# basic education

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

## NATIONAL
## SENIOR CERTIFICATE

## GRADE 12

**MATHEMATICAL LITERACY P1**

**FEBRUARY/MARCH 2016**

**MEMORANDUM**

**MARKS: 150**

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

**QUESTION 1 [34]**

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

| Ques | Solution | Explanation | Level |
|---|---|---|---|
| 1.2.4 | $\checkmark$M $\qquad$ $\checkmark$M <br> VAT = R143 988 $\times 14\%$ $\div 114\%$ <br> $\quad$ = R17 682,73684 <br> $\quad$ $\approx$ R17 682,74 $\checkmark$CA <br><br> **OR** <br><br> R143 988 = 114% <br> $\quad x \quad$ = 14% <br><br> $x \quad = \dfrac{143\,988 \times 14}{114}$ $\begin{array}{l}\checkmark M \\ \checkmark M\end{array}$ <br> $\quad$ = R17 682,73684 <br> $\quad$ $\approx$ R17 682,74 $\checkmark$CA <br><br> **OR** <br><br> $\qquad\qquad$ $\checkmark$M <br> VAT = R143 988 $-$ $\dfrac{R143\,988}{1,14}$$\checkmark$M <br> $\quad$ = R143 988 – R126 305,26 <br> $\quad$ $\approx$ R17 682,74$\checkmark$CA | 1M multiply by 14 <br> 1M dividing by 114 <br> 1CA VAT amount <br><br> **OR** <br><br><br><br><br> 1M multiply by 14 <br> 1M dividing by 114 <br> 1CA VAT amount <br><br><br> **OR** <br><br><br> 1M subtracting <br> 1M dividing by 1,14 <br><br> 1CA VAT amount <br> $\hfill$ (3) | **F** <br> L2 |
| 1.2.5 | The amount of money that the lender charges for lending the money. $\checkmark\checkmark$D | 2D definition <br><br> $\hfill$ (2) | F <br> L1 |
| 1.2.6 | Interest = deferred amount × interest × 30 months p.a <br> $\qquad\qquad$ $\checkmark$A $\qquad$ $\checkmark$M <br> $\quad$ = R143 597,33 × 11,23316% × $\dfrac{30}{12}$ $\checkmark$C <br><br> $\quad$ = R40 326,29 | 1A correct values <br> 1M simple interest <br> 1C months to years <br> $\hfill$ (3) | **F** <br> L1 |
| 1.2.7 | B = tot. cost of credit – all risks ins. – tot. deferred <br> $\qquad\qquad$ $\checkmark$M $\qquad$ $\checkmark$A <br> $\quad$ = R195 540,52 – R2 049,90 – R183 923,62 <br> $\quad$ = R9 567 $\quad$ $\checkmark$CA | 1M subtracting <br> 1A using correct values <br> 1A value of A <br> $\hfill$ (3) | **F** <br> L1 |
| 1.2.8 | $\checkmark$A $\qquad\qquad$ $\checkmark$A $\qquad\qquad$ $\checkmark$A <br> Fitting charges, TV Licence fee, Service fee | 1A fitting <br> 1A TV License <br> 1A service fee <br> $\hfill$ (3) | **F** <br> L1 |
| 1.2.9 | $\qquad\qquad\qquad$ $\checkmark$M $\qquad\qquad$ $\checkmark$M <br> Final instalment = R195 540,52 – (29 × R6 518,10) <br> $\qquad\qquad$ = R195 540,52 – R189 024,90 <br> $\qquad\qquad$ = R6 515,62 $\checkmark$CA | 1M subtracting <br> 1M multiply by 29 <br> 1CA final instalment <br> $\hfill$ (3) | **F** <br> L2 |
| | | | **[34]** |

