

**Functional Skills Mathematics**  
**March 2008 Mark Scheme L2**  
**Task 1 Weight To Lose**

Finding measures of location, using these to draw conclusions about WTL, considering efficacy of conclusions'/data sets

	<b>Process</b>	<b>Award</b>	<b>on evidence of ...</b>
A	Choosing and calculating a measure of location for all 4 data sets.	9	<p>Award 2 for each correct measure of location. (Just 1 each for "age" unless used)  Or Award 1 for each group where the numbers of people, separate weights or net weight lost <i>or</i> gained is correctly calculated.</p> <p>The same principle applies if groups A&amp;C and B&amp;D are clearly merged.</p> <p>Award 1 for at least one correct calculation of the range of a group.</p> <p style="text-align: right;"><i>Maximum total mark 9.</i></p>
B	Drawing conclusions from the calculated measures of location etc. found above.	4	<p>Award 2 for each clear conclusion based on "their" results for the mean or median.</p> <p>Clearly means specifically mentioning the treatments rather than merely A, B, C and D – the later cases gain just 1 each.</p> <p>Award 1 each for conclusion based on less than secure methodology such as range or numbers losing/gaining weight in each group without recognizing that comparing unequal groups may not be valid.</p> <p style="text-align: right;"><i>Maximum total mark 4.</i></p>
C	Making observations about the reliability/usefulness of the conclusions or other observations regarding weight loss.	4	<p>Award 2 for each sensibly different and clearly stated observation not previously awarded but supported by some numerical reasoning, for example taking age of subjects into consideration, or any other flaws in the constitution of the data sets.</p> <p>Award 1 for statements not supported by "numbers".</p> <p style="text-align: right;"><i>Maximum total of 4.</i></p>
D	Checking and considering the reasonableness of any results.	1	Clear evidence, at any point, of specifically checking or considering the reasonableness of numerical work.
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Measures location correct to 1 d.p. or better.

**Measures of location for the data sets (to 2 d.p.)**

Group (s)	Age (years)	Weight change (kg)
<b>A</b>	<i>Regular exercise + diet + placebo</i>	
11 in group, 8 lost weight, 3 gained weight.		
mean	27.82	-2.73
median	28.00	-1.50
range	9	15.5
total	306	-30
Separate loss/gain, Total: -39/9 Mean: -4.875/3		
<b>B</b>	<i>Regular exercise + diet + WTL</i>	
13 in group, 9 lost weight, 4 gained weight.		
mean	27.54	-2.85
median	28.00	-3.50
range	8	11.5
total	358	-37
Separate loss/gain, Total: -44.5/7.5 Mean: -4.94/1.875		
<b>C</b>	<i>Working - out + diet + placebo</i>	
11 in group, 11 lost weight, none gained weight.		
mean	26.09	-5.45
median	27.00	-4.50
range	13	9
total	287	-60
Separate loss/gain, Total: -60/0 Mean: -5.45/0		
<b>D</b>	<i>Working-out + diet + WTL</i>	
12 in group, 10 lost weight, two remained the same.		
Mean	28.42	-4.92
median	28.50	-2.50
range	7	11.5
total	341	-59
Separate loss/gain, Total: -59/0 Mean: -5.9/0		
<b>A &amp; C</b>	<i>Regular exercise/working-out + placebo</i>	
22 in group, 19 lost weight, 3 gained weight		
mean	26.95	-4.09
median	27.00	-3.50
range	14	15.5
total	593	-90
Total of 19 lost weight, for this mean weight loss = 99 kg.		
<b>B &amp; D</b>	<i>Regular exercise/working-out + WTL</i>	
25 in group, 19 lost weight, two remained the same, four gained.		
Mean	27.96	-3.84
median	28.00	-2.50
range	9	14
total	699	-96
Total of 19 lost weight, for this mean loss = 103.5 kg		

	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>
Lost	8	9	11	10
Gained	3	4	0	0 (2 stayed the same)

Average age of **all** subjects is 27.4893 .... so could accept 27, 27.5 etc.

