basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

SENIOR CERTIFICATE EXAMINATIONS

MATHEMATICAL LITERACY P1

2016

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 OR a graph
SF	Correct substitution in a formula
J	Reason/Explain/Decision
P	Penalty, e.g. for no units, incorrect rounding off etc.
R	Rounding off
NPR	No penalty for rounding

This memorandum consists of 13 pages.

QUESTION 1 [44] Tolerance range 2 marks			
Ques	**Solution**	**Explanation**	**T & L**
1.1.1	✓J ✓J It is the <u>outstanding</u> (still owing) balance of the <u>previous</u> month's account. **OR** ✓J ✓J Opening balance for new month.	2 J explanation (2)	L1
1.1.2	Aug : 19 days ✓A Sep : 9 days ✓A ✓CA Therefore total number of days lapsed = 19 + 9 = 28	2A correct number of days per month 1CA Total Answer only For 28 : 3 marks For 27 or 29 : 1 mark (3)	L1
1.1.3	Total Basic Levy = R2 105,89 + R2 158,50 ✓MA = R4 264,39 ✓A	1MA adding levies 1A total amount Answer only full marks (2)	L1
1.1.4 (a)	New reading – previous reading = 1 190 786 kWh – 1 158 957 kWh ✓A ✓M = 31 829 kWh	1A identify the reading 1M subtracting correct order (if dividing max 1) (2)	L1
1.1.4 (b)	✓A ✓M 31 829 × 0,6303 = R20 061,8187 ≈ R20 061,82	1A identifying the values 1M multiply by 0,6303 (2)	L1
1.1.5	✓MA R2 105,89 + R2 158,50 + R20 061,82 + R24 781,93 = R49 108,14 ✓A VAT = $\frac{14}{100}$ × ✓M R49 108,14 ≈R6 875,14 **OR** Amount = $\frac{R6\,875,14}{14\%}$ ✓M = R49 108,14 ✓A = R2 105,89 + R2 158,50 + R20 061,82 + R24 781,93 ✓A	1MA adding all amounts 1A total before VAT 1M calculating 14% VAT **OR** 1M calculating 14% VAT 1A amount before VAT 1MA adding all amounts (3)	L2

Ques	Solution	Explanation	T & L
1.1.6	**B** $= \frac{24\,781{,}93}{137}$ ✓MA = R180,89 ✓A	1MA dividing 1A tariff Answer only full marks (2)	L1
1.1.7	**C** ✓M = 2 105,89 + R2 158,50 + R20 061,82 + R24 781,93 + 6 875,14 – 0,03 = 55 983,25 ✓CA **OR** C = 49 108,14 + 6 875,14 – 0,03 ✓M = 55 983,25 ✓CA	1M adding and subtracting 0,03 1CA account total **OR** 1M adding and subtracting 0,03 CA value from1.1.5 Answer only full marks (2)	L2
1.1.8	To round down the amount due to the non-availability of 1c and 2c coins. ✓✓J **OR** Rounding down to 5c	2J explanation (2)	L1
1.1.9	Monthly interest rate = 10% ÷ 12 ✓M Interest after 1 month $= \frac{1}{120} \times$ R55 983,25 ≈ R466,527 ✓A Amount payable after 1 month (November 15) = R55 983,25 + R466,527 ✓M ≈ R56 449,777 ✓CA Interest after 2 months $= \frac{1}{120} \times$ R56 449,77 ≈ R470,415 Amount payable after 2 months (Dec 15) = R56 449,777 + R470,415 ≈ R56 920,19 ✓CA **OR**	CA from Q1.1.7 1M divide by 12 1A 1st month's interest 1M adding interest 1CA value after 1 month 1CA value after 2 months **OR**	L3

