gateway qualifications

Functional Skills

Maths – Level 2

Sample

Mark Scheme and Marking Guidance

The following documents are included in this marking guidance:

- General marking guidance and assessment principles.
- Mark schemes and guidance.

Assessment Code: FSML2AB/P

General Marking Guidance

- 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.

Allowable responses

All of the following are Allowable types of responses.

- Writing initials of objects
- Drawings or symbols
- Drawing lines to show position or matches
- Evidence of counting
- Marking in any way to indicate choices.

Applying the Mark Scheme

- The mark scheme states the marks awarded for the process and the answer. In most questions the majority of marks are awarded for the process the candidate uses to reach an answer. The most likely processes used by candidates are given. However, if the candidate gives different evidence for a correct process you should award the mark(s).
- If working is crossed out and still legible, then it should be marked, as long as it has not been replaced by alternative work.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 the candidate shows more than one set of working, then you should mark the one you consider to be closest to the mark scheme.
- If it appears that the candidate has misread the question, marks can still be awarded for applying the correct process.
- 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.
- Where transcription errors occur and the candidate presents a correct answer in working, but writes it incorrectly on the answer line, mark the better answer.
- **Error carried forward** marks (**ecf**) 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.
- 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 (£) 256.40 indicates that the units do not have to be stated for the mark to be awarded.

- **Correct money notation** (**cmn**) 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
  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 as '**oe'** – 'or equivalent'. 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.
- **Parts of questions**: because most Functional Skills questions are unstructured and open, you should be prepared to award marks for answers that are not in their expected position e.g. an answer expected in a later part of a question may be given earlier in the candidate's response.

Using the mark scheme

- apply the mark scheme methodically
- most mark points are single. However, where required:
    - initially apply the unshaded section for each question
    - if this is not achieved, then work down the shaded rows until you find the right mark
    - if none of the shaded sections are met then award 0 for that part of the mark scheme.

Section A - Prizes and probability

Question	Answer	Marks	Skills
1	Calculates the sum of all items on list to work out total cost of buying prizes: (£)97.17	1	A
	Interprets that: only 18 prizes in total therefore need two more prizes	1	I
	Interprets that: extra prizes chosen as bubble bath (@99p as is cheapest)	1	I
	Represents the calculation to find total cost: (£)97.17 + 2((£)0.99) Allow: ecf from miscalculation of cost of prizes on list **and/or** addition of two other prizes rather than bubble baths	1	R
	Calculates total cost of 20 prizes: £99.15 cmn Allow: ecf from miscalculation of cost of prizes on list **and/or** addition of two other prizes rather than bubble baths	1	A
2	Interprets that: each 10 tickets will have two winning numbers /that end in 0 and 5	1	I
	Interprets that for 20 prizes she will need: 2 (winning numbers) x 10 (tickets)	1	I
	Calculates that for a 1 in 5 chance of winning one of 20 prizes: 5 x 20 = 100 (tickets)	1	A
3	Represents the calculation to work out the probability: 20 (prizes)/80 (remaining tickets) Allow: ecf from miscalculation of total number of tickets in **Q2**	1	R
	Calculates probability: ¼ or 1 in 4 or 0.25 or 25% Allow: ecf from miscalculation of total number of tickets in **Q2**	1	A

4	Calculates total amount of money taken: (100(tickets) /4(tickets each time) x (£)5 = (£)125 Allow: ecf from miscalculation of total number of tickets in **Q2**	1	A
	Calculates profit: (£)125 – (£)99.15 = £25.85 Allow: ecf from **Q1** as total spent on prizes Allow: ecf from miscalculation of total number of tickets in **Q2**	1	A
5(a)	Complete valid check of any original calculation seen in **Q4** using a different method to the one shown: e.g. a reverse calculation **OR** a calculation using estimated / approximate values	1	A
5(b)	Explains why check was effective, for example: My estimation is close to the answer I found therefore effective **OR** Check is above the original answer which is as I expected because I rounded up **OR** I reversed the calculation by dividing my answer by 25 (lots of 4 tickets) and multiplying this by 4 (tickets in a set). This gave me the 100 tickets. Allow: oe	1	I
6	Represents probability of heads or tails: ½ **OR** 1 in 2 **OR** 0.5 **OR** 50:50 **OR** 50%	1	R
	Interprets that: expect that half of people win/get £2/Sam loses £2 whilst other half of people lose/Sam gains £1 (inequality)	1	I
7	Interprets that: 2012 is incorrect	1	I
	Interprets that: 2015 is incorrect	1	I
8	Interprets that: each fete is a separate event/discrete variable/discontinuous variable (even though time is continuous)	1	I
	Interprets that: Yes, Ali is correct	1	I
		Total for Section A = 20 marks	

