Mark Scheme (Results)

November 2012

Functional Skills Mathematics
Level 2 (FSM02)

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Guidance for Marking Functional Mathematics Papers

General

- All candidates must receive the same treatment. You must mark the first candidate in exactly the same way as you mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- All the marks on the mark scheme are designed to be awarded. You should always award full marks if deserved, i.e. if the answer matches the mark scheme. You should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.

Applying the Mark Scheme

- The mark scheme has a column for **Process** and a column for **Evidence**. In most questions the majority of marks are awarded for the process the candidate uses to reach an answer. The evidence column shows the most likely examples you will see: if the candidate gives different evidence for the process, you should award the mark(s).
- **Finding 'the answer'**: in written papers, the demand (question) box should always be checked as candidates often write their 'final' answer or decision there. Some questions require the candidate to give a clear statement of the answer or make a decision, in addition to working. These are always clear in the mark scheme.
- If working is **crossed out and still legible**, then it should be marked, as long as it has not been replaced by alternative work.
- If there is a **choice of methods** shown, then marks should be awarded for the 'best' answer.
- A suspected **misread** may still gain process marks.
- It may be appropriate to **ignore subsequent work** (isw) when the candidate's additional work does not change the meaning of their answer. You are less likely to see instances of this in functional mathematics.
- You will often see correct working followed by an incorrect decision, showing that the candidate can calculate but does not understand the demand of the functional question. The mark scheme will make clear how to mark these questions.

- **Transcription** errors occur when the candidate presents a correct answer in working, and writes it incorrectly on the answer line; mark the better answer.
- **Follow through marks** must only be awarded when explicitly allowed in the mark scheme. Where the process uses the candidate's answer from a previous step, this is clearly shown. Speech marks are used to show that previously incorrect numerical work is being followed through, for example '**240**' means **their** 240.
- Marks can usually be awarded where **units** are not shown. Where units, including money, are required this will be stated explicitly. For example, 5(m) or (£)256.4 indicate that the units do not have to be stated for the mark to be awarded.
    - **Correct money notation** indicates that the answer, in money, must have correct notation to gain the mark. This means that money should be shown as £ or p, with the decimal point correct and 2 decimal places if appropriate.
        e.g. if the question working led to £12÷5,
        Mark as correct: £2.40 240p £2.40p
        Mark as incorrect: £2.4 2.40p £240p 2.4 2.40 240
    - Candidates may present their answers or working in many **equivalent** ways. This is denoted **o.e.** in the mark scheme. Repeated addition for multiplication and repeated subtraction for division are common alternative approaches. The mark scheme will specify the minimum required to award these marks.
    - A **range** of answers is often allowed :
        - [12.5,105] is the inclusive closed interval
        - (12.5,105) is the exclusive open interval
    - **Parts of question**s: because most FS questions are unstructured and open, you should be prepared to award marks for answers seen in later parts of a question, even if not explicit in the expected part.
    - Discuss any queries with your Team Leader

Graphs

The mark schemes for most graph questions have this structure:

Process		Evidence
Appropriate graph or chart – (e.g. bar, stick, line graph,)	**1**	1 of
	or	linear scale(s), labels, plotting (2mm tolerance)
	2	2 of
	or	linear scale(s), labels, plotting (2mm tolerance)
	3	all of
		linear scale(s), labels, plotting (2mm tolerance)

The mark scheme will explain what is appropriate for the data being plotted.

A **linear scale** must be linear **in the range where data is plotted**, whether or not it is broken, whether or not 0 is shown, whether or not the scale is shown as broken. Thus a graph that is 'fit for purpose' in that the **data is displayed clearly and values can be read**, will gain credit.

The minimum requirements for **labels** will be given, but you should give credit if a title is given which makes the label obvious.

Plotting must be correct for the candidate's scale. Award the mark for plotting if you can read the values clearly, even if the scale itself is not linear.

The mark schemes for **Data Collection Sheets** refer to **input opportunities** and to **efficient input opportunities**. When a candidate gives an input opportunity, it is likely to be an empty cell in a table, it may be an instruction to 'circle your choice', or it may require writing in the data in words. These become efficient, for example, if there is a well-structured 2-way table, or the input is a tick or a tally rather than a written list.

