Mark Scheme (Results)

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Pearson Edexcel 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- If working is **crossed out and still legible**, then it should be marked, as long as it has not been replaced by alternative work.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 mark the working leading to the answer given in the answer box or working box. If there is no definitive answer then marks should be awarded for the 'lowest' scoring method shown.
- 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 indicates 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 2.40£

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: Outdoor swimming pool

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q1	I6	Works with information from table	1 or	A	11 + 25 + 22 + 62 (=120) **OR** 38 + 56 + 14 + 52 + 24 + 48 + 42 + 56 + 11 + 25 + 22 + 62 (=450)
	R2	Full process to find a percentage or use percentage with their total swimmers	2 or	AB	'120' ÷ '450' × 100 (=26.666...) **OR** 0.27 × '450' (=121.5) oe
	I7	Decision from correct figures	3	ABC	Yes **and** [26.6, 27] (%) rounds to 27 (%) **OR** Yes **and** [26.6, 26.7] (%) **and** 27 (%) **OR** No **and** [26.6, 26.7] (%) **OR** No **and** 120 **and** 121.5 **or** 121 **or** 122 (people)
		Total marks for question	**3**		

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q2	R1	Process to start to use formula or work with fraction	1 or	D	5.8×112 (=649.6) **OR** 8.7×28 (=243.6) **OR** 300×3 (=900)
	A4	Process to use full formula or begins to reverse formula	2 or	DE	'649.6' + '243.6'(=893.2) oe **OR** '900' − 8.7×28 (=656.4) **OR** '900' − 5.8×112 (=250.4)
	A4	Full process to find figures to compare	3 or	DEF	'893.2' ÷ 3 (=297.73..) **OR** '656.4' ÷ 112 (=5.86..) **OR** '656.4' ÷ 5.8 (=113.1...) **OR** '250.4' ÷ 28 (=8.94..) **OR** '250.4' ÷ 8.7 (=28.7...)
	I7	Correct decision from correct figures	4	DEFG	No **AND** (£)[297, 298] (amount put in savings account) **OR** No **AND** (£)[5.86, 6] (contract hourly rate needed) **or** [113, 114] (number of contract hours needed) **OR** No **AND** (£)[8.9, 9] (overtime rate needed) **or** [28.7, 29] (number of overtime hours needed) **NB:** accurate figures from fully correct working are required
		Total marks for question	**4**		

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q3(a)	R2	Begins to develop solution	1 or	H	$15 \times 2 \times 5.20 (=156)$ **OR** ('30'− 20) × 5.20(=52) **OR** $138 \div 30 (=4.6)$
	A4	Develops solution further	2 or	HJ	$15 \times 2 \times 5.20 (=156)$ **and** ('30'− 20) × 5.20(=52) **OR** 83.20 + ('30'− 20) × 5.20(=135.2) **OR** '135.2' ÷ 30(=4.506..)
	I7	Correct decision with accurate figures	3	HJK	No **and** (£)135.2(0) **OR** Cheaper to buy a book of 20 single tickets and 10 single tickets **and** (£)135.2(0) **OR** No **and** (£)4.6(0) **and** (£)[4.5(0), 4.51]
	A5	Valid check	1	L	E.g. reverse calculation, estimation, alternative method
	A5	Evaluates the effectiveness of their check	1	M	E.g. My estimation is close to the original answer therefore effective **or** I reversed the process and got the same numbers **or** Alternative method leads to the same decision.

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q3(b)	R2	Works with consistent units	1	N	E.g. 50 ÷ 1000 (=0.05) **OR** 3 × 1000 (=3000) May be seen in subsequent calculations
	A4	Works with mean or total distance swum or required	1 or	P	(24 + 40 + 32 + 20 + 24 + 26 + 34 + 32) ÷ 4 (=58) **or** '3000' ÷ 50 (=60) **OR** (24 + 40 + 32 + 20 + 24 + 26 + 34 + 32) × 50 (=11600) **or** '3000' × 4 (=12000)
	R2	Finds figures to compare	2 or	PQ	(24 + 40 + 32 + 20 + 24 + 26 + 34 + 32) ÷ 4 (=58) **and** '3000' ÷ 50 (=60) **OR** (24 + 40 + 32 + 20 + 24 + 26 + 34 + 32) × 50 (=11600) **and** '3000' × 4 (=12000) **OR** '11600' ÷ 4 (=2900) **or** '58' × 50 (=2900)
	I7	Decision from correct figures	3	PQR	E.g. No **and** 58 (lengths) **and** 60 (lengths) **OR** No **and** 11600 (m) **and** 12000 (m) **OR** No **and** 2900 (m) **and** 3000 (m) **OR** No **and** 2.9 (km) oe from correct method seen **NB:** Working could be in metres or kilometres or both throughout
Total marks for question			**9**		

