Functional Skills

Mathematics

Mark Schemes for Mathematics Level 2 2011

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This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by Examiners. It does not indicate the details of the discussions which took place at an Examiners' meeting before marking commenced.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the functional skills Report for centres.

OCR will not enter into any discussion or correspondence in connection with this mark scheme.

OCR Level 2 Functional Skills Maths Referencing for Coverage and Range

Our ref	Coverage and Range
N1	understand and use positive and negative numbers of any size in practical contexts
N2	carry out calculations with numbers of any size in practical contexts, to a given number of decimal places
N3	understand, use and calculate ratio and proportion, including problems involving scale
N4	understand and use equivalences between fractions, decimals and percentages
A1	understand and use simple formulae and equations involving one- or two-step operations
G1	recognise and use 2D representations of 3D objects
G2	find area, perimeter and volume of common shapes
G3	use, convert and calculate using metric and, where appropriate, imperial measures
S1	collect and represent discrete and continuous data, using information and communication technology (ICT) where appropriate
S2	use and interpret statistical measures, tables and diagrams, for discrete and continuous data, using information and communication technology (ICT) where appropriate
S3	use statistical methods to investigate situations
S4	use probability to assess the likelihood of an outcome

Representing	Our Ref
Understand routine and non-routine problems in familiar and unfamiliar contexts and situations.	R1
Identify the situation or problems and identify the mathematical methods needed to solve them.	R2
Choose from a range of mathematics to find solutions.	R3
Analysing	
Apply a range of mathematics to find solutions.	A1
Use appropriate checking procedures and evaluate their effectiveness at each stage.	A2
Interpreting	
Interpret and communicate solutions to multistage practical problems in familiar and unfamiliar contexts and situations.	I1
Draw conclusions and provide mathematical justifications	I2

N – Number
A – Algebra
G – Geometry
S – Statistics

Task 1   **Making lunch**

	Process	Award	on evidence of …
(a)(i)	Finding weekly spend (*W*) **[A]**	**2**	**2:** £14.95 _____ **or** _____ **1:** 2.99 × 5 or 7 (figs 1495 or 2093)
(ii)	Finding annual spend (*S*) **[B]**	**2**	**1:** Number of working weeks in range 44 to 48 (*N*) seen or implied **1:** Annual spend (*S*) = *N* × *W* *(followed through on correct answer to "N" x "W" but* accept answer in range £657.80 to £717.60 (or 920.92 for 7day week) for full credit. Also accept by the route (365 – 28) x 2.99 = £1007.63 (days in year),
(b)	Comparing fraction of daily allowance **[C]**	**3**	**1:** Fat in meal deal (*F*) = 17.6 + 11.4 (= 29) **1:** 95 ÷ 4 = 23.75 or 4 ×" 29" (= 116) seen or equivalent (dividing the two quantities) **1:** Supported by relevant working: statement to the effect that Meal Deal is more than a quarter of 95 a "yes" is sufficient (but working must support this – lone "yes" and no working gains no credit). Following though on "*F*".
(c)	Calculating fat content in own lunch **[D]**	**3**	**1:** Statement somewhere of what is needed for lunch eg bread, cheese, tomato, crisps [4 items (but not quantities) water is optional] **2:** Calculation of total amount of fat for all ingredients Any three ingredients correct and total. Allow sensible quantities i.e. can depart from below. Sensible is: 1, 2, 3, 4 slices of bread, cheese 1 , 2, tomatoes ½ ,1 or 2, 1 bag of crisps Condone fat for crisps: 8.3 or 11.4 (2 × 0.7 + 4.0 + 0.2 + 8.3 = 13.9) **3:** 13.9 www (first mark may be implied) _____ **or** _____ **1:** Attempt to calculate total with at least 2 items correctly (out of possible 5) (usually by only considering cheese and bread).
	Comparing fat contents **[E]**	**1**	**1:** Correct comparison of "total" with "29g" (*F*), must have reference to original statement about "half as much fat".