| QUESTION 2 [31] | | | |
|---|---|---|---|
| **Ques** | **Solution** | **Explanation** | **Level** |
| 2.1.1 | Outer diameter $= \dfrac{54}{100} \checkmark^{M} \times 121{,}92$ cm <br><br> $= 65{,}8368$ cm $\checkmark$CA <br> $= 658{,}368$ mm $\checkmark$C <br> $\approx 658$ mm $\checkmark$R | 1M % of 121,92 cm <br><br> 1CA outer diameter in cm <br> 1C conversion to mm <br> 1R rounding <br><br> (4) | **M** <br> L1 |
| 2.1.2 | Circumference of rim $= 3{,}142 \checkmark^{SF} \times 584$ mm <br> $= 1\,834{,}93$ mm $\checkmark$A <br><br> Part of circumference filled by spokes $= 24 \times 2$ mm <br> $= 48$ mm $\checkmark$A <br><br> Distance between spokes $= \dfrac{1834{,}93 - 48}{24 \checkmark M} \checkmark^{M}$ mm <br> $= 74{,}46$ mm $\checkmark$CA/NP | 1SF substitution <br> 1A circumference <br><br><br> 1A space by spoke <br><br> 1M subtracting part filled by spokes <br> 1M division by 24 <br> 1CA/NP distance apart in cm <br><br> (6) | **M** <br> L2 |
| 2.1.3 | Width by wheelchair and hands $= 60{,}96 \times 10$ mm <br> $= 609{,}6$ mm $\checkmark$C <br><br> Gap width $= \dfrac{750 - 609{,}6}{2 \checkmark M} \checkmark^{M}$ mm <br><br> $= 70{,}2$ mm $\checkmark$CA | 1C conversion to mm <br><br> 1M difference between 750 mm and 609,6 mm <br> 1M divide difference by 2 <br><br> 1CA gap width <br><br> (4) | **M** <br> L1 |

| Ques | Solution | Explanation | Level |
|------|----------|-------------|-------|
| 2.2.1 | Total width = (80 × 4)mm + (640 × 2)mm <br> $\qquad$ = 320 mm + 1 280 mm ✓M <br> $\qquad$ = 1 600 mm ✓CA <br> $\qquad$ = 1,6 m ✓C <br> **OR** <br> Total width = 80 + 640 + 80 + 80 + 640 + 80 mm ✓M <br> $\qquad$ = 1 600 mm ✓CA <br> $\qquad$ = 1,6 m ✓C | 1M adding values <br> 1CA width in mm <br> 1C conversion <br><br> **OR** <br> 1M adding values <br> 1CA width in mm <br> 1C conversion <br><br>$\qquad\qquad\qquad$ (3) | **M** <br> L1 |
| 2.2.2 | $\overset{✓M}{}$ <br> **e** = [2 485 mm – (80 + 640 + 95 + 95 + 220) mm] ÷ 2 <br> $\qquad\overset{✓A}{}$ <br> $\quad$ = (2 485 mm – 1 130 mm) ÷ 2 <br> $\quad$ = 1 355 mm ÷ 2 ✓M <br> $\quad$ = 677,5 mm ✓CA <br><br> $\qquad$ **OR** <br> $\qquad\overset{✓A}{}\quad\overset{✓M}{}$ <br> **e** = (2 485 – 80 – 640 – 95 – 95 – 220) mm ÷ 2 <br> $\quad$ = 1 355 mm ÷ 2 ✓M <br> $\quad$ = 677,5 mm ✓CA | 1M adding <br> 1A simplification <br> 1M divide by 2 <br> 1CA length <br><br> **OR** <br> 1A correct values <br> 1MA subtracting <br> 1M divide by 2 <br> 1CA length <br><br>$\qquad\qquad\qquad$ (4) | **M** <br> L1 |
| 2.2.3 | $\qquad\overset{✓SF}{}\quad\overset{✓M}{}\qquad\overset{✓A}{}$ <br> Total area = (640 × 677,5 × 4) + $\left(\dfrac{3,142 \times 640^2}{2 \quad \overset{✓M}{}}\right)$ mm² <br> $\qquad\qquad\overset{✓M}{}$ <br> $\quad$ = 1 734 400 mm² + 643 481,6 mm² <br> $\quad$ = 2 377 881,6 mm² ✓CA | 1SF substitute in formulas <br> 1M multiply by 4 <br> 1A identify of correct radius <br> 1M divide by 2 <br> 1M adding different areas <br> 1CA total area <br><br>$\qquad\qquad\qquad$ (6) | **M** <br> L3 |
| 2.2.4 | $\qquad\qquad\overset{✓M}{}$ <br> Total mass = 15 985,408 cm³ × 2,5g/cm³ ✓SF <br> $\qquad$ = 39 963,52 g ✓A <br> $\qquad$ = 39,96 kg ✓C | 1M change subject of formula <br> 1SF substitution into formula <br> 1A total mass in gram <br> 1C conversion to kg <br><br>$\qquad\qquad\qquad$ (4) | **M** <br> L2 |
| | | | **[31]** |

