Mark Scheme (Results)

February 2013

Functional Skills Mathematics
Level 2 (FSM02)

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- If working is **crossed out and still legible**, then it should be marked, as long as it has not been replaced by alternative work.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** **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: Dog Kennels

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q1a	R2	Full process for amount spent or to find figures to compare	1 or	A	$-3754 - 829 - 420(=-5003)$ **OR** $3754 + 829 + 420(=5003)$ **OR** $5000 - 3754(=1246)$ **AND** $829 + 420(=1249)$ **OR** $5000 - 829 - 420(=3751)$
	I7	Valid decision and accurate figures	2	AB	Yes **AND** $\pm$ (£)5003 **OR** Yes **AND** (£)3 over **OR** Yes **AND** (£)1246 **AND** (£)1249 **OR** Yes **AND** (£) 3751 **OR**
Q1b	R1	Begins to consider constraints	1 or	C	Correctly books 2 dogs, at least one of which is Butch or Mitzi or Peggy with no double bookings or extra nights. **OR** Correctly books at least 3 of Fido, Honey, Capo, Rover
	A5	Checks & improves solution	2 or	CD	Correctly books 4 dogs, at least one of which is Butch or Mitzi or Peggy with no double bookings or extra nights.
	I6	Fully correct optimal solution considering all criteria	3	CDE	Fully correct optimal solution (15 nights booked) with correct nights and correct number of nights. See solutions at the end. Allow dogs to move between kennels
Total marks for question			**5**		

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q2a	R2	Process to find difference in cost or uses percentage	1 or	F	16.95 − 14.5(=2.45) OR 0.15 × 14.5(=2.175) oe Condone use of 0.15 × 16.95 for this mark only
	A4	Process to find figures to compare	2 or	FG	1.15 × 14.5(=16.675) oe OR 16.95 − 14.5(=2.45) and 0.15 × 14.5(=2.175) OR (16.95 − 14.5)÷ 14.5 (=0.168…) OR 16.95 ÷ 14.5(=1.168…)
	I7	Valid decision and accurate figures	3	FGH	Yes and (£) [16.6,16.7] OR Yes and (£) 2.45and(£) [2.17, 2.18] OR Yes and [16, 17] (%)
Q2b	R3	Process to find perimeter	1	J	70 + 40 + 70 + 40(=220) May use converted dimensions
	A4	Uses formula	1 or	K	3 ×'220'÷ 10(=66) OR 50 × 10 ÷ 3(=166.66…)
	I7	Valid decision and accurate figures	2	KL	No and 66 OR No and 220 and [166, 167] OR He needs another 16 m
Total marks for question			6		

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q3	R1	Uses consistent units	1	M	e.g. [22 , 27.5] (kg) or [2.4,3] (kg) or 180 000 (g)
	R2	Process to find food available or days of food required	1	N	12 × 15(=180) oe **OR** 6 (days of food needed)
	A4	Process to find food needed per day or food available per day or food for 6 days for 1 dog	1 or	P	55 ×[400,500] (=[22000, 27500]) oe **OR** 12 × '15 000' ÷ '6'(=30 000) **OR** '180 000' ÷ 55 (=3272.72…) **OR** '6' ×[400,500] (=[2400,3000]) **OR**
	A4	Process to calculate days food will last or total amount of food required or figures to compare	2 or	PQ	'180'÷ '[22,27.5]' (=[8.18, 6.54….]) **OR** 55 ×[400,500] (=[22000, 27500]) **and** 12 × '15 000' ÷ '6'(=30 000) **OR** '180 000' ÷ '6' ÷ 55 (=545.4545…) **OR** '6' × '[22,27.5]' (=[132, 165]) **OR** 55 × '[2.4,3]' (=[132, 165]) **OR** '180 000' ÷ 55 (=3272.72…) **and** '6' ×[400,500] (=[2400,3000])
	I7	Valid decision and accurate figures	3	PQR	Yes **and** 6≤ days ≤ 8.2 available **and** 6 days needed **OR** Yes **and** [22 000,27 500] **and** 30 000 (g for all dogs for 1 day)**OR** Yes **and** [545,546] (g per day per dog available) **OR** Yes **and** [132, 165] (kg) **and** 180 (kg)**OR** Yes **and** [3272,3273] **and** [2400,3000] (g per dog for 6 days) **Throughout the problem candidates may work in grams or kg. The final answer must be in consistent units**
Total marks for question			**5**		

