



education

Department:
Education
REPUBLIC OF SOUTH AFRICA

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

MATHEMATICAL LITERACY P2

NOVEMBER 2009

MEMORANDUM

MARKS: 150

SYMBOL	EXPLANATION
A	Accuracy
CA	Consistent accuracy
C	Conversion
J	Justification (Reason/Opinion)
M	Method
MA	Method with accuracy
P	Penalty, e.g. for no units, incorrect rounding off, etc.
R	Rounding off
RT/RG	Reading from a table/Reading from a graph
S	Simplification
SF	Correct substitution in a formula

This memorandum consists of 14 pages.

QUESTION 1 [29]			
Ques	Solution	Explanation	AS
1.1.1	$\begin{aligned} & \checkmark A \qquad \qquad \checkmark A \\ & \text{Limpopo and Western Cape} \\ & \text{Difference} = 30,1\% - 6,7\% \\ & \qquad \qquad \qquad \checkmark A \\ & \qquad \qquad \qquad = 23,4\% \end{aligned}$	2A Solution 1A Solution (3)	12.4.4 12.1.1
1.1.2	$\begin{aligned} & \text{Did not use a computer} \qquad \checkmark M \\ & = (100\% - 9,1\%) \text{ of } 911\,118 \\ & = 90,9\% \text{ of } 911\,118 \\ & \qquad \qquad \qquad \checkmark A \\ & = 828\,206,262 \\ & \qquad \qquad \checkmark CA \\ & \approx 828\,206 \\ & \mathbf{OR} \\ & 9,1\% \text{ of } 911\,118 = 82\,911,738 \quad \checkmark A \\ & \text{Not using computers} = 911\,118 - 82\,911,738 \quad \checkmark M \\ & \qquad \qquad \qquad = 828\,206,262 \\ & \qquad \qquad \qquad \approx 828\,206 \quad \checkmark CA \end{aligned}$	1M Subtraction 1A Solution 1CA Rounding off 1A Number using computers 1M Subtraction 1CA Number not using computers, rounded off (3)	12.1.1 12.1.2 12.4.4
1.1.3	$\begin{aligned} & \qquad \qquad \qquad \checkmark A \\ & \text{Difference in } \% = 61,8\% - 13,2\% = 48,6\% \\ & \text{Difference in usage} = 48,6\% \text{ of } 264\,654 \quad \checkmark M \\ & \qquad \qquad \qquad = 128\,621,844 \\ & \qquad \qquad \qquad \approx 128\,622 \quad \checkmark CA \\ & \mathbf{OR} \\ & \text{No. of cellphone users} - \text{No. of computer users} \\ & = 61,8\% \text{ of } 264\,654 - 13,2\% \text{ of } 264\,654 \quad \checkmark M \\ & = 163\,556,172 - 34\,934,328 \\ & = 128\,621,844 \quad \checkmark A \\ & \approx 128\,622 \quad \checkmark CA \end{aligned}$	1A Difference in % 1M Calculating % 1CA Solution 1M Calculating % and subtraction 1A Simplification 1CA Solution (3)	12.1.1 12.1.2 12.4.4

Ques	Solution	Explanation	AS
1.1.4	<p>Total number of households surveyed</p> $= 9 \times 1\,388\,957$ <p style="text-align: center;">✓M</p> $= 12\,500\,613$ <p style="text-align: center;">✓A</p> <p>Number surveyed in Mpumalanga</p> $= 12\,500\,613 - (1\,586\,739 + 802\,872 + 3\,175\,578 + 2\,234\,129 + 1\,215\,936 + 911\,118 + 264\,654 + 1\,369\,181)$ <p style="text-align: center;">✓M</p> $= 12\,500\,613 - 11\,560\,207$ <p style="text-align: center;">✓M</p> $= 940\,406$ <p style="text-align: center;">✓CA</p>	<p>1M Multiplying</p> <p>1A Total surveyed</p> <p>1M Subtraction</p> <p>1M Addition</p> <p>1CA Solution</p> <p style="text-align: right;">(5)</p>	<p>12.1.1</p> <p>12.4.4</p>
1.1.5	<p>The provinces with high cellphone usage have a corresponding relatively high computer usage.</p> <p style="text-align: center;">✓O ✓O</p> <p>The provinces with a low cellphone usage have a corresponding relatively low computer usage.</p> <p style="text-align: center;">✓O ✓O</p> <p>Exceptions are NC, MPU and LIM.</p>	<p>2 O Own opinion</p> <p>2 O Own opinion</p> <p style="text-align: right;">(4)</p>	12.4.4

