



# basic education

Department:  
Basic Education  
**REPUBLIC OF SOUTH AFRICA**

## NATIONAL SENIOR CERTIFICATE

**GRADE 12**

**MATHEMATICAL LITERACY P1**

**FEBRUARY/MARCH 2016**

**MEMORANDUM**

**MARKS: 150**

<b>Codes</b>	<b>Explanation</b>
<b>M</b>	Method
<b>MA</b>	Method with Accuracy
<b>CA</b>	Consistent Accuracy
<b>A</b>	Accuracy
<b>C</b>	Conversion
<b>D</b>	Define
<b>S</b>	Simplification
<b>RT/RD/RG</b>	Reading from a table OR a graph OR a diagram OR a map OR a plan
<b>SF</b>	Substitution in a formula
<b>P</b>	Penalty, e.g. for no units, incorrect rounding off, etc.
<b>R</b>	Rounding Off
<b>NP</b>	No penalty for rounding OR omitting units

**This memorandum consists of 10 pages.**

**KEY TO TOPIC SYMBOLS:****F = Finance; M = Measurement; MP = Maps; Plans and other representations****DH = Data Handling; P = Probability**

<b>QUESTION 1 [34]</b>			
<b>Ques</b>	<b>Solution</b>	<b>Explanation</b>	<b>Level</b>
1.1.1	$\begin{aligned} \text{Total amount} &= (22 \times R250) + (22 \times R400) \\ &= R5\,500 + R8\,800 \checkmark M \\ &= R14\,300 \checkmark CA \end{aligned}$	1M multiply 22 by R250 and by R400 1M addition 1CA total amount (3)	<b>F</b> L1
1.1.2	$\begin{aligned} \text{Total amount} &= R400 + (4,75\% \times R400) \\ &= R400 + R19 \checkmark S \\ &= R419 \checkmark CA \end{aligned}$	1M 7,5% of R400 1S simplifying 1CA amount (3)	<b>F</b> L1
1.1.3	$\begin{aligned} \text{Amount received per member} \\ &= \text{Total bank balance} - \text{non-refundable initial fee} \\ &= R110\,614,84 - (250 \times 22) \\ &= R110\,614,84 - R5\,500,00 \checkmark M \\ &= R105\,114,84 \div 22 \checkmark M \\ &= R4\,777,95 \checkmark CA \\ &\checkmark MA \end{aligned}$	1M for using R110 614,84 1M for subtracting R5 500 1M for dividing by 22 1CA simplification with correct rounding (4)	<b>F</b> L1 L2
1.2.1	$\begin{aligned} A &= R1\,799,88 \div 12 \\ &= R149,99 \checkmark A \end{aligned}$	1MA divide by 12 1A unit price (2)	<b>F</b> L1
1.2.2	$\begin{aligned} \text{Total goods value} &= R143\,988 + R1\,799,88 \\ &= R145\,787,88 \end{aligned}$	1A correct values 1M adding values (2)	<b>F</b> L1
1.2.3	$\begin{aligned} &\frac{R17\,494,55}{R145\,787,88} \times 100\% \checkmark A \checkmark M \\ &= 12,00000302\% \\ &\approx 12\% \checkmark CA \end{aligned}$	1A correct values 1M percentage calculation 1CA percentage (3)	<b>F</b> L1

