basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

MATHEMATICAL LITERACY P2

FEBRUARY/MARCH 2013

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/Reading from a graph
SF	Correct substitution in a formula
O	Opinion/Example
P	Penalty, e.g. for no units, incorrect rounding off etc.
R	Rounding off

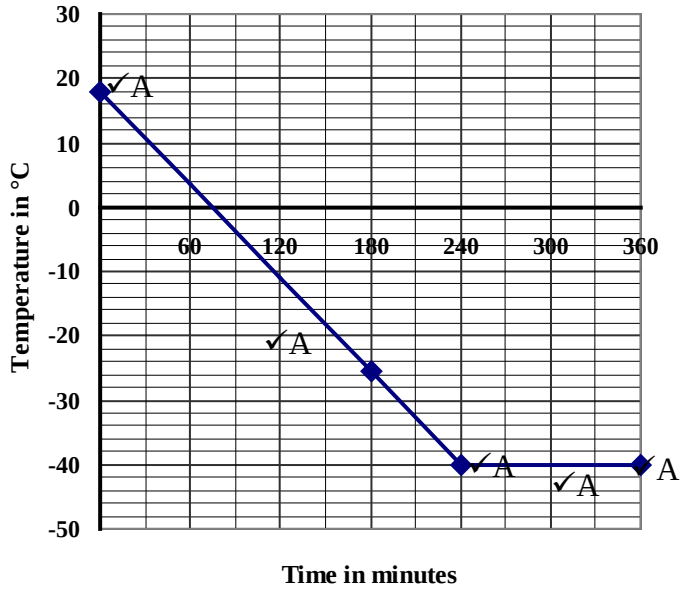
This memorandum consists of 17 pages.

QUESTION 1 [24 MARKS]			
Ques	**Solution**	**Explanation**	**AS**
1.1.1 (a)	✓M $7\frac{1}{2}$ 8 $8\frac{1}{2}$ $8\frac{1}{2}$ 9 9 9 9 $9\frac{1}{2}$ The median score = 9 ✓✓A	1M arranging in order 2A correct identification **Answer only full marks** (3)	12.4.3 L3
1.1.1 (b)	Range = $9\frac{1}{2} - 7\frac{1}{2}$ ✓M = 2 ✓A	1M subtraction 1A simplification **Answer only full marks** (2)	12.4.3 L2
1.1.2 (a)	✓✓O To eliminate scores of judges who are biased. **OR** Eliminating the highest and lowest scores will have the effect that the mean is calculated without extreme values ✓✓O **OR** Any other valid, well-thoughtout opinion	2O opinion OR 2O opinion (2)	12.4.4 L4
1.1.2 (b)	Bongani's mean = $\frac{9+8+9+9+9+8\frac{1}{2}+8\frac{1}{2}}{7}$ ✓M = $\frac{61}{7}$ ✓A = 8,714.... = 8,71 ✓CA Graham's mean = $\frac{9+9+7\frac{1}{2}+8+8\frac{1}{2}+9+9}{7}$ ✓A = $\frac{60}{7}$ ✓A = 8,5714... = 8,57 ✓CA ∴ Bongani attained the higher mean score ✓CA	1M concept of mean 1A correct numerator 1A correct denominator 1CA simplification 1A correct numerator 1A concept of mean 1CA simplification 1CA conclusion (8)	12.4.3 L4

Ques	Solution	Explanation	AS
1.2.1	Total points scored $= (20 \times \mathbf{g}) + (10 \times \mathbf{s}) + (5 \times \mathbf{b})$ ✓A ✓✓M **OR** $= (20 \times \mathbf{g}) + (10 \times \mathbf{s}) + (\frac{1}{2} \times 10 \times \mathbf{b})$ ✓A ✓✓M	1A correct values 2M adding and multiplying **OR** 1A correct values 2M adding and multiplying (3)	12.2.1 L2
1.2.2	Total points scored by China $= 20(9) + 10(3) + 5(11)$ ✓M $= 265$ ✓A Total points scored by Australia $= 20(8) + 10(5) + 5(10)$ $= 260$ ✓A Total points scored by South Africa $= 20(5) + 10(15) + 5(3)$ $= 265$ ✓A Although South Africa and China had an equal number of points, China performed the best because they had more gold medals. ✓✓O **OR** Any other well-thoughtout opinion	1M substitution 1A simplification 1A simplification 1A simplification 2O conclusion (6)	12.2.1 12.4.1 L3 (4) L4 (2)
			[24]