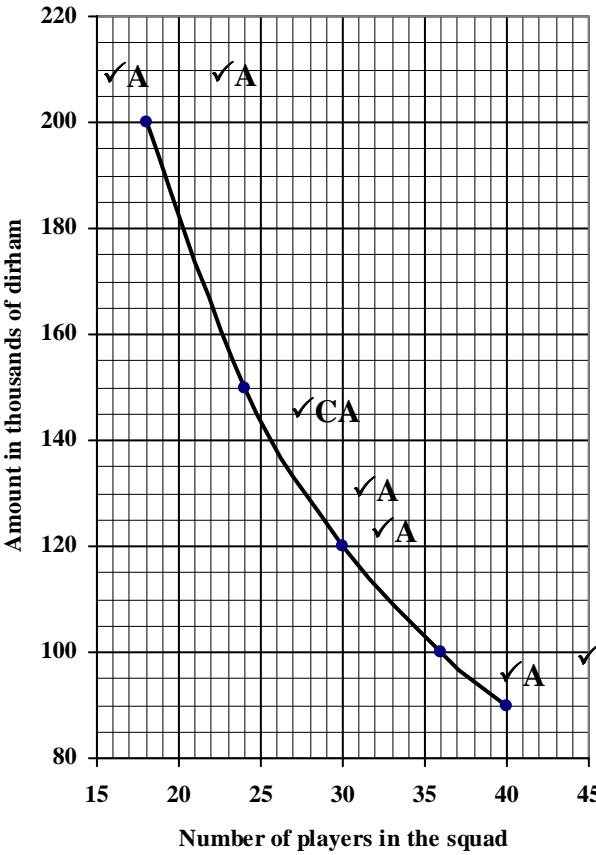
Ques	Solution	Explanation	AS
1.2.1	Increase for P500 = $1\,520 - 980 = 540$ ✓A Increase for Q600 = $1\,500 - 600 = 900$ ✓A \therefore Q600 has the greatest increase in sales ✓CA	1A Range of P500 1A Range of Q600 1CA Highest range (3)	12.1.1 12.4.4
1.2.2	Length of screen on diagram = 20 mm ✓A Height of screen on the diagram = 38 mm ✓A Scale is 2:5. This means that the actual length is $\frac{5}{2}$ times the given length. ✓M Actual length of screen = $\frac{5}{2} \times 20$ mm $= 50$ mm ✓CA Actual height of screen = $\frac{5}{2} \times 38$ mm $= 95$ mm ✓CA OR Length of screen on diagram = 20 mm ✓A Height of screen on diagram = 38 mm ✓A Scale is 2:5 = 1:2,5 ✓M This means that the actual length is 2,5 times the given length. Actual length = $2,5 \times 20$ mm $= 50$ mm ✓CA Actual height of screen = $2,5 \times 38$ mm $= 95$ mm ✓CA	1A Length on diagram 1A Height on diagram 1M Using the given scale 1CA Actual length 1CA Actual height OR 1A Length on diagram 1A Height on diagram 1M Using the given scale 1CA Actual length 1CA Actual height (5)	12.3.1 12.3.3
1.2.3	Graph B is misleading. ✓A The graph was drawn with the months reversed. ✓✓O	1A Statement about the claim 2O Support of statement (3)	12.4.6

