

Mark Scheme (Results)

May 2017

Functional Skills Mathematics Level 2

FSM02

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**FUNCTIONAL SKILLS (MATHEMATICS)
MARK SCHEME – LEVEL 2 – MAY 2017**

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- If working is **crossed out and still legible**, then it should be marked, as long as it has not been replaced by alternative work.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

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- **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 **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.

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Section A: Swimming Pool

Question	Skills Standard	Process	Mark	Mark Grid	Evidence																							
Q1	R2	Begins to work with constraints	1 or	A	One trainer assigned to at least 2 different correct sessions with correct time duration (with/without breaks) OR One type of session assigned to at least 2 correct trainers with correct time duration (with/without breaks)																							
	A4	Improves solution	2 or	AB	Two trainers assigned to at least 2 different correct sessions with correct time duration (with/without breaks) OR Two types of sessions assigned to at least 2 correct trainers with correct time duration (with/without breaks)																							
	I6	Fully correct schedule	3	ABC	Fully correct schedule seen One Example <table border="1" style="margin-left: 20px;"> <thead> <tr> <th></th> <th>Session</th> <th>Trainer</th> </tr> </thead> <tbody> <tr> <td>9.00-10.00</td> <td>C</td> <td>K</td> </tr> <tr> <td>10.05-10.50</td> <td>A</td> <td>K</td> </tr> <tr> <td>10.55-11.40</td> <td>A</td> <td>R</td> </tr> <tr> <td>11.45-13.15</td> <td>G</td> <td>R</td> </tr> <tr> <td>13.20-14.50</td> <td>G</td> <td>R</td> </tr> <tr> <td>14.55-15.55</td> <td>C</td> <td>T</td> </tr> <tr> <td>16.00-16.45</td> <td>A</td> <td>T</td> </tr> </tbody> </table>		Session	Trainer	9.00-10.00	C	K	10.05-10.50	A	K	10.55-11.40	A	R	11.45-13.15	G	R	13.20-14.50	G	R	14.55-15.55	C	T	16.00-16.45	A
	Session	Trainer																										
9.00-10.00	C	K																										
10.05-10.50	A	K																										
10.55-11.40	A	R																										
11.45-13.15	G	R																										
13.20-14.50	G	R																										
14.55-15.55	C	T																										
16.00-16.45	A	T																										
Total marks for question			3																									

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Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q2(a)	R1	Full process to find total cost for 11 months	1	D	$69.99 \times 11 (=769.89)$ oe Allow use of 70
	R2	Process to begin to find the discount	1 or	E	$0.3 \times 150 (=45)$ oe OR $(100 - 30) \div 100 (=0.7)$ oe
	A4	Full process to find the discounted price	2	EF	$0.7 \times 150 (=105)$ oe OR $150 - '45' (=105)$
	A4	Full process to find total cost or figures to compare	1	G	'769.89' + '105' (=874.89) OR $900 - '769.89' - '105' (=25.11)$ OR $900 - '769.89' (=130.11)$
	I7	Valid conclusion with accurate figures	1	H	Yes AND (£)874.89 or (£)875 OR Yes AND (£)25.11 or (£)25 OR Yes AND (£)130(.11) and (£)105
Q2(b)	R3	Begins working with mean	1 or	J	$('118' + '122' + '116' + '130') \div 4 (=121.5)$ oe OR $('128' + '116' + '118' + '118' + '124') \div 5 (=120.8)$ oe
	A4	Full process to find figures to compare	2 or	JK	$('118' + '122' + '116' + '130') \div 4 (=121.5)$ oe AND $('128' + '116' + '118' + '118' + '124') \div 5 (=120.8)$ oe
	I7	Correct answer with accurate figures	3	JKL	Yes AND 121.5 and 120.8 (seconds) OR Yes AND 2(mins) 1.5(secs) and 2(mins) 0.8(secs) OR Yes AND 2.025 and 2.013.. (mins)
	A5	Valid check	1	M	e.g. reverse calculation or alternative method
Total marks for question			9		

