

Mark Scheme (Results)

November 2016

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- If working is **crossed out and still legible**, then it should be marked, as long as it has not been replaced by alternative work.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

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: Bowling

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q1	R2	Begins to design bowling schedule or considers number of games	1 or	A	One of: <ul style="list-style-type: none"> • Designs bowling schedule with input opportunities for games and times • all games for at least 2 friends (one error or omission)
	I6	Begins to design bowling schedule and considers number of games	2	AB	Both of: <ul style="list-style-type: none"> • Designs bowling schedule with input opportunities for games and times • all games for at least 2 friends (one error or omission)
	R1	Begins to show data on bowling schedule or works with all games	1 or	C	One of: <ul style="list-style-type: none"> • All games with correct times for at least 2 friends (one error or omission) • finish time of 9.10(pm) or last game starts at 8.50 (pm) • 10 games
	I7	Fully correct solution	2	CD	Correctly shows games for all 5 friends with start times and end time of 9.10(pm) or last game starts at 8.50 (pm) Note: See possible solution at end of mark scheme
Total marks for question			4		

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q2	R2	Process to work with time	1 or	E	Adds at least 2 times onto 3.30 pm OR Subtracts at least 2 times from 7.15 pm OR Writes three quarters of an hour as 45 minutes OR 7.15 – 3.30 (= 3 hrs 45 mins or 225 mins) OR 45 + 20 + 1 hr 15 + 35 + 1 hr (= 3 hrs 55 mins or 235 mins)
	A4	Full process to find figures to compare	2 or	EF	e.g. 3.30, 4.15, 5.15, 5.35, 6.50, 7.25 OR 7.25 (pm) OR 3.20 (pm) OR 7.15 – 3.30 (= 3 hrs 45 mins or 225 mins) and 45 + 20 + 1 hr 15 + 35 + 1 (= 3 hrs 55 mins or 235 mins)
	I6	Correct conclusion and accurate figures	3	EFG	No and (would arrive at bowling alley at) 7.25 (pm) OR No and (would have to leave work at) 3.20 (pm) OR No and 3 hrs 55 mins and 3 hrs 45 mins OR No and 225 mins and 235 mins
Total marks for question			3		

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q3(a)	R3	Starts to work with mean average	1 or	H	$158 \times 4 (=632)$ OR $473 + 160 (=633)$
	A4	Finds total score if 160 is scored in game 4 or total score needed for 3 games if 160 is scored in game 4	2 or	HJ	$473 + 160 (=633)$ and $158 \times 4 (=632)$ OR '633' $\div 4 (=158.25)$ OR '632' $- 160 (=472)$ OR '632' $- 473 (=159)$
	I6	Correct conclusion and accurate figures	3	HJK	No and 632 and 633 OR No and 158.25 is less than 159 OR No and 472 OR No and 159
	A5	Valid check of their calculation	1	L	Reverse or alternative method for any of their calculations
Q3(b)	R1	Begins to develop appropriate graph or chart	1 or	M	1 of: Labels, plotting, linear scale
	A4	Improves graph or chart	2 or	MN	2 of: Labels, plotting, linear scale
	I6	Completes graph or chart	3	MNP	All of: Labels, plotting, linear scale Min labels: A(ndy), B(ilal), C(az), D(om), E(de), score, highest, lowest NB. Vertical axis label may be seen in title Note: See example bar chart at end of mark scheme

Q3(c)	I7	Selects most consistent	1 or	Q	D(om) OR Correctly works out ranges for at least 3 people
	A5	Evaluates their answer	2	QR	e.g. D(om) has smallest range OR D(om's) bars have smallest difference in height (Ranges are 28, 30, 20, 5, 34)
Total marks for question			9		

Section B: Hot air ballooning

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q4(a)	R1	Begins to work with fraction	1 or	A	$197 \div 4 (=49.25)$ oe OR $2 \times 197 \div 4 (=98.5)$ oe
	A4	Full process to find price for offer A	2	AB	$197 - '49.25' (=147.75)$ OR $197 \div 4 \times 3 (=147.75)$ oe OR $'98.5' \times 3 (=295.5)$ OR $'394' \times 0.75 (=295.5)$ oe
	R1	Begins to work with percentage	1 or	C	$460 \times 0.45 (=207)$ oe OR $460 \div 2 \times 0.45 (=103.5)$
	A4	Full process to find price for offer B	2	CD	$460 - '207' (=253)$ OR $460 \times 0.55 (=253)$ oe OR $(460 \div 2) - '103.5' (=126.5)$ OR $(460 \div 2) \times 0.55 (=253)$
	I7	Correct conclusion with accurate figures	1	E	Offer B and (£)295.5 and (£)253 OR Offer B and (£)42.50 Offer B and (£)147.75 and (£)126.5 OR Offer B and (£) 21.25

