basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

MATHEMATICAL LITERACY P1

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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 19 pages.

QUESTION 1 [33 MARKS] Answer only – full marks			
Ques	**Solution**	**Explanation**	**AS/L**
1.1.1	$\sqrt{\frac{1225,51}{4}} - 27\% \times 1,514$ $= 17,50364... - 0,40878$ ✓A $= 17,0948...$ $\approx 17,09$ } ✓CA	1A simplification 1CA final value **No penalty for rounding** **Answer only: Accept 17,0948…, 17,09; 17,1; 17** (2)	12.1.1 L1
1.1.2	1 020 000 – 950 000 = 70 000 ✓A **OR** 1,02 million – 0,95 million = 0,07 million ✓A	1A simplification **OR** 1A simplification **(No mark if million omitted)** (1)	12.1.1 L1
1.1.3	1 mℓ of sugar weighs 0,8 g ∴ 245 mℓ of sugar weighs (0,8 × 245) g ✓M/A = 196 g ✓CA **OR** ✓M/A $\therefore 245 \times \frac{8}{10} = 196$ g ✓CA **OR** $10 : 8 = 245 : x$ $x = \frac{8 \times 245}{10}$ g ✓M/A = 196 g ✓CA	1M/A multiplication with correct values 1CA mass of sugar **OR** 1M/A multiplying by $\frac{8}{10}$ 1CA mass of sugar **OR** 1M/A proportion 1CA mass of sugar (2)	12.3.2 L2
1.1.4	Time (in seconds) = $\frac{50}{8}$ ✓SF = $\frac{25}{4}$ ✓A **OR** $6\frac{1}{4}$ **OR** 6,25	1SF substitution 1A solution (2)	12.2.1 L1

Ques	Solution	Explanation	AS/L
1.1.5 (a)	✓C 170 minutes = 2 hours and 50 minutes **OR** 2,83 h Time finished = 07H50 + 2H50 ✓M = 10H40 ✓CA **OR** 10:40 **OR** Twenty to Eleven AM **OR** 170 minutes = 3hrs – 10 min ✓C 7H50min + 3 hrs = 10H50 min 10H50min – 10 min = 10H40min ✓M **OR** 10:40 **OR** Twenty to Eleven AM ✓CA **OR** 170 min = 60 + 60 + 50 ✓C From 07:50 to 08:50 is 60 min From 08:50 to 09:50 is 60 min } ✓M From 09:50 to 10:40 is 50 min **OR** 10:40 **OR** Twenty to Eleven AM ✓CA	1C conversion 1M adding 1CA time **OR** 1C conversion 1M adding 1CA time **OR** 1C conversion 1M adding 1CA time (3)	12.3.2 L2
1.1.5 (b)	In 170 minutes she packs 9 450 apples ∴ in 1 minute she packs $\frac{9\,450}{170}$ apples ✓M/A = 55,588.. apples ≈55 apples ✓R **OR** 170 : 9 450 = 1: x $x = \frac{1 \times 9450}{170}$ apples ✓M ≈ 55 apples ✓R	1M/A dividing by 170 1R correct rounding **OR** 1M proportion 1R correct rounding (2)	12.1.1 L1
1.1.6	P(white ball) = $\frac{1}{10}$ ✓A ✓A **OR** 0,1 ✓✓A **OR** 10% ✓✓A	1A correct numerator 1A correct denominator (2)	12.4.5 L2

Ques	Solution	Explanation	AS/L
1.1.7	Number of sheep = $\frac{35}{36} \times 288$ ✓M $= 280$ ✓CA **OR** 1 part = $\frac{288}{36} = 8$ animals ✓M Number of sheep = $288 - 8 = 280$ ✓CA **OR** 1 part = 8 animals ✓M Number of sheep = $35 \times 8 = 280$ ✓CA	1M using ratio 1CA simplification **OR** 1M using ratio 1CA simplification **OR** 1M using ratio 1CA simplification (2)	12.1.1 L2
1.2.1	Cost per CD = $\frac{R64,50}{50}$ ✓M $= R1,29$ ✓CA	1M dividing by 50 1CA simplification (2)	12.1.1 L1
1.2.2	Minimum number of CDs = $\frac{2\,940}{700}$ ✓M $= 4,2$ ✓A ≈ 5 ✓R **OR** (700 + 700 + 700 + 700 + 700) MB ✓M = 3 500 MB (3 500 – 2 940) MB = 560 MB ∴ 5 CD's ✓✓A	1M dividing by 700 1A simplification 1 R rounding up **OR** 1M adding all 700's 2A number of CD's (3)	12.1.1 L1
1.2.3	Writeable area = **85% of** $\pi(R^2 - r^2)$ $= 0,85 \times 3,14\,(58^2 - 7,5^2)\ mm^2$ ✓SF $= 2,669\ (3\,307,75)\ mm^2$ ✓S $= 8\,828,38475\ mm^2$ $\approx 8\,828,38\ mm^2$ } ✓CA	1SF substituting 1S finding 3 307,75 or 2,669 1CA simplification **Accept 8 832,86 using π** **If ($r^2 - R^2$) used, max 2 marks** **(no penalty for rounding)** (3)	12.3.3 L1
1.3.1	Maximum number of days = $\frac{120}{6}$ ✓M $= 20$ ✓CA	1M dividing by 6 1CA simplification (2)	12.1.1 L1