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Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q3	R1	Process to find total volume of water in the pool	1	N	$20 \times 8 \times 1.8 (=288)$
	R3	Begins the process to work with proportion	1 or	P	e.g. $'288' \div 50 (=5.76)$ OR $5000 \div 300 (=16.66..)$ OR $5000 \div 4 (=1250)$ OR Build up method e.g. 300, 600, 900, 1200, 1500 (at least 5 values)
	A4	Full process to find figures to compare	2 or	PQ	e.g. $'5.76' \times 300 \times 4 (=6912)$ OR $'288' \div 50 (=5.76)$ and $5000 \div 300 \div 4 (=4.166..)$ OR $'5.76' \times 300 (=1728)$ and $5000 \div 4 (=1250)$ OR $5000 \div '5.76' \div 300 (=2.89..)$ OR $5000 \div '5.76' \div 4 (=217.01..)$
	I7	Valid decision with accurate figures	3	PQR	No AND 6912 (grams) OR No AND 5(.76) and 4(.16..) (lots of 300 g per week) OR No AND 1728 and 1250 (grams per week) OR No AND 2(.89..) (weeks) OR No AND 217(.01..) (g) (per 50 m ³ available)
Total marks for question			4		

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Section B: Loft

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q4	R2	Converts between m ² and sq ft	1	A	$53.52 \times 10.76 (=575.8752)$ OR $600 \div 10.76 (=55.76..)$ May be seen in subsequent working
	I6	Begins the process to find total BTU needed	1 or	B	'14000' \times 1.1 (=15400) oe OR $18000 - (3 \times 600) (=16200)$ Allow any BTU figure from the table for this mark
	A4	Full process to find BTU figures to compare	2 or	BC	'15400' + (3 \times 600) (=17200) OR '16200' \div 1.1 (=14727.27..) OR Allow any BTU figure from the table for this mark
	I7	Valid decision with accurate figures	3	BCD	No/Yes AND 17200 (BTU) OR No/Yes AND 14727(.27..) and 14000 (BTU) No/Yes AND 55(.76) (m ²)
Total marks for question			4		

FUNCTIONAL SKILLS (MATHEMATICS)
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Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q5(a)	R3	Process to find missing length	1	E	$5.1 - 3.4 (=1.7)$
	A4	Engages with area	1 or	F	e.g. $2.7 \times 3.4 (=9.18)$ oe OR $5.1 \times 2.7 (=13.77)$ oe OR $0.5 \times 2.7 \times '1.7' (=2.295)$ oe
	R2	Full process to find area of wall	2	FG	'9.18' + '2.295' (=11.475) oe OR '13.77' - '2.295' (=11.475) oe If FG awarded, award E.
	A4	Full process to find figures to compare	1 or	H	'11.475' $\times 3 \div 16$ (=2.15..) OR '11.475' $\times 3$ (=34.425) and 16×2 (=32) OR $16 \times 2 \div 11.475$ (=2.78..) OR '11.475' $\times 3 \div 2$ (=17.21..)
	I7	Valid decision with accurate figures	2	HJ	No AND [2.15, 2.2] (litres) OR No AND [34, 34.425] and 32 (m ²) OR No AND 2(.78..) (number of times it can be painted) OR No AND 17(.21..) (m ² per litre)
	A5	Valid check	1	K	Valid check e.g. reverse calculation or alternative method or estimation

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Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q5(b)	R1	Begins to work with time	1 or	L	$25 + 4 \times 60 + 2 \times 25 (=315 \text{ or } 5\text{hr } 15 \text{ min})$ OR $2 \times 25 + 4 (=4\text{hr } 50 \text{ min})$ oe OR $6 - 12.30 (=5\text{h } 30\text{min})$ oe OR Adds at least 2 times to 12.30 e.g. $12.30 + 25 + 4$ (hrs) OR Subtracts at least 2 times from 6 pm e.g. $6 - 25 - 25$ Allow $2 \times 25 + 4 \times 60 + 2 \times 25 (=340 \text{ or } 5\text{hr } 40\text{min})$
	A4	Full process to find figures to compare	2 or	LM	e.g. $12.30 + '5\text{h } 15\text{min}' (=17.45)$ oe OR $6 - '5\text{h } 15\text{min}' (=12.45)$ OR $25 + 4 \times 60 + 2 \times 25 (=315 \text{ or } 5\text{hr } 15 \text{ min})$ and $6 - 12.30 (=5\text{h } 30\text{min})$ oe OR Allow $2 \times 25 + 4 \times 60 + 2 \times 25 (=340 \text{ or } 5\text{hr } 40\text{min})$ and $6 - 12.30 (=5\text{h } 30\text{min})$ oe
	I7	Valid decision with accurate figures	3	LMN	No AND 5.45 (pm) oe OR No AND 12.45(pm) oe OR No AND 5(hrs) 15(min) and 5(hrs) 30(min) oe Allow No AND 5hrs 40 min and 5(hrs) 30(min) oe OR No AND 6.10 (pm) oe OR No AND 12.20 (pm) oe Allow use of any acceptable time notation
Total marks for question			9		