**Functional Skills Mathematics**  
**March 2008 Mark Scheme L2**  
**Task 2 Rain**

Finding total rainfall to start of May(end April) → converting to volume of water using formula → calculating volume of water need for watering lawn each fortnight → conclusion based on previous figures.

Condone **sensible** rounding at any point in the calculations.

	<b>Process</b>	<b>Award</b>	<b>on evidence of ...</b>
<b>A</b>	Using rainfall chart to calculate total rainfall from January to April	2	(168 ± 4) mm SC1 for 160 mm. Award 1 for sight of a single month's rainfall (± 1 mm, Jan to May only) or cumulative total for rainfall ± x mm - see table of results.
<b>B</b>	Using formula to convert rainfall (mm) into a volume ("R" m <sup>3</sup> ) using the given formula	4	Award 4 www for using the <i>correct</i> cumulative rainfall (168 ± 4) mm giving the correct answer → [1.7(890...) to 1.8(763...)] m <sup>3</sup> + must have units Or Award 3 for correct use of the formula, for any other rainfall figures with units clearly stated or wrong footprint Or Award 2 for clear use of formula as above but no direct reference made to why the formula was being applied, almost in isolation and no units given. Or Award 1 correct calculation of the roof area/footprint (12 (m <sup>2</sup> )) seen, possibly in the formula itself or on planning sheet.
<b>C</b>	Calculating volume of water to water new lawn once from the number of watering cans needed. Volume (gallons)  Converting V(gallons) into W(m <sup>3</sup> )	1 1 1  4	20 x 6 ÷ 6 = 20 watering can cans (C) (B2 for 20) "C" x 5 = V (100 gallons if C correct (B3))  Award B4 for correct answer (0.358... or 0.454... m <sup>3</sup> ) – must state units. Or Award 3 for "their" correct answer to "V" $w = \frac{"V"}{279 \text{ or } 220}$ and units (m <sup>3</sup> ) or from W = "V" x (0.00358 or 0.00454) Or Award 2 or 3 for above if units omitted. Or If zero award 1 if "279" or "220" seen in an correct expression involving "V" – condone one error Or From diary conversion table: Award 4 for correct answer to "V" x 8 x 0.57 x 0.001 or "V" x 0.0045(6...) = Wm <sup>3</sup> Award 3 for three correct multipliers but no units or award 2 for two correct multipliers.

			Or For equivalent conversion of rainwater yield into gallons. Award 2 for “ <i>R</i> ” × 279 or 220, 1 for correct answer to this, and 1 for correct units (gallons) stated.
<b>D</b>	Calculating the volume of water left in tank after each watering of the lawn (or after 8 weeks watering which can be the result of 4 or 5 watering periods).	3	For at least two correct volumes based on “ <i>W</i> ” and attempted above figures for half monthly watering. Systematic and clearly labeled or annotated. Or Equivalent by working out water needs for 8 weeks (4 or 5 watering periods) Or Award 1 each for consistent “number” but little coherent commentary (Max. 2 marks)  See table of results.
<b>E</b>	Conclusion	2	Conclusion explicitly and correctly stated consistent with and reference made to their own figures.  Award 1 for conclusion clearly consistent with their figures, but no explicit or stated use of these figures in forming the conclusion.
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						end of time period	
Month	Rain fall (mm)		For each month's end (mm)		cumulative	Volume m <sup>3</sup> / gallons	
Jan	51		Jan	51 (±1)	51 (±1)	0.55(...) /122.40 /155.23	
Feb	35		Feb	35 (±1)	86 (±2)	0.93(...) /206.40 /261.75	
Mar	40		Mar	40 (±1)	126 (±3)	1.37(...) /302.40 /383.50	
Apr	42		Apr	42 (±1)	168 (±4)	1.83(...) /403.20 /511.33	
May	40		May	40 (±1)	208 (±5)	2.26(...) /499.20 /633.08	

Each watering of lawn uses 0.456 m<sup>3</sup> Or 0.358 (0.3584..) 1 m<sup>3</sup> = 220 or 279 gallons