Ques	Solution	Explanation	Level
1.2.4	$\text{VAT} = \text{R}143\,988 \times 14\% \div 114\%$ $= \text{R}17\,682,73684$ $\approx \text{R}17\,682,74 \quad \checkmark\text{CA}$ <p style="text-align: center;"><b>OR</b></p> $\text{R}143\,988 = 114\%$ $x = 14\%$ $x = \frac{143\,988 \times 14}{114}$ $= \text{R}17\,682,73684$ $\approx \text{R}17\,682,74 \quad \checkmark\text{CA}$ <p style="text-align: center;"><b>OR</b></p> $\text{VAT} = \text{R}143\,988 - \frac{\text{R}143\,988}{1,14}$ $= \text{R}143\,988 - \text{R}126\,305,26$ $\approx \text{R}17\,682,74 \quad \checkmark\text{CA}$	<p>1M multiply by 14 1M dividing by 114 1CA VAT amount</p> <p style="text-align: center;"><b>OR</b></p> <p>1M multiply by 14 1M dividing by 114 1CA VAT amount</p> <p style="text-align: center;"><b>OR</b></p> <p>1M subtracting 1M dividing by 1,14 1CA VAT amount</p> <p style="text-align: right;">(3)</p>	<b>F</b> L2
1.2.5	The amount of money that the lender charges for lending the money. $\checkmark\checkmark\text{D}$	2D definition	<b>F</b> L1
1.2.6	$\text{Interest} = \text{deferred amount} \times \text{interest} \times 30 \text{ months p.a.}$ $= \text{R}143\,597,33 \times 11,23316\% \times \frac{30}{12}$ $= \text{R}40\,326,29$	<p>1A correct values 1M simple interest 1C months to years</p> <p style="text-align: right;">(3)</p>	<b>F</b> L1
1.2.7	$B = \text{tot. cost of credit} - \text{all risks ins.} - \text{tot. deferred}$ $= \text{R}195\,540,52 - \text{R}2\,049,90 - \text{R}183\,923,62$ $= \text{R}9\,567 \quad \checkmark\text{CA}$	<p>1M subtracting 1A using correct values 1A value of A</p> <p style="text-align: right;">(3)</p>	<b>F</b> L1
1.2.8	Fitting charges, TV Licence fee, Service fee	<p>1A fitting 1A TV License 1A service fee</p> <p style="text-align: right;">(3)</p>	<b>F</b> L1
1.2.9	$\text{Final instalment} = \text{R}195\,540,52 - (29 \times \text{R}6\,518,10)$ $= \text{R}195\,540,52 - \text{R}189\,024,90$ $= \text{R}6\,515,62 \quad \checkmark\text{CA}$	<p>1M subtracting 1M multiply by 29 1CA final instalment</p> <p style="text-align: right;">(3)</p>	<b>F</b> L2
			<b>[34]</b>

QUESTION 2 [31]			
Ques	Solution	Explanation	Level
2.1.1	$\text{Outer diameter} = \frac{54}{100} \times 121,92 \text{ cm} \quad \checkmark\text{M}$ $= 65,8368 \text{ cm} \quad \checkmark\text{CA}$ $= 658,368 \text{ mm} \quad \checkmark\text{C}$ $\approx 658 \text{ mm} \quad \checkmark\text{R}$	1M % of 121,92 cm  1CA outer diameter in cm 1C conversion to mm 1R rounding  (4)	M L1
2.1.2	$\text{Circumference of rim} = 3,142 \times 584 \text{ mm} \quad \checkmark\text{SF}$ $= 1\,834,93 \text{ mm} \quad \checkmark\text{A}$ $\text{Part of circumference filled by spokes} = 24 \times 2 \text{ mm}$ $= 48 \text{ mm} \quad \checkmark\text{A}$ $\text{Distance between spokes} = \frac{1\,834,93 - 48}{24} \text{ mm} \quad \checkmark\text{M}$ $= 74,46 \text{ mm} \quad \checkmark\text{CA/NP}$	1SF substitution 1A circumference  1A space by spoke  1M subtracting part filled by spokes 1M division by 24 1CA/NP distance apart in cm  (6)	M L2
2.1.3	$\text{Width by wheelchair and hands} = 60,96 \times 10 \text{ mm}$ $= 609,6 \text{ mm} \quad \checkmark\text{C}$ $\text{Gap width} = \frac{750 - 609,6}{2} \text{ mm} \quad \checkmark\text{M}$ $= 70,2 \text{ mm} \quad \checkmark\text{CA}$	1C conversion to mm  1M difference between 750 mm and 609,6 mm 1M divide difference by 2  1CA gap width  (4)	M L1

