basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

MATHEMATICAL LITERACY P2

FEBRUARY/MARCH 2014

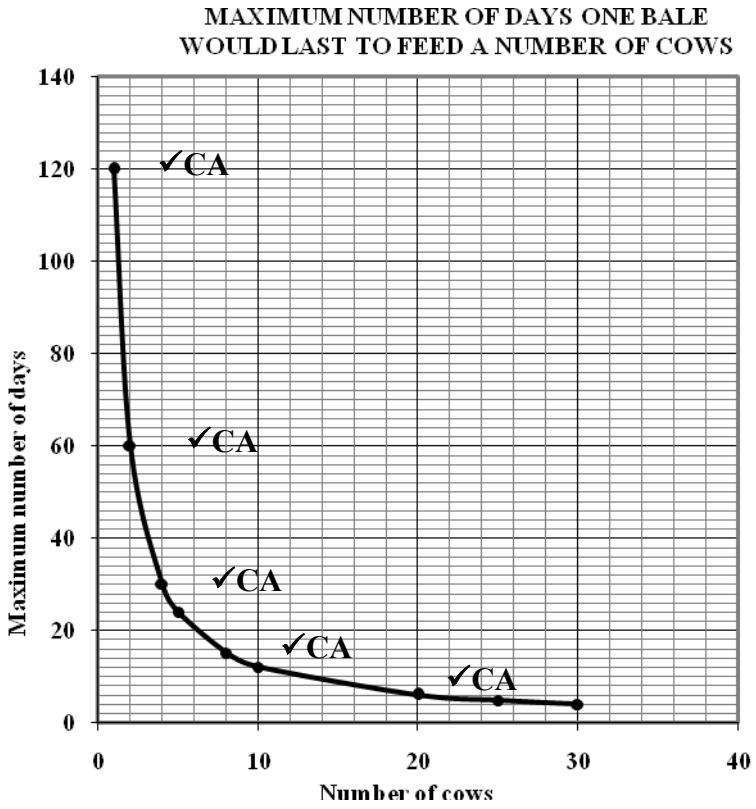
MEMORANDUM

MARKS: 150

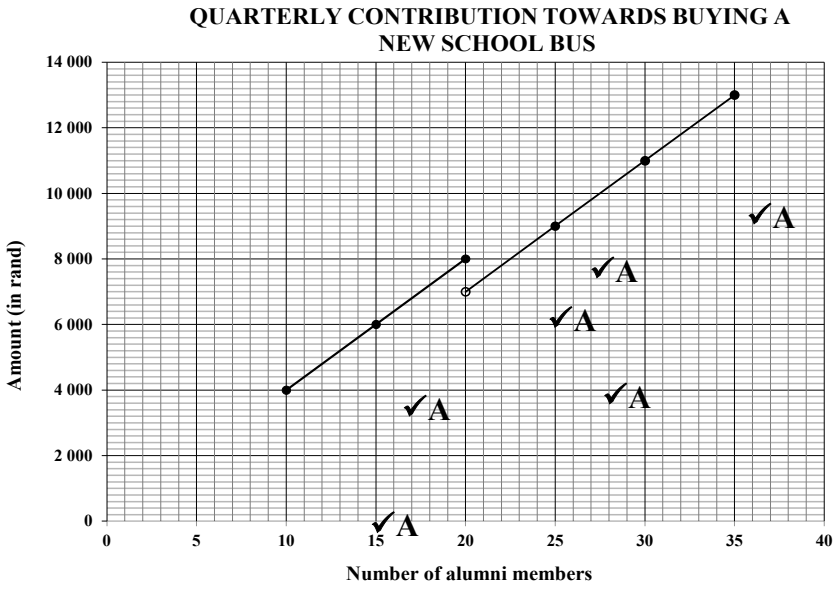
Symbol	Explanation
M	Method
M/A	Method with accuracy
CA	Consistent accuracy
A	Accuracy
C	Conversion
S	Simplification
RT/RG	Reading from a table/Reading from a graph
SF	Correct substitution in a formula
O	Opinion/Example
P	Penalty, e.g. for no units, incorrect rounding off etc.
R	Rounding off
J	Justification/reason

This memorandum consists of 14 pages.