Watering	Water	Used	Left	Water	Used	Left	
Start May	1.83(272...)	0.456	1.37672	1.83(272...)	0.358	1.4(743...)	
Mid-May		0.456	0.92072		0.358	1.1(159...)	
Start June		0.456	0.46472		0.358	0.7(579...)	
Mid-June		0.456	0.00872		0.358	0.3(99...)	
Start July		0.456	None left		0.358	0.0419	

ACCEPT 4 OR 5 WATERING PERIODS

**Functional Skills Mathematics**  
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**Task 3 Chairs**

Estimating number of chairs in stack → estimating number of chairs in hall,  
 subject to layout constraints → calculating time to set out hall.

	<b>Process</b>	<b>Award</b>	<b>on evidence of ...</b>
<b>A</b>	Estimating the “footprint” of a chair.	2	Effective footprint of (470 to 480) (mm) by (760 to 1000) (mm) (or the cm equivalent) – foot room allowance giving the (760 to 1000) Award 1 when no recognition of the need for foot room (i.e. (470 to 480) by (470 to 480)) (If volume attempted -1, so LxW needed for 1)
<b>B</b>	Deciding on total region of hall taken by chairs.	2	Unambiguously implied dimensions for each block of chairs 7m by 10m, 1 for each dimension. Dimensions may be hidden in “calculating the chair numbers” or scribbled in on the diagram. Give full credit for “(total) area for chairs is 14 by 10” or equivalent.
<b>C</b>	Calculating the total number of chairs.  “width”	2	“7000” ÷ “(470 to 480)” = (14.89 to 14.58 ...) Award 1 for “7000” ÷ “(470 to 480)” seen or implied.
		2	Candidate’s answer rounded down with reason (“W”) (“correct” W = 14 chairs wide). Award 1 for just correct unambiguous integer answer no working. SC1 “28 chairs in a row”
	“length”  Finding the total number of chairs	2	“10000” ÷ “(760 to 1000)” = (13.157 ... to 10). Award 1 for “10000” ÷ “(760 to 1000)” seen or implied. Award 1 for correct follow through with no foot room if answer given in range 20.833 .. to 21.27.
		2	Candidates answer rounded down with reason (L) (“correct” L = 13 or 10 chairs long (or 20 or 21)). Award 1 for just correct unambiguous integer answer with or without working.
<b>D</b>	Calculating the total time needed to set out the hall. “T” = [×3][÷4][÷4] or equivalent	3	Award 1 for each correct operation (in any order) on “T”. Condone one wrong operation, but more than one gains a total of zero.
		1	Candidate’s resulting answer rounded to a sensible extent i.e. no seconds or decimals of a minute
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*Alternative when assumed that each chair takes 1 minute to put out – with “T” as the total number of chairs*

<b>D'</b>	Estimating total time “TT” assuming that each chair takes 1 minute to put out “TT”	2	Award 1 for implicit assumption, but 2 for explicit mention of it “taking 1 minutes to put out a single chair” or better
	Estimating take taken by 4 helpers “TT” ÷ 4 with sensible rounding	2	Award 1 for the calculation seen but inappropriate final answer – for example decimals of a minute or seconds given.

*Alternative simplistic method to find total number of chairs using just area*

<b>B'</b>	Deciding on total area of hall taken by chairs. (A)	2	A = Total area – width the gangways Award 1 for total area with no account of gangways
<b>C'</b>	Finding number of chairs by dividing area of hall by area of single chair.	4	Correct answer to $T = A \div [470 \text{ to } 480] \times [760 \text{ to } 1000]$ . or Award 3 for clearly implied method. or Award 2 for chair area – not footprint used in the calculation. or Award 1 for one of [470 to 480] or [760 to 1000] used in attempted method.  ----- Area of single chair: 220 900 to 230 400 o.e.  Area of footprint: 357200 to 480000 o.e. (i.e. taking account of foot room)

Effectively half marks 6/12 for inappropriate method.

Do not penalise non-statement of units during a calculation.