

# Mark Scheme (Results)

May 2011

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- If working is **crossed out and still legible**, then it should be marked, as long as it has not been replaced by alternative work.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   |    | Evidence  |
|---|----|---|
| Appropriate graph or chart –<br>(e.g. bar, stick, line graph, ) | 1  | 1 of  |
|   | or | linear scale(s), labels, plotting (2mm tolerance) |
|   | 2  | 2 of  |
|   | or | 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: Sports Centre

| Question                        | Skills Standard | Process   | Mark     | Mark Grid | Evidence   |
|---------------------------------|-----------------|---|----------|-----------|--|
| Q1(a)                           | R1              | Process to calculate total wages                          | 1 or     | A         | '16.5' × 7.08 (=116.82) OR [16,17] × 7(=[112, 119]) OR at least 2 of 28.32, 21.24, 17.7  |
|                                 | A1              |   | 2        | AB        | £116.82 correct money notation   |
| Q1(b)                           | A2              | Shows any suitable check using a different method         | 1        | C         | e.g. '116.82' ÷ 7.08(=16.5) OR '116.82' ÷ 16.5(=7.08) OR uses estimation 120 ÷ 7(=17.14...) OR uses approximation '16' × 7(=112) or '17' × 7(=119) OR 28.32 ÷ 4(=7.08) or 21.24 ÷ 3(=7.08) or 17.7 ÷ 2.5(=7.08) OR 17 ÷ 7(=2.42...), or 16 ÷ 7(=2.28..) repeated subtraction from '116.82' |
| Q1(c)                           | I               | Considers features for at least 1 person                  | 1 or     | D         | 3 of: worker named, pool named, time slot specified, suitable number of hours worked   |
|                                 | I               | Considers presentation, co-ordinates time slot and person | 2 or     | DE        | Slots given for at least 3 people, condone use of early, evening, late rather than times for at least 3 workers  |
|                                 | I               | Co-ordinates all features in a fully correct solution     | 3        | DEF       | All slots covered, all staff work correct hours, must be fully correct for 3 marks<br>e.g.<br><b>Time</b> <b>Main pool</b><br>6 - 8.30        Mary, Andy<br>17.30 - 19       Mary, Andy<br>19 - 22         Pat, Jo<br><br><b>Learner pool</b><br>17.30 - 20        Shanie                  |
| <b>Total marks for question</b> |                 |   | <b>6</b> |           |  |

| Question                        | Skills Standard | Process                 | Mark     | Mark Grid | Evidence   |
|---------------------------------|-----------------|-------------------------|----------|-----------|--|
| Q2(a)                           | R2              | Draws side view of ramp | 1 or     | G         | 2 of: right angled triangle, correct length, correct height  |
|                                 | R2              |                         | 2        | GH        | All of: right angled triangle, correct length, correct height and no additional lines drawn                          |
| Q2(b)                           | R1              | Considers criteria      | 1 or     | J         | 3 of: day or date, time, adults, children, input opportunities as data collection sheet or a questionnaire           |
|                                 | R2              | Improves consideration  | 2 or     | JK        | 4 of: day or date, time, adults, children, input opportunities as a data collection sheet or a questionnaire         |
|                                 | A2              |                         | 3        | JKL       | all of: day or date, time, adults, children, efficient input opportunities do not accept a questionnaire for 3 marks |
| <b>Total marks for question</b> |                 |                         | <b>5</b> |           |  |

