

Mark Scheme (Results)

May 2013

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- If working is **crossed out and still legible**, then it should be marked, as long as it has not been replaced by alternative work.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 $£12 \div 5$,
 - 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

Appropriate graph or chart –
(e.g. bar, stick, line graph,)

1
or

Evidence

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: Cupcake business

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q1(a)	R2	Starts to use ratio	1 or	A	$220 \div 24 (=9\dots)$ (g for 1 cake) OR '3000' $\div 220 (=13.6\dots)$ (batches from 3 kg flour) OR $400 \div 24 (=16.6\dots)$ (batches needed for 400 cakes) OR Starts build up method, at least 3 shown
	A4	Completes process to find figures to compare	2 or	AB	'9....' $\times 400$ OR '3000' \div '9....' 9 (= [327.5, 333.3]) OR '13.6..' $\times 24 (=326.4)$ OR $13 \times 24 (=312)$ OR '16.6..' $\times 220 (= [3650, 3700])$ or $17 \times 220 (=3740)$ OR Complete build up method e.g. 24(cakes) – 200(g) ... 120 (cakes) – 1000(g); 360 (cakes) – 3000(g) '3000' $\div 220 (=13.6\dots)$ (batches from 3 kg flour) AND $400 \div 24 (=16.6\dots)$ (batches needed for 400 cakes)
	I6	Finds accurate figures to compare	3	ABC	3520 or 3600, or [3650, 3700] or 3740 (in g or in kg), OR [327, 333] (cakes) or 326 (cakes) OR 312 (cakes) OR 13(.6) AND 16.6 or 17 (batches)
	I7	Draws conclusion ft their figures provided A and B scored	1	D	E.g. No ft their figures provided A and B scored 3 (kg) makes 328 cakes not 400 OR 67 cakes short

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q1(b)	R3	Works with number of cakes	1 or	E	$4 \times 4 (\times 1)$ OR $8 \times 2 (\times 1)$ OR $1 \times 16 (\times 1)$ OR $2 \times 2 \times 4$ OR 'number used for width or length' $\times 6.5$ (=13 or 26 or 52 or 104) OR 'number used for height' $\times 3.5$ (= 7 or 14) Numbers could be implied by dimensions or seen as a diagram with cakes clearly shown
	A4	Finds at least one dimension	2 or	EF	13 or 26 or 52 or 104 OR 7 or 14
	I6	3D sketch or net with valid dimensions	3	EFG	3D sketch or net with dimensions e.g. $26(\text{cm}) \times 26(\text{cm}) \times 3.5(\text{cm})$ or $52(\text{cm}) \times 13(\text{cm}) \times 3.5(\text{cm})$ or $104(\text{cm}) \times 6.5(\text{cm}) \times 3.5(\text{cm})$ or $26(\text{cm}) \times 13(\text{cm}) \times 7(\text{cm})$ or $13(\text{cm}) \times 13(\text{cm}) \times 14(\text{cm})$ or $52(\text{cm}) \times 6.5(\text{cm}) \times 7(\text{cm})$ or $26(\text{cm}) \times 14(\text{cm}) \times 3.5(\text{cm})$ Allow responses where extra space is clearly justified for cakes
Total marks for question			7		

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q2(a)	R1	Starts graph - chooses an appropriate graph type: Bar chart(s), line graph(s), etc. Scatter graph NOT suitable	1 or	H	one of : linear scale, clear labels, accurate plotting (± 2 mm) of points or bars Labels : Need Months on one axis and minimum of Profits or Money or (£) on other axis or title and key to differentiate between 2011 and 2012
	A4	Develops graph	2 or	HJ	two of : linear scale, clear labels, accurate plotting (± 2 mm) of points or bars
	I6	Completes graph	3	HJK	All of : linear scale, clear labels, accurate plotting (± 2 mm) of points or bars
Q2(b)	I7	Makes one valid comparative statement	1	L	E.g. Total profits for 2012 greater than total profits for 2011 (£14500 and £14150 or difference of £350 may be seen) Average profits for 2012 greater than average profits for 2011 Range for 2012 greater than range for 2011 Profits were greatest in Oct-Dec in both years Profits were least in Jan-Mar in 2011 but least in Apr-Jun in 2012 Profits were greater in all quarters in 2012 apart from Apr-Jun Profits in 2011 increased every month whereas in 2012 they decreased from quarter 1 to quarter 2 but then increased
Total marks for question			4		

