education

Department:
Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

MATHEMATICAL LITERACY P2

MARKING GUIDELINES 2008

MARKS: 150
TIME: 3 hours

This marking guidelines consist of 14 pages.

QUESTION 1		
1.1.1	Difference in amounts spent on education in 2005/6 and 2002/3 = amount spent on education in 2005/6 – amount spent on education in 2002/3 ✓ = R62 billion – R44 billion = R18 billion ✓ So R18 billion more was spent on education in 2005/6 than in 2002/3	Substitution 1 Subtraction 1 Correct value 1 (2)
1.1.2	The amount spent on all three of them has increased over the years. ✓ The amount spent on social development has increased by R21 billion ✓ The amount spent on health has increased by R10 billion ✓ The amount spent on education has increased by R18 billion. ✓ This means that spending on social development has increased far more than the spending on health and on education. ✓	Description of trend 1 Reason for trend 4 (5)

TABLE 2: CALCULATION OF TAX LIABILITY (1 March 06 to 28 February 07)			
	1. INCOME RECEIVED AND/OR ACCRUED	**Rand only**	
1.2.1	Gross annual salary = 12 × R10 560 + R10 560 ✓ = R126 720 ✓ + R10 560 ✓ = R137 280 ✓ OR Gross annual salary = 13 × R10 560 = R137 280	**R137 280**	Method Substitution Correct value (4)
1.2.2(a)	Interest received from South African banks $i = \frac{7{,}2\%}{2} = 3{,}6\% = \frac{3{,}6}{100} = 0{,}036$ per half-year ✓ n = 1 year = 2 half-years ✓ $A = P(1+i)^n$ $= R150\,000\,(1+0{,}036)^2$ ✓ = R160 994,40 ✓ ***Interest = A – P*** = R160 994,40 – R150 000 ✓ = R10 994,40 ✓		Calculating i Calculating n Substitution Correct value Substitution Correct value (6)
1.2.2(b)	Taxable interest	**Nil or R0** ✓	Correct conclusion (1)
1.2.3	**SUB-TOTAL A = Total income on which tax must be paid**	**R137 280** ✓	Correct value (1)
	2. MEDICAL AID AND PENSION FUND		
1.2.4(a)	Annual medical aid contributions = 12 × R495 ✓ = R5 940 ✓	**R5 940**	Multiplication Correct value (2)
1.2.4(b)	Annual pension fund contributions = 12 × R792 ✓ = R9 504 ✓	**R9 504**	Multiplication Correct value (2)
1.2.4(c)	SUB-TOTAL B = Medical aid + pension fund contributions	✓ **R15 444**	Correct value (1)
	3. TAXABLE INCOME		
1.2.4(d)	**SUB-TOTAL A – SUB-TOTAL B**	✓ **R137 280** **– R15 444** ✓ **R121 836**	Subtraction Correct value (2)
	4. TOTAL TAX PAYABLE (use tax tables for calculation)		
1.2.5(a)	Tax on R121 836 ✓ = Tax on R100 000 + tax on R21 836 = R18 000 + 25% of R21 836 ✓ = R18 000 + R5 459 ✓ = R23 459 ✓ **SUB-TOTAL C = Total tax payable**	**R23 459**	Method Percentage Addition Correct value (4)
	5. PAYE		
1.2.5(b)	✓ ✓ 13 × R1 918,77 = R24 944,01 **SUB-TOTAL D = Annual PAYE deductions**	**R24 944**	Multiplication Correct value (2)
1.2.5(c)	**6. TOTAL AMOUNT PAYABLE BY/TO YOU (The difference between SUB-TOTAL C AND SUB-TOTAL D)**	**R24 944** ✓ **– R23 459** ✓ **R 1 485**	Subtraction Correct value (2)
1.2.6	Patsy's PAYE deductions were more than her total tax payable. ✓ This means that more than enough PAYE tax was subtracted from Patsy's gross salary and she will get a rebate of R1 485. ✓		Answer reason (2)
			[36]

QUESTION 2

2.1.1

Arrange the heights in ascending order: ✓

1,68 1,70 1,74 1,78 1,80 1,81 | 1,85 1,90 1,95 1,98 2,00 2,02

Median

(There are 12 data items, so the median lies midway between the 6th and 7th data item.)