| Question                        | Skills Standard | Process   | Mark     | Mark Grid | Evidence   |
|---------------------------------|-----------------|---|----------|-----------|--|
| Q3                              | A1              | Deals with total number of courts or 2:1 ratio  | 1        | M         | 15 or 10 or 5 seen OR 2 hours are members bookings or 1 hour are non - members bookings seen OR<br>$2 \times 9.8 + 12.4 (=32)$ OR<br>$\frac{2}{3} \times 5 (=3.33...)$ OR $\frac{1}{3} \times 5 (=1.66...)$ OR<br>$\frac{2}{3} \times 9.8 (=6.53...)$ OR $\frac{1}{3} \times 12.4 (=4.13...)$ OR<br>$'3.33'... \times 9.8 (=32.66...)$ OR $'1.6...' \times 12.4 (=20.66...)$   |
|                                 | R2              | calculates revenue from courts allocated to members or non-members or revenue for 1 court for 3 hours | 1        | N         | $10 \times 9.8 (=98)$ OR $5 \times 12.4 (=62)$ OR<br>$'32.66...' \times 3 (=98)$ OR $'20.66...' \times 3 (=62)$ OR<br>32 OR 160  |
|                                 | A1              | works with 25% or finds correct total before 25% increase or equivalent process                       | 1 or     | P         | 1.25 or $0.25 \times '98'$ (=122.50 or 24.50) OR<br>1.25 or $0.25 \times '62'$ (=77.50 or 15.50) OR<br>1.25 or $0.25 \times 32$ (=40 or 8)<br>1.25 or $0.25 \times '160'$ (=200 or 40) OR<br>1.25 or $0.25 \times 9.8$ (=12.25 or 2.45) OR<br>1.25 or $0.25 \times 12.4$ (=15.5 or 3.1) OR<br>1.25 or $0.25 \times (9.8+12.4)$ (=27.75 or 5.55) OR<br>1.25 or 0.25 of any money calculated from 9.8 or 12.4 OR<br>160 seen |
|                                 |                 | Finds correct answer for 'money' increased by 25%   | 2        | PQ        | 12.25, or 15.5, 27.75 or 40, or 77.5, or 122.5, or 200 or correct answer for 'money' increased by 25%  |
|                                 | I1              | Correct total found   | 1        | R         | (£)200 cao<br>Note: for finds 232.5 from $15 \times 1.25 \times 12.4$ (non member) OR finds 183.75 from $15 \times 1.25 \times 9.8$ (member) award 1,1,1,1,0   |
| <b>Total marks for question</b> |                 |   | <b>5</b> |           |  |

Section B: Holiday

| Question                        | Skills Standard | Process  | Mark     | Mark Grid | Evidence  |
|---------------------------------|-----------------|--|----------|-----------|---|
| <b>Q4(a)</b>                    | R2              | Convert between units  | 1 or     | A         | 48.2÷2.2[=21,22] OR 23×2.2[=50,51] OR uses a build up method<br>OR<br>uses an estimate for conversion factor 48.2÷ 2(=24.1) AND no<br>OR 23×2(=46) AND no |
|                                 | I2              | Decision from valid comparison   | 2        | AB        | yes [21,22] seen OR yes [50,51] seen  |
| <b>Q4(b)</b>                    | R2              | Considers number of £5 needed  | 1 or     | C         | $\frac{199+85+97}{5}$ (= 381) (=76.2) OR $\frac{750}{10}$ (= 75) OR<br>199÷5(=39or 39.8) or 85÷5(=17) or 97÷5(=19or 19.4)                                 |
|                                 | A1              | Considers airmiles acquired OR expenditure needed  | 2 or     | CD        | '76'×10(=760) OR 75×5(=375) OR<br>199÷5(=39or 39.8) +85÷5(=17)+97÷5(=19or 19.4) (=75or 76.2)  |
|                                 | I2              | Makes a correct decision from correct comparable evidence seen                                   | 3        | CDE       | e.g. yes 760 or 762 seen OR yes 381 and 375 seen OR<br>yes 76.2 and 75 seen OR<br>yes and '750' from individual calculations rounded down                 |
| <b>Q4(c)</b>                    | R2              | Converts pounds to dollars OR converts dollars to pounds   | 1 or     | F         | 199×1.62 [=322,323] OR $\frac{335}{1.62}$ [=206,207]  |
|                                 | A1              |  | 2        | FG        | [=322,323] OR [=206,207] seen   |
|                                 | I2              | Makes correct (ft) decision from their working seen provided at least process (F) mark is scored | 1        | H         | e.g. yes or flight cheaper [322,323] < 335 OR [206,207]>199 OR<br>£7 or 8 higher / less or \$12 / 13 higher/ less   |
| <b>Total marks for question</b> |                 |  | <b>8</b> |           |   |