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q3	R2	Starts to work with percentages	1 or	M	26×0.75 oe (=19.5)
	A4	Finds discounted price	2	MN	26×0.25 oe (=6.5) OR $26 - '19.5'$ (=6.5)
	R2	Starts to find profit with offer or in a month	1 or	P	$600 \times ('6.5' - 4.8)$ (=1020) OR $600 \times ('19.5' - 4.8)$ (=8820) OR $50 \times (26 - 4.8)$ (=1060) OR $600 \times '6.5'$ (=3900) AND 50×26 (=1300) OR 600×4.8 (=2880) AND 50×4.8 (=240)
	A4	Complete process to find figures to compare (profit with offer and in a month or number of sales needed)	2 or	PQ	$600 \times ('6.5' - 4.8)$ (=1020) AND $50 \times (26 - 4.8)$ (=1060) OR ' $1060' \div ('6.5' - 4.8)$ (=623.5..)
	I6	Correct decision with accurate figures	3	PQR	E.g. No and (£)1020 AND (£)1060 or (£)40 less OR No and [623, 624] (boxes) OR Didn't make as much profit and (£)1020 AND (£)1060 or (£)40 less
Total marks for question			5		

Section B: Cinema

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q4	R2	Works out a cost for tickets for 2 adults and 4 children or starts to subtract costs from budget	1 or	A	$2 \times 8.9 + 4 \times 7.2 (=46.6)$ OR $30 + 2 \times 7.2 (=44.4)$ OR $2 \times 6.9 + 4 \times 5.7 (=36.6)$ OR $24 + 2 \times 5.7 (=35.4)$ OR $30 + 2 \times 5.7 (=41.4)$ OR E.g. $50 - (30 + 2 \times 7.2) (=5.6)$ OR $50 - (2 \times 8.9 + 4 \times 7.2)(=3.4)$
	A4	Uses process for cost of glasses and tickets or finds cost of tickets alone	2 or	AB	E.g. $2 \times 8.9 + 4 \times 7.2 + 6 (=52.6)$ OR $30 + 2 \times 7.2 + 6 (=50.4)$ OR $50 - (2 \times 8.9 + 4 \times 7.2) - 6 (= -2.6)$ OR $50 - (30 + 2 \times 7.2) - 6 (= -0.4)$ OR $(£)46.6(0)$ OR $(£)44.4(0)$
	I7	Correct conclusion with minimum cost	3	ABC	E.g. No with $(£)50.4(0)$ or 40(p) or $(£)0.4(0)$ OR they can't afford it with $(£)50.4(0)$ or 40(p) or $(£)0.4(0)$ OR 40(p) too much
Total marks for question			3		

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q5	R3	Works with the time for 1 film	1 or	D	1 hour 44 (mins) or 2 hours 22 (mins) OR 19:59 or 19:52
	A4	Works with time for 2 films or two showings.	2 or	DE	1 hour 44 (mins) or 19:59 AND 2 hours 22 (mins) or 19:52 OR 20:07 or later OR 20:14 or later
	A5	Incorporates gaps	3 or	DEF	S1/DS: [20:14, 21:16] AND S2/ MM): [20:07, 20:38]
	I6	Fully correct schedule	4	DEFG	S1/DS: [20:14, 21:16] AND S2/MM: [20:07, 20:38] AND Films must start at least 15 minutes apart
Total marks for question			4		

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q6(a)	R2	Works with fraction or number of tickets	1 or	H	$7.8 \div 3 (=2.6)$ OR $290 \div 120(=2.416..)$ OR $120 \times 7.8 (=936)$ OR $7.8 \times 0.33 (=2.5...)$
	A4	Completes process	2 or	HJ	$120 \times '2.6' (=312)$ OR $290 \div '2.6' (=111.538)$ OR 111 tickets OR $7.8 \div 3 (=2.6)$ AND $290 \div 120(=2.416..)$ OR $7.8 \times 0.33 (=2.5..)$ AND $290 \div 120(=2.416..)$ OR $'2.416..' \times 3(=7.25)$ OR $120 \times 7.8 \div 3 (=312)$
	I6	Correct figures	3	HJK	(£)312 OR (£)308.88 OR 112 (tickets) OR 2.6 and [2.41, 2.42] OR 2.5 and [2.41, 2.42] OR (£)7.25
	I7	Decision ft if mark J awarded	1	L	Decision ft provided mark J is awarded E.g. Yes and (£)312 OR Yes as needs to sell a minimum of 112 (tickets) OR (£)22 more raised OR 8 tickets more sold