QUESTION 2 [30 MARKS]			
Ques	**Solution**	**Explanation**	**AS**
2.1.1	800 km = 500 miles ✓A 2 798 km = $\frac{500 \times 2\,798}{800}$ miles ✓C = 1 748,75 miles ✓CA **OR** l = the length of South African coastline $\frac{2\,798}{800} = \frac{l}{500}$ ✓M $l = \frac{500 \times 2\,798}{800}$ ✓M l = 1 748,75 miles ✓CA **OR** 800 km = 500 miles So 1 km = $\frac{500}{800}$ miles ✓M ∴ 2 798 km = $\frac{500}{800}$ × 2 798 miles ✓C = 1 748,75 miles ✓CA	1A equating distances 1C correct conversion 1CA simplification **OR** 1M concept 1M manipulation 1CA simplification **OR** 1M concept 1C conversion 1CA simplification **Answer only full marks** (3)	12.1.1 L3
2.1.2	✓A ✓✓M Western Cape, Eastern Cape, Kwazulu Natal, Northern Cape	1A naming the coastal provinces 2M correct order (3)	12.3.1 L4
2.1.3	223 mm on the map represents 2 798 km ✓C 223 mm on the map represents 2 798 000 000 mm ✓C 1 mm on the map represents $\frac{2\,798\,000\,000\,000}{223}$ = 12 547 085,2 mm ✓S Scale is 1: 12 500 000 ✓R	1C correct conversion values 1C conversion 1S simplification 1R rounding **Answer only full marks** (4)	12.3.3 L3
2.2.1	Crew = (3 × 10) + 14 + (2 × 22) ✓A ✓A = 88 ✓CA	1A ski-boat crew 1A medium freezer crew 1CA simplification (3)	12.2.1(2) 12.1.1(1) L3

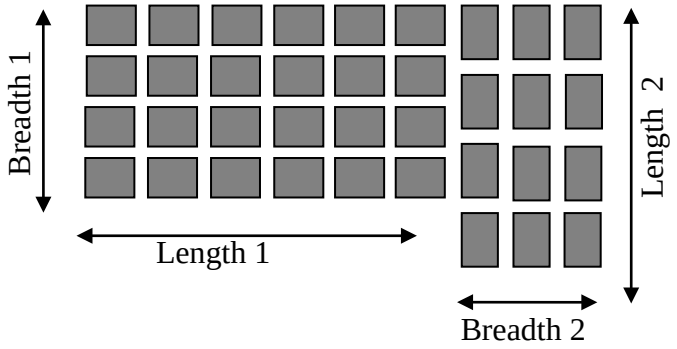
Ques	Solution	Explanation	AS
2.2.2	Number of extra crew members = 102 – 88 ✓M = 14 ✓CA ✓✓J He should buy one Small freezer boat as he can operate it with a maximum of 14 crew members.	1M difference 1CA simplification 2J correct boat (4)	12.1.1 (1) 12.2.1 (3) L3 (1) L4 (3)
2.3.1	Temperature in °C $= 18 - \left(14{,}5 \times \frac{\text{time in minutes}}{60}\right)$ $D = 18 - \left(14{,}5 \times \frac{120}{60}\right)$ ✓SF $= 18 - 29$ $= -11$ ✓CA Temperature in °C $= 18 - \left(14{,}5 \times \frac{\text{time in minutes}}{60}\right)$ $0 = 18 - \left(14{,}5 \times \frac{E}{60}\right)$ ✓SF $14{,}5 \times \frac{E}{60} = 18$ $0{,}24166... \times E = 18$ $E = \frac{18}{0{,}24166...}$ ✓M $E = 74{,}482...$ $E \approx 74{,}48$ minutes ✓CA **OR** $E = \frac{18 \times 60}{14{,}5}$ ✓M $E = 74{,}482...$ $E \approx 74{,}48$ minutes ✓CA	1SF substituting 1CA value of D 1SF substituting 1M making E the subject 1CA value of E **Answer only full marks** (5)	12.2.1 L2 (2) L3 (3)

