



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

SENIOR CERTIFICATE EXAMINATIONS

MATHEMATICAL LITERACY P1

2016

MEMORANDUM

MARKS: 150

Symbol	Explanation
M	Method
M/A	Method with accuracy
CA	Consistent accuracy
A	Accuracy
C	Conversion
S	Simplification
RT/RG	Reading from a table OR a graph
SF	Correct substitution in a formula
J	Reason/Explain/Decision
P	Penalty, e.g. for no units, incorrect rounding off etc.
R	Rounding off
NPR	No penalty for rounding

This memorandum consists of 13 pages.

Ques	Solution	Explanation	T & L
1.1.6	$B = \frac{24781,93}{137} \checkmark MA$ $= R180,89 \checkmark A$	1MA dividing 1A tariff <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> Answer only full marks </div> (2)	L1
1.1.7	$C = 2\ 105,89 + R2\ 158,50 + R20\ 061,82 + R24\ 781,93$ $+ 6\ 875,14 - 0,03$ $= 55\ 983,25 \checkmark CA$ <p style="text-align: center;">OR</p> $C = 49\ 108,14 + 6\ 875,14 - 0,03 \checkmark M$ $= 55\ 983,25 \checkmark CA$	1M adding and subtracting 0,03 1CA account total <p style="text-align: center;">OR</p> 1M adding and subtracting 0,03 CA value from 1.1.5 <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> Answer only full marks </div> (2)	L2
1.1.8	To round down the amount due to the non-availability of 1c and 2c coins. $\checkmark\checkmark J$ <p style="text-align: center;">OR</p> Rounding down to 5c	2J explanation (2)	L1
1.1.9	Monthly interest rate = $10\% \div 12 \checkmark M$ $\text{Interest after 1 month} = \frac{1}{120} \times R55\ 983,25$ $\approx R466,527 \checkmark A$ $\text{Amount payable after 1 month (November 15)}$ $= R55\ 983,25 + R466,527 \checkmark M$ $\approx R56\ 449,777 \checkmark CA$ $\text{Interest after 2 months} = \frac{1}{120} \times R56\ 449,77$ $\approx R470,415$ $\text{Amount payable after 2 months (Dec 15)}$ $= R56\ 449,777 + R470,415$ $\approx R56\ 920,19 \checkmark CA$ <p style="text-align: center;">OR</p>	CA from Q1.1.7 1M divide by 12 1A 1st month's interest 1M adding interest 1CA value after 1 month 1CA value after 2 months <p style="text-align: center;">OR</p>	L3

Ques	Solution	Explanation	T & L
1.1.9	$\text{Monthly interest rate} = 10\% \div 12 \quad \checkmark M$ <p>Amount payable after 1 month (November 15)</p> $= \left(\frac{1}{120} \times R55\,983,25 \right) + R55\,983,25 \quad \checkmark M$ $\approx R56\,449,777 \quad \checkmark CA$ <p>Amount payable after 2 months (by 15 Dec)</p> $= \left(\frac{1}{120} \times R56\,449,777 \right) + R56\,449,78$ $\approx R56\,920,19 \quad \checkmark CA$	CA from Q1.1.7 1M divide by 12 1A monthly interest 1M calculating interest and adding 1CA value after 1 month 1CA value after 2 months (Max 3 marks if interest rate is not monthly) (5)	
1.1.10 (a)	$\text{New three-phase commercial levy} = R2\,105,89 + R50,00 \quad \checkmark M$ $= R2\,155,89 \quad \checkmark A$	1M adding R50 to a levy 1A simplification <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">Answer only full marks</div> (2)	L1
1.1.10 (b)	$\text{New tariff per kWh} = \left(\frac{12,2}{100} \times R0,6303 \right) + R0,6303 \quad \checkmark MA \quad \checkmark A$ $= 0,0768966 + R0,6303$ $\approx R\,0,7072 \quad \checkmark CA$ <p style="text-align: center;">OR</p> $\text{New tariff per kWh} = \left(\frac{112,2}{100} \times R0,6303 \right) \quad \checkmark A \quad \checkmark MA$ $\approx R\,0,7072 \quad \checkmark CA$	1MA calculating percentage of tariff 1A adding 0,6303 1CA tariff per kWh <p style="text-align: center;">OR</p> 1A percentage increase 1MA calculating percentage of tariff 1CA tariff NPR <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">Answer only full marks</div> (3)	L2
1.2.1	Income is less/smaller than expenditure $\checkmark\checkmark J$ <p style="text-align: center;">OR</p> Expenditure is more/bigger than income $\checkmark\checkmark J$ <p style="text-align: center;">OR</p> Amount of shortfall from income. $\checkmark\checkmark J$	2J terminology used (income & expenditure) more than /exceeds 2J less/smaller than 2J shortfall (2)	L1