Section B: South Africa

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q4	I7	Interprets whale season and 1 other constraint	1 or	A	Oct **OR** Nov
	I7	Interprets all constraints with reason	2	AB	Nov **AND** reason (at least 2 of: whale season, more than 15ºC, less than 40 mm) E.g. November as this is whale season and there is less than 40 mm rainfall
Total marks for question			**2**		

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q5(a)	R1	Begins to solve problem	1 or	C	$(6 - 4) + 3$ (=5) oe **OR** $0.15 \times 6 \times 2170$ (=1953) **OR** $1 - 0.15$(=0.85)
	R2	Develops solution	2 or	CD	'5' × 2170 (=10850) **OR** 0.15×2170 (=325.5) **OR** $6 \times 2170 - $ '1953' (=11067)
	A4	Further developed solutions	3 or	CDE	'10850' × 0.15(=1627.5) **OR** $2170 - 325.5$ (=1844.5) **OR** 0.85×2170 (=1844.5)
	R3	Process to find total cost payable	4 or	CDEF	'10850' – '1627.5'(=9222.5) **OR** $0.85 \times$ '10850'(=9222.5) **OR** '5' × '1844.5' (=9222.5)
	I6	Correct figure with correct units supported by valid working	5	CDEF G	9222.5(0) (South African) Rand Accept SAR or R for unit **NB:** Unsupported answer only award 1 mark (C)

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q5(b)	R1	Process to find cost of all tickets or converts price of some tickets	1 or	H	E.g. 2 × (280 + 225 + 150) (=1310) **OR** (280 + 225 + 150) ÷ 19.82 (= 33.(04…)) **OR** 280 ÷ 19.82 (=14.1...) **OR** 225 ÷ 19.82 (=11.3..) **OR** 150 ÷ 19.82 (=7.5..) **OR** 80 × 19.82 (=1585.6)
	A4	Finds figures to compare	2 or	HJ	'1310' ÷ 19.82 (=66.(09…)) **OR** 80 × 19.82 (=1585.6) **and** 2 × (280 + 225 + 150) (=1310) **OR** '33.(04…)' × 2 (=66….) **OR** 2 × ('14.1' + '11.3' + '7.5') (=66…)
	I7	Decision from correct figures	3	HJK	Yes **AND** [66, 67] **OR** Yes **AND** 1310 **AND** [1585, 1586] **NB:** Accept a full comparison for 1 person and £40
	A5	Check using estimation	1	L	E.g. 300 + 200 + 200 = 700 **or** 300 + 200 + 150 = 650, 650 × 2 = 1300, 1300 ÷ 20 = 65
Total marks for question			**9**		

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q6(a)	R1	Process to find travel time	1	M	520 ÷ 100 (=5.2) **OR** 5 hours 12 minutes **OR** 312 minutes
	A4	Starts to work out total time or starts to subtract from 5:30pm	1 or	N	All of '5 h 12 min', 45 min, 1 h 30 min added **OR** All of '5 h 12 min', 45 min, 1 h 30 min subtracted from 5:30 **OR** 7 h 27 min oe **OR** '5.2' + 0.75 + 1.5(=7.45)
	I6	Correct time	2	NP	10 03 (am) **OR** 10 (am) oe provided correct working seen **NB**: Accept any valid time format e.g. 10:03 10.03 etc.
Q6(b)	A4	Works with consistent units and average growth	1 or	Q	36.9 × 100 ÷ 600 (=6.15)
	I6	Correct answer	2	QR	6.2 (cm)
Total marks for question			5		

Section C: Zoo

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q7(a)	R1	Starts to work with proportion	1 or	A	310 ÷ 2.2 (=140.9...) **or** 63 × 2.2 (=138.6) **OR** 310 ÷ 2.5(=124) **or** 63 × 2.5(=157.5)
	A4	Full process to find figures to compare	2 or	AB	E.g. '140.9..' ÷ 2.5(=56.36...) **OR** '138.6' × 2.5 (=346.5) **OR** '124' ÷ 2.2(=56.36..) **OR** '157.5' × 2.2(=346.5) **OR** 310 ÷ 2.2 (=140.9...) **and** 63 × 2.5(=157.5) **OR** 310 ÷ 2.5(=124) **and** 63 × 2.2 (=138.6) **OR** 310 ÷ '138.6'(=2.23..) **OR** '140.9..' ÷ 63(=2.23..) **OR** '124' ÷ 63(=1.96..)
	I7	Decision from correct figures	3	ABC	No **and** [56, 57] **OR** No **and** [346, 347] **OR** No **and** [140, 141] **and** [157, 158] **OR** No **and** 124 **and** [138, 139] **OR** No **and** [2.2, 2.3] times **OR** No **and** [1.9, 2] conversion from kg to pounds