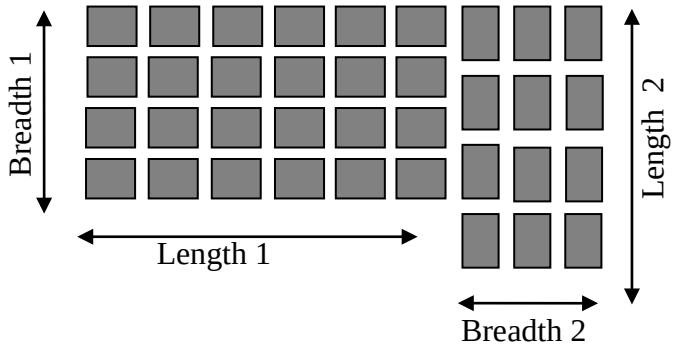
Ques	Solution	Explanation	AS
2.3.2	**TEMPERATURE AND TIME GRAPH**  	1A plotting (0;20) 1A plotting (240;–40) 1A plotting (360;−40) 1A joining points with a straight line 1A horizontal line (5)	12.2.2 L3(4) L4(1)
2.3.3	Cooling rate = 14,5 °C per hour = 14,5 °C per 60 minutes ✓C = 2,4166... °C per 10 minutes ✓M ≈ 2,42 °C per 10 minutes **YES** the claim is valid. ✓CA **OR** Cooling rate = $\frac{14{,}5^{\circ}\text{C}}{60\ \text{min}} \times 10\ \text{min}$ ✓M ✓CA = 2,41666 °C per 10 minutes **YES** the claim is valid. ✓CA	1C converting to minutes 1M dividing by 6 1CA conclusion 1M finding the rate 1CA simplification 1CA conclusion (3)	12.2.3 L4
			[30]

QUESTION 3 [31 MARKS]			
Ques	**Solution**	**Explanation**	**AS**
3.1.1	$x = \frac{98 - 26}{2}$ ✓M $= 36$ ✓M **OR** $y = 16 + 8 + \frac{1}{3}(36)$ $= 36$ **OR** $26 + x + x = 98$ ✓M $2x = 72$ $x = 36$ ✓CA **OR** $\frac{1}{3} \times 36 = 12$ ✓CA $y = 16 + 8 + 12$ $= 36$ ✓CA	1M finding the total 1CA value of x 1CA calculating $\frac{1}{3}$ 1CA value y **Answer only full marks** (4)	12.4.4(1) 12.2.1(3) L3
3.1.2	Ms Nana could have calculated her scores incorrectly ✓O ✓O **OR** One of the learners was absent and did not complete and submit the questionaire. ✓O ✓O **OR** Any other valid reason	2O reason (2)	12.4.4 L4
3.2.1	Cost (in rand) = $m \times (375 + 150)$ ✓A OR Cost (in rand) = $m \times (525)$ ✓A	2 A equation (2)	12.2.1 L4
3.2.2	There are seven learners under 18 years old. ✓A This would mean that 4 family rooms can be booked. Four family rooms could accommodate 16 people in total. ✓CA The teacher can book one twin room since the teacher will not share a room. ✓CA Minimum number of rooms needed is 4 family rooms and 1 twin room. ✓CA	1A counting 1CA total number of people in the family rooms. 1CA recognising 1 twin room for the teacher 1CA minimum number of rooms. (4)	12.2.1 L4

Ques	Solution	Explanation	AS
3.2.3	Cost per night for one twin room = 1 × (R375 + R150) ✓M = R525 ✓A Cost per night for four family rooms = 4 × R679 ✓M = R2 716 ✓A Cost per night for accomodation = R525 + R2 716 = R3 241 ✓CA Total cost for two nights = R3 241 × 2 = R6 482 ✓CA Cost per person ✓M $= \frac{R6\,482}{16} \approx R405{,}13$ ✓CA Mrs Suzman estimation is **INCORRECT**. ✓C **OR** Total cost for two nights ✓CA ✓CA ✓✓A ✓✓M = 2 ×[4 ×R679 + 1 × (R375 + R150)] = R6 482 Cost per person ✓M $= \frac{R6\,482}{16} \approx R405{,}13$ ✓CA Mrs Suzman's estimation is **INCORRECT**. ✓C	1M concept 1A cost of one twin room per night 1M concept 1A cost of four family rooms per night 1CA accommodation cost per night 1CA cost per two nights 1M dividing 1CA simplification 1C conclusion **OR** 2M formula 2A use of correct values 1CA for two nights 1CA simplification 1M dividing 1CA simplification 1C conclusion (9)	12.1.1(5) 12.2.1(4) L3(2) L4(7)
3.3.1	B2 ✓✓A	2A grid reference (2)	12.3.4 L2
3.3.2	North West ✓✓A	2A direction (2)	12.3.4 L3
3.3.3	Hamilton Street ✓✓A	2A answer (2)	12.3.3 L2

