

Mark Scheme (Results)

March 2017

Functional Skills Mathematics Level 2

FSM02

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Guidance for Marking Functional Skills Maths 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- If working is **crossed out and still legible**, then it should be marked, as long as it has not been replaced by alternative work.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 his or her answer.
- You will often see correct working followed by an incorrect decision, showing that the candidate can calculate but does not understand the functional demand of the 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 in a written paper); mark the better answer.
- **Incorrect method** if it is clear from the working that the "correct" answer has been obtained from incorrect working, award 0 marks. Send the response to review for your Team Leader to check.
- **Follow through marks (ft)** 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
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 **oe** 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
- **Parts of questions:** because most FS questions are unstructured and open, you should be prepared to award marks for answers seen in other parts of a question, even if not explicit in the expected part. E.g. checks in on earlier answer box.
-
- **Graphs**

The mark schemes for most graph questions have this structure:

| Process | Mark | Evidence |
|---|------|--|
| Appropriate graph or chart – (e.g. bar, stick, line graph) | 1 or | 1 of: linear scale(s), labels, accurate plotting (2 mm tolerance) |
| | 2 or | 2 of: linear scale(s), labels, accurate plotting (2 mm tolerance) |
| | 3 | all of: linear scale(s), labels, accurate plotting (2 mm 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**, and use consistent intervals. The scale may not start at 0 and not all intervals must be labelled. Thus a graph that is 'fit for purpose' is one where 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. Candidate's scale must be in numerical order. Award the mark for plotting if you can read the values, even if the scale is not linear.

The mark schemes for **Data Collection and/ or summary 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.

Discuss any queries with your Team Leader.

Section A: Getting to college

| Question | Skills Standard | Process | Mark | Mark Grid | Evidence |
|---------------------------------|-----------------|--|----------|-----------|--|
| Q1(a) | R2 | Accurately interprets graph | 1 | A | $(5 + 3 =) 8$ AND $(7 + 8 =) 15$ |
| | I7 | Correct ratio given | 1 | B | '8' : '15' oe Allow ft of their figures provided ratio written in the correct order |
| Q1(b) | R2 | Correct totals | 1 | C | $(3 + 6 =) 9$ and $(5 + 3 + 7 + 8 + 3 + 6 + 3 + 4 + 7 + 8 =) 54$ |
| | A4 | Begins calculation of percentage | 1 or | D | $('9' \div '54') \times 100 (=16.66..)$ oe OR $0.18 \times '54' (=9.72)$ |
| | I7 | Correct conclusion from their accurate figures | 2 | DE | No AND '[16.6, 16.7]' OR No/Yes AND '9' and '9.72' Allow ft of their figures |
| Total marks for question | | | 5 | | |

| Question | Skills Standard | Process | Mark | Mark Grid | Evidence |
|---------------------------------|-----------------|---|----------|-----------|---|
| Q2 | R2 | Process to find median value | 1 or | F | A clear intention to find the median from their list allow one error or omission OR $(25 + 26) \div 2 (=25.5)$ |
| | I7 | Correct conclusion with accurate figure | 2 | FG | Yes AND median shown as the middle of 25 and 26 OR Yes AND 25.5 OR Yes AND statement e.g if 27 is the median there needs to be 7 numbers greater than or equal to 27 |
| Total marks for question | | | 2 | | |

| Question | Skills Standard | Process | Mark | Mark Grid | Evidence |
|---------------------------------|-----------------|---|----------|-----------|--|
| Q3 | R1 | Process to work with dimensions | 1 or | H | $18 \div 2 (=9)$ or $4.8 \div 0.6 (=8)$ or $18 \div 0.6 (=30)$ or $4.8 \div 2 (=2.4)$ OR $0.6 \times 2 (=1.2 \text{ m}^2)$ or $18 \times 4.8 (=86.4)$ May be seen on a diagram |
| | A4 | Process to find number of bicycles | 2 or | HJ | '9' \times '8' (=72) or '30' \times '2' (=60) or '30' \times '2.4' (=72) OR '86.4' \div '1.2' (=72) OR '1.2' \times 90 (=108) and $18 \times 4.8 (=86.4)$ OR Full arrangement seen on a diagram |
| | I7 | Correct conclusion with accurate figure | 3 | HJK | No AND 72 (bicycles) OR No AND 108 (m ²) and 86.4 (m ²) |
| | A5 | Valid check | 1 | L | Valid check E.g. one reverse process or alternative method |
| Total marks for question | | | 4 | | |

