Mark Scheme (Results)

May 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- If working is **crossed out and still legible**, then it should be marked, as long as it has not been replaced by alternative work.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 questions:** 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 or	1 of linear scale(s), labels, plotting (2mm tolerance)
	2 or	2 of 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: Jewellery

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q1a	A1	Process to find number of pairs of earrings that could be made from either large beads or small beads or starts to find number of large or small beads needed	1 or	A	15 ÷ 2(=7.5) **OR** 50 ÷ 8(=6.25) **OR** builds up method e.g. bead ratios (4,16), (6,24), (8,32) etc e.g. repeated subtraction 15,13,11, 9 etc e.g. repeated subtraction 50−42−36, 28 etc
	I2	Finds correct number of pairs of earrings	2	AB	6 (pairs of earrings)
Q1b	R2	Starts to find cost of making 20 necklaces or cost per necklace	1 or	C	6.25 × 20(=125) **OR** 94.60 ÷ 20(=4.73)
	A1	Full process to find total costs for 20 necklaces or for 1 necklace	2	CD	'125' + 94.6(=219.6) **OR** '125'+(1.4×94.6) (=257.44) **OR** '4.73' + 6.25(=10.98) **OR** 1.4 × '4.73' + 6.25 (=12.87)
	A1	Process for 40% of 'cost'	1 or	E	0.4 × '219.6'(=87.84) **OR** 0.4 × '10.98'(=4.392) **OR** 1.4 × '219.6'(=307.44) **OR** 1.4 × '10.98'(=15.372)
	I1	Finds correct selling price per necklace or for 20 necklaces	2	EF	£[15.37,15.40] **OR** £ [307.44, 307.50] **OR** condone £[12.87,12.88] **OR** £257.44 correct money notation
Q1c	R1	Converts between inches and cm	1 or	G	23 × 2.54(=58.4..) **OR** 60 ÷ 2.54(=23.6..) **OR** 40 ÷ 2.54(=15.7..) **OR** 50 ÷ 2.54(=19.6..) **OR** 100 ÷ 2.54(=39.3..)**OR** 20 × 2.54 = 50.8 **OR** 30 × 2.54 = 76.2
	I2	Chooses correct chain	2	GH	60 (cm chain) **AND** [57.5,58.4] **OR** 60 (cm chain) **AND** [23.6, 24]
		Total marks for question	8		

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q2	R1	Begins graph or chart	1 or	J	1 of: suitable labels, linear scale, plotting (2mm tolerance) must have website shop market autumn winter sales or £ all 6 correctly plotted – line, bar, point, stick, scatter accepted
	R2	Improves graph or chart	2 or	JK	2 of: suitable labels, linear scale, plotting (2mm tolerance)
	I1	Accurate graph or chart	3	JKL	All of: suitable labels, linear scale, plotting (2mm tolerance)
Total marks for question			**3**		
Q3	R1	Begins to consider time in places	1 or	M	Shows start and finish time for at least 2 of Wick, Bath, jewellery making at home (elapsed time correct) NB work at home could be split
	A1	Considers time in all places	2	MN	Shows start and finish time for all 3 places (elapsed time correct **AND** starts no earlier than 8.30) **AND** meets business advisor in Wick at 11.30 or at 11.25 but finishes at 12
	R2	Begins to consider travelling time	1 or	P	Allows correct travelling time for at least 2 journeys **OR** Allows correct travelling time for at least 1 journey, places lunch break and starts and finishes at home.
	A2	Considers travelling time	2	PQ	Allows correct travelling time for at least 3 journeys **AND** places lunch break of at least 45 minutes or starts and finishes at home
	I1	Clearly presented schedule	1	R	Sequentially ordered schedule showing at least arrival time in all places, has a lunch break, finished including jewellery making at home by 4 pm
Total marks for question			**5**		