Section A: Training for a Triathlon

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q1a	I7	Identifies suitable events	1	A	Super sprint **and** Sprint
Q1b	R2	Uses distance conversion	1	B	e.g: 5(km) = 5000(m)
	A4	Process to find total number of lengths	1 or	C	'5000' ÷ 25(=200) **OR**
	A4	Process to find total time	2 or	CD	'200' × ½ (=100) **OR** '200' × 30 ÷ 60(= 100) **OR** 6000 (sec) **OR** [1.6, 1.7](hrs)
	I6	Total time in hours and minutes	3	CDE	1hr 40(min)
Total marks for question			**5**		

Q2a	R1	Starts to process mean	1 or	F	22(mins)32(secs) + 22(mins)25(secs) + 22 (mins)13(secs)(=66(mins)70(secs)) **OR** 22(mins) 21 (secs) × 3(=66(mins) 63(secs)) oe **OR** ± 11, ± 4, ± 8
	A5	Full process to find figures to compare.	2 or	FG	66(mins)70(secs) ÷ 3(=) **OR** 22(mins)23(…)(secs) 22(mins)32(secs) + 22(mins)25(secs) + 22 (mins)13(secs)(=66(mins)70(secs)) **AND** 22(mins) 21 (secs) × 3(=66(mins) 63(secs)) oe **OR** ±(11 + 4 − 8) ÷ 3(=±2.33..)
	I7	Decision from accurate figures	3	FGH	YES and 22 mins 23(…)secs OR YES and 66 mins70 secs AND 66 mins 63 secs OR YES and ±2.3… OR YES and 7 secs extra oe
Q2b	R1	Appropriate graph	1 or	J	One of: Linear scale, clear labels, accurate plotting Minimum label: vertical axis or title ref to km or distance Horizontal axis or key ref to Mar, Apr, May and Paige and Cherry. Plotting tolerance +/- 1 small square.
	R2	Bar chart/ frequency polygon	2 or	JK	Two of: Linear scale, clear labels, accurate plotting
	I6	Presents complete graph	3	JKL	All of: Linear scale, clear labels, accurate plotting
		Total marks for question	**6**		

Q3	R2 R3 A4 I6 A5	Identifies change in BMI Coordinate 2 features Coordinates 3 features Full process for figures to compare. Valid decision from correct figures	1 1 or 2 or 3 or 4	M N NP NPQ NPQR	22 − 20(=2) may be seen in subsequent working 2.5 × 2(=5)(kg) **OR** 7700 × 2.5(=19250) **OR** 7700 ÷ 450(=17.1..) OR 450 × 90(=40500) 7700 × '5'(=38500) **OR** '19250' ÷ 450(=42.7…) **OR** '17.1' × 2.5(=42.7...) **OR** '38500'÷ 450(=85.5..) **OR** '42.7' × 2(=85.5..)(days) **OR** 450 × 90(=40500) and 7700 × '5'(=38500) **OR** '40500' ÷ '7700'÷2(= [2.62,2.63]) **OR** '40500' ÷ '7700'÷2.5(=2.1…) and 22-20(=2) **OR** '40 500' ÷ '7700'(=5.2…) and 2.5 × 2 (= 5) An affirmative statement **and** [85,86] (days) OR 40500 and 38500 (calories) OR [2.62,2.63] (kg) OR 2.1… and 2 BMI OR 5.2… and 5 (kg)
		Total marks for question	**5**		

Section B: Supermarkets

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q4	R2	Process to find cost to travel by own car	1	A	OPTION B: 45 × 260(=117(00)
	R3	Process to find number of litres with hire car	1 or	B	OPTION C: 260 ÷ 13(=20)(litres)
	A4	Process to find petrol cost	2 or	BC	'20' × 145.9(=2918)(p) **OR** '20' × 146(=2920)(p)
	A4	Process to find total cost to hire car using consistent units.	3	BCD	'29.18' + 58.46(=(£)87.64) **OR** '29.20' + 58.46(=(£)87.66)
	I6	Accurate figures to compare	1 or	E	(£)87.64 and (£)117 **OR** (£)87.66 and (£) 117
	I7	Correct decision from correct figures	2	EF	(Option) C
Total marks for question			**6**		

Q5a	A5	Starts to draw net, checks edges match and makes cuboid	1	G	Net with at least 5 faces and not more than one incorrect or inconsistent dimension
	R1	Improves net	1 or	H	Complete net that will join to make a cuboid with all faces adhering to consistent scale Eg: a scale factor of 1:4 applied to all dimensions.
	I6	Complete correct net	2	HJ	Complete net, all faces correct from the correct scale
Q5b	R2	Process to establish the number of boxes along one dimension.	1or	K	e.g. 56÷6(=9) **OR**
	A5	Finds the number of boxes along all three dimensions.	2 or	KL	e.g. 12 and 2 and 2
	I6	Identifies arrangement for 48 or 54 boxes	3	KLM	Yes and 12×1×4=48 OR 12×2×2=48 OR 6×4×2 =48 OR 4×4×3=48 OR 3×9×2=54 OR 6×1×9=54
Total marks for question			**6**		