Median height = $\frac{1,81 + 1,85}{2}$ ✓✓

$= \frac{3,66}{2}$

= 1,83 m ✓

Correct formula 1
Correct order 1
Substitution 1
Calculation 1
(4)

2.1.2

1,68 1,70 1,74 | 1,78 1,80 1,81 | 1,85 1,90 1,95 1,98 2,00 2,02

Lower quartile Median

(The lower quartile is midway through the lower half of the data items.)

Lower quartile (Q_1) $= \frac{1,78 + 1,74}{2}$ ✓

$= \frac{3,52}{2}$

= 1,76 m ✓

Calculation 1
Correct value 1
(2)

2.1.3

1,68 1,70 1,74 | 1,78 1,80 1,81 | 1,85 1,90 1,95 | 1,98 2,00 2,02

Lower quartile Median Upper quartile

(The upper quartile is midway through the upper half of the data items.)

Upper quartile (Q_3) $= \frac{1,95 + 1,98}{2}$ ✓

$= \frac{3,93}{2}$

= 1,965 m ✓

Calculation 1
Correct value 1
(2)

2.1.4

Interquartile range = Upper quartile – Lower quartile

= 1,965 m – 1,76 m

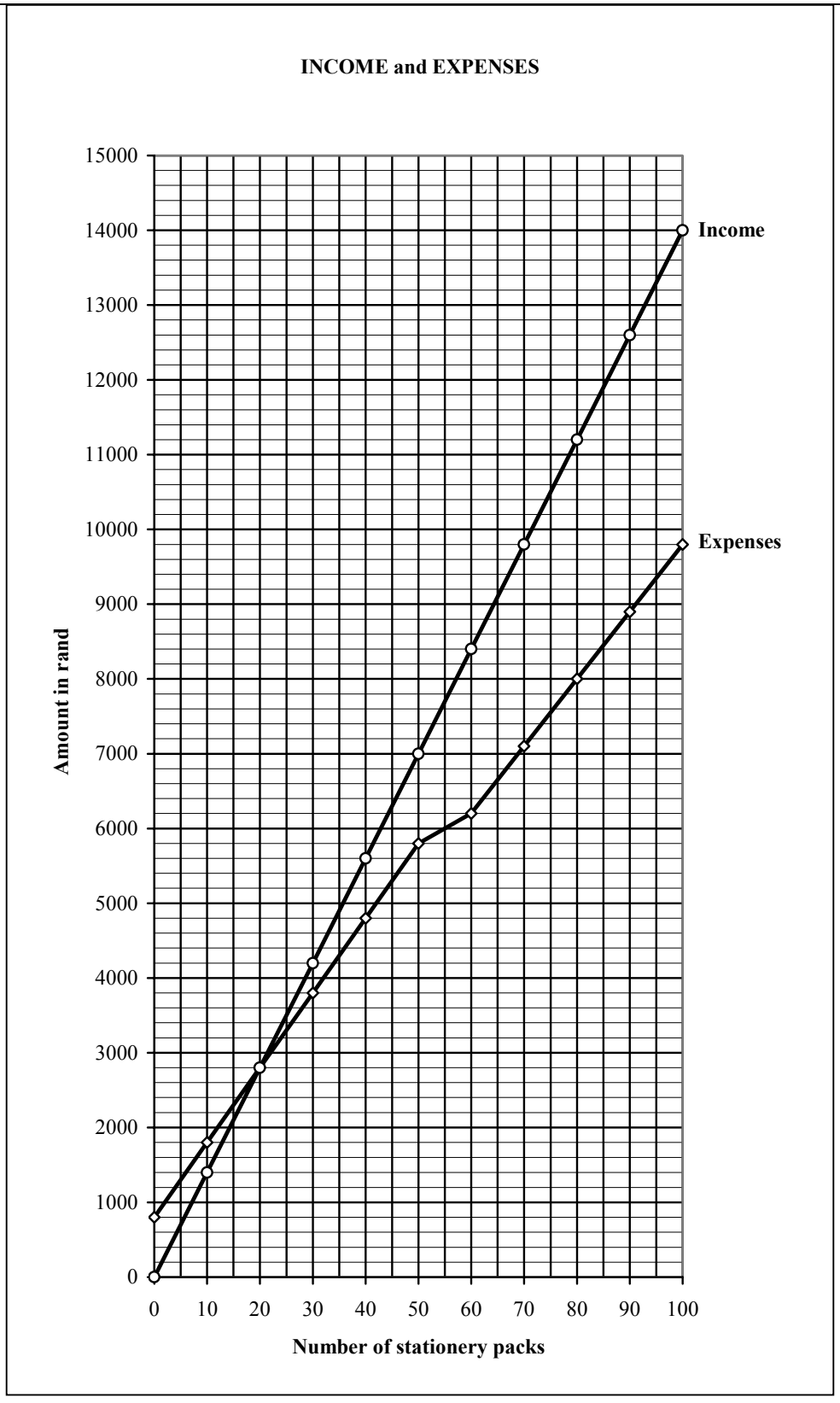
= 0,205 m ✓

= 20,5 cm ✓

Calculation 1
Conversion 1
(2)

2.2.1	NOTE: Depending on the method used, two slightly different answers are possible. METHOD 1 There are 12 data items. ✓ 75% of 12 items = $\frac{3}{4} \times 12$ = 9th item. ✓✓ The 9th