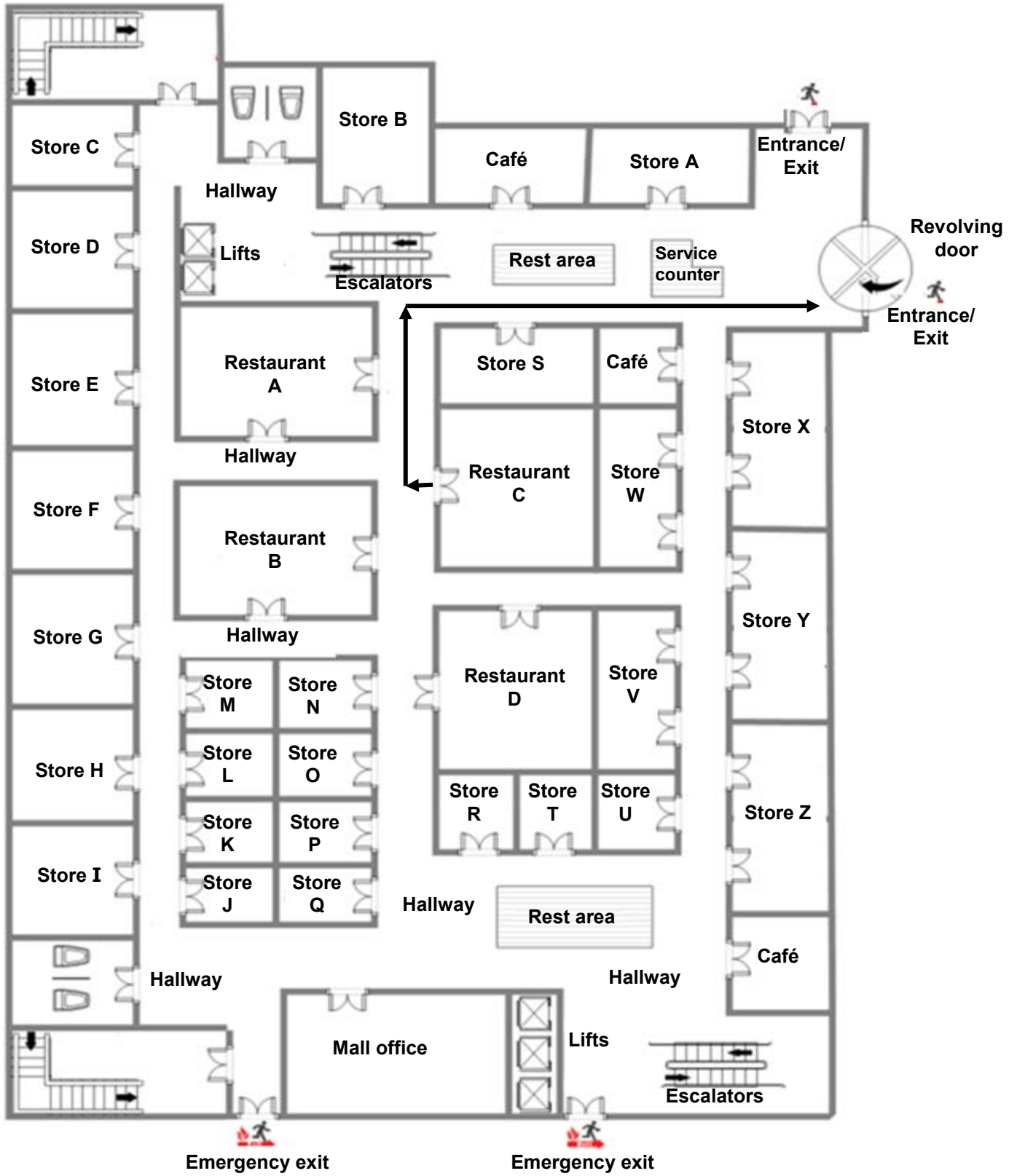
Ques	Solution	Explanation	T & L
1.1.9	Monthly interest rate = $10\% \div 12$ ✓M Amount payable after 1 month (November 15) $= \left(\frac{1}{120} \times R55\,983{,}25\right)$ ✓A + R55 983,25 ✓M $\approx$ R56 449,777 ✓CA Amount payable after 2 months (by 15 Dec) $= \left(\frac{1}{120} \times R56\,449{,}777\right)$ + R56 449,78 $\approx$ R56 920, 19 ✓CA	CA from Q1.1.7 1M divide by 12 1A monthly interest 1M calculating interest and adding 1CA value after 1 month 1CA value after 2 months (Max 3 marks if interest rate is not monthly) (5)	
1.1.10 (a)	New three-phase commercial levy = R2 105,89 ✓M + R50,00 = R2 155,89 ✓A	1M adding R50 to a levy 1A simplification Answer only full marks (2)	L1
1.1.10 (b)	New tariff per kWh = $\left(\frac{12{,}2}{100} \times R0{,}6303\right)$ ✓MA ✓A + R0,6303 = 0,0768966 + R0,6303 $\approx$ R 0,7072 ✓CA **OR** New tariff per kWh = $\left(\frac{112{,}2}{100} \times R0{,}6303\right)$ ✓A ✓MA $\approx$ R 0,7072 ✓CA	1MA calculating percentage of tariff 1A adding 0,6303 1CA tariff per kWh **OR** 1A percentage increase 1MA calculating percentage of tariff 1CA tariff **NPR** Answer only full marks (3)	L2
1.2.1	Income is less/smaller than expenditure ✓✓J **OR** Expenditure is more/bigger than income ✓✓J **OR** Amount of shortfall from income. ✓✓J	2J terminology used (income & expenditure) more than /exceeds 2J less/smaller than 2J shortfall (2)	L1