Ques	Solution	Explanation	T & L
1.2.2	The municipality showed a surplus. ✓J $A = R65\,771\,447 - R28\,490\,095$ $= R37\,281\,352$ ✓MA	1J decision (from the subtraction) 1MA finding differences (2)	L1
1.2.3	Six million, nine hundred and seventy nine thousand, nine hundred and nine rand ✓✓A	2 A correct number and wording. (If six million, five hundred and thirty thousand seven hundred and eighty five rand : Max 1 mark) (2)	L1
1.2.4	Department B ✓✓A	2A answer (2)	L1
1.2.5	% difference $= \frac{\text{Expenditure 2014} - \text{Expenditure 2013}}{\text{Expenditure 2013}} \times 100\%$ $= \frac{R33\,031\,602 - R30\,645\,928}{R30\,645\,928} \times 100\%$ ✓SF $\approx 7,784636183\%$ ✓CA $\approx 8\%$ ✓R	1SF substitute correct values from table 1CA simplify 1R rounding <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">Answer only full marks</div> (3)	L2
1.2.6	$P = \frac{3}{7} \times 100\%$ ✓A $\approx 42,86\%$ ✓CA	1A numerator 1A denominator 1CA % <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">Answer only full marks</div> NPR (3)	P L2
			[44]

Ques	Solution	Explanation	T & L
2.1.3 (a)	$\begin{aligned} \text{Width of a cement slab} &= 2\frac{1}{2} \times 22 \text{ cm} + 2 \text{ cm} \\ &= 57 \text{ cm} \end{aligned}$	1MA multiply length of one brick by $2\frac{1}{2}$ and adding 2 cm (or 20mm) 1CA width <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 5px auto;">Answer only full marks</div>	L1 (2)
2.1.3 (b)	$\begin{aligned} \text{Volume of one cement slab} &= 92 \text{ cm} \times 57 \text{ cm} \times 3,5 \text{ cm} \\ &= 18\,354 \text{ cm}^3 \end{aligned}$	1SF correct values substituted from (a) 1C conversion 1CA volume in cm^3 <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 5px auto;">Answer only full marks</div>	L2 (3)
2.2.1	$\begin{aligned} \text{Height} &= [1\,800 \text{ mm} - (2 \times 40) \text{ mm}] \div 10 \\ &= 172 \text{ mm} \end{aligned}$	1M subtracting 80 1MA divide by 10 1CA height in mm <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 5px auto;">Answer only full marks</div>	L2 (3)
2.2.2 (a)	$\text{Side length} = \sqrt{2025 \text{ cm}^2} = 45 \text{ cm}$	1M square root 1A side length <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 5px auto;">Answer only full marks</div>	L1 (2)
2.2.2 (b)	$\begin{aligned} \text{Total floor area} &= 2\,025 \text{ cm}^2 \times 15 = 30\,375 \text{ cm}^2 \\ &= 3,0375 \text{ m}^2 \end{aligned}$	1M area multiplied by 15 1CA area in m^2 NPR <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 5px auto;">Answer only full marks</div>	L2 (2)
2.2.3 (a)	$\begin{aligned} \text{Area of circle} &= 3,142 \times \left(\frac{3}{2} \text{ cm}\right)^2 \\ &= 7,0695 \text{ cm}^2 \end{aligned}$	1A 3,142 1A correct radius 1A squaring 	L2 (3)
2.2.3 (b)	$\begin{aligned} \text{Surface area} &= 180 \text{ cm} \times 45 \text{ cm} - 10 \times 7,0695 \text{ cm}^2 \\ &= 8\,100 \text{ cm}^2 - 70,695 \text{ cm}^2 \\ &= 8\,029,305 \text{ cm}^2 \end{aligned}$	CA 45 cm from Q2.2.2(a) 1SF correct values 1M subtracting 1CA simplification 1CA total surface area	L3 (4)
			[28]