Section B - Water!			
Question	**Answer**	**Marks**	**Skills**
1	Represents the calculations to find the volume of water used per week for **all** events: *baths* 4/20 x $1m^3$ *washing machine* 4/16 x $1m^3$ *showers* 7/28 x $1m^3$ *toilet* 55/111 x $1m^3$ Allow: use of fraction without $1m^3$	2	R
	Represents the calculations to find the volume of water used per week for **two** events: *baths* 4/20 x $1m^3$ *washing machine* 4/16 x $1m^3$ *showers* 7/28 x $1m^3$ *toilet* 55/111 x $1m^3$ Allow: use of fraction without $1m^3$	(1)	(R)
	Calculates the volume of water used per week for each event: *baths* 0.2(m^3) **or** 1/5 (m^3) *washing machine* 0.25(m^3) **or** 1/4 (m^3) *showers* 0.25(m^3) **or** 1/4 (m^3) *toilet* 0.5(m^3) **or** ½ (m^3)	1	A
	Represents the calculation to find the total volume of water used per week: 0.2(m^3) + 0.25(m^3) + 0.25(m^3) + 0.5(m^3) **OR** 1/5 (m^3) + 1/4 (m^3) + 1/4 (m^3) + ½ (m^3) Allow: ecf from miscalculations of volume of water used per week for each event	1	R
	Calculates the volume of water used in a week: 1.2m^3 Allow: ecf from miscalculations of volume of water used per week for each event	1	A

2	Represents the calculation to find cost of using the total cost of water by meter per week: $1.2m^3$ x (£)5.35 Allow: ecf from miscalculation of weekly water use from **Q1**	1	R
	Calculates the total cost of water by meter per week = (£)6.42 Allow: ecf from miscalculation of weekly water use from **Q1**	1	A
	Represents the calculation to find annual costs from current monthly costs: (£)36.55 x 12 months (= (£)438.60)	1	R
	Represents the calculation to find metered (weekly) costs to annual: (£)6.42 x 52 weeks (= (£)333.84) Allow: ecf from miscalculation of weekly water use from **Q1**	1	R
	Calculates saving: (£)438.60 - (£)333.84 per year = £104.76 Allow: ecf from miscalculation of weekly water use from **Q1** cmn	1	I
	Interprets that: Yes, (she will save money)	1	I
3	Interprets that other relevant further information is required: For example: It would be useful to know what else she uses water for so that the savings I worked out would be closer to reality. I would like more information on how much it costs to fit a water meter – this might need to be taken away from the savings.	2	I
	Interprets that: there is a degree of uncertainty as all facts are not known	(1)	(I)

4	Converts cm to m or cm^3 to m^3 at any point Allow: from values used in calculation	1	R
	Represents equation by inputting all values: $v = 22/7 \times (0.30(m))^2 \times 1.2(m)$ Allow: 3.14 or 3.1428 or 3.143 for π	2	R
	Represents equation with one error: e.g. uses diameter instead of radius	(1)	(R)
	Calculates volume in m^3: $0.339(m^3)$ Allow: 339 428.57(cm^3) Allow: 339 428.6(cm^3) **or** 339 429(cm^3)	1	A
	Converts m^3 or cm^3 to litres to get answer: 339 litres Allow: 339.43 litres	1	R
		Total for Section B = 18 marks	

