basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

MATHEMATICAL LITERACY P2

FEBRUARY/MARCH 2012

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
O	Own opinion/Example

This memorandum consists of 13 pages.

QUESTION 1 [28 MARKS]			
Ques	**Solution**	**Explanation**	**AS**
1.1.1	✓C 45 mm = 4,5 cm **OR** 265 cm = 2 650 mm Scale: 4,5 cm : 265 cm ✓M **OR** 450 mm : 2 650 mm = 1: 58,888 = 1: 58,888 = 1: 58,89 ✓CA = 1: 58,89	1C converting 1M ratio in correct order 1CA simplification (3)	12.3.1
1.1.2	✓O **6 m wide plastic:** He would have to buy 3 m (and would have lots left over). ✓A Cost = 3 m × R44,99/m = R134,97 ✓CA **Cut to order plastic:** Area = 380 cm × 265 cm = 3,80 m × 2,65 m ✓C = 10,07 m^2 ✓CA Cost (ex. VAT) = 10,07 m^2 × R12,24/m^2 = R123,26 ✓CA Cost including VAT: **OR** 100% + 14% = 114% ✓M ∴ Cost = $\frac{114}{100}$ × R123,26 = R140,52 ✓CA VAT = $\frac{14}{100}$ × R123,26 ✓M = R17,26 Cost = R123,26 + R17,26 = R140,52 ✓CA The most economical way of buying the ground sheet is to buy the **6 m wide plastic**. ✓O	1 O recognising that only 6 m is suitable 1A length of the 6 m wide plastic 1CA cost of plastic 1C conversion 1CA area of plastic 1CA cost excl VAT 1M calculating increased % 1CA cost including VAT 1O opinion (9)	12.1.3 12.3.1 12.3.2

Ques	Solution	Explanation	AS
1.2.1	9 hours ✓✓RG	(Accept answers with ± 15 min.) 2RG reading from graph (2)	12.4.4
1.2.2	7 °C ✓RG 15:00 ✓RG	(Accept answers from 6,5° to 7°) 1RG temperature 1RG time (2)	12.4.4
1.2.3	Between 00:00 and 09:00 ✓RG ✓RG	2RG reading from graph (2)	12.4.4
1.2.4	DAY 1 Range ≈ 15 °C – (– 4 °C) ✓RG ≈ 19 °C ✓CA DAY 2 Range ≈ 7 °C – (–1, 6 °C) ≈ 8,6 °C ✓CA ✓O He should go on DAY 1. Although the night-time temperatures are colder than on Day 2, the day-time temperatures are higher and the temperature range is larger. ✓R ✓R **OR** ✓O He should go on DAY 2. Although the day-time temperatures are colder than DAY 1, the night-time temperatures are warmer. ✓R ✓R	1 RG correct values 1 CA range Accept difference of ± 0,1 1CA range 1O opinion 2R reason 1O opinion 2R reason (6)	12.4.3 12.4.4
1.3.1	1 513 912 1513 1 003 1 052 ✓A 5 ✓A	1A identifying the values 1A the value Answer only: full marks (2)	12.4.3
1.3.2	Median ✓A ✓A	2A median (2)	12.4.3

QUESTION 2 [18 MARKS]			
Ques	**Solution**	**Explanation**	**AS**
2.1.1	✓A ✓A The profits for the years 2008 and 2010 were not plotted in graph B.	1A mentioning profits 1A not plotting 2008 and 2010 (2)	12.4.6
2.1.2	Graph B ✓A Graph B conceals the years where the annual profit went down or where it remained the same, thus creating an impression that profits only went up every year.✓R✓R	1A choice of graph 2R reasons (3)	12.4.6
2.2.1	✓A Volume = 3,14 × $(10\text{ cm})^2$ × 35 cm ✓SF = 10 990 cm^3 = 10 990 mℓ ✓S Total volume of juice = 9 × 1 200 mℓ ✓A = 10 800 mℓ ✓CA The container is big enough to mix the juice in. ✓C	1SF substitution 1A correct radius 1S simplification 1A using dilution 1CA total volume 1C conclusion (6)	12.1.1 12.3.1
2.2.2	40 servings of 200 mℓ = 40 × 200 mℓ = 8 000 mℓ ✓A ✓M Juice left after 40 servings = 10 800 mℓ – 8 000 mℓ ✓CA = 2 800 mℓ Number of 140 mℓ servings = $\frac{2\,800\,\text{m}\ell}{140\,\text{m}\ell}$ ✓M = 20 ✓CA	1A correct servings 1M subtraction 1CA simplification 1M dividing 1CA simplification (5)	12.1.1 12.3.1 12.3.2
2.2.3	Number of 140 mℓ servings = $\frac{10\,800 - 200 \times x}{140}$ ✓A ✓A **OR** Number of 140 mℓ servings = $\frac{540 - 10 \times x}{7}$ ✓A ✓A	1A numerator 1A denominator 1A numerator 1A denominator (2)	12.2.1