item = 1,95 m. So the height at Lerato's 75th percentile = 1,95 m ✓ METHOD 2 The 75th percentile = the upper quartile. ✓✓ Lerato's 75th percentile = 1,965 m ✓ So, the height at Lerato's 75th percentile = 1,95 m. ✓	METHOD 1 12 items Item number 2 Height 1 METHOD 2 Equivalence of percentile and quartile 2 Height 1 Conclusion (4)
2.2	Charles 1,94 m Lebo 1,80 m Mohamed 1,95 m Siyabonga 2,00 m ***Lerato 1,95 m or 1,965 m*** ✓ Charles and Lebo did not qualify to take part as the heights at their 75th percentile were less than 1,95 m. ✓	Correct names 1 Reason 1 (2)

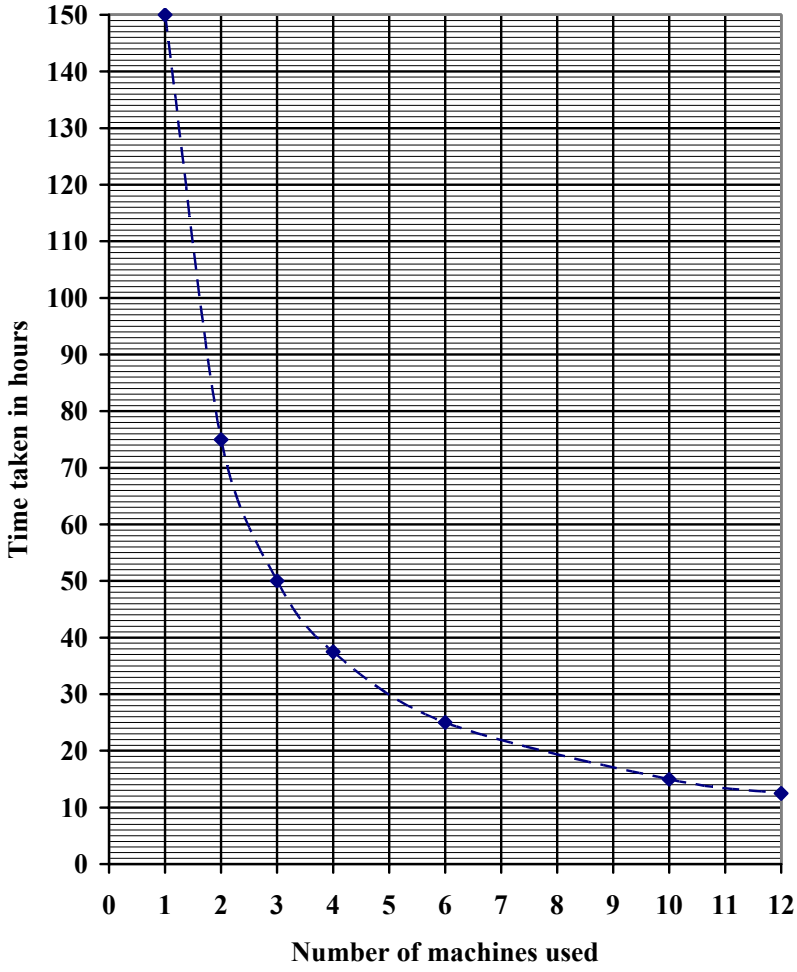
QUESTION 3 [26]		
3.1	The fixed cost is R800 ✓	1A Correct value (1)
3.2	METHOD 1 10% discount, means he paid 90% ✓ New cash price = $\frac{90}{100} \times$ R100 = R90,00 ✓ METHOD 2 10% discount = $\frac{10}{100} \times$ R100 = R10 ✓ New price = R100 – R10 = R90 ✓	METHOD 1 1M percentage 1CA correct value METHOD 2 1M percentage 1CA correct value (2)
3.3.1	A = R800 + R90 × 80 ✓ = R8 000 ✓ B = R800 + R90 × 100 ✓ = R 9 800 ✓	1M substitution 1 A correct value 1M substitution 1 A correct value (4)