QUESTION 2 [34]			
Ques	Solution	Explanation	AS
2.1.1	Percentage using other languages $= 100\% - (64,4\% + 11,9\% + 9,1\%) \quad \checkmark A$ $= 100\% - 85,4\%$ $= 14,6\% \quad \checkmark CA$ Number speaking other languages $= 14,6\% \text{ of } 2\,965\,600 \quad \checkmark M$ $= 432\,977,6$ $\approx 432\,978 \quad \checkmark CA$	1A Subtracting from 100% 1CA Other languages 1M Calculating % of population 1CA Rounding up (4)	12.1.1 12.1.2 12.4.4
2.1.2	$P(\text{Afrikaans and IsiXhosa}) = 21\% \quad \checkmark A$ $P(\text{not Afrikaans and IsiXhosa})$ $= 100\% - 21\% \quad \checkmark M$ $= 79\% \quad \checkmark CA$ OR Percentage speaking Afrikaans and isiXhosa $= 11,9 + 9,1 = 21 \quad \checkmark A$ Percentage not speaking Afrikaans and isiXhosa $= 100 - 21 = 79 \quad \checkmark M$ $P(\text{not Afrikaans and IsiXhosa}) = 79\% \quad \checkmark CA$	1A Identifying the percentage 1M Subtraction 1CA Solution 1A Identifying the percentage 1M Subtraction 1CA Solution (3)	12.4.5 12.1.1
2.1.3(a)	$\checkmark A \quad \checkmark A$ They are children, the elderly, people who are ill. OR Accept any other possible correct answer.	2A (Any two answers) (2)	12.4.4

Ques	Solution	Explanation	AS
2.1.3(b)	<p>Workforce = 60% of 2 965 600 ✓M = 1 779 360 ✓A</p> <p>Unemployed = 26,4% of 1 779 360 ✓M = 469 751,04 ✓S ≈ 469 751 ✓CA</p> <p>OR</p> <p>Unemployed = $26,4\% \times 60\% \times 2\,965\,600$ ✓M = 469 751,04 ✓S ≈ 469 751 ✓CA</p>	<p>1M Calculating % 1A Workforce</p> <p>1M Calculating % of unemployed 1S Simplifying 1CA Number unemployed</p> <p>OR</p> <p>1M Calculating % 1A Workforce 1M Calculating % of unemployed 1S Simplifying 1CA Number unemployed (5)</p>	12.1.1 12.1.2 12.4.4
2.2.1	<p>Gauteng has the highest economic activity in the country. It has many mines and most of the large factories, head offices of companies and banks, as well as the Stock Exchange are in Gauteng. ✓✓J</p>	<p>2J Candidates' valid reasons (2)</p>	12.4.4
2.2.2 (a)	<p>Total area of SA ✓M = (129 370 + 169 580 + 92 100 + 361 830 + 129 480 + 116 320 + 17 010 + 79 490 + 123 910) km² = 1 219 090 km² ✓A</p> <p>Land for farming ✓M = 80% of 1 219 090 km² = 975 272 km² ✓CA</p>	<p>1M Addition 1A Total 1M Calculating 80% 1CA Total area for agriculture (4)</p>	12.4.4 12.3.1 12.1.1

Ques	Solution	Explanation	AS
2.2.2(b)	$\begin{aligned} \text{Arable land} &= 11\% \text{ of } 975\,272 \text{ km}^2 && \checkmark M \\ &= 107\,279,92 \text{ km}^2 && \checkmark CA \\ \\ 3\,200\,000 \text{ ha} &= 3\,200\,000 \times 0,01 \text{ km}^2 \\ &= 32\,000 \text{ km}^2 && \checkmark CA \\ \\ \text{\% arable land in the Free State} \\ &= \frac{32\,000}{107\,279,92} \times 100\% && \checkmark M \\ &= 29,828 \dots \\ &\approx 29,83\% && \checkmark R \\ \\ \text{Arable land in the Free State is } 29,83\% \text{ of the total} \\ \text{area of arable land in South Africa.} \end{aligned}$	<p>1M Calculating %</p> <p>1CA Arable land in the country</p> <p>1CA Simplifying</p> <p>1M Calculating %</p> <p>1R Rounding off</p> <p style="text-align: right;">(5)</p>	12.1.1 12.3.2 12.4.4
2.2.3 (a)	<p>The province with the smallest land surface is Gauteng $\checkmark A$</p> $\begin{aligned} \text{Population density (GAU)} &= \frac{9\,688\,100 \text{ people}}{17\,010 \text{ km}^2} && \checkmark M \\ &= 569,55 \dots \text{ people/km}^2 \\ &\approx 570 \text{ people/km}^2 && \checkmark CA \end{aligned}$	<p>1A Identifying Gauteng</p> <p>1M Substitution in formula</p> <p>1CA Simplification</p> <p style="text-align: right;">(3)</p>	12.2.1 12.4.4
2.2.3 (b)	<p><u>Tebogo's statement:</u> The province with the smallest population is the Northern Cape $\checkmark A$</p> $\begin{aligned} \text{Population density (NC)} &= \frac{1\,102\,200 \text{ people}}{361\,830 \text{ km}^2} && \checkmark M \\ &= 3,046 \dots \text{ people/km}^2 \\ &\approx 3 \text{ people/km}^2 && \checkmark CA \end{aligned}$ <p>Tebogo is correct. $\checkmark A$</p> <p>The population density of the Northern Cape (the province with the smallest population) is less than the population density of Gauteng (the province with the smallest land surface area). Gauteng has a large population living on a small land surface area whereas Northern Cape has a small population living on a large land surface area. $\checkmark J$ $\checkmark J$</p>	<p>1A Identifying NC</p> <p>1M Substitution</p> <p>1CA Simplification</p> <p>1A Identifying who is correct</p> <p>2J Reason</p> <p style="text-align: right;">(6)</p>	12.2.1 12.1.1 12.4.4

