

Mark Scheme (Results)

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- If working is **crossed out and still legible**, then it should be marked, as long as it has not been replaced by alternative work.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

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
<b>Q1a</b>	R2	Full process to find the cost of guinea pigs	1 or	A	$14.6 \times 2 + 14.6 \div 2 (=36.5)$ oe
	A4	Finds total cost with correct money notation	2	AB	£36.50 correct money notation
<b>Q1b</b>	R2	Full process for percentage	1	C	e.g. $0.75 \times 59.95 (=44.9625)$ <b>OR</b> $0.25 \times 59.95 (=14.9875)$ <b>OR</b> $0.75 \times 44.95 (=33.7125)$ <b>OR</b> $0.25 \times 44.95 (=11.2375)$ <b>oe</b> A build-up method must be complete Allow this mark if percentage is found for any relevant figure.
	A4	Process to add costs for 4 suitable items	1 or	D	e.g. '33.71' + 7.95 + 2.95 + 5.95 (=50.56) <b>OR</b> '33.71' + 10.95 + 2.95 + 5.95 (=53.56) <b>OR</b> '44.96' + 7.95 + 2.95 + 5.95 (=61.81) <b>OR</b> '44.96' + 10.95 + 2.95 + 5.95 (=64.81)
	I7	Accurate figures and valid decision	2	DE	Yes with (£)[50.56, 50.57] or (£)[53.56, 53.57] <b>OR</b> Yes with (£)[9.43, 9.44] or (£)[6.43.6.44]
<b>Total marks for question</b>			<b>5</b>		

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q2a	R2	Works with 10m fence length or uses scale	1 or	F	Draws a rectangle. This can be <ul style="list-style-type: none"> <li>• away from the wall</li> <li>• using the wall</li> <li>• or against wall but not using it</li> </ul> <b>AND</b> fence length 20 squares <b>or</b> fence length 10 squares <b>or</b> one side 4 squares
	I6	Uses correct fence length and scale	2	FG	Draws rectangle 4 squares by 6 squares (can be against wall) <b>OR</b> 8,4,8 against wall <b>OR</b> 4,12,4 against wall

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q2b	A4	Works with consistent units	1	H	2500 g or [0.035,0.055] seen <b>OR</b> Converts correctly after calculation eg $2310 = 2.31$ <b>OR</b> [1.47,2.31]
	R3	Works with days food will last or food needed for 1 guinea pig or amount each guinea pig is fed or food needed per day for all guinea pigs	1 or	J	'2500' ÷ [35,55] (= [45.45...,71.42..]) <b>OR</b> $2.5 \div '[0.035,0.055]'$ (= [45.45...,71.42..]) <b>OR</b> [35,55] × 2 × 7 (= [490,770]) <b>OR</b> '[0.035,0.055]' × 2 × 7 (= [0.49,0.77]) <b>OR</b> $2 \times 7 \times 3$ (=42) <b>OR</b> $3 \times [35,55]$ (= [105,165])
	A4	Full process to find figures to compare	2 or	JK	'490' × 3 (=1470) <b>OR</b> '[45.45, 71.42]' ÷ 3 (= [15.15,23.80..]) <b>OR</b> '2500' ÷ '42' (=59.523..) <b>OR</b> '2500' ÷ '105' (= [15.15,23.80..])
	I6	Valid decision with accurate figures	3	JKL	Yes <b>AND</b> [ 1470,2310](g) <b>and</b> 2500 (g) <b>OR</b> Yes <b>AND</b> [1.47, 2.31](kg) <b>OR</b> Yes <b>AND</b> [ 15,23.80..](days) <b>OR</b> Yes <b>AND</b> 59.5(g) <b>OR</b> Yes <b>AND</b> [190,1030] (g left)
<b>Total marks for question</b>			6		



Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q3	R1	Begins to construct schedule	1 or	M	Structured schedule with days labelled <b>AND</b> showing children <b>or</b> time slots <b>or</b> tasks <b>or</b> points
	A4	Constructs schedule with all features	2	MN	Efficient structured schedule with 7 days labelled <b>AND</b> clearly showing children <b>and</b> what they have to do
	R2	Works with number of points	1	P	$1 \times 7 + 3 \times 7 + 5 (=33)$ <b>OR</b> Finds total for any child
	A5	Schedules tasks	1 or	Q	Schedule with at least 2 of All children have equal points. All tasks completed. No child clashes task and club.
	I6	Completes solution without errors	2	QR	All of: Each child has 11 points. All tasks completed. No child clashes task and club. Full correct solution with no errors
<b>Total marks for question</b>			<b>5</b>		

**Section B: The farm**

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q4a	R2	Works with fraction or number of tents	1 or	A	$6 \div 3 \times 2 (=4)$ oe <b>OR</b> $200 \div 45 (=4.4..)$
	A4	Complete process to find figures to compare	2 or	AB	'4' $\times 45 (=180)$ <b>OR</b> '4.4..' $\times 3 \div 2 (=6.6..)$
	I7	Valid decision from accurate figures	3	ABC	No <b>and</b> 180 (tents) <b>OR</b> No <b>and</b> 6.6..(acres needed)
Q4b	R3	Starts to process area or number of bags	1 or	D	$4047 \times 6 (= 24282)$ (m <sup>2</sup> ) <b>OR</b> $3500 \div 95 (=36.8..)$ (bags) <b>OR</b> $4047 \div 800 (=5.05..)$ (bags per acre)
	A4	Coordinates features	2 or	DE	'24282' $\div 800 (=30.35..)$ <b>OR</b> '36' $\times 800 (=28800)$ <b>OR</b> '5.05' $\times 6 (=30.3)$
	I6	Full process to find figures to compare	3 or	DEF	'36' $\times 800 (=28800)$ <b>and</b> $4047 \times 6 (= 24282)$ <b>OR</b> '31' $\times 95 (=2945)$ <b>OR</b> '28800' $\div 4047 (= 7.1..)$ <b>OR</b> $24282 \div '36' (=674.5)$ <b>OR</b> '24282' $\div 800 (=30.35..)$ <b>or</b> '5.05' $\times 6 (=30.3)$ <b>AND</b> $3500 \div 95 (=36.8..)$
	I7	Correct decision with correct figures	4	DEFG	Yes <b>AND</b> 24282 <b>and</b> 28800 <b>OR</b> Yes <b>AND</b> (£)2945 <b>or</b> £3420 <b>OR</b> Yes <b>AND</b> 7.1 (acres) <b>OR</b> Yes <b>AND</b> (bag only needs to cover) 674.5(m <sup>2</sup> ) <b>OR</b> Yes <b>AND</b> [ 30,31] <b>bags needed and can buy [ 36,37]</b> <b>bags</b>
<b>Total marks for question</b>			<b>7</b>		

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q5	R1	Begins graph	1 or	H	One of: linear scale, plotting ( $\pm 2$ mm), labels Labels must include Profit, dairy, livestock, 1 <sup>st</sup> Q etc. May be in title or axis labels
	A4	Improves graph	2 or	HJ	Two of: linear scale, plotting ( $\pm 2$ mm), labels
	I6	Complete graph	3	HJK	All of: linear scale, plotting ( $\pm 2$ mm), labels
<b>Total marks for question</b>			<b>3</b>		
Q6	R2	Works with cooling of milk	1	L	$(9 - 5) \times 10 (=40)$ <b>OR</b> 10.15 Shows full build up e.g. 9.35,9.45,9.55 10.05,10.15
	A4	Works with rate of pumping	1or	M	eg $2500 \div 20000 (=0.125)$ <b>OR</b> $20000 \div 2500 (=8)$ <b>OR</b> $20000 \div 60 (=333.3)$
	A4	Works with time needed for pumping	2or	MN	eg $'0.125' \times 60 (=7.5)$ <b>OR</b> $60 \div '8' (=7.5)$ <b>OR</b> $2500 \div 333.3 (=7.5)$
	I6	Works with total time needed	3	MNP	$'40' + '7.5' + [5,10] (= [52.5, 57.5])$ <b>OR</b> Shows build up method '10:15', '10:22.5', [10:27.5,10:32.5] If their 7.5 is 8 , 8 must be from correct process ie NOT from $20000 \div 2500 (=8)$
	R2	Works with time available	1	Q	$10:45 - 9:35 (=1 \text{ hour } 10 \text{ minutes})$ <b>OR</b> [10:27.5,10:33] 10:33 if from correct process
	A5	Checks figures and gives decision based on valid figures	1	R	Yes <b>AND</b> [52.5, 58] 58 if from correct process <b>and</b> 70 <b>OR</b> Yes <b>AND</b> [10:27.5,10:33] 10:33 if from correct process <b>OR</b> Yes <b>AND</b> [2,3] or [7,8] mins left
	<b>Total marks for question</b>			<b>6</b>	