3.3.2		1A Plotting points from table CA Plotting calculated points. 1A joining first points 1CA joining last points (4)

3.3.3(a)	He must sell 20 packs to break even. ✓	1A Correct value (1)
3.3.3(b)	Profit = Income – Expenses = R14 000 ✓ – R9 800 ✓ = R4 200 ✓	1A income 1A expenses 1CA Correct value (3)
3.4.1	Profit = Income from 80 packs – Expenses from 100 packs ✓ = R11 200 ✓ – R9 800 ✓ = R1 400 ✓	1M method 1A income 1A expenses 1CA Correct value (4)
3.4.2	The wholesaler will buy the pack at $\frac{80}{100}$ ✓ × R90 = R72,00 ✓ Mr. Ndlovu would receive 20 × R 72,00 = R1 440 ✓ extra New total profit = R1 400 ✓ + R1 440 = R2 840 ✓	1M percentage 1A correct value 1CA amount 1CA new profit (5)
		[24]

QUESTION 4 [35]

4.1.1	Percentage decrease in number of workers $= \frac{70\,500 - 50\,500}{70\,500} \times \frac{100\%}{1}$ ✓ ✓ $= 28{,}4\%$ ✓	1 Method 1 Substitution 1 Correct value (3)
4.1.2	Percentage decrease in number of woven clothing items imported $= \frac{140\,395\,000 - 101\,084\,000}{140\,395\,000} \times \frac{100\%}{1}$ ✓ ✓ $= 28\%$ ✓	1 Method 1 Substitution 1 Correct value (3)
4.1.3	Any acceptable answer with a valid reason. *A possible answer:* The decrease is justified. ✓ The decline in the number of workers is even more than the decrease in the number of woven clothing items. ✓ ✓	1 Opinion 2 Reason (3)
4.2.1	$N = 74\,907\,000 + n \times 6\,759\,000$	1 Equation (1)
4.2.2	METHOD 1 Imports in 2008 = 74 907 000 + 6 759 000 = 81 666 000 Imports in 2009 = 81 666 000 + 6 759 000 = 88 425 000 ✓ Imports in 2010 = 88 425 000 + 6 759 000 = 95 184 000 ✓ Imports in 2011 = 95 184 000 + 6 759 000 = 101 943 000 Imports in 2012 = 101 943 000 + 6 759 000 = 108 702 000 ✓ Imports in 2013 = 108 702 000 + 6 759 000 = 115 461 000 ✓ In the year 2013 the number if knitted clothing items imported will be more than were imported in 2006. METHOD 2 $n \times 6\,759\,000 + 74\,907\,000 = N$ $n \times 6\,759\,000 + 74\,907\,000 = 113\,496\,000$ ✓ $n \times 6759\,000 = 113\,496\,000 - 74\,907\,000$ $n \times 6759\,000 = 38\,589\,000$ $n = \frac{38\,589\,000}{6\,759\,000}$ ✓ $= 5{,}7 = 6$ ✓ The year would be 2007 + 6 years = 2013 In the year 2013 the number of knitted clothing items imported will be more than were imported in 2006. ✓	METHOD 1 1 Method addition 1A correct addition 1CA addition 1CA Correct value METHOD 2 1 Method (substitution) 1 Simplification 1 Correct value 1 Final year (4)