| Question                 | Skills Standard | Process  | Mark | Mark Grid | Evidence   |
|--------------------------|-----------------|--|------|-----------|--|
| Q5                       | R1              | Considers criteria   | 1 or | J         | lists at least 3 activities at appropriate times of day OR lists at least 3 activities with their correct total cost or amount left  |
|                          | A2              | Improves solution  | 2 or | JK        | lists at least 4 activities at appropriate times of day OR lists at least 4 activities with their correct total cost or amount left inside constraints OR lists 5 activities and their correct total cost but the cost is outside the constraints  |
|                          | I1              | Fully correct solution   | 3    | JKL       | Lists 5 activities at appropriate times of day and gives total cost or amount left correctly inside constraint.<br>Note throughout this question accept 1 morning, 2 afternoon and 2 evening activities without reference to the day, or day 1 with 2 activities that could be 1 afternoon and 1 evening and day 2 with 3 activities that could be 1 of each |
| Total marks for question |                 |  | 3    |           |  |
| Question                 | Skills Standard | Process  | Mark | Mark Grid | Evidence   |
| Q6                       | A1              | Uses map   | 1    | M         | [7.5,8.5] seen or attempt to mark off sections on map OR [150,170] seen  |
|                          | R2              | Uses scale   | 1    | N         | '8'×20(='160') or 50÷20(=2.5) or attempt to mark off 2.5 cm sections on map  |
|                          | A1              | Calculates fuel in tank or km for full tank                        | 1 or | P         | $\frac{1}{2} \times 10 (=5)$ OR $10 \times 50 (=500)$  |
|                          | A1              | Calculates km she should get or rate of consumption or fuel needed | 2    | PQ        | $5 \times 50 (=250)$ OR $0.5 \times 500 (=250)$ OR $'160' \div 5 (=32)$ OR $'160' \div 50 (=3.2)$ OR 160 and 4 gallons is enough   |
|                          | I1              | Communicates solution to multistage problem must score N and Q     | 1    | R         | e.g. yes she has enough fuel   |
| Total marks for question |                 |  | 5    |           |  |

Section C: Rented houses

| Question                        | Skills Standard | Process   | Mark     | Mark Grid | Evidence  |
|---------------------------------|-----------------|---|----------|-----------|---|
| Q7                              | R1              | Considers time needed in towns                        | 1 or     | A         | Shows start and finish times for at least 2 towns (elapsed times correct)   |
|                                 | A1              |   | 2        | AB        | Shows start and finish times for all 4 towns (elapsed times correct) and meets client in Ash at 1pm   |
|                                 | R3              | Considers travelling times between towns              | 1 or     | C         | Allows correct travelling time for at least 2 journeys OR<br>2 of:<br>Allows correct travelling time for at least 1 journey, places 30 to 45 minute lunch break, he starts and finishes in Cove   |
|                                 | A1              |   | 2 or     | CD        | Allows correct travelling time for at least 3 journeys, and places 30 to 45 minute lunch break, or he starts and finishes in Cove   |
|                                 | I1              | Clearly presented accurate schedule                   | 3        | CDE       | Schedule to be sequentially ordered and shows at least correct arrival time in each town, meets client in Ash at 1pm, includes a 30 to 45 minute lunch break and states finish time at end of day<br>See notes at the end for some solutions. Inefficient solution (eg returning to Cove between each job) not penalised.<br>Note travelling time may be built in rather than explicit and office work (90 mins) may be split |
| <b>Total marks for question</b> |                 |   | <b>5</b> |           |   |
| Q8                              | R2              | Substitutes correctly into a formula                  | 1 or     | F         | $500 + 0.96 \times 650 (=1124)$ OR $0.6 \times 650$ OR $500 + 0.36 \times 650$  |
|                                 | A1              | Finds either cost or difference in cost               | 2        | FG        | (£)1124 OR (£)390 OR (£)734   |
|                                 | I2              | Makes a correct comparison ft. Mark F must be awarded | 1        | H         | e.g. Service B is (£734) cheaper<br><br>Note: if only see service B is cheaper with an algebraic justification award 1,0,1 mark.<br>Note: if only see Service B is £734 cheaper, award 1,1,1  |
| <b>Total marks for question</b> |                 |   | <b>3</b> |           |   |