Q6a	A4 I7	Finds how much he can save Makes correct decision	1or 2	N NP	e.g.: 2280 ÷ 4 (=570) **OR** 0.25 × 2280(=570) **OR** 500 × 4(=2000) 570 **and** YES **OR** 2000 **and** Yes
Q6b	R1 A4	Process to find discount Correct answer	1or 2	Q QR	0.05 × 125 (=6.25) **OR** 0.95 × 125 (=118.75) **OR** complete build up method £118.75 Correct money notation
		Total marks for question	**4**		

Section C: Garden improvements

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q7a	R2	Starts to substitute or reverse substitute	1 or	A	eg:1000×3.14=3140 **OR** $3^2 = 9$ **OR** 16000 ÷ 1000 = 16 **OR** 16000 ÷ 3.14 = 5095.54 or better
	A4	Completes substitution or reverse process	2 or	AB	1000 × 3.14×3^2 ×0.75(=21195) **OR** complete change of subject of formula
	I6	Finds figure to compare	3	ABC	[20250, 21206] or value for r (=2.6065…) or h (=0.56617…)
	I7	Compares Titan with 'pool volume'	1	D	No ft their answer provided B awarded
Q7b	R3	Starts to process the problem	1 or	E	e.g. 80 × [28,30] (= [2240,2400]) **OR** 282 600 ÷ 60 (= 4710) **OR** 60×[28,30](=[1680,1800])
	A4	Process to find figures to compare	2 or	EF	282 600÷[2240,2400] (=[117,126]) (cm^2 per fish) **OR** 4710÷[28,30] (=[157,168]) number of fish **OR** [2240, 2400] × 60 (=[134 400, 144 000]) surface area needed **OR** 282 600÷[1680,1800] (=[157,168]) number of fish from SA **OR** 80 × [28,30] (= [2240,2400]) **and** 282 600 ÷ 60 (= 4710)
	I7	Evidence and correct decision	3	EFG	YES **and** [117,126] **OR** [157,168] **OR** [134 400, 144 000] **OR** 4710 and [2240,2400]
	A5	Provides a suitable check	1	H	e.g. reverse check 4710 × 60 = 282 600 **OR** adopts a different route through the problem
		Total marks for question	**8**		

Q8	R1	Begins process	1 or	J	Writes down a product which is part of a trial and improvement process with answer in the range [16,19] **OR** Considers number of skips required 16 ÷ 3(=5.33…) **OR** 16÷4.6(= 3.47…)**OR** 16÷6(=2.6….) **OR** Considers cost per m^3 72÷3(=24) **OR** 96÷4.6(=20.86…) **OR** 120÷6(=20)	
	A5	Full process to cost at least $16m^3$ from their skips or costs all three per m^3	2	JK	Eg:4×96(=384) from [16,19] **OR** Process to find cost of $1m^3$ of each skip type 72÷3(=24) and 96÷4.6(20.8…) and 120÷6(=20)	
	I6	Correct answer	1	L	2 large builders and 1 small builders	
		Total marks for question	**3**			Correct a

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q9	R2	Starts process to find area by finding missing length	1	M	6.5 – 1.85(=4.65) **OR** 3.25 – 1.75(=1.5) May be shown on diagram or in subsequent working
	R3	Process to find area of 1 rectangle	1 or	N	3.25 × 1.85(=6.0125) **OR** **'**4.65' × 1.75(=8.1375) **OR** 6.5 × 1.75(=11.375) **OR** 1.85 **×** **'**1.5'(=2.775) **OR** 1.75 ×1.85(=3.2375) **OR** 3.25 × 6.5(=21.125) **OR** '1.5' × '4.65'(=6.975) May be shown on diagram
	A4	Full process to find composite area	2	NP	'6.0125' + '8.1375'(=14.15) **OR** '11.375' + '2.775'(=14.15) **OR** '8.1375' + '2.775' + '3.2375'(=14.15) **OR** '21.125' – '6.975'(=14.15) May be shown on diagram
	A4 I6	Process to find price Finds price	1 or 2	Q QR	'14.15' × 40(=566) N must have been awarded (£)566
		Total marks for question	**5**		

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