Section B: Activity centre

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q4	R1	Considers criteria	1 or	A	3 of: 6 different activities, 2 per day at least 2 are water sports, no more than 3 high effort
	A1	Develops solution	2	AB	All of 6 different activities, 2 per day at least 2 are water sports, no more than 1 high effort per day
	A2	Works with cost constraint	1 or	C	their cost is correctly totalled **OR** actual cost for their selections is ≤£180
	I1	Meets cost constraint	2	CD	actual cost is correctly totalled and total ≤£180
		Total marks for question	**4**		

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q5a	R1	Process to calculate mean, or find figures to compare, or work with differences	1 or	E	$(53+61+57+52) \div 4$ (=55.75) **OR** $53+61+57+52$(=223) **AND** 4×57(=228) **OR** $-4 + 4 + 0 + -5$(=−5) or $4 + -4 + 0 + 5$(=5)
	A1	Finds mean, or figures to compare or sum of differences	2	EF	55.75 **OR** 223 **AND** 228 **OR** sum of differences = −5 or 5
	I2	Makes a valid decision and justifies it provided mark E has been awarded and there is a figure to compare in F	1	G	Chooses either Tess or Erin but **must** give a reason for choice e.g. Tess because her mean score is higher than Erin's **OR** e.g. Erin because Tess's 57 might be from three lower scores and 1 very high one such as 51,51,51, 75
Q5b	R1	Begins to calculate points score	1 or	H	1×-2(= −2) or 2×-3(=−6) or 6×-3(=−18) or 4×2(=8) **OR** Works from 5 points.
	A1	Correct points scores calculated or correct total loss for each person	2	HJ	−3 **AND** −5 **OR** Total loss 8 **AND** total loss 10
	I2	Decision (ft) provided H has been awarded **AND** 'total points score' has at least one negative or 'total loss' has at least one > 5	1	K	e.g Len (ft) provided H has been awarded **AND** 'total points score' has at least one negative or 'total loss' has at least one > 5
Total marks for question			**6**		
Q6	I2	Writes one comparative statement	1	L	e.g. 1 of: total or average profit in 2011 is less than total or average profit in 2010 profit in 2010 was £20000 but in 2011 was only £19000 in both years profits were greatest in Jul – September in both years profit was least in Jan – Mar in both years profits rose in the 1st three quarters but dropped in the 4th quarter Jan – Mar is the only quarter where more profit was made in 2011 than 2010
Total marks for question			**1**		

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q7	A1	Uses consistent units	1	M	1240 or 890 or 0.5 or 0.25 or 24 or 24.8 or 17 or 17.8 or 18 seen
	R2	Process to find number of tiles along a length or works with area	1 or	N	'1240'÷50(=24.8) or '890'÷50(=17.8) o.e. **OR** 12.4×8.9(=110.36) or 50×50(=2500) o.e.
	R3	Process to find number of tiles needed or area covered by a pack of tiles	2	NP	'25'× '18'(=450) **OR** '110.36'÷ '0.25'(=441.44) o.e. **OR** '0.25'×20(=5) o.e. **OR** '460'× 0.25(=115)
	A1	Works with number of packs	1 or	Q	'450'÷20(=22.5) **OR** '441.44'÷20(=22.07…) **OR** 20×23(=460) **OR** 23× '5'(=115) o.e. (the area you can cover) **OR** '110.36'÷ '5'(=22.07…)
	I2	Valid decision and accurate figures	2	QR	yes **AND** 22.5 (boxes) **OR** yes **AND** [22.07,22.2] (boxes) **OR** yes **AND** 450 **AND** 460 (tiles) **OR** yes **AND** [110.3, 111] **AND** 115 (m²) or consistently in cm² yes **AND [** 441.4,442] **AND** 460
Total marks for question			**5**		