4.3.1	**TIME TAKEN TO MAKE 300 JERSEYS**  	3 points plotted correctly on graph 1 correct shape 1 dotted line for graph (5)
4.3.2(a)	30 hours ✓ ✓	2CA Correct value (2)
4.3.2(b)	8 machines (actually 7,5 machines, but answer needs to be rounded up to 8) ✓ ✓	Correct value (2)
4.3.3	Number of machines used × time taken = 150 ✓ ✓	Equation (2)

4.3.4	METHOD 1 Six machinists are used to produce 1 800 jerseys. One machinist would have to produce 300 jerseys. ✓ From the table or from the graph one machinist would take 150 hours. ✓ So 150 hours would be needed for 6 machinist to produce 1 800 jerseys. ✓ METHOD 2 Time taken for 1 machinist to make 1 Jersey = $\frac{1}{2}$ hour Time taken for 6 machinist to make 1 Jersey = $\frac{1}{12}$ hour ✓ Time taken for 6 machinist to make 1 800 jerseys $= 1\,800 \times \overset{\checkmark}{\frac{1}{12}} = \frac{1\,800}{12} = 150$ hours ✓ METHOD 3 From the table: Time taken for six machinists to make 300 jerseys = 25 hours Time taken for six machinists to make 1 800 jerseys = $\frac{1\,800}{300} \times 25$ hours $= 6 \times 25$ hours $= 150$ hours	1 Proportion 1 Substitution 1 Correct Value (3)
4.4.1	Area of outer circle = $\pi \times r^2$ $= 3{,}14 \times (8\text{ cm})^2$ ✓ $= 200{,}96\text{ cm}^2$ ✓ ✓	1A Substitution 1CA Answer 1A Correct unit (3)
4.4.2	Radius of inner circle: r = $\frac{12\ cm}{2} = 6$ cm ✓ Area of circle = $\pi \times r^2$ $= 3{,}14 \times (6\text{ cm})^2$ $= 113{,}04\text{ cm}^2$ ✓ Area of checked part of logo = $(200{,}96 - 113{,}04)\text{ cm}^2$ ✓ $= 87{,}92\text{ cm}^2$ ✓	1A Calculating r 1CA Substitution 1 Method 1 Solution (4)
		[35]

QUESTION 5		
5.1.1	Area of northern wall to be painted with blue gloss paint = area of bottom half of the wall – area of the bottom portion of the door = (12 m × 1,5 m) – 1,5 m × 0,9 m ✓ = 18 m^2 – 1,35 m^2 ✓ = 16,65 m^2 ✓	Method 1 Correct dimensions 1 Simplification 1 solution 1 (4)
5.1.2	Area of the northern wall to be painted with white PVA = area of top half of wall – area of the windows – area of top portion of the door ✓ = (12 m × 1,5 m) – 3 × (0,45 m × 1,2 m) – (0,9 m × 1 m) ✓ = 18 m^2 – 3 × 0,54 m^2 – 0,9 m^2 = 18 m^2 – 1,62 m^2 – 0,9 m^2 ✓ = 15,48 m^2 ✓	Method 1 Correct dimensions 2 Simplification 1 Solution (5)
5.2.1	Area of western wall to be painted with blue paint = area of bottom half of the wall – area of the bottom half of the chalkboard = (8 m × 1,5 m) – (0,5 m × 4 m) ✓ = 12 m^2 – 2 m^2 ✓ = 10 m^2 ✓	Method 1 Correct dimensions 1 Simplification 1 Solution 1 (4)
5.2.2	Area of the western wall to be painted with white PVA = area of top half of the wall – area of top half the chalkboard = (8 m × 1,5 m) – (4 m × 0,5 m) ✓ = 12 m^2 – 2 m^2 = 10 m^2 ✓	Method 1 Solution 1 (2)