QUESTION 3 [24] Tolerance range 0 marks			
Ques	Solution	Explanation	T & L
3.1.1	ORPEN Gate ✓✓RD	2RD reading from map (2)	L1
3.1.2	R537, R536 ,R36 , R532 ✓✓RD	2D reading from map (2)	L1
3.1.3	R40 ✓✓RD [KZN do not mark this question.]	2RD reading from map (2)	L1
3.1.4	Lydenburg ✓✓✓RD	3RD reading from map (3)	L2
3.1.5	North West ✓✓RD	2D reading from map (2)	L1
3.2.1	Lifts ✓A ✓A Escalators ✓A Stairs/ Steps	2A for 1st feature 1A for 2nd feature P for INCORRECT features added (3)	L1
3.2.2	Clockwise ✓✓RD [Eastern Cape do not mark this question]	2RD reading from plan (2)	L1
3.2.3	✓A S124 ✓A	1A for S 1A correct number (accept 1024) (2)	L1
3.2.4	20 mm : 5 m ✓A = 20 mm : 5 000 mm ✓C = $\frac{20}{20}$ mm : $\frac{5\,000}{20}$ mm = 1 mm : 250 mm Scale = 1 : 250 ✓CA	1A ratio in different units 1C converting to the same units 1CA scale (3)	L3

Ques	Solution
3.2.5	<p>(Source: www.edrawsoft.com)</p>
3.2.5	<p>2A route to ANY exit 1A shortest route</p> <p style="text-align: right;">(3) L2</p>

Question 4 [24] Tolerance range 1 mark			
Ques	Solution	Explanation	T & L
4.1	\checkmark A CONTINUOUS. The data represents mass (in kilogram) which can be expressed in smaller fractional units. \checkmark J	1A continuous 1J explanation (2)	L1
4.2	$\checkmark\checkmark$ A Other meat 46% \checkmark CA	2A item 1CA percentage (Accept Beef –7 % then Max 2 marks) (3)	L1
4.3	\checkmark A $6,7 \text{ kg} \times 49\,320\,500$ \checkmark M $= 330\,447\,350 \text{ kg.}$ \checkmark CA	1A correct value from table 1M multiply by 49 320 500 1CA total in kg <div style="border: 1px solid black; padding: 2px; display: inline-block;">Answer only full marks</div> (3)	L1
4.4	\checkmark M $M = 43,8 - (13,8 + 3,7 + 3,6 + 22,4)$ $= 43,8 - 43,5$ \checkmark A $= 0,3$ \checkmark CA	1M subtracting 1A 43,5 1CA value of M <div style="border: 1px solid black; padding: 2px; display: inline-block;">Answer only full marks</div> (3)	L1
4.5	Fish and seafood $\checkmark\checkmark$ A	2A identifying fish and seafood (2)	L1
4.6	\checkmark A \checkmark CA \checkmark A $-46,0\% ; -7,0\% ; -5,0\% ; 109\% ; 119,0\% .$	1A Correct position -46% 1CA position of the -7% and -5% 1A arrangement of the positive percentages (If Other meat ; beef ; mutton ; poultry ; pork max 2 marks) <div style="border: 1px solid black; padding: 2px; display: inline-block;">Penalty 1 mark if in descending order</div> (3)	L1
4.7	No mode $\checkmark\checkmark$ A	2A correct answer (2)	L1