Ques	Solution	Explanation	AS/L
1.3.2	Discount $= \frac{304,99 - 269,99}{304,99} \times 100\%$ ✓M $= \frac{35}{304,99} \times 100\%$ ✓S $= 11,48\%$ ✓CA **OR** Percentage $= \frac{269,99}{304,99} \times 100\% = 88,52\%$ ✓S Percentage discount $= 100\% - 88,52\%$ ✓M $= 11,48\%$ ✓CA	1M difference in price 1S simplification 1CA simplification **OR** 1S Percentage change 1M difference in percentages 1CA simplification **(no penalty for rounding)** (3)	12.1.3 L1
1.3.3	New price excluding VAT $= \frac{R12,49}{114\%} \times 100\%$ ✓M $= R10,96$ ✓A **OR** New price excluding VAT $= \frac{R12,49}{1,14}$ ✓M $= R10,96$ ✓A **OR** VAT $= R12,49 \times \frac{14\%}{114\%}$ ✓M $= R1,53$ Price excluding VAT $= R12,49 - R1,53$ $= R10,96$ ✓A **OR** x = new price excluding VAT $12,49 : x = 114\% : 100\%$ ✓M $x = \frac{R12,49}{114\%} \times 100\%$ $= R10,96$ ✓A	1 M dividing by 114% 1A simplification **OR** 1 M dividing by 1,14 1A simplification **OR** 1 M multiplying by $\frac{14\%}{114\%}$ 1A simplification **OR** 1 M concept of proportion 1A simplification (2)	12.1.1 L2

Ques	Solution	Explanation	AS/L
1.3.4	Total cost = R269,99 + 4 × R12,49 + 3 × R10,99 ✓M/A = R352,92 ✓CA	1M/A adding and multiplying correct values 1CA simplification **(CA only if at least one of the values are multiplied by 3 or 4 or if 3 and 4 with incorrect costs)** (2)	12.2.1 L1

QUESTION 2 [31 MARKS]			
Ques	**Solution**	**Explanation**	**AS/L**
2.1.1	Maximum length = 125 cm + 250 cm + 125 cm ✓M/A = 500 cm ✓CA **OR** Maximum length = 250 cm × 2 ✓M/A = 500 cm ✓CA	1M/A adding correct lengths 1CA simplification **OR** 1M/A adding correct lengths 1CA simplification **Answer only: full marks** (2)	12.3.3 L2
2.1.2	Total area $= 2 \times \pi \times \left(\frac{d}{2}\right)^2$ ✓M/A $= 2 \times 3{,}14 \times \left(\frac{250}{2}\right)^2 \text{ cm}^2$ ✓SF $= 6{,}28 \times 15\,625 \text{ cm}^2$ $= 98\,125 \text{ cm}^2$ ✓CA ✓A **OR** Area of a circle $= \pi \times \left(\frac{d}{2}\right)^2$ $= 3{,}14 \times \left(\frac{250}{2}\right)^2$ ✓SF $= 49\,062{,}5 \text{ cm}^2$ ✓A ✓A Total Area $= 49\,062{,}5 \text{ cm}^2 \times 2$ $= 98\,125 \text{ cm}^2$ ✓CA **OR** Area of a semi-circle $= \pi \times \left(\frac{d}{2}\right)^2 \div 2$ $= 3{,}14 \times \left(\frac{250}{2}\right)^2 \div 2$ ✓SF $= 24\,531{,}24 \text{ cm}^2$ ✓A ✓A Total Area $= 24\,531{,}24 \text{ cm}^2 \times 4$ $= 98\,124{,}96 \text{ cm}^2$ ✓CA	1M/A area of 2 circles 1SF substitution 1CA simplification 1A unit **Accept 98 174,77 using π** **OR** 1SF substitution 1A simplification 1A unit 1CA multiplying by 2 **OR** 1SF substitution 1A simplification 1A unit 1 CA multiplying by 4 **Answer only: full marks** (4)	12.3.1 L2