QUESTION 1 [31 MARKS]			
Ques	**Solution**	**Explanation**	**AS/L**
1.1.1	Curved area of the cylinder = $2 \times 3{,}14 \times 70\text{ cm} \times 140\text{ cm}$ ✓A ✓SF $= 61\,544\text{ cm}^2$ ✓CA Area of wrap = $1{,}06\text{ cm} \times 61\,544\text{ cm}^2$ ✓A ✓M $= 65\,236{,}64\text{ cm}^2$ ✓CA **OR** Area of wrap: $\frac{6}{100} \times 61544\text{ cm}^2 = 3\,692{,}64\text{ cm}^2$ ✓M $\therefore$ Area of wrap = $61\,544\text{ cm}^2 + 3\,692{,}64\text{ cm}^2$ ✓A $= 65\,236{,}64\text{ cm}^2$ ✓CA	1A circumference 1SF substitution 1CA curved area 1A increasing by 6% 1M concept 1CA area **OR** 1M concept of % 1A increasing by 6% 1CA area (6)	12.3.1 L3
1.1.2	Volume = $3{,}14 \times (70\text{ cm})^2 \times 140\text{ cm}$ ✓SF $= 2\,154\,040\text{ cm}^3$ ✓CA Total surface area = $2 \times 3{,}14 \times 70\text{ cm}(70\text{ cm} + 140\text{ cm})$ $= 439{,}6\text{ cm} \times (210\text{ cm})$ $= 92\,316\text{ cm}^2$ ✓CA Volume: Total surface area = 2 154 040 : 92 316 ✓M = 23,333 : 1 $\approx$ 23 : 1 ✓CA $\therefore$ Mathys' bales do conform. ✓CA	1SF substitution 1CA simplification 1CA simplification 1M writing as a ratio 1CA ratio in required form 1CA conclusion (6)	12.3.1 L3
1.1.3	Temperature in °F = $\frac{9}{5} \times 55° + 32°$ ✓SF $= 131°$ ✓CA ✓CA No, his action was not correct.	1SF substitution 1CA temperature in °F 1CA verification (3)	12.3.2 L4
1.2	1st layer = 12 bales ✓A 2nd layer = 5 bales 3rd layer = 4 bales ✓A 4th layer = 3 bales ✓A Total number of bales = 12 + 5 + 4 + 3 ✓M = 24 ✓CA	1A number of bales in 1st layer 1A number of bales in 3rd layer 1A number of bales in last (4th) layer 1M adding 1CA simplification (5)	12.1.1 L3

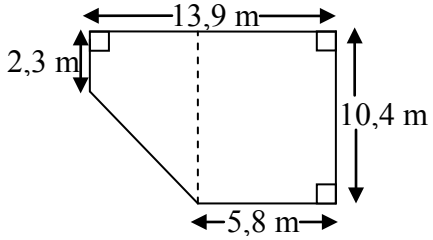
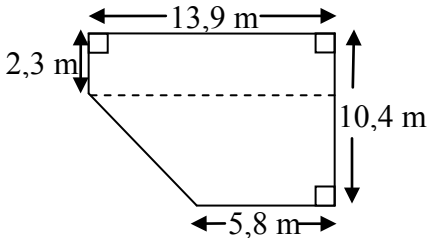
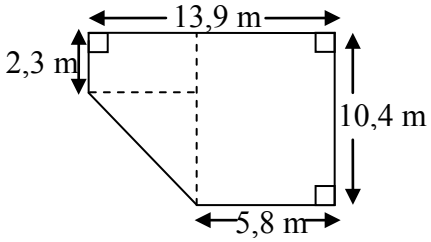
Ques	Solution	Explanation	AS/L
1.3.1	Max number of days = $\frac{1440\,\text{kg}\ \checkmark\text{A}}{12\text{kg/day}\times 10\ \checkmark\text{A}}$ = 12 days ✓CA **OR** Consumption per 10 cows = 12 kg/day × 10 = 120 kg/day ✓A Max number of days = $\frac{1440\,\text{kg}}{120\,\text{kg/day}}$ ✓A = 12 days ✓CA	1A mass of each bale 1A consumption per 10 cows 1CA time taken **OR** 1A mass of each bale 1A consumption per 10 cows 1CA time taken (3)	12.2.1 L2
1.3.2	Max number of days = $\frac{1440\,\text{kg}}{12\,\text{kg/day}\times\text{number of cows}}$ ✓A ✓M = $\frac{120}{\text{number of cows}}$ ✓CA **OR** Using variables	1A correct values used 1M dividing 1CA simplified formula (3)	12.2.1 L3
1.3.3		1CA (1; 120) 3CA any other 3 points plotted correctly 1CA joining by means of a smooth curve (5)	12.2.2 L3
		[31]	