QUESTION 3 [30 MARKS]			
Ques	**Solution**	**Explanation**	**AS**
3.1.1	Theft, using vulgar language, etc. ✓R ✓R	2R any valid reason (2)	12.4.4
3.1.2	Percentage copying in Gr 10 $= \frac{156}{559} \times 100\%$ ✓M $= 27{,}91\%$ ✓A Percentage copying in Gr 11 $= \frac{187}{559} \times 100\%$ $= 33{,}45\%$ ✓A Percentage copying in Gr 12 $= \frac{216}{559} \times 100\%$ $= 38{,}64\%$ ✓A Increase from Gr 10 to Gr 11 = 33,45% – 27,91% = 5,54% ✓CA Increase from Gr 11 to Gr 12 = 38,64% – 33,45% = 5,19% ✓CA Mr Khan was correct; the percentage does increase by more than 5 % in each grade. ✓J The reasons could be: • Senior learners are more stressed about the marks for assignments, test and examinations and fall in the trap of copying. ✓R • The increase in copying could be attributed to the higher academic demands in Grades 11 and 12. ✓R (Any other relevant reason)	1M calculating % 1A percentage in Gr 10 1A % in Gr 11 1A % in Gr 12 1CA % increase Gr 10 to 11 1CA % increase Gr 11 to 12 1J verify Mr Khan's statement 1R one valid reason 1R second valid reason (9)	12.1.2 12.4.4

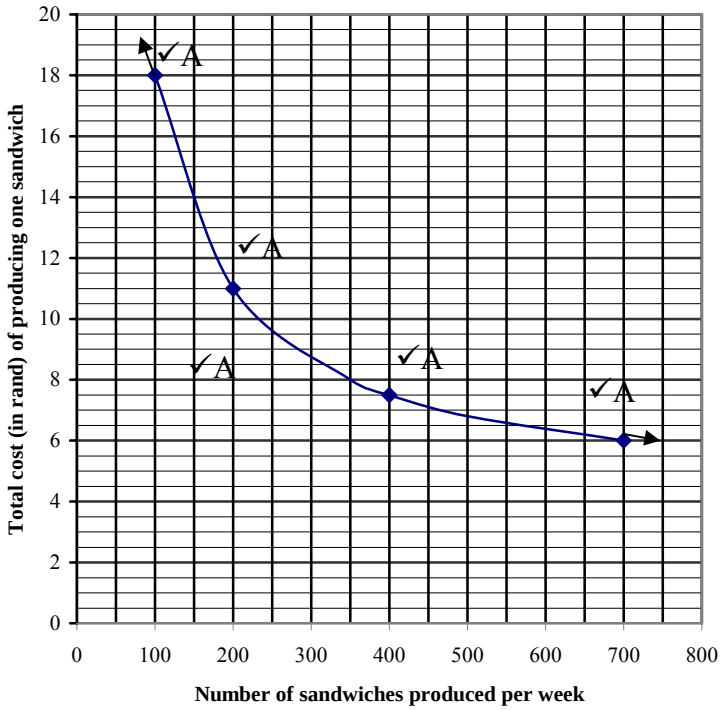
Ques	Solution	Explanation	AS
3.1.3	✓A In most types of offences there has been a decrease/decline in the number of offences from Grade 10 to Grade 12, except for copying that has increased. ✓R • The decline could be as a result of learners getting more mature as they grow. • Most prefects/team captains are in senior classes and they behave better as they are in leadership roles. • In Grade 10 they do not know each other in their chosen subjects and they are not as tolerant of each other. • The increase in copying could be attributed to the higher academic demands in Grades 11 and 12. ✓R (Any other relevant reason)	1A correct trend 1R reason for decline 1R reason for increase in copying (3)	12.4.4
3.1.4	✓O He could have used a compound bar graph to represent the data. It would clearly show the comparison between the different offences and between the different grades. ✓R **OR** ✓O He could have used three pie charts. Each pie chart will represent each grade and a comparison of the sectors of the pie charts can be done. ✓R	1O correct graph 1R valid reason **OR** 1O correct graph 1R valid reason (2)	12.4.2
3.2	% of learners arriving late daily (12A) $= \frac{115}{50 \times 28} \times 100\% \approx 8{,}21\%$ ✓A % of learners arriving late daily (12B) $= \frac{172}{50 \times 42} \times 100\% \approx 8{,}19\%$ ✓A ✓A Mr Abel's claim is invalid as the number of learners arriving late daily is approximately the same for both classes. Mr Abel probably based his claim on the fact that more learners from 12B arrived late than from 12A. There are more learners in 12B than in 12A, so we could expect more absentees in 12B than in 12A. ✓R	1A simplification 1A simplification 1A conclusion 1R reason (4)	12.2.1