Ques	Solution	Explanation	AS/L
2.1.3	Perimeter of the herb garden = $2 \times \pi \times d$ ✓SF $= 2 \times 3{,}14 \times 250\,cm$ $= 1\,570$ cm ✓CA	1SF substitution 1CA simplification **Accept 1 570,80 using π** **Answer only: full marks** (2)	12.3.1 L1
2.1.4	Number of thyme plants = $2 \times 5 - 1$ ✓SF $= 9$ ✓A	1SF substitution 1A number of plants **Answer only: full marks** (2)	12.2.1 L1
2.2.1	5 6 7 9 15 15 15 ✓A 17 20 21 25 36 65 70 ✓A	1A ascending order 1A all values **Answer only: full marks** (2)	12.4.3 L1
2.2.2	Range = 70 – 5 ✓M # = 65 ✓A	1M identifying range concept 1A simplification **Answer only: full marks** **# CA from Question 2.2.1** (2)	12.4.3 L1 L2
2.2.3	54✓✓A	2A correct mode **(for the incorrect data set, if answer 15 max 1 mark) Including 60 and/or 46, max 1 mark** (2)	12.4.3 L1
2.2.4	Mean = $\frac{35+60+46+57+54+34+60+54+56+46+47}{15} + \frac{67+65+54+45}{15}$ ✓A ✓A $= \frac{780}{15}$ $= 52$ ✓CA	1A sum of data 1A dividing by number of data entries 1CA solution **Answer only: full marks** (3)	12.4.3 L1 L2

Ques	Solution	Explanation	AS/L
2.2.5	36; 65; 70 ✓✓A	2A correct values **(one or two values correct, 1 mark)** **Including an incorrect value max 1 mark** (2)	12.4.3 L2
2.2.6	$A = P(1 - i \times n)$ ✓SF ✓SF $= R15\,000(1 - 0{,}175 \times 4)$ $= R4\,500$ ✓CA **OR** ✓SF ✓SF $R15\,000\left(1 - \frac{17{,}5}{100} \times 4\right)$ $= R4\,500$ ✓CA	1SF substituting any 2 values correctly 1SF substituting the 3rd value correctly 1CA value **Answer only: full marks** (3)	12.1.3 L2
2.3.1	Inverse **OR** Indirect ✓A	1A answer **Accept Not direct** (1)	12.2.1 L1
2.3.2	R300 ✓✓RG **OR** $\frac{R2\,400}{7 + 1\checkmark M} = R\,300$ ✓A	2RG correct reading **OR** 1M dividing by 8 1A simplification **If divided by 7 max 1 mark** **Accept a range of values from 340 to 350 max 1 mark** (2)	12.2.1 L1
2.3.3	3 ✓✓RG **OR** $\frac{R2\,400}{R800\checkmark M} = 3\checkmark A$	2RG correct reading **OR** 1M dividing by 800 1A simplification (2)	12.2.1 L1

Ques	Solution	Explanation	AS/L
2.3.4		**NOTE: if there is no variable, symbol or words used, then 0 marks**	12.2.1 L2
	Monthly petrol costs per person $= \frac{\text{R2 400 } \checkmark A}{\text{number of persons} \checkmark A}$	1A using R2 400 in an equation 1A dividing by number of persons	
	OR	**OR**	
	Monthly petrol costs per person $= \frac{\text{R2 400}}{\text{n}} \begin{matrix}\checkmark A \\ \checkmark A\end{matrix}$, where n is the number of persons	1A using R2 400 1A dividing by number of persons	
	OR	**OR**	
	Monthly petrol costs per person $\checkmark A$ $= \text{R2 400} \div \text{number of persons}$ $\checkmark A$	1A using R2 400 1A dividing by number of persons	
	OR	**OR**	
	Monthly petrol costs per person $\checkmark A$ $= \text{Total petrol cost} \div \text{number of persons}$ $\checkmark A$	1A total petrol cost 1A dividing by number of persons (2)	