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q7(b)	R1	Begins to process information	1 or	D	$(125 + 10 + 10) \times 8$ (=1160) **OR** $(125 + 10 + 10) \times [28, 31]$ (=4060, 4205, 4350, 4495) **OR** $40000 \div 8$ (=5000) **OR** $40000 \div [28, 31]$ (=[1290, 1429]) NB: [28, 31] – only accept 28, 29, 30 or 31 or $366 \div 12$ or $365 \div 12$
	A4	Process to find total amount of food	2 or	DE	'1160' $\times [28, 31]$ (= e.g. 32480, 33640, 34800, 35960) **OR** '4060' $\times 8$ **OR** '4205' $\times 8$ **OR** '4350' $\times 8$ **OR** '4495' $\times 8$ **OR** $(125 + 10 + 10) \times [28, 31]$ (= e.g. 4060, 4205, 4350, 4495) **and** $40000 \div 8$ (=5000) **OR** $40000 \div [28, 31]$ (=[1290, 1429]) **and** $(125 + 10 + 10) \times 8$ (=1160) **OR** [1290, 1429] $\div 8$ (=[161, 179]) **and** $(125 + 10 + 10)$ (=145)
	I7	Correct figures	3	DEF	E.g. No **AND** 32480 **or** 33640 **or** 34800 **or** 35960 (pounds) **OR** No **AND** 5000 **AND** 4060 **or** 4205 **or** 4350 **or** 4495 (pounds) **OR** No **and** [1290, 1429] **and** 1160 (pounds) **OR** No **and** [161, 179] **and** 145 (pounds)
	A5	Shows a check	1	G	Any reverse calculation or estimation or alternate method
Total marks for question			**7**		

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q8	R3	Process to find appropriate area	1 or	H	$45 \times 10 (=450)$ **or** $(18 - 10) \times 24 (=192)$ **or** $18 \times 24 (=432)$ **or** $(45 - 24) \times 10 (=210)$ **or** $45 \times 18 (=810)$ **or** $(45 - 24) \times (18 - 10)(=168)$
	A4	Full process for compound area	2 or	HJ	'450' + '192'(=642) **OR** '432' + '210'(=642) **OR** '810' − '168'(=642)
	I6	Correct compound area	3	HJK	642 (m^2)
	R2	Process to find area needed	1 or	L	E.g. $200 + (10 - 4) \times 80 (=680)$ **OR** ('642' − 200) ÷ (10 − 4) (=73.6...) **OR** ('642' − 200) ÷ 80(=5.52..) **OR** '642' − 200 (=442) and 80 × 6 (=480) **OR** Complete correct build-up method
	I7	Correct decision from correct figures	2	LM	No **and** 642 **and** 680 (m^2) **OR** No **and** 642 **and** [73, 74] (m^2) **OR** No **and** 5.5.. (elephants) **and** 6 (elephants) **OR** No **and** 9 (elephants) from a complete correct build-up method **OR** No **and** 442 and 480 (m^2) **NB:** ft. their 642 provided HJ has been awarded
		Total marks for question	5		

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q9	R2	Begins to allocate presenters	1 or	N	Two of : Lemur talk, Sarah **and** Bear talk, Ali **and** Penguin talk, Zak **and** Chimpanzee talk, Zak**;** appropriate presenters allocated to all activities (may be overlaps); all presenters max of 5 events
	I6	All talks have an appropriate presenter	2	NP	Lemur talk, Sarah **and** Bear talk, Ali **and** Penguin talk, Zak **and** Chimpanzee talk, Zak **AND** appropriate presenters allocated to all activities (may be overlaps) **AND** all presenters max of 5 events
	R3	Starts to interpret other information	1	Q	At least 3 presenters have an hour for lunch between 11:45 and 14:15 (must not overlap with other allocated events) **NB:** At least mark N must be awarded to score this mark
	I7	Fully correct plan	1	R	Fully correct plan including lunch breaks **NB:** Accept clear abbreviations
Total marks for question			**4**		

Time	Event	Presenter	Presenter	Presenter	Presenter	Presenter
10:20 - 10:40	Lemur talk	**Sarah**				
10:50 - 11:10	Bear talk	**Ali**				
11:20 - 11:40	Penguin talk	**Zak**				
11:50 - 12:10	Train ride		Rachel			
12:20 - 12:40	Elephant talk		Ali			
12:20 - 12:40	Train ride		Sarah			
12:50 - 13:10	Train ride		Rachel			
13:20 - 13:40	Meerkat talk		Zak			
13:20 - 13:40	Train ride		Ali			
13:50 - 14:10	Train ride		Sarah			
14:20 - 14:40	Wolf talk		Zak			
14:20 - 14:40	Train ride		Ali			
14:50 - 15:10	Train ride		Sarah			
15:20 - 15:40	Chimpanzee talk	**Zak**				
15:20 - 15:40	Train ride		Ali			
15:50 - 16:10	Train ride		Rachel			

Presenter	Lunch time	Presenter	Lunch time	Presenter	Lunch time	Presenter	Lunch time
Ali	12:40 – 13:40						
Rachel	13:10 – 14:10						
Sarah	12:40 – 13:40						
Zak	11:50 – 12:50						