Ques	Solution	Explanation	T & L
1.2.2	The municipality showed a surplus. ✓J A = R65 771 447 – R28 490 095 = R37 281 352 ✓MA	1J decision (from the subtraction) 1MA finding differences (2)	L1
1.2.3	Six million, nine hundred and seventy nine thousand, nine hundred and nine rand ✓✓A	2 A correct number and wording. (If six million, five hundred and thirty thousand seven hundred and eighty five rand : Max 1 mark) (2)	L1
1.2.4	Department B ✓✓A	2A answer (2)	L1
1.2.5	% difference $= \frac{\text{Expenditure 2014} - \text{Expenditure 2013}}{\text{Expenditure 2013}} \times 100\%$ $= \frac{\text{R33 031 602} - \text{R30 645 928}}{\text{R30 645 928}} \times 100\%$ ✓SF ≈ 7,784636183% ✓CA ≈ 8% ✓R	1SF substitute correct values from table 1CA simplify 1R rounding Answer only full marks (3)	L2
1.2.6	$P = \frac{3}{7} \times 100\%$ ✓A ✓A ≈ 42,86% ✓CA	1A numerator 1A denominator 1CA % Answer only full marks **NPR** (3)	P L2
			[44]

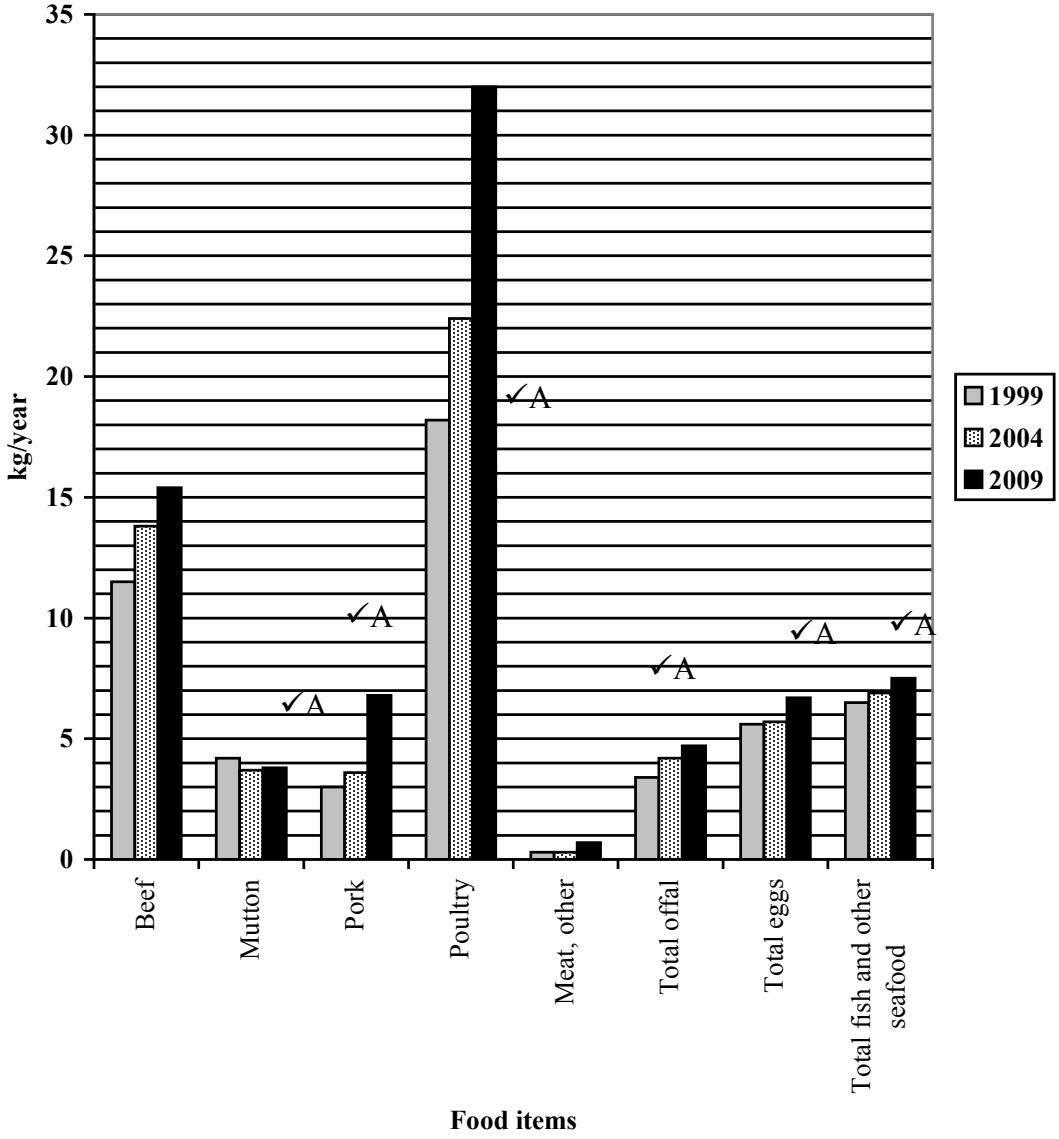
Question 2 [28] Tolerance range 1 mark			