| Question | Skills Standard | Process | Mark | Mark Grid | Evidence |
|---------------------------------|-----------------|--|----------|-----------|---|
| Q4 | R2 | Process to convert units correctly | 1 | M | e.g. 20×1.6 (=32(km)) OR 100×1.6 (=160(km)) OR 7×1.6 (=11.2(litres/100 miles)) or 0.112 litres/mile OR $100 \div 1.6$ (=62.5 miles) |
| | R3 | Process to find the car park cost or the weekly distance | 1 | N | 1.2×5 (=6) OR 20×5 (=100) OR $'32' \times 5$ (=160) |
| | A4 | Process to find the cost of a journey | 1 or | P | e.g. $\frac{'32' \times 7.0}{100} \times 1.10$ (=£2.46.. /day) oe OR $\frac{'160' \times 7}{100} \times 1.10$ (=£12.32/week) oe |
| | A4 | Full process to find the total cost for the full week | 2 or | PQ | e.g. $'2.46' \times 5 + '6'$ (=18.30) oe OR $'2.46..' \times 5 + '6'$ (=18.32) oe OR $'12.32' + '6'$ (=18.32) |
| | I6 | Correct answer with correct money notation | 3 | PQR | £18.30 or £18.32 |
| Total marks for question | | | 5 | | |

Section B: Saving energy

| Question | Skills Standard | Process | Mark | Mark Grid | Evidence |
|----------|-----------------|--|------|-----------|---|
| Q5(a) | A4 | Uses consistent units | 1 | A | e.g. 4.8 or 1.2 or 15000 or 12000 or 3600 NB can be implied in subsequent working |
| | R3 | Identifies the number of lengths or starts to work with area | 1 or | B | e.g. $3.6 \div 1.20 (=3)$ or $2 \times 3.6 \div 1.20 (=6)$ OR $15 \div 4.8 (=3.125)$ or $12 \div 4.8 (=2.5)$ OR $15 \times 3.6 (=54)$ or $12 \times 3.6 (=43.2)$ or $3.6 \times (15 + 12) (=97.2)$ or $4.8 \times 1.2 (=5.76)$ or $15 \times (3.6 + 3.6) - (3 \times 3.6) (=97.2)$ May be seen on diagram |
| | A4 | Develops solution | 2 or | BC | e.g. $3.6 \div 1.20 (=3)$ and $15 \div 4.8 (=3.125)$ or $12 \div 4.8 (=2.5)$ OR $7.2 \div 1.20 (=6)$ and $15 \div 4.8 (=3.125)$ or $12 \div 4.8 (=2.5)$ OR $15 \times '3' + 12 \times '3' (=81)$ OR $3.6 \times (15 + 12) (=97.2)$ and $4.8 \times 1.2 (=5.76)$ |
| | R2 | Full process to calculate the number of rolls | 3 or | BCD | e.g. $('3' \times '3.125') + ('3' \times '2.5')$ or $9.375 + 7.5 (=16.875)$ OR $'81' \div 4.8 (=16.875)$ OR $'97.2' \div '5.76' (=16.875)$ |
| | I6 | Correct answer | 4 | BCDE | 17 (rolls) from valid working |

| Question | Skills Standard | Process | Mark | Mark Grid | Evidence |
|-----------------------------------|-----------------|--|------|-----------|--|
| Q5(b) | R2 | Process to identify saving in £ | 1 or | F | $£775 \div 5 (=155)$ oe |
| | A4 | Calculates payback period for £1850 at £155/year | 2 or | FG | $1850 \div '155' (=11.935)$ oe |
| | I6 | Correct answer | 3 | FGH | 12 (years) or 11.9(35) (years) |
| Q5(c) | A5 | Valid evaluation | 1 | J | E.g. price of fuel may change, cost of using the boiler may change, may go on holiday, saving may not be 1/5 |
| Total marks for question 9 | | | | | |