5.3.1	Total area of the classroom to be painted with blue gloss paint = Area of northern wall + Area of the western wall + Area of the southern wall + Area of the eastern wall ✓ = 16,65 m^2 ✓ + 10 m^2 + (12 m × 1,5 m) ✓ + (8 m × 1,5 m) = 16,65 m^2 + 10 m^2 + 18 m^2 + 12 m^2 = 56,65 m^2 ✓	Method 1 Area of southern wall 1 Area of western wall 1 Solution 1 (4)
5.3.2	Total area to be painted with white PVA paint ✓ = Area of northern wall + Area of the western wall + Area of the southern wall + (Area of the eastern wall – Area of Pin Board) = 15,48 m^2 + 10 m^2 + (12 m ✓ × 1,5 m) + [(8 m ✓ × 1,5 m) – (6 m ✓ × 1 m)] = 15,48 m^2 + 10 m^2 + 18 m^2 + 12 m^2 – 6 m^2 = 49,48 m^2 ✓	Method Area of southern wall 1 Area of western wall Area of pin board 1 Solution 1 (5)
5.4.1	BLUE GLOSS PAINT: 8 m^2 is covered by 1 ℓ So 1 m^2 is covered by $\frac{1}{8}\ell$ ✓ Then 56,65 m^2 will be covered by $\frac{1}{8} \times 56{,}65\ \ell = 7{,}08125\ \ell$ ✓ $\approx 8\ \ell$ ✓	 Proportion 1 Solution 1 Rounding up 1 (3)
5.4.2	PVA: 6 m^2 is covered by 1 ℓ So 1 m^2 is covered by $\frac{1}{6}\ell$ ✓ Then 49,48 m^2 will be covered by $\frac{1}{6} \times 49{,}48\ m^2$ = 8,246666666 ℓ ✓ $\approx 9\ \ell$ ✓	 Proportion 1 Solution 1 Rounding up 1 (3)

5.5	5 × cost of 1 ℓ of blue gloss paint or white PVA = 5 × R92,00 = R460,00 So it is cheaper to buy one 5 ℓ tin of blue gloss paint or white PVA than to buy five 1-litre tins. ✓ Cost of buying 8 ℓ of blue gloss paint = cost of buying one 5 ℓ tin + three 1 ℓ tins = 1 × R289,00 + 3 × R99,00 ✓ = R289,00 + R297,00 = R586,00 ✓ 4 × cost of 1 ℓ of white PVA = 4 × R92,00 = R368,00. It is cheaper to buy one 5 ℓ tin of white PVA paint than to buy four 1 ℓ tins of paint. So, it is cheaper to buy two 5 ℓ tins of white PVA paint than to buy 5 ℓ + (4 × 1 ℓ) of paint. ✓ Cost of buying 9 ℓ of white PVA = cost of buying 10 ℓ of paint = 2 × R220,00 ✓ = R440,00 ✓ Total cost of painting the classroom = cost of buying 7 ℓ of blue gloss paint + cost of buying 10 ℓ of white PVA + cost of 4 mohair rollers sets ✓ = R586,00 + R440,00 + (4 × R30,00) ✓ = R586,00 + R440,00 + R120,00 = R1 146,00 ✓	Concept that it is cheaper to buy one 5 ℓ tin than to buy four 1 ℓ tins 1 Solution 2 Concept that it is cheaper to buy two 5 ℓ tins than to buy one 5 ℓ and four 1 ℓ tins 1 Solution 2 Method 1 Substitution 1 Answer 1 (9)

TOTAL: 150