QUESTION 3 [34]			
Ques	Solution	Explanation	AS
3.1.1	Total Income $\checkmark A$ $= (\text{number of Category 1 tickets}) \times R1\,400$ $+ (\text{number of Category 2 tickets}) \times R1\,050$ $+ (\text{number of Category 3 tickets}) \times R700$ $+ (\text{number of Category 4 tickets}) \times R350 \checkmark A$	1A Category 1 seat price 1A Category 2 seat price 1A Correct formula (3)	12.2.1
3.1.2 (a)	$\checkmark M$ Total Income $= (12\,425 \times R1\,400) + (8\,672 \times R1\,050)$ $+ (4\,546 \times R700) + (14\,424 \times R350)$ $\checkmark A$ $= R34\,731\,200 \checkmark CA$	1M Formula 1A Correct number of tickets 1CA Total revenue (3)	12.2.1 12.1.1
3.1.2 (b)	Total number of tickets sold $= 40\,067 \checkmark A$ Number of unsold tickets $= 42\,000 - 40\,067$ $= 1\,933 \checkmark CA$ Average price $= R \frac{700 + 350}{2} \checkmark A$ $= R525 \checkmark A$ 48% of average price $= R252 \checkmark CA$ Additional income $= R252 \times 1\,933 \checkmark CA$ $= R487\,116 \checkmark CA$	1A Number of tickets sold 1CA Number of tickets not sold 1A Finding average price 1A Average price for Cat. 3 & 4 1CA 48% of average price 1CA Calculations 1CA Additional income (7)	12.1.1 12.2.1 12.4.3
3.2.1	$\checkmark A$ $\checkmark A$ Total cost $= (5 \times R1\,120) + (1 \times R1\,400)$ $= R7\,000 \checkmark CA$	1A Price for group matches 1A Price for round 1 (6 matches) 1CA Total cost (3)	12.1.1 12.4.4
3.2.2 (a)	$i = 7\% \div 12 \checkmark A$ $= 0,5833... \%$ $= 0,58\% \checkmark CA$	1A Divided by 12 1CA Value of i (2)	12.1.3
3.2.2 (b)	$n = 14 \text{ months} \checkmark A$	1A Number of monthly deposits (1)	12.1.3

Ques	Solution	Explanation	AS
3.2.2 (c)	$x = \frac{R7\,000 \times 0,0058}{(1 + 0,0058)^{14} - 1} \quad \checkmark\checkmark\text{SF}$ $= R481,422\dots \quad \checkmark\text{CA}$ He must save R481,42 monthly. $\checkmark\text{CA}$	2SF Substituting 1CA Simplification 1CA Amount to be saved monthly (4)	12.1.3 12.2.1
3.3	$150 \text{ US dollars} = 150 \times 0,72025 \text{ euros} \quad \checkmark\text{M}$ $= 108,0375 \text{ euros} \quad \checkmark\text{A}$ $108,0375 \text{ euros} = 108,0375 \div 0,0230344 \text{ rouble} \quad \checkmark\text{M}$ $= 4\,690,27 \text{ rouble} \quad \checkmark\text{CA}$	1M Using conversion to euro 1A Amount in euro 1M Conversion to rouble 1CA Amount in rouble (4)	12.1.3
3.4	<p style="text-align: center;">PLAYERS' SHARE OF THE BONUS OF 3,6 MILLION DIRHAM</p>  <p style="text-align: center;">Number of players in the squad</p>	<p>1A For 200 000 at 18 players 1A Plotting (18; 200 000) 1A For 90 000 at 40 players 1A Plotting (40; 90 000) 1A Any other point calculated 1A Correct plotting of point 1A Joining the points</p> <p style="text-align: right;">(7)</p>	12.2.1 12.2.2