	Process	Award	on evidence of …
(d)	Costing items for annual cost of DIY lunch **[F]**	**4**	**1:** For each "number" within given range with **maximum of 3** Condone lack of money units. **1:** If each of "correct" numbers correctly identified _____ calculated from weekly costings _____ Bread: (£) 16.28 to 76.96 Cheese: (£) 42.90 to 101.40 Tomatoes: (£)19.36 to (£)91.52 Crisps: (£)30.62 to (£)45.24 Water: (£)94.60 to (£)111.80 _____ calculated weekly costings _____ Bread: 37 or 74 or 148 Cheese: 97(p) or 98(p) or (£)1.95 Tomatoes: 44(p) or 88(p) or (£)1.76 Crisps: 69(p) or 87(p) Water: (£)2.15 _____ calculated daily costings _____ Bread: 8p or 9p or 12p or 13p or 16p or 17p Cheese: 19p or 20p or 39p Tomatoes: 7p or 8p or 14p or 15p or 29p or 30p Crisps: 14p or 15p Water: 43p unless rational alternative _____ If variety of time intervals used mark to candidates advantage. _____ if **zero** scored _____ **1:** For mention of all five components

	Process	Award	on evidence of …
	Calculating total annual cost **[G]**	1	**1:** By-eye correct total of at least 3 different items for the year. (For weekly costings "Weekly total" x (44 – 52) weeks) then by-eye (For daily costings "Daily total" x days (44 – 52) x (5 or 7) (308 days is common) then by-eye
	Calculating annual saving **[H]**	1	**1:** *S* – above DIY total (accept loss if stated as such and is consistent with candidates figures.) Must be correct money units, but if no symbol $\Rightarrow$ £s
	Comparing saving with cost of laptop **[I]**	1	**1:** Consistent statement + explicit or implied laptop in cost range £200 to £800 or If loss correctly indentified and stated "no laptop".
	Checking **[J]**	2	**2:** Clear evidence of a formal checking procedure being carried out at least once (e.g. by reverse calculation or repeating the calculation providing this is clearly a genuine check as opposed to a mere copying exercise). **1:** Clear recognition and relevant statement at any appropriate point that a particular answer to a calculation is appropriate/expected or inappropriate/not expected _____ **or** _____ ***Three or more*** calculations relevant/valid for the task correctly performed, ***together with*** the absence of idiosyncratic part answers in the course of the task – these will usually be such that they are clearly at least two orders of magnitude different from the real-life quantity or measure. *Possible examples for this task might be prices/costs in £1000s* **0:** No evidence of checking or consideration of reasonableness of answers – including bland statements to the effect that calculations were checked without any relevant evidence.
		Total 20	

Task 2   Using gas

	Process	Award	on evidence of …			
(a)(i)	Interpreting graph (no gas used) **[A]**	1	**1:**	24 August or any time in range 10 August to 31 August 3rd week in August etc.		
(a)(ii)	Interpreting graph (start of cold season) **[B]**	1	**1:**	October or November (condone an actual date providing month is correct)		
(a)(iii)	Finding coldest month **[C]**	2	**1:** **1:**	January Reason e.g. most of the readings were higher than in any other month or equivalent or heating used more etc. (Dependent on first mark)		
(b)(i)	Calculating cost per quarter at higher rate **[D]**	2	**1:** **1:**	1143×3.675 must seen £42 or £42.00525 (or rounded to nearest 1p) or £40.005 seen this mark dependent on first mark.		
(b)(ii)	Calculating annual cost **[E]**	4	**1:** **2:** Q1 Q2 Q3 Q4 **1:** **1:**	Evidence of use of "$\times$ figs 2676", may be implied by calculations seen **or** x one of the other tariff rates seen *at least twice* (i.e. figs $\times 35$, $\times 2549$, $\times 3675$) Cost for a quarter at lower rate (allow margin of ± 1(p)) (**1:** each correct calculation or [answer] seen, maximum of 2): $[(6326 - 1143$ or $5183) \times 2.676]$ $[(1493 - 1143$ or $350) \times 2.676]$ $[(1301 - 1143$ or $158) \times 2.676]$ $[(6898 - 1143$ or $5755) \times 2.676]$ _____ or _____ $[16018 - 1143]$ or $[14875]$ seen _____ Total cost for 4 quarters (T) = £474.30 $\pm$ 10p this answer range only, no follow through (this in many respects represents credit for overall accuracy) **www 4**	$[= 13869.708]$ $[= 936.6]$ $[= 422.808]$ $[= 15400.38]$	[figs 13870] [figs 937] [figs 423] [figs 15400]