Ques	Solution	Explanation	AS
3.3.4	From the Hotel, turn left into Proes St. ✓A At the intersection of Proes and Beatrix St, turn right into Beatrix St. ✓A Continue on Beatrix St, which later becomes Voortrekkers St Travel until the intersection of Voortrekkers and Jacobs St. ✓A Turn right into Jacobs Street and right into Tenth Ave. ✓A **OR** **WITH THE NEW STREET NAMES**: From the Hotel, turn left into Johannes Ramohoase St.✓A At the intersection of Johannes Ramohoase St. and Steve Biko St, turn right into Steve Biko St.✓A Travel until the intersection of Steve Biko St. and Jacob St. ✓A Turn right into Jacobs Street and right into Tenth Ave. ✓A	1A correct direction from the hotel 1A Beatrix St 1A Voortrekkers and Jacob St. 1A Jacobs St and Tenth Av. **OR** 1A correct direction from the hotel 1A Steve Biko St 1A Steve Biko St and Jacob St. 1A Jacobs St and Tenth Av. (4)	12.3.3 L3
			[31]

QUESTION 4 [29 MARKS]			
Ques	**Solution**	**Explanation**	**AS**
4.1.1	Breadth of tent increased by 15% = 1,8 m + (0,15 ×1,8 m) **OR** 1,8 m × 1,15 ✓M = 2,07 m ✓A	1M increased % 1A increased breadth	12.3.1 L3 (4) L4 (4)
	Length of tent icreased by 15% = 2,4 m + 0,15 × 2,4 m ✓M **OR** 2,4 m × 1,15 = 2,76 m ✓A	1A increased length	
	Area needed for one tent = 2,76 m × 2,07 m ✓M = 5,7132 m^2 ✓CA	1M substitution 1CA simplification	
	Area needed for 36 tents = 36 ✓A × 5,7132 m^2 = 205,6752 m^2 ≈ 205,68 m^2 ✓CA	1A for the 36 1M multiplication 1CA simplification	
	OR		
			
	Breadth of tent increased by 15% = 1,8 m + (0,15 ×1,8 m) **OR** 1,8 m × 1,15 ✓M = 2,07 m ✓A	1M increased % 1A increased breadth	
	Length of tent icreased by 15% = 2,4 m + 0,15 × 2,4 m **OR** 2,4 m × 1,15 = 2,76 m ✓A	1A increased length	
	Area of camp site = [(6 × 2,76 m) + (4 × 2,07 m)] ✓M + [(4 × 2,76) ✓CA × (3 × 2,07 m)] ✓CA = 137,1168 m^2 + 68,5584 m^2 ✓CA = 205,6752 m^2 ≈ 205,68 m^2 ✓CA	1M substitution 2CA use of correct values 1CA simplification 1CA solution	

Ques	Solution	Explanation	AS
	OR  Breadth of tent increased by 15% = 1,8 m + (0,15 × 1,8 m) **OR** 1,8 m × 1,15 ✓M = 2,07 m ✓A Length of tent icreased by 15% = 2,4 m + 0,15 × 2,4 m **OR** 2,4 m × 1,15 = 2,76 m ✓A Breadth 1 = 4 × 2,07 m = 8,28 m Breadth 2 = 3 × 2,07 m = 6,21 m ✓CA Length 1 = 6 × 2,76 m = 16,56 m ✓CA Length 2 = 4 × 2,76 m = 11,04 m ✓CA Area of camp site = (16,56 m × 8,28 m) + (11,04 m × 6,21 m) ✓S = 137,1168 m^2 + 68,5584 m^2 = 205,6752 m^2 = 205, 68 m^2 ✓CA	**OR** 1M increased % 1A increased breadth 1A increased length 1CA breadths 2CA lengths 1S substitution 1CA simplification (8)	
4.1.2	The probability of it raining is very high. ✓✓O **OR** There is an 80% chance that it will rain. ✓✓O **OR** There is a 20% chance that it will not rain. ✓✓O	2O Opinion (2)	12.4.5 L4