Ques	Solution	Explanation	Level
2.2.1	$\begin{aligned} \text{Total width} &= (80 \times 4)\text{mm} + (640 \times 2)\text{mm} \\ &= 320 \text{ mm} + 1\,280 \text{ mm} \checkmark\text{M} \\ &= 1\,600 \text{ mm} \checkmark\text{CA} \\ &= 1,6 \text{ m} \checkmark\text{C} \end{aligned}$ <p style="text-align: center;"><b>OR</b></p> $\begin{aligned} \text{Total width} &= 80 + 640 + 80 + 80 + 640 + 80 \text{ mm} \checkmark\text{M} \\ &= 1\,600 \text{ mm} \checkmark\text{CA} \\ &= 1,6 \text{ m} \checkmark\text{C} \end{aligned}$	<p>1M adding values 1CA width in mm 1C conversion</p> <p style="text-align: center;"><b>OR</b></p> <p>1M adding values 1CA width in mm 1C conversion</p> <p style="text-align: right;">(3)</p>	<b>M</b> L1
2.2.2	$\begin{aligned} e &= [2\,485 \text{ mm} - (80 + 640 + 95 + 95 + 220) \text{ mm}] \div 2 \\ &= (2\,485 \text{ mm} - 1\,130 \text{ mm}) \div 2 \\ &= 1\,355 \text{ mm} \div 2 \checkmark\text{M} \\ &= 677,5 \text{ mm} \checkmark\text{CA} \end{aligned}$ <p style="text-align: center;"><b>OR</b></p> $\begin{aligned} e &= (2\,485 - 80 - 640 - 95 - 95 - 220) \text{ mm} \div 2 \\ &= 1\,355 \text{ mm} \div 2 \checkmark\text{M} \\ &= 677,5 \text{ mm} \checkmark\text{CA} \end{aligned}$	<p>1M adding 1A simplification 1M divide by 2 1CA length</p> <p style="text-align: center;"><b>OR</b></p> <p>1A correct values 1MA subtracting 1M divide by 2 1CA length</p> <p style="text-align: right;">(4)</p>	<b>M</b> L1
2.2.3	$\begin{aligned} \text{Total area} &= (640 \times 677,5 \times 4) + \left( \frac{3,142 \times 640^2}{2} \right) \text{ mm}^2 \\ &= 1\,734\,400 \text{ mm}^2 + 643\,481,6 \text{ mm}^2 \\ &= 2\,377\,881,6 \text{ mm}^2 \checkmark\text{CA} \end{aligned}$	<p>1SF substitute in formulas 1M multiply by 4 1A identify of correct radius 1M divide by 2 1M adding different areas 1CA total area</p> <p style="text-align: right;">(6)</p>	<b>M</b> L3
2.2.4	$\begin{aligned} \text{Total mass} &= 15\,985,408 \text{ cm}^3 \times 2,5\text{g/cm}^3 \checkmark\text{SF} \\ &= 39\,963,52 \text{ g} \checkmark\text{A} \\ &= 39,96 \text{ kg} \checkmark\text{C} \end{aligned}$	<p>1M change subject of formula 1SF substitution into formula 1A total mass in gram 1C conversion to kg</p> <p style="text-align: right;">(4)</p>	<b>M</b> L2
			<b>[31]</b>

<b>QUESTION 3 [21]</b>			
<b>Ques</b>	<b>Solution</b>	<b>Explanation</b>	<b>Level</b>
3.1.1	Bus stop 2 ✓✓A	2A answer (2)	<b>MP</b> L1
3.1.2	West ✓✓A	2A answer (2)	<b>MP</b> L1
3.1.3	4 and 5 ✓✓A	2A 4 and 5 (2)	<b>MP</b> L1
3.1.4	Round trip = 19:40 – 17:55 ✓M = 1 hour 45 minutes ✓A	1M subtracting 1A time taken (2)	<b>MP</b> L1
3.1.5	Arrival time at bus stop 5 = 11:52 + 13 min ✓A = 12:05  Next bus to bus stop 2 is at 12:17 ✓RT  Waiting time = 12:17 – 12:05 = 12 minutes ✓CA	1A adding minutes  1RT reading correct value from table  1CA waiting minutes (3)	<b>MP</b> L2
3.1.6	✓RT 7:45 – 7:19 = 26 minutes ✓CA	1RT reading correct values 1CA time in minutes (2)	<b>MP</b> L1
3.2	Time taken = 08:23 – 08:15 = 8 minutes ✓A  Distance = 43 km/h × $\left(\frac{8}{60}\right)$ h ✓C ✓M = 43 km/h × 0,1333..... h = 5,73 km ✓CA/NP	1A time in minutes  1C conversion to hours  1M multiply speed and time 1CA/NP distance in km (4)	<b>MP</b> L2
3.3.1	B, C, A, D ✓✓A	2A correct order of instructions/diagrams (2)	<b>MP</b> L2
3.3.2	C ✓✓A	1A answer A (2)	<b>MP</b> L1
		<b>[21]</b>	