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Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q6	R2	Begins to work with scale	1 or	P	Rectangle with one side 4.5 sq or 7.5 sq OR Rectangle with sides at least 1.5 sq by 2.5 sq at least 3 squares above the floor or at least 1 square below the window OR $75 \div 20 (=3.75)$ or $45 \div 20 (=2.25)$
	A4	Develops solution	2 or	PQ	Rectangle 4.5 sq by 7.5 sq OR Rectangle with sides in ratio 3 to 5 at least 3 squares above the floor and at least 1 square below the window
	I6	Fully correct answer	3	PQR	Rectangle 4.5 sq by 7.5 sq and at least 3 squares above the floor and at least 1 square below the window
Total marks for question			3		

Examples of a fully correct answer at the bottom

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Section C: Boat

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q7(a)	R1	Begins to draw a graph or chart	1 or	A	One of: suitable labels completes linear scale accurate plotting
	I6	Improves solution	2 or	AB	Two of: suitable labels completes linear scale accurate plotting
	I6	Fully correct graph or chart	3	ABC	All of: suitable labels (minimum labels J, J, A, (20)15, (20)16, income or euros (€)) completes correct linear scale accurate plotting (allow 1 sq tolerance)

Examples of a fully correct answer at the bottom

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Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q7(b)	I6	Fully substitutes in the formula	1	D	$990 + 70 \times (14 - 6)$ (=1550) oe OR '804.22..' + '56.86..' $\times (14 - 6)$ (=1259.13..)
	R3	Begins the process to find the discounted total	1 or	E	e.g. '1550' $\div 5$ (=310) oe OR '1259.13..' $\div 5$ (=251.82..) oe
	R2	Full process to find the discounted total	2	EF	e.g. '1550' $\div 5 \times 4$ (=1240) oe OR '1259.13..' $\div 5 \times 4$ (=1007.31..) oe
	A4	Converts between £ and euros	1	G	e.g. '1240' $\div 1.231$ (=1007.31..) OR '88.57' $\div 1.231$ (=71.95..) OR $990 \div 1.231$ (=804.22..) or $70 \div 1.231$ (=56.86..) OR '1550' $\div 1.231$ (=1259.13)
	A4	Process to find cost per passenger	1	H	e.g. '1007.31..' $\div 14$ (=71.95..) OR '1240' $\div 14$ (=88.57..)
	I6	Correct figures in correct money notation	1	J	£71.95 or £71.96 (in correct money notation)
Total marks for question			9		

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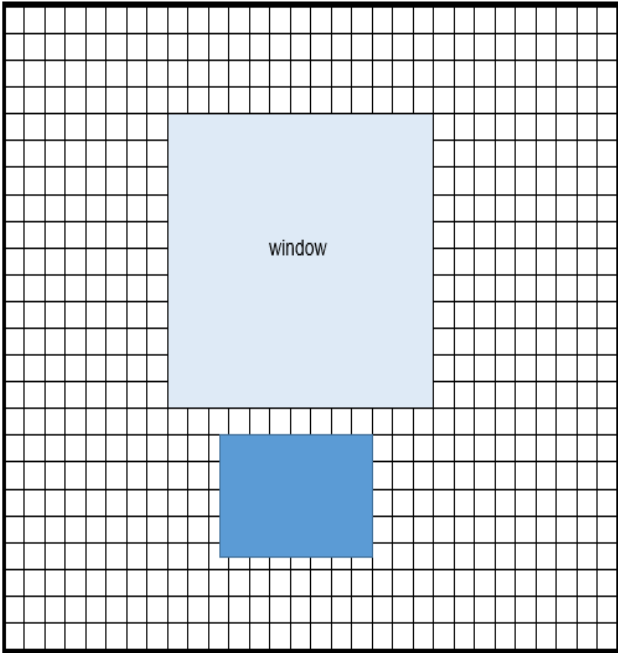
Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q8	R2	Process to find profit or proportion of costs	1 or	K	$382\,000 - 291\,500 (=90\,500)$ oe OR $291500 \div 382000 (=0.763..)$ oe
	A4	Process to find proportion	2 or	L	'90 500' \div 382 000 (=0.2369..) oe OR '90 500' \div 382 000 \times 100 (=23.69...) oe OR $1 - 0.763 (=0.237)$ oe
	I6	Accurate percentage to 1 decimal place	3	LM	23.7(%)
Total marks for question			3		