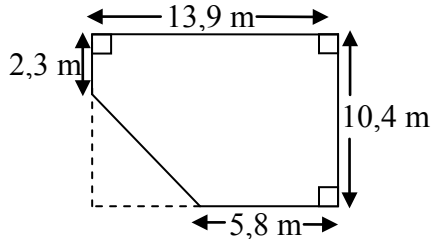
QUESTION 2 [26 MARKS]

Ques	Solution	Explanation	AS/L
2.1	i = 0,072; n = 5 $A = R650\,000(1 + 0{,}072)^5$ ✓SF ✓A $= R920\,210{,}7097$ $\approx R920\,210{,}71$ ✓CA	1A value of i 1SF substitution 1CA price of bus (3)	12.1.3 L3
2.2.1	Amount (in rand) ✓A ✓A = 400 × number of alumni members – 1 000 **OR** Using symbols	1A multiplying number by 400 1A subtracting 1 000 (2)	12.2.1 L4
2.2.2	 1A starting at (10 ; 4000) 1A point (20 ; 8 000) 1A any other correct point between the above two points 1A joining the points 1A for (20 ; 7 000) indicated by a circle 1A point (35; 13 000) 1A any other correct point between the above two points (7)		12.2. L3
2.2.3	✓✓RG 24 **OR** $\frac{8\,600 + 1\,000}{400}$ ✓M = 24 ✓CA	2RG reading from graph **OR** 1M calculation 1CA solution (2)	12.2.2 L3

Ques	Solution	Explanation	AS/L
2.3.1	Total amount deposited = R40 000 × 20 ✓M = R800 000 ✓CA Total interest earned = R911 408,73 – R800 000 ✓M = R111 408,73 ✓CA	1M multiplying by 20 1CA amount deposited 1M subtracting 1CA amount deposited quarterly (4)	12.1.3 L3
2.3.2	Amount contributed by alumni $= (400 \times 18) \times 4 + (400 \times 25 - 1\,000) \times 12 + (400 \times 35 - 1\,000) \times 4$ ✓A ✓A ✓A ✓A = R28 800 + R108 000 + R52 000 = R188 800 ✓CA Percentage contribution = $\frac{\text{R188 800}}{\text{R800 000}} \times 100\%$ ✓M = 23,6 % ✓CA His statement is not valid. ✓O	1A correct value for 18 members 1A value for 25 members 1A value for 35 members 1A R108 800 1CA amount deposited 1M calculating % 1CA solution 1O conclusion (8)	12.1.2 L2 (3) L3(3) L4(2)
		[26]	

QUESTION 3 [30 MARKS]			
Ques	**Solution**	**Explanation**	**AS/L**
3.1.1	South East ✓ ✓A	2A correct direction (2)	12.3.3 L2
3.1.2	Exiting Hallmark, she must: ✓ A * turn left and walk until she reaches the end of the fountain * then turn right passing shop number 9 and then left towards entrance number 3 * then enter Cafe Teen on the right hand side ✓ A **OR** Exiting Hallmark, she must: * walk straight passing entrance number 1 ✓ A * then turn left at the corner and walk until she reaches the end of the fountain * then turn left passing shop number 11 and then right towards entrance number 3 * enter Cafe Teen on the right hand side ✓ A	1A first turn and direction 1A destination **OR** 1A first turn and direction 1A destination (2)	12.3.3 L3
3.1.3	Cash 4 U ✓ A	1A correct store (1)	12.3.3 L2
3.1.4	The names are not alphabetical ✓ J The shops in the zones are not grouped together ✓ J	1J alphabetical order 1J numerical order (2)	12.4.2 L4
3.1.5	P(clothing shop) = $\frac{4}{13}$ ✓ A ✓ A	1A numerator 1A denominator (2)	12.4.5 L2