Ques	Solution	Explanation	T & L																																				
4.8	<p style="text-align: center;">Consumption of different food items in South Africa from 1994 to 2009</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <caption>Approximate data from the bar chart</caption> <thead> <tr> <th>Food item</th> <th>1999 (kg/year)</th> <th>2004 (kg/year)</th> <th>2009 (kg/year)</th> </tr> </thead> <tbody> <tr> <td>Beef</td> <td>11.5</td> <td>13.5</td> <td>15.5</td> </tr> <tr> <td>Mutton</td> <td>4.0</td> <td>3.5</td> <td>3.5</td> </tr> <tr> <td>Pork</td> <td>3.0</td> <td>3.5</td> <td>7.0</td> </tr> <tr> <td>Poultry</td> <td>18.0</td> <td>22.5</td> <td>32.0</td> </tr> <tr> <td>Meat, other</td> <td>0.5</td> <td>0.5</td> <td>1.0</td> </tr> <tr> <td>Total offal</td> <td>3.5</td> <td>4.0</td> <td>4.5</td> </tr> <tr> <td>Total eggs</td> <td>5.5</td> <td>6.0</td> <td>6.5</td> </tr> <tr> <td>Total fish and other seafood</td> <td>6.5</td> <td>7.0</td> <td>7.5</td> </tr> </tbody> </table> <p style="text-align: center;">Food items</p> <p>1A for each bar plotted correctly (for the last bar - mark any bar below 10 as correct)</p>	Food item	1999 (kg/year)	2004 (kg/year)	2009 (kg/year)	Beef	11.5	13.5	15.5	Mutton	4.0	3.5	3.5	Pork	3.0	3.5	7.0	Poultry	18.0	22.5	32.0	Meat, other	0.5	0.5	1.0	Total offal	3.5	4.0	4.5	Total eggs	5.5	6.0	6.5	Total fish and other seafood	6.5	7.0	7.5		L2
Food item	1999 (kg/year)	2004 (kg/year)	2009 (kg/year)																																				
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Total fish and other seafood	6.5	7.0	7.5																																				
		(6)	[24]																																				

Question 5 [30] Tolerance range 0 marks			
Ques	Solution	Explanation	T & L
5.1.1	$\checkmark A$ 5 365 : 112 043 $\checkmark MA$ $\approx 1 : 20,884$ $\checkmark CA$	1MA writing as a ratio 1A correct values 1CA form 1:... NPR (3)	F L1
5.1.2	R150, R200 and R300 $\checkmark\checkmark A$	2A correct values (2)	F L1
5.1.3	$\% \text{ savings} = \frac{9\,288}{202\,714} \times 100\% \checkmark M$ $\approx 4,58\% \checkmark CA$	1MA correct values 1M percentage 1CA % savings <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 5px auto;">Answer only full marks</div> (3)	F L1
5.1.4	Fixed expense $\checkmark\checkmark A$	2A answer (2)	F L1
5.1.5	R126 696 – R112 043 $\checkmark M$ = R14 653 $\checkmark CA$	1M subtract correct values 1CA difference <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 5px auto;">Answer only full marks</div> (2)	F L1
5.2.1	$\checkmark\checkmark A$ Charles and David Koch $\checkmark A$	2A Charles Koch 1A David Koch (3)	DH L1
5.2.2	$\checkmark M$ $\checkmark A$ \$79,2 billion – \$15,7 billion = \$63,5 billion $\checkmark CA$	1A correct values / names 1M subtraction 1CA solution including billions (3)	DH L2
5.2.3	$\checkmark A$ 40,1 ; 40,6 ; 41,7 ; 42,9; 42,9 ; 54,3 ; 64,5; 72,7; 77,1; 79,2 $\checkmark M$ $\text{Median} = \$ \frac{42,9 \text{ billion} + 54,3 \text{ billion}}{2}$ = \$48,6 billion $\checkmark CA$	1A arranging values 1M concept of median 1CA median (No penalty omitting billion) (3)	D L2

Ques	Solution	Explanation	T & L
5.2.4	Mean (in billions\$) $= \frac{3,9 + 6,7 + 3,3 + 7,4 + 15,7 + 4,0 + 6,3 + 6,3 + 3,1 + 4,0}{10}$ $= \frac{60,7}{10}$ $= 6,07$	1M concept of mean 1A dividing by 10 1CA simplification (No penalty omitting billion) (3)	D L2
5.2.5	$P_{(\text{south african} < 7)} = \frac{2}{10}$ $= \frac{1}{5}$	1A numerator 1A denominator 1CA simplified fraction (3)	P L2
5.2.6	$= R \left(\frac{6300000000}{0,0606} \right)$ $= R103\ 960\ 396\ 000$ $= R\ 103960,3960\ \text{million}$ $\approx R103\ 960\ \text{million OR } R103\ 960\ 000\ 000$ <p style="text-align: center;">OR</p> $\$6,3\ \text{billion} = \$6\ 300\ \text{million}$ $\frac{\$6\ 300\ \text{million}}{0,0606}$ $= R\ 103960,3960\ \text{million}$ $\approx R103\ 960\ \text{million OR } R103\ 960\ 000\ 000$	1M dividing by rate 1CA simplification 1R rounding OR 1M dividing by rate 1CA simplification 1R rounding (3)	D L2
			[30]