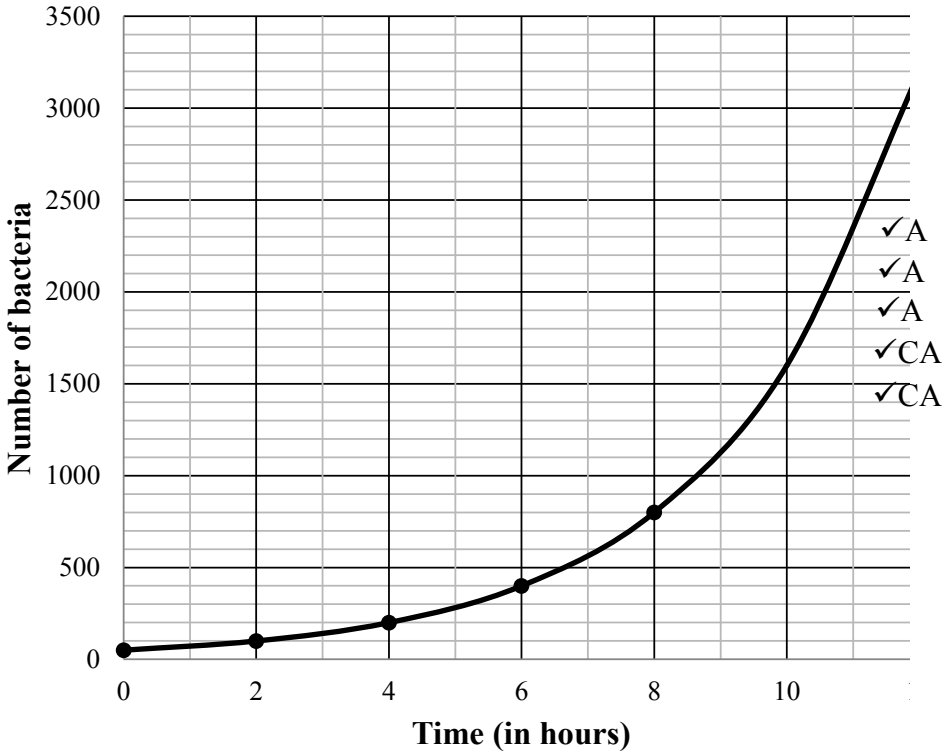
QUESTION 3 [22 MARKS]			
Ques	**Solution**	**Explanation**	**AS/L**
3.1.1	Area to be repainted $= \ell \times b + 2h(\ell + b)$ ✓SF✓SF $= [50 \times 25 + 2 \times 1{,}5(50 + 25)]$ m^2 $= [1\,250 + 3(75)]$ m^2 $= 1\,475$ m^2 ✓CA	1SF substitution ℓ and b 1SF substitution h 1CA area **Incorrect use of BODMAS, no CA** **Answer only: full marks** (3)	12.3.1 L1
3.1.2	Height of a rectangular prism $= \frac{1500\,\text{m}^3}{50\,\text{cm} \times 25\,\text{cm}}$ ✓SF $= 1{,}2$ m ✓A	1SF substitution 1A height **Answer only: full marks** (2)	12.3.1 L1
3.2	Temperature in °F $= 32 + 1{,}8 \times$ (Temperature in °C) $= 32 + 1{,}8 \times (22)$ ✓SF $= 71{,}6$ ✓CA ≈ 72 ✓R	1SF substitution 1CA simplification 1R rounding (3)	12.3.2 12.1.1 L1 L2
3.3.1	Number of children 3 years and under ✓M/A $= 177 - (50 + 45 + 50 + 15)$ $= 17$ ✓CA	1M/A subtracting from 177 1CA simplification **If the answer is 0 max 1 mark** **Subtracting at least 2 values from 177 max 1 mark** (2)	12.1.1 L1
3.3.2	Total Income $= a \times$ R7,50 $+ b \times$ R10,50 ✓A ✓SF $= (50 + 15) \times$ R7,50 $+ (45 + 50) \times$ R10,50 $=$ R487,50 $+$ R997,50 ✓S $=$ R1 485,00 ✓CA	1SF substitution 1A correct values 1S simplification 1CA solution **(only if number of people multiplied by fee)** **If only single values are used for a and b, max 3 marks** (4)	12.2.1 L2
3.4	Profit per bag = R22,00 ✓A Number of bags sold $= \frac{\text{R}594{,}00}{\text{R}22{,}00}$ ✓M/A $= 27$ ✓CA	1A profit per bag 1M/A dividing by correct values 1CA number of bags **Answer only: full marks** (3)	12.1.1 L1