Section B: A New Bathroom

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q4	A4	Uses consistent units	1	A	0.33 (m) **OR** 2200(mm) **OR** 2500 (mm) **OR** 220(cm) **and** 33 (cm) **OR** 250(cm) **and** 33 (cm)
	R2	Process to find number of tiles along a length or works with area	1 or	B	e.g. '2200'÷ 330(=6.6...) **OR** e.g. '2500'÷ 250(=10) **OR** 2.2 × 2.5(=5.5) **OR** '0.33' × '0.25'(=0.0825)
	A4	Process to calculate number of tiles needed or area the available tiles cover	2	BC	e.g.'7'× '10'(=70) **OR** '5.5'÷ '0.0825' (=66.66..) **OR** '0.0825' × 72(=5.9400) **OR** '5.5'÷ 72(=0.07638…)
	I6	Process to check if there are sufficient tiles	1 or	D	8 × 9(=72) **OR** '70'÷ 8(=8.75) **OR** '70'÷ 9(=7.77..) **OR** '66.66..'÷ 8(=8.33..)**OR** '66.66..'÷ 9(=7.4..)
	I7	Valid decision and correct figures	2	DE	Yes **and** 72 **and** 70 **OR** Yes **and** 8.75 **OR** Yes **and** 7.7...
		Total marks for question	**5**		

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q5	R1	Considers space for bath	1 or	F	Rectangle with **two** of: correct length (17 squares) correct width (7 squares) in a corner length:width in ratio 17:7
	I6	Fully correct bath solution	2	FG	Rectangle with **all** of: correct length (17 squares) correct width (7 squares) in a corner
	R1	Considers space for basin	1 or	H	Rectangle with **two** of: correct length (6 squares) correct width (5 squares) at least 60 cm (6 squares) from the toilet **OR** Rectangle with length:width in ratio 6:5 **and** at least 60 cm from toilet **and consistently** uses same scale as for bath
	A5	Fully correct checked basin solution	2	HJ	Rectangle with **all** of: correct length (6 squares) correct width (5 squares) at least 60 cm (6 squares) from toilet
Total marks for question			**4**		

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q6a	R2	Starts to calculate number of boxes needed or cost per box at Tile Warehouse	1 or	K	¾ × 16(=12) **OR** ¾ × 12.8(=9.6) **OR** Uses a build-up method for ratio 3:1, 6:2, 9:3, 12:4
	A4	Complete process for cost for Tile Warehouse	2	KL	'12'× 12.8(=153.6) **OR** 16 × 9.6(=153.6) **OR** 0.75 × 12.8(=9.6) **and** evidence that 16 is a multiple of 4
	A4	Full process for cost at Decor Styles or process for costs to compare for 1 box of tiles	1 or	M	19.5 ÷ 2 × 16(=156) **OR** 19.5 ÷ 2(=9.75) **and** 0.75 × 12.8(=9.6)
	I7	Valid decision and accurate figures to compare	2	MN	Chooses Tile Warehouse **and** (£)153.6(0) **and** (£)156 **OR** Chooses Tile Warehouse **and** (£)9.6(0) **and** evidence that 16 is a multiple of 4 **and** (£)9.75
Q6b	R2	Process for cost without VAT or begins to reverse calculate or VAT for daily cost	1 or	P	6 × 340(=2040) **OR** 2500 ÷ 1.2(=[2083, 2084]) **OR** 0.2 × 340(=68) o.e
	A4	Works with percentage or continues reverse process	2 or	PQ	0.2 ×'2040'(=408) **OR** 1.2 ×'2040'(=2448) **OR** ['2083, 2084']÷ 6(=[347, 348]) **OR** 6 × 340(=2040) **AND** 2500 ÷ 1.2(=[2083, 2084])
	I7	Valid decision and accurate figures	3	PQR	Yes **and** (£) 2448 **OR** Yes **and** (£)[347, 348] **OR** Yes **and** 2040 **and** [2083, 2084]
Total marks for question			**7**		