Ques	Solution	Explanation	AS
3.3.1	School starts at 07:35 Time for assembly and period 1 = 5 minutes + 45 minutes = 50 minutes ✓M Time up to start of period 2 = 7 hours 35 min. + 50 min. = 8 hours 25 min. ∴ Tom arrived at 08:25. ✓A	1M adding 1A time of arrival (2)	12.3.3
3.3.2	Tom did not come to school. ✓R✓R **OR** Tom arrived at school after Mr Abel had left the school to attend a workshop. ✓R ✓R **OR** Mr Abel was teaching another class. ✓R ✓R	2R reason (2)	12.4.4
3.3.3	Zara arrived late at school seven times. ✓A ✓A Total = 33 + 16 + 4 + 21 + 7 + 27 + 11 minutes ✓M = 119 minutes ✓CA Zara's mean = $\frac{119}{7}$ minutes ✓M = 17 minutes ✓CA	2A correct number of minutes 1M adding correct numbers 1CA total 1M finding mean 1CA simplification (6)	12.4.3

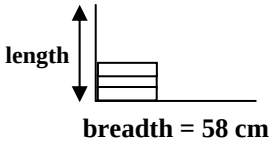
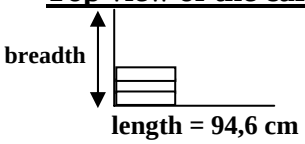
QUESTION 4 [32 MARKS]			
Ques	**Solution**	**Explanation**	**AS**
4.1.1	✓M Time to leave home = 08 hours 15 min. – $2\frac{1}{2}$ hours = 5 hours 45 min. ∴ Latest time to leave home is 05:45 ✓CA	1M subtracting time 1CA simplification (2)	12.4.3 12.3.2
4.1.2	Cost of petrol = R650 × 4 ✓A = R2 600 ✓M Maintenance costs = 2 × 65 km × 22 × R0,35/km = R1 001 ✓A Colleague's contribution = 4 × R330 = R1 320 ✓A Total expenses = R2 600 + R1 001 – R1 320 ✓M = R2 281 ✓CA **OR** Total expenses ✓M ✓A ✓A ✓M = R650 × 4 + 65 × 22 × 2 × R0,35 – 4 × R330 = R2 600 + R1 001 – R1 320 ✓CA = R2 281 ✓CA	1A petrol cost 1M correct values used 1A maintenance cost 1A colleague's contribution 1M addition and subtraction 1CA transport cost 1M multiplication 1M subtraction 2A correct values used 1CA simplification 1CA final amount (6)	12.1.3
4.2	Time taken = 42 minutes = $\frac{42}{60}$ h = 0,7 h ✓C Average speed = $\frac{\text{Distance}}{\text{Time}}$ 85,8 km/h = $\frac{\text{Distance}}{0,7\text{ h}}$ ✓M Distance = 85,8 km/h × 0,7 h ✓CA = 60,06 km ✓CA	1C conversion 1M substitution 1CA multiplication 1CA simplification (4)	12.2.1 12.3.2