Ques	Solution	Explanation	AS/L
3.2.1	 Total floor space = area of rectangle + area of trapezium $= \text{length} \times \text{breadth} + \frac{1}{2}(\text{sum of parallels}) \times \text{height}$ ✓SF ✓SF ✓M $= 5{,}8\text{ m} \times 10{,}4\text{ m} + \frac{1}{2}(2{,}3\text{ m} + 10{,}4\text{ m}) \times 8{,}1\text{ m}$ ✓CA ✓CA $= 60{,}32\text{ m}^2 + 51{,}44\text{ m}^2 = 111{,}76\text{ m}^2$ ✓CA **OR**  Total floor space = area of rectangle + area of trapezium $= \text{length} \times \text{breadth} + \frac{1}{2}(\text{sum of parallels}) \times \text{height}$ ✓SF ✓SF ✓M $= 13{,}9\text{ m} \times 2{,}3\text{ m} + \frac{1}{2}(13{,}9\text{ m} + 5{,}8\text{ m}) \times 8{,}1\text{ m}$ ✓CA ✓CA $= 31{,}97\text{ m}^2 + 79{,}79\text{ m}^2 = 111{,}76\text{ m}^2$ ✓CA **OR**  Total floor space = area of big rectangle + area of smaller rectangle + area of triangle $= \text{length} \times \text{breadth} + \text{length} \times \text{breadth} + \frac{1}{2} \times \text{base} \times \text{height}$ ✓SF ✓SF ✓M $= 10{,}4\text{ m} \times 5{,}8\text{ m} + 2{,}3\text{ m} \times 8{,}1 + \frac{1}{2} \times 8{,}1 \times 8{,}1$ ✓CA ✓CA $= 60{,}32\text{ m}^2 + 18{,}63\text{ m}^2 + 32{,}81\text{ m}^2$ $= 111{,}76\text{ m}^2$ ✓CA **OR**	1M calculating height 2SF substitution into correct formulae 2CA simplifying 1CA total floor space **OR** 1M calculating height 2SF substitution 2CA simplification 1CA total floor space 1M calculating height 2SF substitution 2CA simplification 1CA total floor space	12.3.1 L2 (3) L3 (2)

Ques	Solution	Explanation	AS/L
	 Total floor space = area of rectangle – area of triangle $= \text{length} \times \text{breadth} - \frac{1}{2} \times \text{base} \times \text{height}$ $= 13,9\text{ m} \times 10,4\text{ m} - \frac{1}{2} \times 8,1\text{ m} \times 8,1\text{m}$ ✓SF ✓SF ✓M ✓CA $= 144,56\text{ m}^2 - 32,805\text{ m}^2$ ✓CA $= 111,76\text{ m}^2$ ✓CA	1M calculating height 2SF substitution 2CA simplification 1CA total floor space (6)	
3.2.2	**Note: The dist between the 2 entrances allow for ± 2 mm range** The one horizontal measurement is 13,9 m On the question paper Hallmark is 1,2 cm✓A On the question paper the distance from the northern entrance door to the southern entrance door is 9,3 cm✓A $\therefore$ total distance $= \frac{9,3}{1,2} \times 13,9$ ✓M **OR** 1,2 cm : 13,9m ✓M $\approx 107,73$ m 1cm = 11,583 m $\therefore$ total distance $= 9,3 \times 11,583$ $\approx 107,72$m $\therefore$ the distance is 110 metres ✓CA **OR** The one vertical measurement is 10,4 m On the question paper the side is 0,9 cm ✓A On the question paper the distance from the northern entrance door to the southern entrance door is 9,3 cm✓A $\therefore$ total distance $= \frac{9,3}{0,9} \times 10,4$ ✓M **OR** 0,9 cm : 10,4m ✓M $\approx 107,47$ m 1cm = 11,555.. m $\therefore$ total distance $= 9,3 \times 11,556$ $= 107,47$m $\therefore$ the distance is 110 metres ✓CA **OR**	1A measuring the side 1A measuring the side 1A measuring the total length 1M using scale and proportion 1CA total distance **Note: A range of values from 1 cm to 1,4 cm will be accepted** 1A measuring the side 1A measuring the total length 1M using scale and proportion 1CA total distance **Note: A range of values from 0,7 cm to 1,1 cm will be accepted**	12.3.3 L4