QUESTION 4 [32]			
Ques	Solution	Explanation	AS
4.1.1	$P(\text{boy in Grade 12}) = \frac{\sqrt{A} \cdot 60}{302} \quad \checkmark A$ $= \frac{30}{151} \quad (\approx 0,20 \approx 19,87\%)$	1A Numerator 1A Denominator (2)	12.4.5
4.1.2	$\text{Number of learners NOT in Grade 10} = 77 + 60 = 137$ $P(\text{not in Grade 10}) = \frac{\sqrt{A} \cdot 137}{302} \quad (\approx 0,45 \approx 45,36\%) \quad \checkmark A$ <p>OR</p> $P(\text{not in Grade 10}) = 1 - \frac{165}{302} = \frac{137}{302}$	1A Number not in Grade 10 1A Numerator 1A Denominator (3)	12.4.5
4.2.1(a)	The return distance = $2 \times 45 \text{ km} = 90 \text{ km} \quad \checkmark M$ 90 km is between 50 km and 100 km Cost = R800 $\quad \checkmark CA$	1M Correct distance 1CA Cost for return distance between 50 km and 100 km (2)	12.2.1 12.3.1
4.2.1 (b)	Return distance = $100 \text{ km} + 36 \text{ km} \quad \checkmark M$ Cost in rand = $R800 + 36 \times R5 \quad \checkmark A$ $= R980 \quad \checkmark CA$	1M Adding 1A Distance above 100 km 1CA Cost (3)	12.2.1 12.3.1
4.2.2	Cost in rand $\quad \checkmark A$ $= R800 + (\text{return distance travelled} - 100 \text{ km}) \times R5/\text{km} \quad \checkmark A$	1A Basic cost up to 100 km 1A Return distance travelled 1A Rate per km (3)	12.2.1

Ques	Solution	Explanation	AS
4.2.3	$R1\ 650 = R800 + (\text{return distance travelled} - 100) \times R5$ $1\ 650 - 800 = (\text{return distance travelled} - 100) \times 5$ $\frac{850}{5} + 100 = \text{distance travelled}$ $170 + 100 = \text{distance travelled}$ $\text{Distance travelled} = 270 \text{ km}$	\checkmark SF Substitution 1CA Dividing by 5 1CA Adding 100 km 1CA Distance travelled (4)	12.2.1 12.3.1
4.3.1(a)	$77 \div 15 = 5 \text{ remainder } 2$ The minimum number of minibuses needed is 6	1A Division 1CA Solution (2)	12.2.1
4.3.1 (b)	Possible arrangement of passengers in the minibuses: 3 minibuses with 15 passengers each and 2 with 10 passengers and 1 with 12 passengers OR 5 minibuses with 13 passengers in each and 1 minibus with 12 passengers OR Accept any suitable combination as long as there are 10 or more passengers in a minibus, and a maximum of 15.	2O For combination of minibuses OR 2O For combination of minibuses OR 2O For combination of minibuses (2)	12.2.1
4.3.2	One bus holds 50 passengers, so two buses are needed Cost of using buses = $2 \times R600$ = R1 200 Cost of using minibuses = $77 \times R14$ = R1 078 The minibus option is cheaper	1A Number of buses 1CA Cost of bus 1A Multiplying no. of learners by cost 1CA Taxi cost 1CA Decision (5)	12.1.3 12.2.1