Section C: Breakfast food company

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q8a	R1	Begins to substitute in formula or begins reverse calculation	1 or	A	Multiplies two of $0.785 \times 6^2 \times 3.5 (=98.91)$ **OR** $100 \div 0.785 (=133.33..)$ **OR** $100 \div 6^2 (=2.77….)$ **OR** $100 \div 3.5 (=28.57..)$
	A1	Full process for substitution or Full process for figures to compare	2 or	AB	$0.785 \times 6^2 \times 3.5 (=98.91)$ **OR** $100 \div (0.785 \times 6^2)$ ($=[3.53,3.54]$) **OR** $100 \div (0.785 \times 3.5)$ ($=[36.39,36.4]$) **OR** $100 \div (6^2 \times 3.5)$ ($=[0.79,0.8]$)
	I2	Valid decision and accurate figures	3	ABC	No **AND** 98.91 **OR** No **AND** [3.53, 3.54] **OR** No **AND** [36.39, 36.4] **OR** No **AND** [0.79, 0.8]
Q8b	R1	Begins to produce data collection sheet	1 or	D	input opportunities **AND** headings for at least 2 of: gender, age, like/don't like product **OR** Accept questionnaire with at least 2 of: gender types, age groups, like/don't like product
	R2	Improves data collection sheet	2 or	DE	input opportunities **AND** all of: gender types, age groups, like/don't like product but **not** an efficient 2 way table **OR** input opportunities **AND** two of: gender types, age groups, like/don't like product in an efficient 2 way table **OR** Accept questionnaire with all of: gender types, age groups, like/don't like product
	I1	Fully correct efficient data collection sheet	3	DEF	data collection sheet deals with all categories in a 2 way table **AND** with **efficient** input opportunities.
Total marks for question			**6**		

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q9a	R3	Uses percentage	1	G	0.15 × 4986000(=747900) **OR** 0.85 × 4986000(=4238100)
	A1	Uses fraction	1	H	7635000 ÷ 3(=2545000) **OR** 7635000 ÷ 3 × 2(=5090000)
	A1	Adds discounts or subtracts a discount from 3 million or process to calculate max allowable spend or actual discounted spend	1or	J	'747900' + '2545000'(=3292900) **OR** 3000000 − '747900'(=2252100) **OR** 3000000 − 2545000(=455000) **OR** 7635000 + 4986000 – 3000000(=9621000) **OR** '4238100' + '5090000' (=9328100)
	I1	Decision from accurate figures	2	JK	yes **AND** (£)3292900 **OR** yes **AND** (£)2252100 **AND** (£)2545000 **OR** yes **AND** (£)455000 **AND** (£)747900 **OR** yes **AND** (£)292900 more than you need **OR** yes **AND** (£)9621000 **AND** (£)9328100
Q9b	A2	Shows a reverse calculation or estimation check of a part of the discount	1	L	e.g. to check total discount 3292900 − 747900 or 3292900−2545000 to check percentage discount 747900÷0.15 to check fraction discount 2545000×3 Estimation check eg >2.5m + >0.5m is > 3m Note: method used to check must not be a repeat of a previous calculation
Total marks for question			**5**		

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q10a	R1	Begins to use isometric grid	1 or	M	Uses isometric grid correctly to draw any one seen face correctly **OR** to draw any cuboid
	I1	Produces a fully correct drawing	2	MN	Isometric drawing of correct size in any orientation
Q10b	R2	Process to calculate cost for newspaper or billboards	1 or	P	18000 ×'30'(=540000) **OR** 7500 × 70(=525000)
	A1	Process to find figures to compare	2 or	PQ	18000 × '30'(=540000) **AND** 7500 × 70(=525000) **OR** '540000' ÷ 7500(=72) **OR** '540000' ÷ 70(=7714.28..)
	I2	Decision based on accurate figures	3	PQR	Yes **AND** (£)540000 **AND** (£)525000 **OR** Yes **AND** 72 (billboards) **OR** Yes **AND** (£) [7714, 7715]
Total marks for question			**5**		