<b>QUESTION 4 [27]</b>			
<b>Ques</b>	<b>Solution</b>	<b>Explanation</b>	<b>Level</b>
4.1.1	Breede Valley ✓✓RT	2RT correct municipality (2)	<b>DH</b> L1
4.1.2	Difference (Tlokwe) = $162\,762 - 128\,353$ = $34\,409$ ✓CA	1M subtracting 1RT correct values 1CA difference (3)	<b>DH</b> L1
4.1.3	Number of elderly = $6,1\% \times 171\,721$ ✓RT = $10\,474,981$ ✓M $\approx 10\,474$ <b>OR</b> $10\,475$ ✓R	1RT correct values 1M percentage calculation 1R rounding (3)	<b>DH</b> L1
4.1.4	$P = 100\% - 14,4\%$ ✓M = $85,6\%$ ✓A = $\frac{107}{125}$ ✓CA	1M subtracting from 100% 1A probability % 1CA fraction in simplest form (3)	<b>P</b> L2
4.1.5	Blouberg ✓✓RT	2RT correct municipality (2)	<b>DH</b> L1
4.1.6	Growth rate = $\frac{\text{Difference in population from 2001 to 2011}}{\text{Population in 2001}} \times 100\%$ = $\frac{166\,825 - 146\,387}{146\,387} \times 100\%$ ✓SF $\approx 13,96\%$ ✓CA/NP	1RT reading from table 1SF substitution  1CA/NP rate per year (3)	<b>DH</b> L2
4.1.7	Land area size in $\text{km}^2 = \text{population} \div \text{population density}$ = $\frac{162\,762}{61} \text{km}^2$ ✓RT $\approx 2\,668 \text{km}^2$ ✓CA	1RT correct values 1M dividing 1CA rounding (3)	<b>M</b> L2
4.2.1	C ✓✓A	2A answer (2)	<b>DH</b> L1
4.2.2	Gas and nuclear = $100\% - (67\% + 15\% + 14\% + 0,3\%)$ = $3,7\%$ ✓S Each contribution: $3,7\% \div 2 = 1,85\%$ ✓CA	1M subtracting from 100% 1S simplification 1CA contribution (3)	<b>D</b> L1
4.2.3	Terrajoules energy supplied by petroleum = $14\% \times 7,3 \times 1000\,000$ terrajoules = $1\,022\,000$ terrajoules ✓CA	1RG 2010 energy supply 1M percentage calculation 1CA energy (3)	<b>D</b> L1
		<b>[27]</b>	