### Section C: Heating

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q7a	I7	Makes a simple comparison on gas or electricity	1 or	A	Makes one simple comment comparing 1 feature. e.g. She uses less electricity in June of this year compared to last year <b>OR</b> Over the whole of last year she used more gas than this year
	I7	Makes 1 developed comparison Or Makes simple comparison on gas and electricity for both years	2	AB	Makes one developed comparative comment e.g. She used less gas and less electricity between October and February of this year compared to last year <b>OR</b> Over the whole year she used less gas and less electricity this year compared with last year <b>OR</b> In both years, gas and electricity she used less in July than December <b>OR</b> There is more variation in gas than electricity in both years
Q7b	R2	Counts number of words	1	C	15 allow 13
	A4	Substitutes in formula	1 or	D	$2(0.45 \times '15' + 1.25)$ (=16)
	I6	Finds correct total cost	2	DE	(£)16 allow (£)14.20
<b>Total marks for question</b>			<b>5</b>		

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
<b>Q8</b>	R2	Finds a missing side	1	F	3 <b>OR</b> 2
	R3	Process to find an area	1 or	G	$3 \times 2 (=6)$ <b>OR</b> $2.5 \times 6.5 (=16.25)$ <b>OR</b> $2.5 \times 3.5 (=8.75)$ <b>OR</b> $4.5 \times 3 (=13.5)$ <b>OR</b> $2.5 \times 3 (=7.5)$ <b>OR</b> $6.5 \times 4.5 (=29.25)$ <b>OR</b> $3.5 \times 2 (=7)$
	A4	Full process for composite area	2	GH	'6' + '16.25' <b>OR</b> '8.75' + '13.5' <b>OR</b> '29.25' - '7' <b>OR</b> '8.75' + '6' + '7.5' (=22.25)
	I6	Process to find volume	1	J	'22.25' $\times$ 2.8 (=62.3) '22.25' must come from a process for area: mark G must be awarded
	A4	Process to find cubic feet	1 or	K	'62.3' $\times$ 36(=2242.8)
	I6	Finds correct kitchen volume in cubic feet	2	KL	2242.8 accept rounded answer
<b>Total marks for question</b>			<b>6</b>		
<b>Q9a</b>	R2	Process to find number of BTUs	1 or	M	$1530 \times 3 (=4590)$
	A4	Process to find correct radiator or combination with sufficient BTUs	2	MN	4590 <b>AND</b> e.g. $2297 \times 2 (=4594)$ <b>or</b> 72 <b>or</b> 2 Large <b>OR</b> $3216 + 1837 (=5033)$ <b>or</b> 80 <b>or</b> 1 X Large , 1Medium <b>OR</b> $1837 \times 3 (=5511)$ <b>or</b> 87 <b>or</b> 3 Medium <b>OR</b> $1148 \times 4 (=4592)$ <b>or</b> 100 <b>or</b> 4 Small <b>OR</b> 4594 <b>or</b> 89 <b>or</b> 1 Super
	I7	Finds cheapest combination	1	P	2 Large
<b>Q9b</b>	R1	Works with % discount	1 or	Q	$0.175 \times 370 (=64.75)$ <b>OR</b> $0.825 \times 370 (=305.25)$ oe
	A4	Finds cost after discount	2	QR	(£)305.25
<b>Total marks for question</b>			<b>5</b>		

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