Section C: The Charity

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q7	R3	Begins to process time in locations	1 or	A	Shows start and finish time for at least **2** of: Office, Community centre, Homeless shelter, Urban gardens (elapsed time correct) **OR** Consistently combines time in locations and travel time **and** shows start and finish time (elapsed time correct) for at least **2** of these
	A4	Correct time in all locations	2	AB	Shows start and finish time for **all** of Office, Community centre, Homeless shelter, Urban gardens (elapsed time correct) **AND** starts no earlier than 9 am) **AND** in Community centre by 2 pm, **OR** Consistently combines time in locations and travel time **and** shows start and finish time (elapsed time correct) for **all** of these **AND** starts no earlier than 9 am) **AND** in Community centre by 2 pm.
	R2	Begins to process travelling time	1 or	C	Correct travelling time for at least **one** journey
	A5	Correct travelling time	2	CD	Correct travelling time for **all** journeys
	I6	Clearly presented schedule	1	E	Sequentially ordered schedule showing at least arrival time in all places, has a lunch break of between 30 and 45 minutes, finished at last location by 6 pm
					See solution examples at the end of this mark scheme
		Total marks for question	**5**		

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q8a	I6	Makes one acceptable statement	1 or	F	**Acceptable statements include** **e.g.** Money raised for projects overall has increased in (Feb) 2012 **OR** In both years more money was raised for projects in Africa than in other locations **OR** In both years least money was raised for projects in America **OR** Money raised for projects in Europe has increased in (Feb) 2012 **OR** Money raised for projects in Asia has increased in (Feb) 2012 **OR** Money raised for projects in Africa has increased in (Feb) 2012 **OR** Money raised for projects in America has decreased in (Feb) 2012
	I6	Makes two acceptable statements	2	FG	See examples above
Q8b	R1	Begins to process suitable graph or chart	1 or	H	**One** of: linear scale, plotting, labelling
	A4	Improves solution	2 or	HJ	**Two** of: linear scale, plotting, labelling
	I6	Fully correct graph or chart	3	HJK	**All** of: linear scale, plotting, labelling (± 2mm tolerance on plotting) Minimum acceptable labelling horizontal axis or key: reference to Europe, Asia, Africa, America, Feb 11, Feb 12 Minimum acceptable labelling vertical axis or in title: money raised or £
Total marks for question			**5**		

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q9a	R1	Checks average amount for 2010 is 1088 or begins to find average amounts in other years or uses 2010 average and scales up for 2011 or 2012	1 or	L	$41344 \div 38$ **OR** $179285 \div 100 (=1792.85)$ **OR** $460225 \div 201 (=2289.6..)$ **OR** $1088 \times 100 (=108800)$ **OR** $1088 \times 201 (=218688)$ **OR** $180000 \div 100 (=1800)$ **OR** $460000 \div 200 (=2300)$
	A4	Process to find figures to compare	2 or	LM	$179285 \div 100 (=1792.85)$ **and** $460225 \div 201 (=2289.6..)$ **OR** $179285 \div 100 (=1792.85)$ **and** '$1792.85 \times 201 (=360362.85)$ **OR** $180000 \div 100 (=1800)$ **and** $460000 \div 200 (=2300)$
	I7	Valid decision and accurate figures	3	LMN	Yes **and** [1792,1793] **and** [2289,2290] **OR** Yes **and** other accurate figures to compare perhaps from use of scaling rather than averages
Q9b	R1	Process to convert between pounds & rupees	1 or	P	$720 \times 87.94 (=63316.8)$ **OR** $65000 \div 87.94 (=739.14…)$
	I7	Valid decision and accurate figures	2	PQ	No **and** [63310, 63320] **or** 63360 No **and** [738, 740]
	A5	Checks solution	1	R	Reverses check e.g.[63310, 63320]$\div 720 (=87.94)$ **OR** uses different method
Total marks for question			**6**		