Ques	Solution	Explanation	AS
4.2	Time spent on group activities on Day 1, 2, 3 and 4 = 2 hours + 2 hours 15 min + 2 hours + 2 hours = 8 hours 15 min ✓M Total time for first four days = 4 × (8 hours 15 min) = 33 hours ✓A Time spent on group activities on Day 5 = 2 hours + 2 hours 15 min + 2 hours = 6 hours 15 min ✓A Total time spent on group activities = 33 hours + 6 hours 15 min = 39 hours 15 min = 39,25 hours ✓CA Total time spent at the camp from 07:00 on Day 1 to 15:30 on Day 5 = 4 × 24 hours + 8 hours 30 min = 104 hours 30 min = 104,5 hours ✓CA Percentage time spent on group activities $= \frac{39,25}{104,5} \times 100\%$ ✓M = 37,5598...% ✓CA ≈ 38% ∴ The teacher is not correct. ✓C	1M adding time 1A total time for four days 1A time for day 5 1CA total workshop time 1CA total camp time 1M calculating % 1CA simplification 1C conclusion (8)	12.1.1 (6) 12.3.2 (2) L4
4.3.1	BEM means brown bread with egg and mayonnaise ✓✓A	2A correct explanation (2)	12.4.5 L2
4.3.2	The following should be found on the tree diagram: (a) WEN ✓A (b) WFN ✓A (c) HEM ✓A (d) HFM ✓A	4A (1 for each correct outcome) (4)	12.4.5 L3

Ques	Solution	Explanation	AS
4.3.3 (a)	$\frac{1}{12}$ ✓A ✓A **OR** 0,08 ✓✓A **OR** 8,33 % ✓✓A	1A numerator 1A denominator (2)	12.4.5 L3
4.3.3 (b)	$\frac{8}{12}$ ✓A ✓A $= \frac{2}{3}$ **OR** 0,67 **OR** 66,67 % ✓CA **OR** 1 ✓A − $\frac{1}{3}$ ✓A $= \frac{2}{3}$ ✓CA	1A numerator 1A denominator 1CA simplification 1A for 1 1A for $\frac{1}{3}$ 1CA simplification **Answer only full marks** (3)	12.4.5 L3
			[29]

QUESTION 5 [35 MARKS]			
Ques	**Solution**	**Explanation**	**AS**
5.1.1 (a)	Difference in cost per kWh = $\frac{\text{R}467,43}{600}$ ✓M $- \frac{\text{R}94,99}{150}$ ✓RT = R 0,77905 – R0,63326 ✓CA = R 0,145 **OR** 14,5 cents ≈ R 0,15 **OR** 15 cents ✓CA	1RT using correct values 1M finding the rate 1CA simplification 1CA difference (accept the answer in rand or cents) **Answer only full marks** (4)	12.4.4(2) 12.1.1(2) L2 (2) L3 (2)
5.1.1 (b)	<table><tr><th>FAIR</th><th>UNFAIR</th></tr><tr><td>The more electricity you use, the more you should pay. ✓✓R **OR** 15 cents per kWh is not a big difference. ✓✓R</td><td>All people who use electricity should pay the same rate because they are using the same resource ✓✓R</td></tr></table> **OR** Any suitable reason.	2R reason (fair) 2R reason (unfair) (4)	12.1.1 L4
5.1.2	**A** = R467,43 – R393,67 = R73,76 ✓A **B** = $\frac{\text{R}888,83 - \text{R}728,63}{\text{R}728,63} \times 100\%$ ✓M = 21,986% ✓A ≈ 21,99 % **C** = R1 147,33 × 123,38% ✓A ✓M = R1 147,33 × 1,2338 = R1 415,58 ✓A **OR** **C** = R1 147,33 + 23,38% of R1 147,33 ✓A ✓M = R1 147,33 + R268,245754 ≈ R1 147,33 + R268,25 ≈ R1 415,58 ✓A **OR** **C** = 123,38% of R1 148,33 ✓M ✓M ≈ R1 416,81 ✓A	1A simplification 1M calculating % 1A simplification 1M increasing by a 25,12% 1A correct values used 1A simplification **OR** 1M increasing by 25,12% 1A correct values used **OR** 2M concept 1A simplification (6)	12.1.3(4) 12.4.4(2) L2