Ques	Solution	Explanation	AS
4.3.1	A 35-day-pass would cost her R1 435,00 ✓A for 22 trips. Cost of using Pay-As-You-Go system = 22 days ✓M × 2 × R41,00/day ✓A = R1 804,00 ✓CA Savings = R1 804,00 – R1 435,00 ✓M = R369,00 ✓CA	1A cost of 35-day-pass 1M multiplication 1A reading from table 1CA simplification 1M subtraction 1CA simplification (6)	12.1.2
4.3.2	First destination is Rosebank ✓RT Cost of the ticket to the second destination = R70,00 – R43,00 = R27,00 ✓A Second destination is Rhodesfield ✓CA	1RT reading from table 1A subtraction 1CA second destination (3)	12.1.3 12.2.1
4.3.3	Total cost of travelling by Gautrain ✓M = cost of ticket + cost of parking + cost of petrol + cost of bus = R1 435,00 + 22 ✓A × R10,00 ✓A + R150,00 ✓A + 22 ✓A × 2 × R6,00 = R1 435,00 + R220,00 + R150,00 + R264,00 = R2 069,00 ✓CA Cost of travelling by car (from 4.1.2) = R2 281,00 Savings = R2 281,00 ✓M – R2 069,00 = R212,00 ✓CA	1M correct formula used 4A correct values used 1CA simplification 1M subtraction 1CA simplification (8)	12.1.2
4.3.4	Yes ✓O She would save R212,00 per month. ✓R She would save the wear and tear on her car. ✓R	1O opinion 1R saving costs 1R saving car repairs (3)	12.1.2

QUESTION 5 [42 MARKS]			
Ques	**Solution**	**Explanation**	**AS**
5.1.1 (a)	✓M 75% of expenses = R520 + R390 + R140 = R1 050 ✓A Weekly expenses $= \frac{R1\,050}{75\%}$ ✓M $= \frac{R1\,050}{0,75}$ ✓CA = R1 400 ✓CA **OR** 25% of expenses $= \frac{R1\,050}{3} = R310$ ✓M ✓CA Weekly expenses = R1 050 + R310 = R1 400 ✓CA	1M 75% of weekly expense 1A adding 1M dividing by 75% 1CA correct values used 1CA simplification (5)	12.1.1
5.1.1(b)	✓M ✓A Total cost (in rand) per week = 1 400 + 4× *x* **OR** Total costs (in rand) per week ✓M ✓A = 1 400 + 4 × (number of sandwiches produced)	1M for R1 400 1A correct cost per sandwich 1M for R1 400 1A correct cost per sandwich (2)	12.2.1
5.1.1(c)	✓A ✓SF R2 400 = R1 400 + (R4× number of sandwiches produced) R1 000 = R4× number of sandwiches produced $\frac{R1\,000}{R4}$ = number of sandwiches produced ✓M 250 = number of sandwiches produced ✓CA	1A correct values used 1SF substitution 1M dividing 1CA simplification (4)	12.2.1

Ques	Solution	Explanation	AS
5.1.2	✓A ✓J **A** will have no value since 0 sandwiches are made **OR** $\mathbf{A} = \frac{R1\,400}{0} + R4$ ✓SF = not possible **OR** cannot divide by 0 ✓J ✓A **B** cannot have an answer since the ingredients for 1 sandwich is R4 ∴ Total costs cannot be less than cost for 1 sandwich. ✓J ✓J **OR** Cannot have a negative number of sandwiches produced **OR** $R2 = \frac{R1\,400}{B} + R4$ ✓SF $-R2 = \frac{R1\,400}{B}$ $B = \frac{R1\,400}{-R2}$ ✓CA $B = -700$ ∴ not a realistic answer ✓J	1A no value 1J explanation **OR** 1SF substitution 1J explanation 1A no answer 2J explanation 1 SF substitution 1CA value of B 1J explanation (5)	12.2.1
5.1.3	**RELATIONSHIP BETWEEN THE TOTAL COST OF PRODUCING ONE SANDWICH AND THE NUMBER OF SANDWICHES PRODUCED PER WEEK**  	1 A (100 ; R18,00) 1 A (200 ; R11,00) 1 A (400 ; R7,50) 1 A (700 ; R6,00) Or any other correctly calculated and plotted points 1 A smooth curve (5)	12.2.2