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q4(b)	R3	Begins to work with scale	1 or	F	$30 \div 500\,000 (=0.000\,06)$ OR $30 \times 1000 \times 100(=3\,000\,000)$ OR correct use of scale e.g. 1 cm = 5 km
	A4	Process to find distance	2	FG	'0.000 06' $\times 1000 \times 100(=6)$ oe OR '3 000 000' $\div 500\,000(=6)$ oe
	I6	Interprets map	1 or	H	Draws circle centre Bakewell any radius
	I6	Identifies correct region on map	2	HJ	Draws circle radius 6 cm (± 2 mm) centre Bakewell on map (award FGHI)
Total marks for question			9		

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q5(a)	A4	Process to work with conversion	1 or	K	636×3.3 (=2098.8 feet) OR $4000 \div 3.3$ (=1212.12... m)
	R2	Process to find difference	2 or	KL	$4000 - '2098.8'$ (=1901.2 feet) OR '1212.12...' - '636' (=576.12..m)
	I6	Correct answer with correct unit	3	KLM	[576, 580] m(etres) OR [1900, 1902] ft. or feet
	A5	Valid check of their calculation	1	N	Valid check of any calculation using reverse calculation, alternative method or estimation

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q5(b)	R3	Starts to work with distance, speed or time	1 or	P	$\frac{24}{60} = \frac{2}{5} = 0.4$ oe OR 25 ÷ 84 (=0.2976..... km/min) OR 20 = 25 ÷ t OR 20 km in 1 hr means 5 km in 15 mins OR Correct use of speed, distance, time formula with inconsistent units
	A4	Full process to find figures to compare	2 or	PQ	$25 \div '1\frac{2}{5}'$ (=17.85..... km/h) OR '0.2976.....' × 60 (=17.85..... km/h) OR 25 ÷ 20 (=1.25 hrs) OR $20 \times '1\frac{2}{5}'$ (=28 km) OR 25 ÷ 84 (=0.2976..... km/min) and 20 ÷ 60 (=0.33...)
	I7	Correct conclusion with accurate figures	3	PQR	No and 17(.85...) (km/h) OR No and 1.25 (hrs) oe OR No and 28 (km) OR No and 0.2976... (km/min) and 0.33...(km/min)
Total marks for question			4		

Section C: Garden pond

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q6(a)	R3	Works with consistent units	1	A	Uses 0.75(m) in calculation OR 420, 240, 650 and 450 (cm)
	A4	Process to substitute into formulae or works backwards from liner dimensions to find any pond dimension	1 or	B	$2 \times '0.75' + 4.2 (=5.7)$ and $2 \times '0.75' + 2.4 (=3.9)$ OR $2 \times 75 + '420' (=570)$ and $2 \times 75 + '240' (=390)$ (units may not be consistent) OR E.g. $(5 - 4.2) \div 2 (=0.4)$ oe and $(5 - 2.4) \div 2$ oe $(=1.3)$ OR $(5.5 - 4.2) \div 2 (=0.65)$ oe and $(4 - 2.4) \div 2$ oe $(=0.8)$ OR $(6.5 - 4.2) \div 2 (=1.15)$ oe and $(4.5 - 2.4) \div 2$ oe $(=1.05)$
	I7	Correct decision and accurate figures in consistent units	2	BC	C and 5.7 (m) oe and 3.9 (m) oe OR C and 0.75 (m) oe and 1.15 (m) oe and 1.05 (m) oe
Q6(b)	R1	Process to work with discount	1 or	D	$240.99 \div 5 (=48.198)$ oe OR Full process to reduce price of any item(s) by $\frac{1}{5}$
	A4	Complete calculation to find cost after discount	2 or	DE	$(240.99 - '48.198') + 74.98 + 79.99 + (2 \times 18.98) (= 385.722)$ Allow one error or omission of full price items
	I6	Correct answer from accurate figures in correct money notation	3	DEF	£385.72 or £385.73 (in correct money notation)
	A5	Valid check of their calculation	1	G	Reverse or alternative method or estimation for any of their calculations

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q6(c)	R2	Process to work with conversion	1 or	H	5900 ÷ 4.5 (=1311.1.. gallons) OR 10 × 4.5 (=45 litres) OR 2 × 60 (=120)
	R3	Process to work with rate of flow or capacity	2 or	HJ	'1311.1..' ÷ 10 (=131.11.. mins) OR 5900 ÷ '45' (=131.11.. mins) OR '120' × 10 (=1200 gallons)
	A4	Process to find figures to compare	3 or	HJK	'1311.1..' ÷ 10 (=131.11.. mins) and 2 × 60 (=120 mins) OR '131.11..' ÷ 60 (=2.185.. hrs) OR 2 hours 11(.1..) minutes OR '1200' × 4.5 (=5400) OR '120' × 10 (=1200 gallons) and 5900 ÷ 4.5 (=1311.1.. gallons)
	I7	Conclusion and accurate figures	4	HJKL	E.g. Yes/No and [131, 131.11..] (mins) and 120 (mins) OR Yes/No and only 11 mins more (than 2 hours) OR Yes/No and 2.1(85..) (hours) OR No and 5400 (litres) OR No and 1200 (gallons) and 1311.1.. (gallons)
Total marks for question			11		