Ques	**Solution**	**Explanation**	**T & L**
2.1.1 (a)	Length of rectangular area to be cleared ✓MA = 1 430 mm + 250 mm × 2 = 1 930 mm ✓CA Width of rectangular area to be cleared = 1 420 mm ✓A **OR** 2 marks for width and 1 mark for length	1MA adding 250 mm × 2 1CA length 1A width (CA 1170) (Counting bricks: Accept Length 1370 + 500 = 1870 mm and Width 1650 mm) Answer only full marks (3)	L1
2.1.1 (b)	✓SF Total area = 1 930 mm × 1 420 mm = 1,93m × 1,42 m ✓C ≈ 2,7406 m² ✓CA **OR** ✓SF Total area = 1 930 mm × 1 420 mm = 2 740 600 mm² ✓CA ≈ 2,7406 m² ✓C **OR** Total area (in m^2) ✓C ✓SF = (1,73 + 0,250 × 2) × (0,92 + 0,25 × 2) = 1,93 × 1,42 = 2,7406 ✓CA	CA from Q2.1.1 (a) 1SF substitute correct values 1C conversion 1CA area in m² **OR** 1SF substitute correct values 1CA area in mm² 1C conversion **OR** 1C conversion 1SF correct values substituted 1CA area in m² **NPR** (3)	L2
2.1.2	✓C ✓M ✓MA Length of A = 2 × 220 mm + 3 × 10 mm = 470 mm	1C converting 1M adding mortar 1MA mortar measure (Accept 450 mm) (3)	L1