Ques	Solution	Explanation	AS/L
3.5	Discounted price of pump = $\frac{88}{100}$ ✓M/A × R4 999,00 ✓M = R4 399,12 ✓CA **OR** Discounted price of pump = 0,88 ✓M/A × R4 999,00 ✓M = R4 399,12 ✓CA **OR** Discount = $\frac{12}{100}$ ✓M/A × R4 999,00 **OR** 0,12 × R4 999,00 = R599,88 Discounted price of pump = R4 999 – 599,88 ✓M = R4 399,12 ✓CA	1M/A subtracting 12% 1M calculating 88% 1CA simplification **OR** 1M/A subtracting 0,12 1M calculating 0,88 1CA simplification **OR** 1M/A concept of % 1M concept of % decrease 1CA simplification (3)	12.1.1 L1 L2
3.6	Exchange rate = $\frac{\text{R14 595,00}}{\text{AUD\$1500,00}}$ ✓M = R9,73/AUD\$ ✓A **OR** R9,73 per AUD\$	1M division with correct values 1A simplification **If R1 = 0,102 AUD\$, max 1 mark** **Answer only: full marks** (2)	12.1.1 L1

QUESTION 4 [23 MARKS]			
Ques	**Solution**	**Explanation**	**AS/L**
4.1.1	A = 20,6 ✓A	1A correct value of A **Accept a range of values from 20 to 21** (1)	12.1.1 L1
4.1.2	7,6 % ✓✓RT	2RT correct reading from table **Accept 7,6** (2)	12.4.4 L1
4.1.3	2011 ✓✓RG	2RG correct reading from graph (2)	12.4.4 L1
4.1.4	After dark ✓✓A	2A conclusion **Accept dark or evening or night** (2)	12.4.4 L1
4.1.5	% Difference = 62,8 – 57 ✓M/A = 5,8 ✓CA	1M/A identifying correct values 1CA simplification **If negative max 2 marks** **Answer only: full marks** (2)	12.1.1 L1
4.1.6	✓RT 57:14 ✓CA	1RT reading from the table 1CA writing as a ratio **If incorrect reading max 1 for simplifying ratio** **If incorrect order max 1 mark** **Incorrect values, rounded to the nearest integer max 1 mark** (2)	12.4.4 L1
4.2.1	✓✓RG Any of the province(s)	2RG province (2)	12.4.4 L1
4.2.2	Free State ✓RG	1RG province (1)	12.4.4 L1
4.2.3	✓✓A 1 – 50 **OR** 41 – 50 **OR** white category	2A category **(must be an interval)** (2)	12.4.4 L2
4.2.4	✓A ✓A Free State and Mpumalanga	1A Free State 1A Mpumalanga **If additional province max 1 mark** **(If 4 or more provinces zero marks)** (2)	12.4.1 L1

Ques	Solution	Explanation	AS/L
4.2.5	Western Cape ✓✓A	2A correct province (2)	12.3.4 L1
4.2.6	0,8 cm : 125 km ✓M = 8 cm : 125 000 000 cm ✓C = 1 : 15 625 000 ✓CA **OR** 0,7 cm : 125 km ✓M = 7 cm : 125 000 000 cm ✓C = 1 : 17 857 142,86 ✓CA **OR** 0,9 cm : 125 km ✓M = 9 cm : 125 000 000 cm ✓C = 1 : 13 888 888,89 ✓CA **OR** 1,6 cm : 250 km ✓M ✓C 1,6 cm = 25 000 000 cm =1: 15 625 000 ✓CA **OR** 1,5 cm : 250 km ✓M ✓C 1,5 cm = 25 000 000 cm =1: 16 666 666,67 ✓CA **OR** 1,7 cm : 250 km ✓M ✓C 1,7 cm = 25 000 000 cm =1: 14 705 882,35 ✓CA **OR** 3,2 cm : 500 km ✓M 3,2 cm = 50 000 000 cm ✓C = 1: 15 625 000 ✓CA **OR** 3,1 cm : 500 km ✓M 3,1 cm = 50 000 000 cm ✓C = 1: 16 129 032,26 ✓CA **OR** 3,3 cm : 500 km ✓M 3,3 cm = 50 000 000 cm ✓C = 1: 15 151 515,15 ✓CA	1M concept of scale 1C conversion 1CA simplification **Answer only: full marks** (3)	12.3.3 L2