| Question | Skills Standard | Process | Mark | Mark Grid | Evidence |
|-----------------------------------|-----------------|---|------|-----------|--|
| Q6 | R3 | Process to work with cost of kWh | 1 | K | $291 \times 15.39 (=4478.49p)$ oe or $291 \times 15.39 \times 3 (=13435.47p)$ oe |
| | A4 | Cost of 12 months payments | 1 or | L | $12 \times 26 (=312)$ |
| | A4 | Total costs found | 2 or | LM | '312' + 5.99 + '134.35..' (=452.34..) oe OR $400 - '312' - 5.99 - '134.35..' (=52.34..)$ oe difference OR Allow $12 \times 26 + 5.99 + '44.78..' (=362.77..)$ oe |
| | I7 | Correct conclusion with accurate figure | 3 | LMN | No AND (£) [452.33, 452.35] OR No AND (£) [52.33, 52.35] seen |
| Total marks for question 4 | | | | | |

| Question | Skills Standard | Process | Mark | Mark Grid | Evidence |
|---------------------------------|-----------------|---|----------|-----------|---|
| Q7 | R3 | Process to identify decrease | 1 or | P | $38.6(0) - 34.2(0) (=4.4(0))$ OR $38.6 \div 6 (=6.43\dots)$ OR $38.6 \times 0.166\dots(=6.4\dots)$ or better |
| | A4 | Decrease identified | 2 or | PQ | $'4.4' \div 38.6 (=0.1139\dots)$ OR $'4.4' \times 6 (=26.4)$ (if 4.4 is 1/6 then 6/6 is 26.4) OR $38.6 - "6.43\dots"$ ($=32.166\dots$) OR $34.2 + "6.43\dots"$ ($=40.63\dots$) OR $38.6(0) - 34.2(0) (=4.4(0))$ and $38.6 \div 6 (=6.43\dots)$ |
| | I7 | Correct conclusion with accurate figure | 3 | PQR | No AND $0.11(39\dots)$ oe and $0.16(66\dots)$ oe OR No AND (£)26.4(0) OR No AND (£)[32.15, 32.17] OR No AND (£) 40.63(3...) OR No AND (£)4.4(0) and (£)6.43(3...) |
| Total marks for question | | | 3 | | |

Section C: The leisure centre

| Question | Skills Standard | Process | Mark | Mark Grid | Evidence |
|---------------------------------|-----------------|---------------------------------|----------|-----------|---|
| Q8(a) | R1 | Begins to work with probability | 1 or | A | 25 + 8 + 11 (=44) |
| | I6 | Correct probability | 2 | AB | 8 / 44 oe OR 0.18(18..) OR 18(.18...)% |
| Q8(b) | I6 | Begins process to draw graph | 1 or | C | 1 of: linear scale(s), labels, accurate plotting (2 mm tolerance) |
| | R2 | Develops graph | 2 or | CD | 2 of: linear scale(s), labels, accurate plotting (2 mm tolerance) |
| | I6 | Correct graph | 3 | CDE | all of: linear scale(s), labels, accurate plotting (2 mm tolerance) Minimum labels – Number (of members. M(ale), F(emale), J(an), F(eb), M(ar) |
| Total marks for question | | | 5 | | |

| Question | Skills Standard | Process | Mark | Mark Grid | Evidence |
|---------------------------------|-----------------|---|----------|-----------|--|
| Q9 | R2 | Works with the power | 1 | F | $1.75 \times 1.75 (=3.0625)$ OR |
| | A4 | Complete substitution | 1 or | G | $83.3 \div 1.75^2 (=27.2)$ |
| | I7 | Correct conclusion with accurate figure | 2 | GH | No AND 27.2 |
| Total marks for question | | | 3 | | |