| Question     | Skills Standard | Process   | Mark | Mark Grid | Evidence  |
|--------------|-----------------|---|------|-----------|---|
| <b>Q9(a)</b> | I2              | Makes one valid simple statement  | 1 or | J         | <p><b>Simple statements include</b><br/> Total fees for 2010 greater than 2009<br/> Average fees for 2010 greater than 2009<br/> Range for 2009 greater than range for 2010<br/> In Jan - Mar, or Jul - Sept or Oct to Dec the fees increased in 2010 over 2009<br/> In both years the highest fees were in Apr-Jun<br/> In both years the lowest fees were in Jan - Mar</p> <p><b>Developed statements include</b><br/> In 2009 fees increased then decreased then increased again whereas in 2010 they increased then decreased then decreased further<br/> In Apr - Jun the 2009 figures were better than 2010 although overall the 2010 figures were higher</p> |
|              | I2              | Makes <b>two</b> valid simple statements or <b>one</b> valid developed statement          | 2    | JK        | See above   |
| <b>Q9(b)</b> | R1              | Chooses an appropriate graph type<br>bar chart(s), line graph(s),<br>frequency polygon(s) | 1 or | L         | one of: linear scale, clear labels, accurate plotting of points or bars   |
|              | R2              | Completes graph   | 2 or | LM        | two of: linear scale, clear labels, accurate plotting of points or bars   |
|              | R3              |   | 3    | LMN       | all of: linear scale, clear labels, accurate plotting of points or bars<br>Tolerance $\pm 2\text{mm}$ square  |

|                                 |    |  |          |    |   |
|---------------------------------|----|--|----------|----|---|
| <b>Q9(c)</b>                    | A2 | Totals either year <b>OR</b> finds differences for at least 2 quarters     | 1 or     | P  | 14500+16200+15600+14900(=61200) <b>OR</b><br>14100+16500+14600+14800(=60000) <b>OR</b> at least 2 of<br>400,300,1000,100 condone without minus sign<br>Note: totals may be shown in Q9a, or Q9b or tables |
|                                 | A2 | Begins to calculates 2% of 2009 total <b>OR</b><br>difference as % of 2009 | 2        | PQ | 0.02× '60000' (=1200) <b>OR</b> $\frac{1200}{60000}$ (=0.02) <b>OR</b> $\frac{61200}{60000}$ (=1.02)<br><b>OR</b> 1.02× '60000' (=61200) o.e. <b>OR</b> 2% of 60000=1200                                  |
|                                 | I1 | Makes a valid decision based on correct evidence                           | 1        | R  | Yes with correct figures  |
| <b>Total marks for question</b> |    |  | <b>8</b> |    |   |