Ques	Solution	Explanation	AS
5.1.3	Monthly increase = R888,83 – R728,63 ✓M **OR** 21,99% × R728,63 = R160,20 = R160,23 Annual increase = 12 × R160,20 **OR** 12 × R160,23 ✓CA = R1 922,40 = R1 922,76 Annual increase including VAT = R1 922,40 × 1,14 ✓M **OR** R1 922,76 × 1,14 ✓M = R2 191,54 ✓CA = R2 191,9464 ≈ R2 191,95 ✓CA **OR** Monthly increase = R888,83 – R728,63 ✓M **OR** 21,99% × R728,63 = R160,20 = R160,23 Annual increase = 12 × R160,20 **OR** 12 × R160,23 = R1 922,40 ✓CA = R1 922,76 Annual increase including VAT ✓M = R1 922,40 + 14% of R1 922,40 = R1 922,40 + R269,136 ≈R2 191,54 ✓CA **OR** Monthly increase = R888,83 – R728,63 ✓M = R160,20 ✓M Monthly increase including VAT = 1,14 × R160,20 = R182,628 = R182,63 ✓CA Annual increase including VAT = 12 × R182,63 = R2 191,56 ✓CA	1M subtraction/ calculating % 1CA annual increase 1M including VAT 1CA simplification 1M subtraction/ calculating % 1CA 1M including VAT 1CA simplification 1M subtraction 1M including VAT 1CA simplification 1CA simplification **Please note the small differences in the final answer depending on where the rounding off occurred** (4)	12.1.1 L2 (1) L3 (3)

Ques	Solution	Explanation	AS
5.2.1 (a)	First two members will need an area of $2\ m^2$ ✓A There are four other members who need $4 \times 0,7\ m^2$ ✓M $= 2,8\ m^2$ Total area $= 2\ m^2 + 2,8\ m^2$ $= 4,8\ m^2$ ✓CA Length $= \frac{\text{area}}{\text{breadth}}$ ✓M $= \frac{4,8\,m^2}{1,5\,m}$ $= 3,2\ m$ ✓CA ✓A	1 A recognising the $2m^2$ 1M multiplying 1CA total 1M using area formula 1CA simplification 1A unit **Answer only full marks** (6)	12.3.1 L3
5.2.1 (b)	Volume of cylinder $= \pi \times r^2 \times$ height $150\ \ell = 3,14 \times r^2 \times 1,2\ m$ ✓SF $150\ 000\ cm^3 = 3,14 \times r^2 \times 120\ cm$ ✓C ✓C $r^2 = \frac{150\ 000}{3,14 \times 120}\ cm^2$ ✓CA $= 398,089172\ cm^2$ $r = 19,9521...\ cm$ ✓CA $\approx 20\ cm$ ✓R	1SF substitution 2C conversion 1CA manipulation 1CA finding square root 1R rounding (6)	12.3.1(4) 12.3.2(2) L3

Ques	Solution	Explanation	AS
5.2.2	Cost of supplying and installing the geyser = R12 490 – R4 500 = R7 990 ✓CA Monthly cost of heating water = 0,45 × R888,83 ✓M = R399,97 ✓A Number of months = $\frac{R7\,990}{R399,97}$ ✓M = 19,976... ✓CA ≈ 19,98 ✓J **YES** her statement is valid. **OR** Cost of supplying and installing the geyser = R12 490 – R4 500 = R7 990 ✓CA Monthly cost of heating water = 0,45 × R888,83 ✓M = R399,97 ✓A Saving R399,97 per month for 2 years Total saving = R399,97 × 24 months ✓M = R9 599,28 ✓CA ✓J **YES** her statement is valid.	1CA simplification 1M multiplication 1A calculating the savings 1M dividing 1CA simplification 1J justification **OR** 1CA simplification 1M multiplication 1A calculating the savings 1M multiplying 1CA simplifictaion 1J justification (6)	12.1.1 L4
			[35]

TOTAL: 150