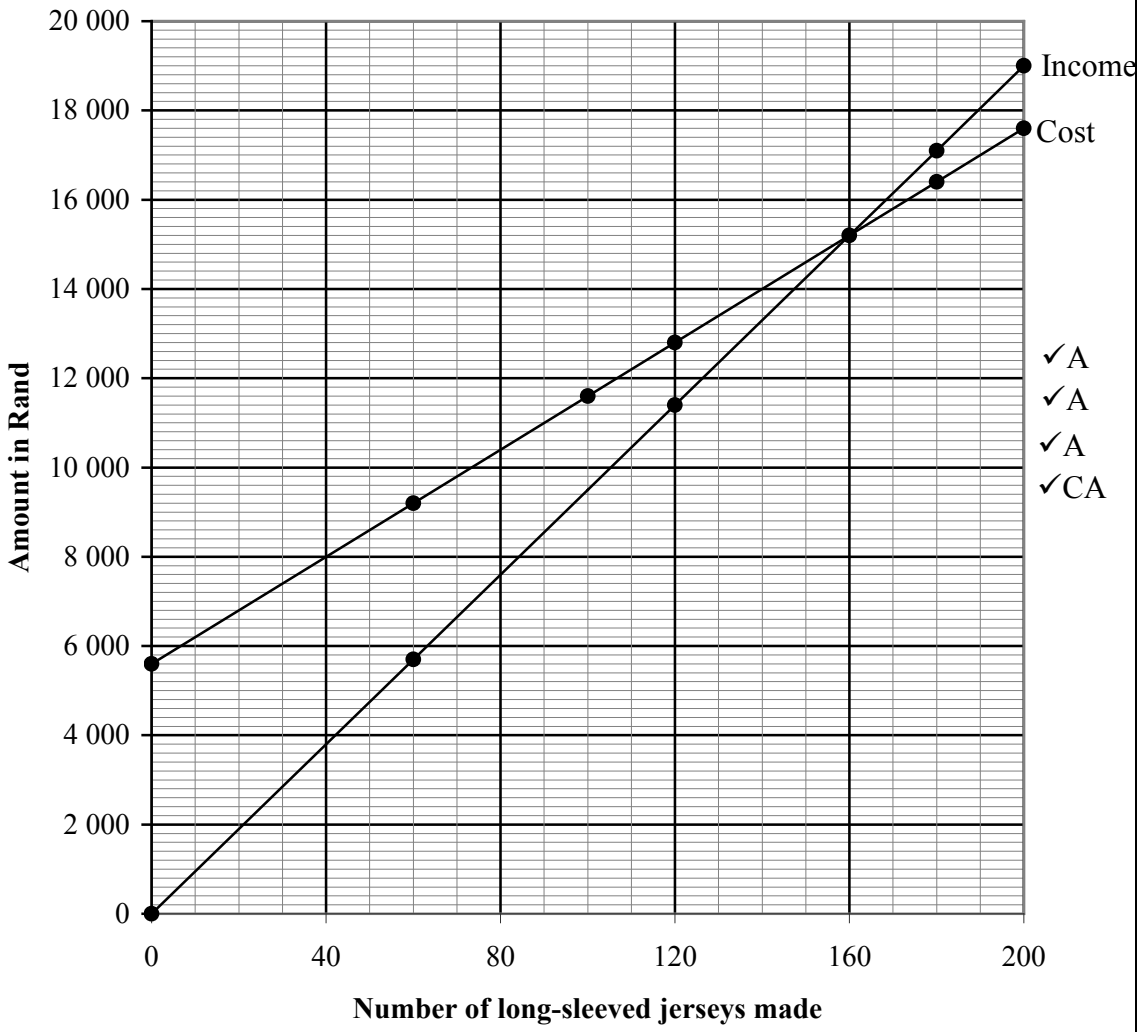
QUESTION 5 [21 MARKS]