<b>QUESTION 5 [37]</b>																																	
<b>Ques</b>	<b>Solution</b>	<b>Explanation</b>	<b>Level</b>																														
5.1.1	37,1 ; 31,1 ; 30,2 ; 24,6 ; 24,3 ; 24,0 ; 21,3 ; 20,6 ; 14,9 <span style="float:right">✓✓A</span>	2A average percentage incomes in descending order (2)	<b>DH</b> L1																														
5.1.2	$\text{Mean \%} = \frac{228,1\%}{9} \checkmark A$ $= 25,34\% \checkmark CA$ Provinces above mean are: KZN, WC and GP <span style="float:right">✓✓CA</span>	1A adding all % 1M mean concept  1CA calculating mean %  2CA identifying 3 provinces (5)	<b>DH</b> L2																														
5.1.3	<p style="text-align:center"><b>Percentage income earned from the sale of electricity</b></p> <table border="1" style="margin-top: 10px; width: 100%; border-collapse: collapse;"> <caption>Data from Bar Chart</caption> <thead> <tr> <th>Province</th> <th>Solid Bar (%)</th> <th>Dotted Bar (%)</th> </tr> </thead> <tbody> <tr> <td>EC</td> <td>20,5</td> <td>34,0</td> </tr> <tr> <td>FS</td> <td>24,5</td> <td>38,5</td> </tr> <tr> <td>GP</td> <td>37,0</td> <td>50,5</td> </tr> <tr> <td>KZN</td> <td>30,0</td> <td>42,0</td> </tr> <tr> <td>LP</td> <td>14,5</td> <td>29,5</td> </tr> <tr> <td>MP</td> <td>21,0</td> <td>40,5</td> </tr> <tr> <td>NW</td> <td>24,0</td> <td>43,5</td> </tr> <tr> <td>NC</td> <td>24,5</td> <td>38,5</td> </tr> <tr> <td>WC</td> <td>31,0</td> <td>44,5</td> </tr> </tbody> </table>		Province	Solid Bar (%)	Dotted Bar (%)	EC	20,5	34,0	FS	24,5	38,5	GP	37,0	50,5	KZN	30,0	42,0	LP	14,5	29,5	MP	21,0	40,5	NW	24,0	43,5	NC	24,5	38,5	WC	31,0	44,5	
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	$A = 24,0\% + 19,5\% = 43,5\% \checkmark CA$ 1A for each of the 5 correctly plotted bars	1M adding 19,5% 1CA value of A																															
			<b>L2</b> (7)																														



Ques	Solution	Explanation	Level
5.1.4	$P_{\text{(earned below 35\%)}} = \frac{2}{9} \times 100\% \quad \checkmark A$ $\approx 22,2\% \quad \checkmark M$ $\quad \quad \quad \checkmark CA/NP$	1A identify numerator 1M multiply by 100 1CA/NP simplification (3)	<b>P</b> L2
5.2.1	$0 \text{ OR zero OR impossible OR none OR } 0\% \quad \checkmark \checkmark A$	2A correct probability (2)	<b>P</b> L1
5.2.2	Virgin Mobile $\checkmark \checkmark RT$	2RT reading correct value from table (2)	<b>DH</b> L1
5.2.3	Profit is when your income is greater than your expenses. $\checkmark \checkmark D$	2D correct explanation/definition (2)	<b>F</b> L1
5.2.4	$MTN \ R270 \div R15 = 18 \text{ vouchers} \quad \checkmark MA$ $\text{Profit on 18 vouchers} = 18 \times R0,51$ $= R9,18 \quad \checkmark CA$ $\text{Virgin Mobile } R120 \div R15 = 8 \text{ vouchers}$ $\text{Profit on 8 vouchers} = 8 \times R0,81$ $= R6,48 \quad \checkmark A$ $\text{Total profit for the day} = R9,18 + R6,48$ $= R15,66 \quad \checkmark CA$	1MA for calculating the number of vouchers 1CA for calculating the profit on selling MTN vouchers  1A for calculating the profit on selling Virgin Mobile vouchers  1CA for calculating the daily profit. (4)	<b>F</b> L3
5.2.5	$\text{Number of weeks} = \frac{5122,50}{341,50} \quad \checkmark M$ $= 15 \text{ days} \quad \checkmark A$ $= 3 \text{ school weeks} \quad \checkmark CA$	1M division by 341,50  1A number of days 1CA number of weeks (3)	<b>F</b> L1

Ques	Solution	Explanation	Level
5.2.6	Total cost of machines = R1 539 × 52 ✓MA = R80 028 ✓CA Number of airtime vouchers = R80 028 ÷ R0,54 = 148 200 ✓CA	1MA multiply by 52 1CA simplification 1M dividing the correct values 1CA simplification (4)	<b>F</b> L1
5.2.7	Total discount = $\frac{3,25}{100} \times R14\,760$ ✓RT ✓M = R479,70 ✓CA	1RT reading correct value from table 1M multiplying 1CA discount (3)	<b>F</b> L1
			<b>[37]</b>

**TOTAL: 150**