	Process	**Award**	**on evidence of …**
(c)	Comparing present cost with monthly payment scheme **[F]**	**2**	**1:** Will need to follow through on answer to b(ii) on previous page. Calculation of monthly cost "T" $\div$ 12 (=39.53$\pm$1p) or 45 $\times$ 12 (= 540) **1:** Alex correct with comparison seen or statement that his usage may increase
(d)	Comparison of tariffs and recommendation as to the best **[G]**	**6**	**2:** (1: each correct [expression or its answer]) C = [2680 $\times$ figs 5.41485] = [figs 1451.......] + [(16 018 − 2680) or 13338 $\times$ figs 2.6208] = [figs 3495....] **1:** = £494.68 $\pm$2p this correct answer only (www can award above so 2+1 or www 2 for figs 4946 ...) _____ **or** if zero scored above _____ **1:** 16018 seen _____ **2:** "Cost of online scheme" = 0.94 $\times$ "C" or equivalent (or =£465 www) Full follow through or **1:** attempt to find 6% of "C" (finding 6% of "C") **1:** Recommendation based either "total cost" in year for both or "monthly cost" for both consistent with candidates presented figures
Checking	Checking **[H]**	**2**	**2:** Clear evidence of a formal checking procedure being carried out at least once (e.g. by reverse calculation or repeating the calculation providing this is clearly a genuine check as opposed to a mere copying exercise). **1:** Clear recognition and relevant statement at any appropriate point that a particular answer to a calculation is appropriate/expected or inappropriate/not expected _____ **or** _____ ***Three or more*** calculations relevant/valid for the task correctly performed, ***together with*** the absence of idiosyncratic part answers in the course of the task – these will usually be such that they are clearly at least two orders of magnitude different from the real-life quantity or measure. **0:** No evidence of checking or consideration of reasonableness of answers – including bland statements to the effect that calculations were checked without any relevant evidence.
		Total 20	

Task 3   Trampoline

	Process	Award	on evidence of …
(a)	Finding total cost of trampoline and anchor kit **[A]**	2	**2:** (£)380 _____ or _____ **1:** 365 + 15
(b)	Calculating diameter (*D*) **[B]**	2	**2:** 720 cm or 7.2 m _____ or _____ **1:** 360 (cm) and 180 (cm) seen ($\Rightarrow$ 540) or figs. 72
(c)	Showing suitable position for trampoline **[C]**	2	**1:** Use of 0.5 cm seen or implied (on drawing ($\pm$ 2 mm) or in working) **1:** Rectangle with correct region shaded (accept intent) _____ or _____ **1:** A rectangle drawn sensibly the same distance in from the fence and the region between it and rectangle shaded or indicated in some way.
(d)(i)	Selecting height of roll needed **[D]**	2	**2:** Height = 375 mm (£10.99) or 450 mm (£12.99) selected _____ or _____ **1:** 300 or 350 (mm) seen or correct number but missing units or 1 correct and 1 wrong if two answers given
(d)(ii)	Calculating the circumference of the fencing round the safety area (*C*) **[E]**	2	**2:** Circumference (*C*)= $\pi \times$ "*D*" (= 2232/2262/2261.(9 ...)) _____ or _____ **1:** Attempt to use of "2πr" or "π D" (i.e. 2 x π x "number" or π x "number")
	Finding number and cost of log rolls **[F]**	2	**1:** Number of rolls (*N*) = "*C*" $\div$ 180, rounded up to integer value (= 13) **1:** Cost = "*N*" $\times$ cost of roll of selected height (*N* must be the result of a calculation not just emerging from no apparent cause)

	Process	Award	on evidence of …
(d)(iii)	Finding number of bags of bark **[G]**	**4**	**1:** Use of consistent units for depth of bark layer thickness and radius of safety area ($\Rightarrow$ size of numbers 300$\rightarrow$mm, 30$\rightarrow$cm and 0.3$\rightarrow$m with corresponding numbers for the "radius" or "diameter") **2:** Volume = $\pi \times 0.3 \times ("D" \div 2)^2$ (allow inconsistent units) full follow through (i.e. figs: 12.05.. / 12.21 ....) **or** (**1:** correct formula selected) i.e. $\pi \times (number)^2 \times fig\ 3$ **1:** Number and capacity of bags required stated (eg 6 $\times$ 2 m^3 and 1 $\times$ 1 m^3)
	Finding cost of bark **[H]**	**2**	**1:** Cost calculated (full follow through) from above *stated* number of bags. **1:** Comment at any point regarding their selection eg allowing for extra bark required or some left for topping up etc.
Checking	Checking **[I]**	**2**	**2:** Clear evidence of a formal checking procedure being carried out at least once (e.g. by reverse calculation or repeating the calculation providing this is clearly a genuine check as opposed to a mere copying exercise). **1:** Clear recognition and relevant statement at any appropriate point that a particular answer to a calculation is appropriate/expected or inappropriate/not expected _____ **or** _____ ***Three or more*** calculations relevant/valid for the task correctly performed, ***together with*** the absence of idiosyncratic part answers in the course of the task – these will usually be such that they are clearly at least two orders of magnitude different from the real-life quantity or measure. *Possible examples for this task might be prices/costs in £1000s* **0:** No evidence of checking or consideration of reasonableness of answers – including bland statements to the effect that calculations were checked without any relevant evidence.
		Total 20	

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