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Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q9(a)	R1	Process to start conversion	1 or	N	$67 \times 4.54 (=304.18)$ OR $67 \times 7 (=469)$
	A4	Full process	2 or	NP	'304.18' $\times 7 (=2129.26)$ OR '469' $\times 4.54 (=2129.26)$
	I6	Accurate figure	3	NPQ	2129(.26 litres) OR 2130 (litres)
Q9(b)	A5	Valid reason	1	R	Valid reason e.g. he should take some extra e.g. any less fuel and he won't be able to travel
Total marks for question			4		

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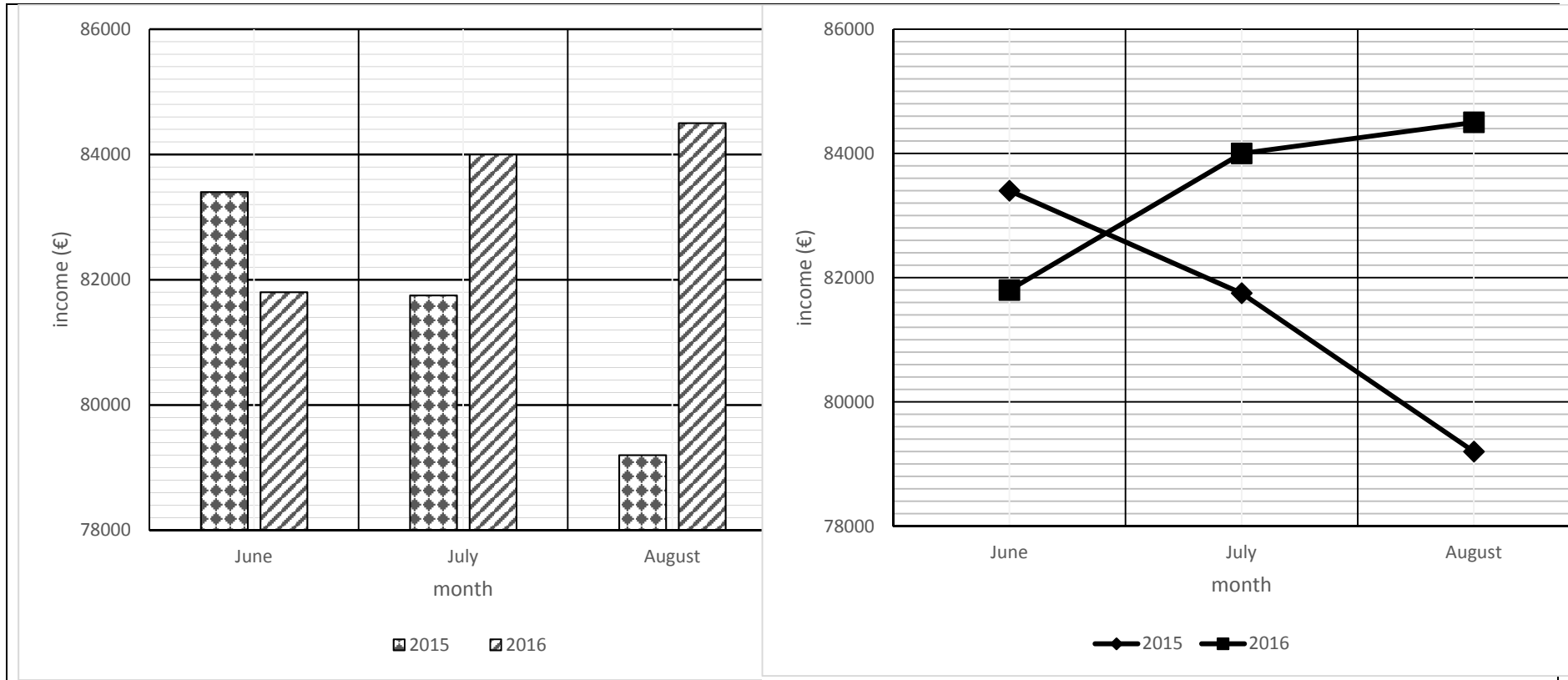
Q6 Example of a fully correct answer



Scale 1 : 10

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Q7(a) Examples of a fully correct answer



Ofqual



Llywodraeth Cynulliad Cymru
Welsh Assembly Government



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