Ques	Solution	Explanation	AS/L
	The other horizontal measurement is 5,8 m On the question paper Hallmark is 0,5 cm ✓A On the question paper the distance from the northern entrance door to the southern entrance door is 9,3 cm ✓A $\therefore$ total distance = $\frac{9,3}{0,5} \times 5,8$ ✓M **OR** 0,5 cm : 5,8 m ✓M $\approx$ 107,88 m 1cm = 11,6 m $\therefore$ total distance = 9,3 × 11,6 = 107,88m $\therefore$ the distance is 110 metres ✓CA **OR** The other vertical measurement is 2,3 m On the question paper Hallmark is 0,2 cm ✓A On the question paper the distance from the northern entrance door to the southern entrance door is 9,3 cm ✓A $\therefore$ total distance = $\frac{9,3}{0,2} \times 2,3$ ✓M **OR** 0,2 cm : 2,3 m ✓M $\approx$ 106,95 m 1cm = 11,5 m $\therefore$ total distance = 9,3 × 11,5 $\approx$ 106,95m $\therefore$ the distance is 110 metres ✓CA	1A measuring the side 1A measuring the total length 1M using scale and proportion 1CA total distance **Note: A range of values from 0,3 cm to 0,7 cm will be accepted** 1A measuring the side 1A measuring the total length 1M using scale and proportion 1CA total distance **Note: A range of values from 0,1 cm to 0,4 cm will be accepted** (4)	
3.2.3	The area of the curtain = 3 × 4 = 12 m^2 ✓A The weigth of the curtain = 4,7 kg/ m^2 × 12 m^2 = 56,4 kg ✓CA Cost of a curtain material = R12,50/kg × 56,4 kg ✓M = R705 ✓CA The cost does NOT exceed R800. ✓O	1A curtain area 1CA curtain weight 1M multiplying 1CA cost of curtain material 1O opinion (5)	12.3.2 L4
3.3.1	Friday ✓A Data for week 1 only started on Friday ✓ J	1A correct day 1J explanation (2)	12.4.4 L4
3.3.2	The number of people visiting the Mall on Friday, Saturday and Sunday is the highest. ✓ ✓J	2J correct justification (2)	12.4.4 L4
3.3.3	✓A ✓A Week 4, Thursday	1A correct week 1A correct day (2)	12.4.4 L4
		[30]	

QUESTION 4 [38 MARKS]			
Ques	**Solution**	**Explanation**	**AS/L**
4.1.1	Percentage of blacks = 79,6% ✓A Black population in 2011 = 79,6% of 51 770 560 ✓M $= \frac{79,6}{100} \times 51\ 770\ 560$ = 41 209 365,76 ✓CA ≈ 41 209 366 or 41 209 365 ✓R	1A correct percentage 1M using percentage 1CA black population 1R rounding (up or down) (4)	12.1.1 L3
4.1.2	Number of whites = $\frac{9,6}{100} \times 44\ 819\ 778$ ✓M/A = 4 302 698,688✓CA Number of white males = $\frac{48,36}{100} \times 4\ 302\ 699$ ✓M/A = 2 080 785,086 ≈ 2 080 785✓CA Thandi's calculation is NOT correct. ✓J	1M/A using percentage 1CA white population 1M/A using percentage of white males 1CA simplification 1J verification (5)	12.4.1 L2(3) L3(2)
4.1.3	Indian population in 2001 = 1 120 494✓A Indian population in 2011 = 1 294 264 ✓A ✓J ∴ Thandi's comment is not correct (the population increased)	1A number of Indians in 2001 1A number of Indians in 2011 1J conclusion (3)	12.4.4 L4
4.2.1 (a)	Population in 2001 = 21 434 041 + 23 385 737 = 44 819 778 ✓A **A** = 44 819 778 – (14 365 288 + 2 215 211) = 28 239 279 ✓CA	1A population in 2001 1CA simplification (2)	12.1.1 L3
4.2.1 (b)	Male : female = 1 : 1,08✓M ✓CA ✓CA 48 males and 52 females **OR** 100 : 108✓M $= \frac{100}{208} \times 100$ = 48 males✓CA ∴ 52 females✓CA	1M ratio 1CA males 1CA females (3)	12.1.1 L4

Ques	Solution	Explanation	AS/L
4.2.2 (a)	**Dependency % (in 2011)** $= \frac{n + m}{p} \times 100\%$ $= \frac{15\,100\,089 + 2\,765\,991}{33\,904\,480} \times 100\%$ ✓SF $= 52{,}695...\%$ $\approx 52{,}70\%$ ✓A **Dependency % (1996)** $= \frac{n + m}{p} \times 100\%$ $= \frac{13\,766\,443 + 1\,934\,664}{24\,882\,465} \times 100\%$ ✓SF $= 63{,}101...\%$ $\approx 63{,}10\%$ ✓CA Difference = 63,10% – 52,70 % = 10,4% ✓CA	1SF substituting correct values 1A simplification 1SF substituting correct values 1CA simplification 1CA difference (5)	12.4.1 L2
4.2.2 (b)	The dependency % decreased because there are more people in the category (P) 15 – 64 years. ✓✓J **OR** Technology became more advanced. ✓✓J **OR** Improved medication ✓✓J **OR** Improvement in health ✓✓J **OR** The receiving of social grants ✓✓J **OR** Any other valid reason ✓✓J	2J opinion (2)	12.4.4 L4
4.3.1	Range = 1 290 – P 569 = 1 290 – P ✓M ✓A ∴ P = 721 ✓CA **OR** ✓M ✓A P = 1 290 - 569 = 721 ✓CA	1M concept of range 1A correct values used 1CA solution (3)	12.4.3 L3