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q6(b)	R2	Works with proportion	1 or	M	$120 \times 125 (=15000)$ OR $750 \div 125 (=6)$ OR $125 \times 6 (=750)$
	A4	Completes proportion calculation	2 or	MN	'15000' \div 750 OR $120 \div$ '6' OR Build up method e.g. 60 (people) = 7500 = 10 (bottles)
	I6	Correct answer	3	MNP	20 (bottles)
Q6(c)	R1	Process to express probability or chance	1 or	Q	Notation may not be correct: e.g. 5 out of 160 or 1 in 32 or 5 : 160 or 5 to 155 OR 3% or 0.03
	I6	Correct probability	2	QR	$\frac{5}{160}$ OR $\frac{1}{32}$ oe OR 3.125% OR 0.03125
Total marks for question			9		

Section C: Healthy living

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q7a	R1	Starts to add times or subtract from 5 hours	1 or	A	At least 4 times added OR At least 4 times subtracted from 5 hours
	I7	Reaches a conclusion based on correct figures	2	AB	E.g. Meets target with 10 (mins) over OR Yes and 310 (mins) and 300 minutes OR Yes and 5h 10 (mins) or 5.16... hours

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q7b	R2	Works with number of lengths completed or needed	1 or	C	$(94 + 83 + 79 + 68) \div 4 (=81)$ OR $2 \times 1000 \div 25 (=80)$ OR $94 \times 25 + 83 \times 25 + 79 \times 25 + 68 \times 25 (=8100)$ OR $4 \times 2 \times 1000 (=8000)$
	A4	Finds figures to compare	2 or	CD	$'8100' \div 4 (=2025)$ OR $81 \times 25 (=2025)$ OR $2 \times 1000 \div 25 (=80)$ AND $(94 + 83 + 79 + 68) \div 4 (=81)$ OR $4 \times 2 \times 1000 (=8000)$ AND $94 \times 25 + 83 \times 25 + 79 \times 25 + 68 \times 25 (=8100)$ OR $4 \times 2 \times 1000 \div 25 (=320)$ AND $94 + 83 + 79 + 68 (=324)$
	I7	Correct conclusion with accurate figures	3	CDE	Eg. Yes with 2025 (m) OR (She swam) 25 (m) extra OR Yes with 2.025 (km) OR Yes with 81 (lengths) and 80 (lengths) OR Yes with 8100 (m) and 8000 (m) OR Yes with 324 (lengths) and 320 (lengths)
	A5	Shows a valid check	1	F	Any reverse calculation OR approximation
Total marks for question			6		

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q8	R2	Process for percentage	1 or	G	90×0.1 (oe) (=9) OR
	I6	Finds weight after reduction	2	GH	$90 - 9 = 81$
	R3	Starts to work with formula	1 or	J	1.73^2 (=2.9929)
	A4	Completes substitution or reverse substitution	2 or	JK	$\frac{81}{1.73^2}$ (=27.06..) OR $[20, 25] \times 1.73^2$ (= [59.858, 74.8225]) OR $\frac{90}{1.73^2}$ (=30.07..) OR $\frac{9}{1.73^2}$ (=3.007..)
	I7	Correct result	3	JKL	[27, 27.1] OR 74.8(225) (kg) and 81 (kg) OR $30.07 - 3.007 = 27.063..$
Total marks for question			5		

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q9a	R1	Process to find number of calories	1 or	M	$1500 \times 7 - (1280 + 1390 + 1630 + 1340 + 1050 + 1860)$ (= 10500 – 8550) OR 220+ 110 -130+ 160+ 450 -360 +1500 (daily differences)
	A4	Correct total	2	MN	1950 (calories)
Q9b	R2	Converts between pounds and kilograms	1	P	$90 \times 2.2 (=198)$ OR $130 \div 2.2 (=59.09\dots)$ or $155 \div 2.2 (=70.45\dots)$ or $180 \div 2.2 (=81.81\dots)$ or $205 \div 2.2 (=93.18\dots)$
	A4	Selects appropriate figure from table	1 or	Q	[490, 558]
	I6	Correct answers	2	QR	[1225, 1395] (calories)
Total marks for question			5		

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