**QUESTION 3 [21]**

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

**QUESTION 4 [27]**

| Ques | Solution | Explanation | Level |
|---|---|---|---|
| 4.1.1 | Breede Valley ✓✓RT | 2RT correct municipality (2) | **DH** L1 |
| 4.1.2 | Difference $_{(Tlokwe)}$ = 162 762 ✓M – 128 353 ✓RT <br> = 34 409 ✓CA | 1M subtracting <br> 1RT correct values <br> 1CA difference (3) | **DH** L1 |
| 4.1.3 | Number of elderly = 6,1% × 171 721 ✓RT <br> = 10 474,981 ✓M <br> ≈ 10 474 **OR** 10 475 ✓R | 1RT correct values <br> 1M percentage calculation <br> 1R rounding (3) | **DH** L1 |
| 4.1.4 | P = 100% – 14,4% ✓M <br> = 85,6% ✓A <br> = $\dfrac{107}{125}$ ✓CA | 1M subtracting from 100% <br> 1A probability % <br> 1CA fraction in simplest form (3) | **P** L2 |
| 4.1.5 | Blouberg ✓✓RT | 2RT correct municipality (2) | **DH** L1 |
| 4.1.6 | Growth rate = $\dfrac{\text{Difference in population from 2001 to 2011}}{\text{Population in 2001}} \times 100\%$ <br> = $\dfrac{166\,825 - 146\,387}{146\,387} \times 100\%$ ✓RT ✓SF <br> ≈ 13,96% ✓CA/NP | 1RT reading from table <br> 1SF substitution <br><br> 1CA/NP rate per year (3) | **DH** L2 |
| 4.1.7 | Land area size in km$^2$ = population ÷ population density <br> = $\dfrac{162\,762}{61}$ km² ✓RT ✓M <br> ≈ 2 668 km² ✓CA | 1RT correct values <br> 1M dividing <br> 1CA rounding (3) | **M** L2 |
| 4.2.1 | C ✓✓A | 2A answer (2) | **DH** L1 |
| 4.2.2 | Gas and nuclear = 100% ✓M – (67% + 15% + 14% + 0,3%) <br> = 3,7 % ✓S <br> Each contribution: 3,7 % ÷ 2 = 1,85% ✓CA | 1M subtracting from 100% <br> 1S simplification <br> 1CA contribution (3) | **D** L1 |
| 4.2.3 | Terrajoules energy supplied by petroleum <br> = 14% × 7,3 × 1000 000 terrajoules ✓M ✓RG <br> = 1 022 000 terrajoules ✓CA | 1RG 2010 energy supply <br> 1M percentage calculation <br> 1CA energy (3) | **D** L1 |
| | | **[27]** | |

**QUESTION 5 [37]**

| Ques | Solution | Explanation | Level |
|---|---|---|---|
| 5.1.1 | 37,1 ; 31,1 ; 30,2 ; 24,6 ; 24,3 ; 24,0 ; 21,3 ; 20,6 ; 14,9   ✓✓A | 2A average percentage incomes in descending order   (2) | **DH** L1 |
| 5.1.2 | Mean % = $\dfrac{228,1\%\ \checkmark A}{9\ \checkmark M}$ <br><br> = 25,34% ✓CA <br><br> Provinces above mean are: KZN, WC and GP  ✓✓CA | 1A adding all % <br> 1M mean concept <br><br> 1CA calculating mean % <br><br> 2CA identifying 3 provinces   (5) | **DH** L2 |
| 5.1.3 |  | | |

**Percentage income earned from the sale of electricity**

| | ✓M <br> A = 24,0% + 19,5% = 43,5% ✓CA | 1M adding 19,5% <br> 1CA value of A | |
|---|---|---|---|
| | 1A for each of the 5 correctly plotted bars | | L2 (7) |

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

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

<div align="right">**TOTAL:**    **150**</div>