Ques	Solution	Explanation	T & L
2.1.3 (a)	✓MA Width of a cement slab = $2\frac{1}{2} \times 22$ cm + 2 cm = 57 cm ✓CA	1MA multiply length of one brick by $2\frac{1}{2}$ and adding 2 cm (or 20mm) 1CA width Answer only full marks (2)	L1
2.1.3 (b)	✓C ✓SF Volume of one cement slab = 92 cm × 57 cm × 3,5 cm = 18 354 cm³ ✓CA	1SF correct values substituted from (a) 1C conversion 1CA volume in cm³ Answer only full marks (3)	L2
2.2.1	✓M Height = [1 800 mm – (2 ×40) mm] ÷ 10✓MA = 172 mm ✓CA	1M subtracting 80 1MA divide by 10 1CA height in mm Answer only full marks (3)	L2
2.2.2 (a)	✓M Side length = $\sqrt{2025\,cm^2}$ = 45cm ✓A	1M square root 1A side length Answer only full marks (2)	L1
2.2.2 (b)	✓M Total floor area = 2 025cm² × 15 = 30 375 cm² = 3,0375 m² ✓CA	1M area multiplied by 15 1CA area in m² **NPR** Answer only full marks (2)	L2
2.2.3 (a)	✓A ✓A ✓A Area of circle = $3{,}142 \times \left(\frac{3}{2}\,cm\right)^2$ = 7,0695 cm²	1A 3,142 1A correct radius 1A squaring (3)	L2
2.2.3 (b)	✓SF ✓M Surface area = 180 cm × 45 cm – 10 × 7,0695 cm² = 8 100 cm² – 70,695 cm² ✓CA = 8 029,305 cm² ✓CA	CA 45 cm from Q2.2.2(a) 1SF correct values 1M subtracting 1CA simplification 1CA total surface area (4)	L3
			[28]

QUESTION 3 [24] Tolerance range 0 marks			
Ques	**Solution**	**Explanation**	**T & L**
3.1.1	ORPEN Gate ✓✓RD	2RD reading from map (2)	L1
3.1.2	R537, R536 ,R36 , R532 ✓✓RD	2D reading from map (2)	L1
3.1.3	R40 ✓✓RD **[KZN do not mark this question.]**	2RD reading from map (2)	L1
3.1.4	Lydenburg ✓✓✓RD	3RD reading from map (3)	L2
3.1.5	North West ✓✓RD	2D reading from map (2)	L1
3.2.1	Lifts ✓A ✓A Escalators ✓A Stairs/ Steps	2A for 1st feature 1A for 2nd feature P for INCORRECT features added (3)	L1
3.2.2	Clockwise ✓✓RD **[Eastern Cape do not mark this question]**	2RD reading from plan (2)	L1
3.2.3	✓A S124 ✓A	1A for S 1A correct number (accept 1024) (2)	L1
3.2.4	20 mm : 5 m ✓A = 20 mm : 5 000 mm ✓C = $\frac{20}{20}$ mm : $\frac{5\,000}{20}$ mm = 1 mm : 250 mm Scale = 1 : 250 ✓CA	1A ratio in different units 1C converting to the same units 1CA scale (3)	L3

Ques	Solution	
3.2.5	 *(Source:www.edrawsoft.com)*	
3.2.5	2A route to ANY exit 1A shortest route (3)	L2