Section C - Youth Club

Question	Answer	Marks	Skills
1	Interprets that: 0.5m of each side can be discounted for the fence Allow from calculation of area using 3(m) x 3(m)	1	I
	Interprets that: each side of the area can have 7 seedlings Allow: from values used in calculation	1	I
	Represents the calculation to find the number of seedlings: 7 x 7	1	R
	Calculates the number of seedlings: 49 (seedlings) Allow: ecf from miscalculation of number of seedlings per side	1	A
2	Calculates perimeter/length of fence: 4(3.5) = 14(m) Allow: oe, e.g. calculation of area of fence on one side: 3.5(m) x 1.25(m) = 4.375(m^2)	1	A
	Represents the calculation to find area by using height of fence: 14(m) x 1.25(m) Allow: ecf from miscalculation of perimeter Allow: oe, e.g. represents calculation of area of all 4 sides: 4 x 4.375(m^2)	1	R
	Calculates area: 17.5m^2 Correct units must be used	1	A

3	Calculates the number of tins of paint required: $17.5(m^2) / 5(m^2) = 3.5$(tins) Allow: ecf from miscalculation of area of fence from **Q2**	1	A
	Interprets that: you can't buy 0.5 of a tin of paint / you will need to buy 4 tins of paint Allow: from value used in cost calculation Allow: ecf from miscalculation of number of tins of paint only if correctly **rounded up**	1	I
	Calculates cost: 4 (tins of paint) x (£)14.99 = £59.96 Allow: ecf from miscalculated number of tins of paint cmn	1	A
4(a)	A complete correct check of any original calculation seen in **Q3** using a different method e.g. a reverse calculation **OR** a calculation using approximate values	1	A
4(b)	Explains why check was effective, for example: My estimation is close to the answer I found therefore effective **OR** Check is above the original answer which is as I expected because I rounded up **OR** I started with my answer and did a reverse calculation (by dividing by £14.99) and ended up with 4 tins of paint. This 4 tins came from rounding up the 3.5 tins I had in my answer. So I reversed the first calculation and ended up with $17.5m^2$. Allow: oe	1	I
			Total for Section C = 12 marks

Item Breakdown Grid Level 2

Section A – Prizes and Probability													
Question	**Skills standards**	**Coverage and Range**											
		a	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**	**l**
1	R, A, I	■	■										
2	A, I	■			■								■
3	R, A	■	■										■
4	A	■	■		■								
5(a)	A	■	■		■								
5(b)	I	■	■		■								
6	R, I	■			■								■
7	I									■	■		
8	I									■	■	■	

Section B – Water!													
Question	**Skills standards**	**Coverage and Range**											
		a	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**	**l**
1	R, A	■	■						■				
2	R, A, I	■	■						■				
3	I											■	
4	R, A	■	■			■		■	■				

Section B – Youth Club													
Question	**Skills standards**	**Coverage and Range**											
		a	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**	**l**
1	R, A, I	■		■					■				

2	R, A												
3	A, I												
4(a)	A												
4(b)	I												

Functional Skills Criteria for Mathematics – Ofqual – Level 2

Skills standards	Coverage and range	Assessment weighting
Representing 1. Understand routine and non-routine problems in familiar and unfamiliar contexts and situations. 2. Identify the situation or problems and identify the mathematical methods needed to solve them. 3. Choose from a range of mathematics to find solutions.	a) Understand and use positive and negative numbers of any size in practical contexts; b) Carry out calculations with numbers of any size in practical contexts, to a given number of decimal places; c) Understand, use and calculate ratio and proportion, including problems involving scale; d) Understand and use equivalences between fractions, decimals and percentages; e) Understand and use simple formulae and equations involving one- or two-step operations; f) Recognise and use 2D representations of 3D objects; g) Find area, perimeter and volume of common shapes; h) Use, convert and calculate using metric and, where appropriate, imperial measures; i) Collect and represent discrete and continuous data, using ICT where appropriate; j) Use and interpret statistical measures, tables and diagrams, for discrete and continuous data, using ICT where appropriate; k) Use statistical methods to investigate situations; l) Use probability to assess the likelihood of an outcome.	30-40%
Analysing 4. Apply a range of mathematics to find solutions. 5. Use appropriate checking procedures and evaluate their effectiveness at each stage.		30-40%
Interpreting 6. Interpret and communicate solutions to multi-stage practical problems in familiar and unfamiliar contexts and situations. 7. Draw conclusions and provide mathematical justifications.		30-40%