
- 4.4 Determine the upper and lower quartiles for the Mathematics means. (2)
- 4.5 The Department of Education uses 60% in Mathematics and 65% in Mathematical Literacy as a benchmark for determining if a school did well in a subject.
- 4.5.1 What percentage of the schools achieved this benchmark for Mathematics? (1)
- 4.5.2 Which schools achieved the benchmark for both Mathematics and Mathematical Literacy? (3)

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QUESTION 5

The diagram below shows the number of runs scored per overs bowled in a recent cricket match played between Pakistan and South Africa. The dots indicate the rate at which the wickets fell. Use this information together with the diagram to answer the questions that follow:



- 5.1 How many wickets were lost by Pakistan at the end of the game? (1)
- 5.2 During which over, do you think, did the two teams have the same number of runs? (1)
- 5.3 Which team lost more wickets in the match? How many wickets did this team lose? (2)
- 5.4 Which team won the match? Give a reason for your answer. (2)
- 5.5 How many overs were bowled for the match in total? (2)
- 5.6 Pakistan scored 145 runs in 20 overs. Determine their average runs per over. (2)

[10]**TOTAL: 100**