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q7	R2	Starts to works with formula	1 or	M	E.g. $25 \times 3.14 (=78.5)$ or $4.2 \times 2.4 (=10.08)$
	A4	Complete process for formula	2 or	MN	$25 \times 3.14 \times 4.2 \times 2.4 \div 4 (=197.82)$
	I6	Finds accurate maximum length	3	MNP	[197, 198] (cm)
	R2	Process to find number of fish	1 or	Q	E.g. $10 \times 12 + 5 \times 15 (=195)$ (cm) OR $4 \times 15 + 9 \times 12(=168)$ (cm)
	I7	Correct type and number of fish and accurate figures	2	QR	E.g. 10 S(hubunkin) and 5 K(oi) AND 195 (cm length of fish) OR 4 K(oi) and 9 S(hubunkin) AND 168 (cm length of fish) NB. Depends on award of MNP
Total marks for question			5		

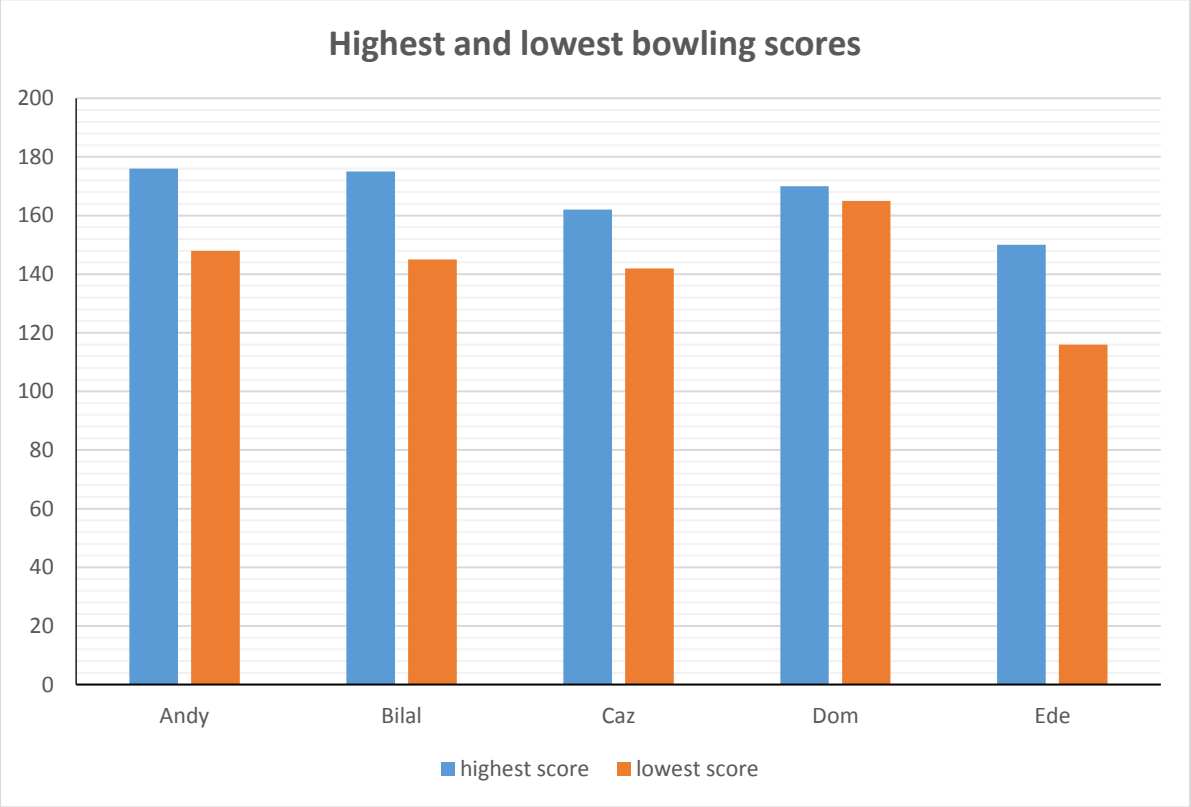
	length	4 fish	5 fish	6 fish	7 fish	8 fish	9 fish	10 fish
Koi	15	60	75	90	105	120	135	150
Goldfish	6	24	30	36	42	48	54	60
Shubunkin	12	48	60	72	84	96	108	120

Possible solution for question 2

Times	Lane 1	Lane 2
7.30 – 7.50	AvB	CvD
7.50 – 8.10	BvC	DvE
8.10 – 8.30	AvC	BvE
8.30 – 8.50	AvD	CvE
8.50 – 9.10	AvE	BvD

(rest)
E
A
D
B
C

Example bar chart for question 3(b)



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Ofqual




Llywodraeth Cymru
Welsh Assembly Government