Question 4 [24] Tolerance range 1 mark			
Ques	**Solution**	**Explanation**	**T & L**
4.1	✓ A CONTINUOUS. The data represents mass (in kilogram) which can be expressed in smaller fractional units. ✓J	1A continuous 1J explanation (2)	L1
4.2	✓✓A Other meat 46% ✓CA	2A item 1CA percentage (Accept Beef –7 % then Max 2 marks) (3)	L1
4.3	✓A 6,7 kg × 49 320 500 ✓M ✓CA = 330 447 350 kg.	1A correct value from table 1M multiply by 49 320 500 1CA total in kg Answer only full marks (3)	L1
4.4	✓M M = 43,8 – (13,8 + 3,7 + 3,6 + 22,4) = 43,8 – 43,5 ✓A = 0,3 ✓CA	1M subtracting 1A 43,5 1CA value of M Answer only full marks (3)	L1
4.5	✓✓A Fish and seafood	2A identifying fish and seafood (2)	L1
4.6	✓A ✓CA ✓A – 46,0% ; –7,0% ; –5,0% ; 109% ; 119,0% .	1A Correct position – 46% 1CA position of the –7% and –5% 1A arrangement of the positive percentages (If Other meat ; beef ; mutton ; poultry ; pork max 2 marks) Penalty 1 mark if in descending order (3)	L1
4.7	✓✓A No mode	2A correct answer (2)	L1

Ques	Solution	Explanation	T & L
4.8	 1A for each bar plotted correctly (for the last bar - mark any bar below 10 as correct) (6)		L2
			[24]

Question 5 [30] Tolerance range 0 marks			
Ques	**Solution**	**Explanation**	**T & L**
5.1.1	✓A 5 365 : 112 043 ✓MA ≈1 : 20,884 ✓CA	1MA writing as a ratio 1A correct values 1CA form 1:… **NPR** (3)	**F** L1
5.1.2	R150, R200 and R300 ✓✓A	2A correct values (2)	**F** L1
5.1.3	✓MA % savings = $\frac{9\,288}{202\,714} \times 100\%$ ✓M ≈4,58 % ✓CA	1MA correct values 1M percentage 1CA % savings Answer only full marks (3)	**F** L1
5.1.4	Fixed expense ✓✓A	2A answer (2)	**F** L1
5.1.5	R126 696 – R112 043 ✓M = R14 653 ✓CA	1M subtract correct values 1CA difference Answer only full marks (2)	**F** L1
5.2.1	✓✓A ✓A Charles and David Koch	2A Charles Koch 1A David Koch (3)	**DH** L1
5.2.2	✓M ✓A $79,2 billion – $15,7 billion = $63,5 billion ✓CA	1A correct values / names 1M subtraction 1CA solution including billions (3)	DH L2
5.2.3	✓A 40,1 ; 40,6 ; 41,7 ; 42,9; 42,9 ; 54,3 ; 64,5; 72,7; 77,1; 79,2 ✓M Median = $\$\frac{42,9\text{ billion} + 54,3\text{billion}}{2}$ = $48,6 billion ✓CA	1A arranging values 1M concept of median 1CA median (No penalty omitting billion) (3)	D L2

Ques	Solution	Explanation	T & L
5.2.4	Mean (in billions$) ✓M $= \frac{3,9 + 6,7 + 3,3 + 7,4 + 15,7 + 4,0 + 6,3 + 6,3 + 3,1 + 4,0}{10}$ ✓A $= \frac{60,7}{10}$ $= 6,07$ ✓CA	1M concept of mean 1A dividing by 10 1CA simplification (No penalty omitting billion) (3)	D L2
5.2.5	$P_{(\text{south african} < 7)} = \frac{2}{10}$ ✓A ✓A $= \frac{1}{5}$ ✓CA	1A numerator 1A denominator 1CA simplified fraction (3)	P L2
5.2.6	$= R\left(\frac{6\,300\,000\,000}{0,0606}\right)$ ✓M = R103 960 396 000 ✓CA = R 103960,3960 million ✓R ≈R103 960 million **OR** R103 960 000 000 **OR** $6,3 billion = $6 300 million $\frac{\$6\,300 \text{ million}}{0,0606}$ ✓M = R 103960,3960 million ✓CA ≈R103 960 million **OR** R103 960 000 000 ✓R	1M dividing by rate 1CA simplification 1R rounding **OR** 1M dividing by rate 1CA simplification 1R rounding (3)	D L2
			[30]