Ques	Solution	Explanation	AS/L
4.3.2	Mean ✓M ✓A $= \frac{814+921+1\,201+1\,290+Q+966+864+721+828+829}{10}$ $= \frac{8\,434+Q}{10}$ $936 = \frac{8\,434+Q}{10}$ $Q = (936 \times 10) - 8\,434$ $= 9360 - 8\,434$ ✓S $= 926$ ✓CA	1A correct values used 1M concept of Mean 1S simplifying 1CA solution (4)	12.4.3 L3
4.3.3	721; 814; 828; 829; 864; 921; 926; 966; 1 201; 1 290 ✓M Median $= \frac{864+921}{2}$ ✓M $= 892,5$ ≈ 893 } ✓CA	1M arranging 1M concept of median 1CA solution (3)	12.4.3 L3
4.3.4	The sample is not representative of all the schools in South Africa. ✓✓J The sample is too small compared to the number of schools in the country. ✓✓J **OR** Any other suitable reasons.	2J reason 2J reason (4)	12.4.4 L4
		[38]	

QUESTION 5 [25 MARKS]			
Ques	**Solution**	**Explanation**	**AS/L**
5.1.1	Loan amount = (Monthly payment ÷ loan factor) × 1 000 ✓M = (R17 550 ÷ 13,00) ✓A × 1 000 ✓SF = R1 350 000 ✓CA	1M subject of formula 1A loan factor 1SF substitution 1CA solution (4)	12.2.1 L3
5.1.2	She needs to have extra money available per month, for other expenses. ✓✓J She will pay more on interest. ✓✓J **OR** Any other valid reason	2J reason 2J reason (4)	12.1.3 L4
5.2.1	**STL Bank:** Monthly payment = (1 100 000 ÷ 1 000) ✓SF × 13,91 ✓A = R15 301 ✓CA ∴ Total repayment = R15 301 × 240 ✓M = R3 672 240 ✓CA Pragashni should rather take STL Bank's deal. ✓O Although the interest rate is higher, the year term is shorter and the total repayment amount is R4 290 000 – R3 672 240 = R617 760 less. ✓✓J **OR** Monthly payment (STL Bank) = (1 100 000 ÷ 1 000) ✓SF × 13,91 ✓A = R15 301 ✓CA Monthly payment (EP Bank) = (1 100 000 ÷ 1 000) ✓SF × 13,00 = R14 300 ✓CA Pragashni should take EP bank his monthly instalment will be reduced by R15 301 – 14 300 = R1 001. ✓O ✓✓J	1SF substitution 1A using correct factor 1CA monthly payment 1M multiplying by 240 1CA final amount 1O choice 2J reason with calculation **OR** 1SF substitution 1A using correct factor 1CA monthly payment 1SF substitution into formula 1CA monthly payment 1O choice 2J reason with calculation (8)	12.1.1 12.1.3 12.2.1 L2 (3) L3(2) L4(3)

Ques	Solution	Explanation	AS/L
5.2.2	**Loan factor** $= \frac{\textbf{Monthly payment}}{\textbf{Loan amount}} \times \textbf{1 000}$ ✓M $= \frac{\textbf{R}13\ 255}{\textbf{R}1\ 100\ 000} \times 1\ 000$ ✓SF $= 12{,}05$ ✓CA ✓CA ✓CA ∴ the interest rate will be 14,25% over a period of 30 years	1M manipulation 1SF substitution 1CA factor 1CA interest 1CA period (5)	12.1.3 12.2.1 L4
5.3	Line C represents a 16% interest rate. ✓A Line B represents a 14,25% interest rate. ✓A The higher the interest rate, the higher your total repayment will be. ✓✓J **OR** The higher the interest rate, the steeper the graph. ✓✓J	1A graph C 1A graph B 2J reason **OR** 2J reason (4)	12.2.3 L4
		[25]	

TOTAL: 150