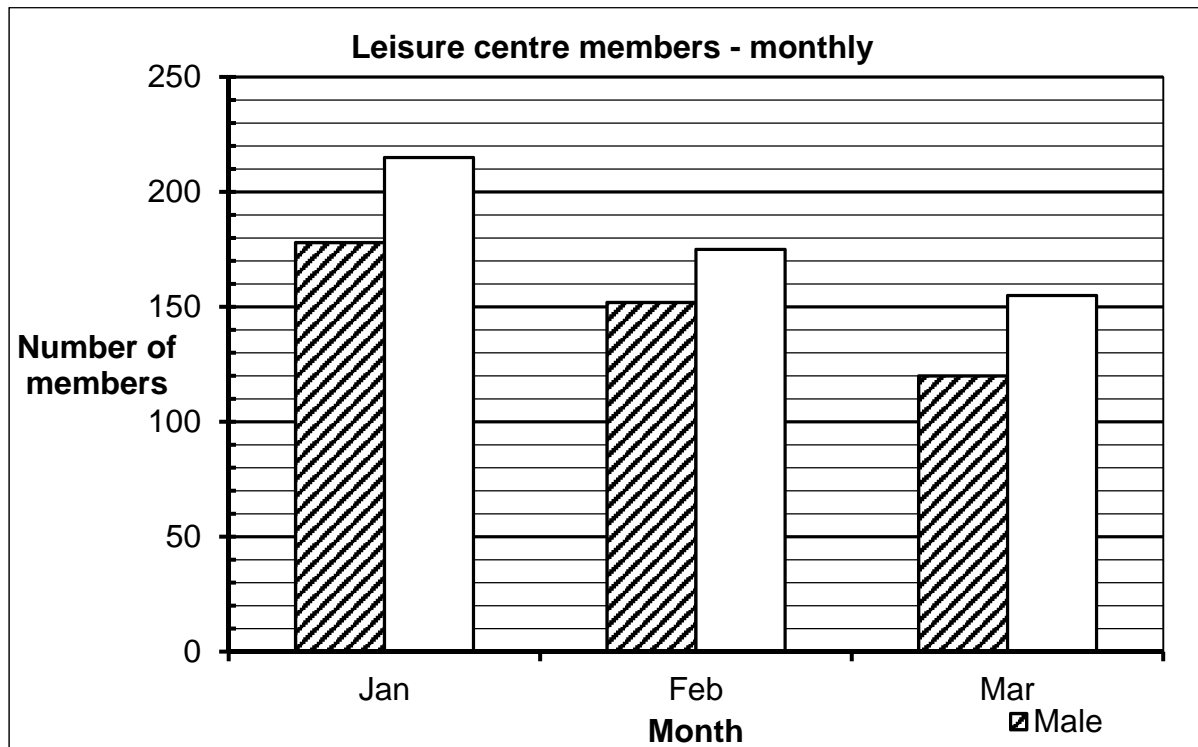
| Question | Skills Standard | Process | Mark | Mark Grid | Evidence |
|---------------------------------|-----------------|--|----------|-----------|--|
| Q10(a) | A4 | Process to work with scale | 1 or | J | 12.3 ÷ 75 (=0.164 m oe) OR 12.3 × 100 ÷ 75 (=16.4 cm) OR 18 × 75 (=1350 cm) OR 18 × 75 ÷ 100 (=13.5 m) |
| | I7 | Correct conclusion with accurate figures and units required | 2 | JK | No AND 0.164 m and 0.18 m OR No AND 16.4 cm OR No AND 1350 cm and 1230 cm OR No AND 13.5 m |
| | A5 | Valid check | 1 | L | Valid check e.g. one reverse process or alternative method |
| Q10(b) | R2 | Process to calculate the volume | 1 or | M | 12.3 × 7.2 × 2.5 (=221.4) |
| | A4 | Process to calculate flow rate based on 2.5 changes per hour | 2 | MN | '221.4' × 2.5 (=553.5) |
| | R3 | Starts process to calculate flow rate based on 18 people | 1 or | P | 28800 ÷ 1000 (=28.8) OR 28800 × 18 (=518400) |
| | A4 | Completes process to find the rate of m ³ | 2 | PQ | '28.8' × 18 (=518.4) OR '518400' ÷ 1000 (=518.4) |
| | I7 | Correct conclusion from accurate figures | 1 | R | 553.5 (m ³ per hour) and 518.4 (m ³ per hour) and '553.5' (m ³ per hour) identified as the greatest flow rate. |
| Total marks for question | | | 8 | | |

Example of Q2

Median identified as mid-point of 8th and 9th values

| | | | | | | | |
|----|----|----|----|----|----|----|----|
| 14 | 19 | 21 | 22 | 22 | 24 | 25 | 25 |
| 26 | 28 | 33 | 33 | 34 | 35 | 39 | 48 |

Example Q8(b)



Ofqual



Llywodraeth Cynulliad Cymru
Welsh Assembly Government



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