Ques	Solution	Explanation	AS
4.4	<p>Diameter of minibus tyre = $\frac{7}{12} \times 120$ cm = 70 cm ✓A</p> <p>Circumference of minibus tyre = $3,14 \times 70$ cm ✓SF = 219,8 cm ✓A = 0,002198 km ✓CA</p> <p>$1\ 862 = \frac{\text{distance travelled}}{0,002198 \text{ km}}$ ✓SF</p> <p>Distance travelled = $1\ 862 \times 0,002198$ km = 4,092676 ≈ 4 km ✓CA</p> <p>OR</p> <p>Radius of minibus tyre = 60 cm Radius of minibus tyre = $\frac{7}{12} \times 60$ cm = 35 cm ✓A</p> <p>Circumference of minibus tyre = $2 \times 3,14 \times 35$ cm ✓SF = 219,8 cm ✓A = 0,002198 km ✓CA</p> <p>$1\ 862 = \frac{\text{distance travelled}}{0,002198 \text{ km}}$ ✓SF</p> <p>Distance travelled = $1\ 862 \times 0,002198$ km = 4,092676 ≈ 4 km ✓CA</p>	<p>1A Diameter of minibus tyre</p> <p>1SF Substitution into formula</p> <p>1A Circumference of minibus tyre in cm</p> <p>1CA Converting to km</p> <p>1SF Substitution into formula</p> <p>1CA Distance travelled</p> <p>OR</p> <p>1A Radius of minibus tyre</p> <p>1SF Substitution into formula</p> <p>1A Circumference of minibus tyre in cm</p> <p>1CA Converting to km</p> <p>1SF Substitution into formula</p> <p>1CA Distance travelled</p>	<p>12.3.1 12.1.1 12.2.1</p> <p>(6)</p>

QUESTION 5 [21]			
Ques	Solution	Explanation	AS
5.1.1	<p>Volume of a round cake ✓F</p> $= \pi \times (\text{radius})^2 \times \text{height}$ <p>✓SF ✓A</p> $= 3,14 \times \left(\frac{50}{2} \text{ cm}\right)^2 \times 15 \text{ cm}$ $= 29\,437,5 \text{ cm}^3 \quad \checkmark\text{CA}$ <p>Volume of a ring cake ✓F</p> $= \pi \times (R^2 - r^2) \times \text{height}$ <p>✓SF ✓A</p> $= 3,14 \times [(28 \text{ cm})^2 - (9 \text{ cm})^2] \times 14 \text{ cm}$ $= 3,14 \times 703 \text{ cm}^2 \times 14 \text{ cm}$ $= 30\,903,88 \text{ cm}^3 \quad \checkmark\text{CA}$ <p>The ring cake as it is the cake with the largest volume ✓✓CA</p>	<p>1 F Identifying correct formula</p> <p>1SF Substitution 1A Correct radius</p> <p>1CA Volume of round cake</p> <p>1F Identifying correct formula</p> <p>1A Correct R and r 1SF Substitution into formula</p> <p>1CA Volume of ring cake</p> <p>2CA Cake with bigger volume</p> <p>(10)</p>	12.3.1
5.1.2	<p>Total outer surface area ✓F</p> $= \pi \times (\text{radius})^2 + 2 \times \text{radius} \times \text{height}$ <p>✓SF ✓A ✓A</p> $= 3,14 \times (25 \text{ cm})^2 + 2 \times 25 \text{ cm} \times 15 \text{ cm}$ $= 1\,962,5 \text{ cm}^2 + 750 \text{ cm}^2$ $= 2\,712,5 \text{ cm}^2 \quad \checkmark\text{CA} \quad \checkmark\text{CA}$	<p>1F Identifying formula</p> <p>1SF Substitution into formula 1A Value of radius 1A Value of height</p> <p>1CA Surface area 1A Correct units</p> <p>(6)</p>	12.3.1

Ques	Solution	Explanation	AS
5.2	<p>Cost for Option 1:</p> $\text{Cost} = 100 \times R120 + R12\,000 \times \frac{14}{100} \quad \checkmark A$ $= R12\,000 + R1\,680$ $= R13\,680 \quad \checkmark CA$ <p>Cost for Option 2:</p> $\text{Cost} = R3\,200 + 100 \times R80 \quad \checkmark M$ $= R11\,200 \quad \checkmark A$ <p>Option 2 is the cheaper option $\checkmark O$</p>	<p>1A Multiplication/adding VAT</p> <p>1CA Simplification</p> <p>1M Addition/multiplication</p> <p>1A Simplification</p> <p>1O Own opinion</p> <p>(5)</p>	<p>12.1.3</p> <p>12.1.2</p>
		TOTAL:	150