Ques	Solution	Explanation	AS/L
5.1.1	3 200 ✓✓A	2A value of K (2)	12.2.3 L1
5.1.2	Number of bacteria = 50 × 8 = 400 ✓A Time taken = 6 hours ✓CA	1A finding 400 1CA reading from table **Answer only: full marks** (2)	12.2.3 L1
5.1.3	 3A one mark per two points plotted accurately **(CA from Question 5.1.1)** 1CA joining points 1CA curve **(the curve must start on the y-axis and pass through at least two points)** (5)		12.2.2 L2
5.1.4	Average growth rate $= \frac{s - t}{r}$ $= \frac{800 - 200}{8 - 4}$ ✓SF ✓A $= \frac{600}{4}$ = 150 bacteria per hour ✓CA	1SF substituting s and t 1A value of r 1CA simplification **If $r = 8$, max 2 marks** **If $r = 12$, max 2 marks** (3)	12.2.1 L1 L2

Ques	Solution	Explanation	AS/L
5.2.1	Fume hood **OR** Non-radioactive waste ✓A	1A correct item (1)	12.3.4 L2
5.2.2	• Exit the radioactive waste room then turn left. ✓A • Walk straight down until you get to the end of the table. ✓A • Then turn right and continue walking straight ahead till you reach the refrigerator. ✓A **OR** • Exit the radioactive waste room then walk straight past the sink to the fume hood. ✓A • Then turn left. ✓A • Walk past the microscope and the next object is the refrigerator. ✓A	1A turn left 1A walk straight down, end of table 1A Turn right, straight ahead **OR** 1A walk past sink to fume hood 1A turn left 1A walk past microscope (3)	12.3.4 L2
5.2.3	Width = $\frac{\text{Total floor area}}{\text{length}}$ $= \frac{18{,}9\,\text{m}^2}{4{,}5\,\text{m}}$ ✓SF $= 4{,}2\ \text{m}$ ✓CA ✓A	1 SF substitution 1 CA simplification 1A unit (3)	12.3.1 L1
5.2.4	Actual length = 2,26 cm × 58 ✓M = 131,08 cm **OR** 1,31 m **OR** 1310,8 mm ✓A	1M multiplying correct values 1A actual length **If 1,31 or 1310,8 (without unit) max 1 mark** (2)	12.3.3 L1

QUESTION 6 [20 MARKS]			
Ques	**Solution**	**Explanation**	**AS/L**
6.1.1	C = 100% – (33 + 10 + 9 + 19)% ✓M/A = 29% ✓A	1M/A subtracting from 100% 1A solution (2)	12.4.4 L1
6.1.2	Total days (no rain) = (33 + 10) % ✓A × 210 = 43% ✓M × 210 **OR** 0,43 **OR** $\frac{43}{100} \times 210$ = 90,3 ✓CA ≈ 90 **OR** Total days (no rain) = 33% ✓M × 210 + 10% ✓A × 210 = 69,3 + 21 = 90,3 ✓CA ≈ 90	1A adding correct values 1M multiplying 1CA solution **OR** 1M multiplying 1A adding correct values 1CA solution **If 91 max 2 marks** (3)	12.4.4 12.1.1 L2
6.2.1	23 ✓A	1A number (1)	12.4.4 L1
6.2.2	Total number of learners = 24 + 32 + 26 + 25 + 20 + 18 + 10 + 4 + 0 ✓M/A = 159 ✓CA	1M/A finding the sum 1CA solution **If wrong set is used max 1** **Answer only: full marks** (2)	12.1.2 12.4.4 L1
6.2.3	22 ✓✓A	2A correct size **If 32 give 1 mark** (2)	12.4.4 L2

Ques	Solution	Explanation	AS/L
6.3.1	$A = \frac{R9\,500}{R95}$ ✓M $= 100$ ✓A **OR** $A = \frac{R11600 - R5600}{R60}$ ✓M $= 100$ ✓A $B = 180 \times 95$ ✓M $= R17\,100$ ✓A	1M dividing by R95 1A simplification **OR** 1M finding difference and dividing 1A simplification 1M multiplying 1A simplification (4)	12.2.1 L1

Ques	Solution	Explanation	AS/L
6.3.2	**COST AND INCOME FOR THE MAKING OF 200 LONG-SLEEVED JERSEYS**  3A one mark per two points plotted accurately **(CA on Question 6.3.1)** 1CA joining plotted points **Full marks if first and last points are correct and joined with a straight line and no other values plotted OR if any two points correctly plotted to draw a complete straight line.** (4)		12.2.2 L2
6.3.3	161✓CA✓CA	2CA minimum value **1 mark for 160 (break-even point)** **If 'more than 160' stated in words, max 1 mark** (2)	12.4.4 L2
		TOTAL	**150**