Question 5 Solutions include

|   |              |                  |
|---|--------------|------------------|
| Day 1   | Day 2        |                  |
| total cost(\$) <b>128</b><br>or(\$) <b>2</b> left | Ellis Island | <b>Morning</b>   |
| zoo   | Museum       | <b>Afternoon</b> |
| food tour   | river cruise | <b>Evening</b>   |
| Day 1   | Day 2        |                  |
| total cost(\$) <b>130</b><br>or(\$) <b>0</b> left | Broadway     | <b>Morning</b>   |
| museum  | Ellis Island | <b>Afternoon</b> |
| river cruise                                      | food tour    | <b>Evening</b>   |
| Day 1   | Day 2        |                  |
| total cost(\$) <b>126</b><br>or(\$) <b>4</b> left | Ellis Island | <b>Morning</b>   |
| zoo   | Broadway     | <b>Afternoon</b> |
| food tour   | river cruise | <b>Evening</b>   |

|   |              |                  |
|---|--------------|------------------|
| Day 1   | Day 2        |                  |
| total cost(\$) <b>130</b> or<br><b>nothing</b> left | Ellis Island | <b>Morning</b>   |
| zoo   | Broadway     | <b>Afternoon</b> |
| jazz  | river cruise | <b>Evening</b>   |

| Day 1   | Day 2        |                  |
|---|--------------|------------------|
| total cost(\$) <b>128</b> or (\$) <b>2</b> left | Museum       | <b>Morning</b>   |
| zoo   | Broadway     | <b>Afternoon</b> |
| jazz  | river cruise | <b>Evening</b>   |

| Day 1                                      | Day 2    |                  |
|--|----------|------------------|
| total cost (\$) <b>130</b> or nothing left | Museum   | <b>Morning</b>   |
| zoo  | Broadway | <b>Afternoon</b> |
| food tour                                  | Jazz     | <b>Evening</b>   |

| Day 1  | Day 2        |                  |
|--|--------------|------------------|
| total cost (\$) <b>124</b> or (\$) <b>6</b> left | Broadway     | <b>Morning</b>   |
| zoo  | Museum       | <b>Afternoon</b> |
| food tour  | River cruise | <b>Evening</b>   |

### Q7 Solution 1

|          |                  |                             |
|----------|------------------|-----------------------------|
| 9 am     | Arrives at Cove  | Officework 1hr 30 mins      |
| 10.30 am | Leaves Cove      | Travels to Frimley 30 mins  |
| 11 am    | Arrives Frimley  | Maintenance check 1 hr      |
| 12 noon  | Leaves Frimley   | Travels to Ash 15 mins      |
| 12.15 pm | Arrives Ash      | Lunch Break 45 mins         |
| 1 pm     | Meets Client Ash | Two house visits total 1 hr |
| 2 pm     | Leaves Ash       | Travels to Hook 30 mins     |
| 2.30 pm  | Arrives Hook     | Inventory 2 hr 30 mins      |
| 5 pm     | Leaves Hook      | Travels to Cove 30 mins     |
| 5.30 pm  | Arrives at Cove  | Workday finished.           |

### Notes for Solution 1 Variation

They could take 30-45 mins lunch before leaving Frimley - then travel to Ash for 1 pm meeting.

### Q7 Solution 2

|          |                   |                             |
|----------|-------------------|-----------------------------|
| 9 am     | Arrives at Cove   | Leaves for Hook 30 mins     |
| 9.30 am  | Arrives Hook      | Inventory 2 hr 30 mins      |
| 12 noon  | Leaves Hook       | Travels to Ash 30 mins      |
| 12.30 pm | Arrives Ash       | Lunch break 30 mins         |
| 1 pm     | Meets client Ash  | Two house visits total 1 hr |
| 2 pm     | Leaves Ash        | Travels to Frimley 15 mins  |
| 2.15 pm  | Arrives Frimley   | Maintenance check 1 hr      |
| 3.15 pm  | Leaves Frimley    | Travels to Cove 30 mins     |
| 3.45 pm  | Arrives Cove      | Office work 1 hr 30 mins    |
| 5.15 pm  | Workday finished. |                             |

### Notes for Solution 2 Variation

They could take 30 mins for lunch in Hook before travelling to Ash for 1 pm meeting.

**PLEASE NOTE THESE ARE EXAMPLES OF OPTIMUM SOLUTIONS NOT THE ONLY ACCEPTABLE 'CORRECT' SOLUTIONS.**

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