Ques	Solution	Explanation	AS
5.1.4 (a)	700 sandwiches ✓ RG	1 RG reading from graph/table (1)	12.2.3
5.1.4 (b)	$29 = \frac{1\,400}{x} + 4$ ✓SF $29 - 4 = \frac{\text{R}1\,400}{x}$ $25 = \frac{\text{R}1\,400}{x}$ ✓A $x = \frac{\text{R}1\,400}{25}$ $= 56$ ✓CA	1SF substitution 1A simplification 1CA value of x (3)	12.2.3
5.2.1 (a)	$d = \sqrt{2} \times s$ $= \sqrt{2} \times 110$ mm ✓SF $= 155{,}56$ mm ≈ 16 cm ✓R	1SF substitution 1R rounding (2)	12.1.1 12.3.1
5.2.1 (b)	Diagonal of box = 105% of 16 cm $= 1{,}05 \times 16$ cm $= 16{,}8$ cm ✓A ∴ length of sticker = $\frac{2}{3} \times 16{,}8$ cm ✓M $= 11{,}2$ cm ✓CA **OR** $2 : 3 = x : 16{,}8$ $\therefore x = \frac{2 \times 16{,}8}{3}$ cm $= 11{,}2$ cm ✓M ∴ length of sticker = 11,2 cm ✓CA	1A length (accept 163,3 mm) 1 M using ratio 1 CA answer 1 M using proportion 1 CA answer (3)	12.1.1 12.3.1

Ques	Solution	Explanation	AS
5.2.2	Thickness of Δ box = $60 \times \frac{105}{100}$ mm = $60 \times 1{,}05$ mm ✓A = 63 mm Side of Δ box = $110 \times \frac{105}{100}$ mm = $110 \times 1{,}05$ mm ✓A = 115,5 mm Sandwiches can be packed along the width or the length of the box. **With sandwiches packed like this along the breadth of the carton** **Top view of the carton**  Number of sandwiches length-wise = $\frac{946\,\text{mm}}{115{,}5\,\text{mm}} \approx 8$ ✓CA Number of sandwiches beadth-wise = $\frac{580\,\text{mm}}{63\,\text{mm}} \approx 9$ ✓CA The number in the bottom layer of the carton = 8 × 9 × 2 = 144 sandwiches ✓CA The number of layers = $\frac{360\,\text{mm}}{115{,}5\,\text{mm}} \approx 3$ ✓CA Number of sandwiches in a carton = 144 × 3 = 432 ✓CA **With sandwiches packed like this along the length of the carton** **Top view of the carton**  Number of sandwiches length-wise = $\frac{946\text{ mm}}{63\text{ mm}} \approx 15$ ✓CA Number of sandwiches width-wise = $\frac{580\text{ mm}}{115{,}5\text{ mm}} \approx 5$ The number in the bottom layer of the carton = 15 × 5 × 2 = 150 sandwiches ✓CA The number of layers = $\frac{360\,\text{mm}}{115{,}5\,\text{mm}} \approx 3$ ✓CA Number of sandwiches in a carton = 150 × 3 = 450 ✓CA The maximum number of sandwiches would be 450. ✓C	1 A thickness 1 A side 1 CA number length-wise 1 CA number width-wise 1 CA number in bottom layer 1CA number of layers 1 CA number in one carton 1 CA number width-/ length-wise 1CA number in bottom layer 1 CA number of layers 1 CA number in one carton 1C conclusion (12)	12.1.1 12.3.1 12.3.2

TOTAL: 150