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Mark Scheme (Results)

June 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- If working is **crossed out and still legible**, then it should be marked, as long as it has not been replaced by alternative work.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÷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 (2 mm tolerance)
	2 or	2 of: linear scale(s), labels, plotting (2 mm tolerance)
	3	all of: linear scale(s), labels, 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,** 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. Candidate's scale must be in numerical order.
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: Holiday

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q1(a)	R1	Finds the cost of 7 nights at the hotel or discount for 1 night	1	A	116 × 7 (=812) **OR** 116 × 0.09 (=10.44)
	R2	Develops solution	1 or	B	'812' × 0.09 (=73.08) oe **OR** 116 × 0.91 (=105.56) oe
	A4	Complete process to find hotel cost after discount	2	BC	'812' – '73.08' (=738.92) **OR** '812' × 0.91 (=738.92) o.e. **OR** '105.56' × 7 (=738.92)
	R3	Finds cost of flights, luggage and insurance or amount remaining	1 or	D	287 × 2 + 17.49 × 2 + 20.75 (=629.73) **OR** 1200 – (287 × 2 + 17.49 × 2 + 20.75) (=570.27) **OR** accept 287 × 2 + 17.49 + 20.75 (=612.24) **OR** 1200 – (287 × 2 + 17.49 + 20.75) (=587.76) **OR** 287 × 4 + 17.49 × 2 + 20.75 (=1203.73) **OR** 1200 – (287 × 4 + 17.49 × 2 + 20.75) (=(–) 3.73)
	A4	Process to find total cost of holiday or amount remaining	2 or	DE	'629.73' + '738.92' (=1368.65) **OR** 1200 – '738.92' (=461.08) **OR** '612.24' + '738.92' (=1351.16) **OR** '1203.73' + '738.92' (=1942.65)
	I7	Correct conclusion with accurate figures	3	DEF	No **and** (£)1368.65 **OR** No **and** (£)570.27 **and** (£)738.92 **OR** No **and** (£)629.73 **and** (£)461.08

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q1(b)	R3	Process to find exchange rate from pounds to euros or from euros to pounds	1 or	G	200 ÷ 153.12 (=1. 306 …) **OR** 153.12 ÷ 200 (=0.7656..)
	A4	Uses exchange rate to find amount in euros or amount in pounds	2 or	GH	250 × '1. 306 …' (=326.5…) **OR** 320 × '0.7656..' (=244.9…) **OR** 250 ÷ '0.7656..' (=326.5…) **OR** 320 ÷ '1. 306 …' (=244.9…)
	I7	Correct conclusion with accurate figures	3	GHJ	Yes **and** (€)[324, 329] **OR** Yes **and** (£)[243, 247]
	A5	Valid check	1	K	Check using reverse calculation, estimation or alternative method e.g. 1. 306 … × 153.12 (=200)
Q1(c)	R1	Begins to engage with at least 3 times	1 or	L	Calculates with 3 of: 10:45, 2 hrs 25 mins, + 20, − 35, 1 hour E.g. 10.45 + 2 hrs 25 mins + 1 hr (= 14.10) o.e. **OR** 2 hrs 25 mins + 20 – 35 (=2 hrs 10 mins)
	A4	Full process to find local time	2 or	LM	E.g. '14.10' + 20 – 35(=13:55) o.e. **OR** 10.45 + '2 hrs 10 mins' + 1 (=13.55) o.e.
	I6	Correct answer in correct time notation	3	LMN	13.55 **OR** 1.55 pm
Total marks for question			**13**		

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q2	R3	Starts to work with distance, speed or time	1 or	P	14 ÷ 40(=0.35) **OR** 60 ÷ 20 (=3)
	A4	Full process to find figures to compare	2 or	PQ	'0.35' × 60 (=21 mins) **OR** 14 × '3' (=42 km/h) **OR** 40 ÷ '3' (=13.33…. km) **OR** 14 ÷ 40(=0.35) **and** 20 ÷ 60(=0.33…)
	I7	Correct conclusion with accurate figures	3	PQR	E.g. No **and** (it would take) 21 (mins) **OR** No **and** (av speed would need to be) 42 (km/h) **OR** No **and** (distance would need to be) 13(.33..) (km) **OR** No **and (**it would take) 0.35 (hrs) **and** (20 mins is) 0.33 (hrs) Yes **and** 21 (mins) is close to 20 (mins)
		Total marks for question	**3**		

Section B: Recycling centre

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q3	A4	Engages with problem	1	A	Identifies 4 (2 hour) sessions are required for the training **OR** Identifies 2 days are needed
	R2	Begins to schedule training	1 or	B	Designs a program for Monday with two or three sessions scheduled with start and finish times
	R1	Develops solution	2 or	BC	Designs a program for Monday with two or three correct sessions scheduled with start and finish times **AND** allocates 1 hour lunch **AND** starts at 10 and finishes before 5 **OR** Fully correct schedule for 2 days with 1 error or omission allow breaks correctly scheduled separately outside 2 hour block and/or correctly scheduled separate 1 hour sessions for B and C marks only
	I7	Fully correct solution	3	BCD	Fully correct schedule for 2 days with lunch on both days **AND** includes 90 minute assessment after the training on day 2 (Accept Mon/Tues or Day 1/Day 2, etc.) **NB** Possible solution at the end of the mark scheme
Total marks for question			**4**		

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q4	R2	Begins to work with fraction	1 or	E	4478 ÷ 8 (=559.75) oe **OR** $\frac{1}{8} + 1 \left(= \frac{9}{8}\right)$ oe, could be implied in later working
	A4	Full process to find final figure	2 or	EF	4478 + '559.75' (=5037.75) **OR** 4478 × 9 ÷ 8 (=5037.75)
	I6	Accurate figure	3	EFG	5037 or 5038 or 5031 **or** 5040 (from earlier rounding or truncating of 559.75)
	A5	Valid check	1	H	Check using reverse calculation, estimation or alternative method
Total marks for question			**4**		

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q5(a)	R3	Full process to calculate mean or find comparable totals	1	J	(771 + 880 + 1161 + 1108 + 956 + 1130 + 1208 + 1184) ÷ 8(=1049.75) **OR** 771 + 880 + 1161 + 1108 + 956 + 1130 + 1208 + 1184 (=8398) **and** 1000 × 8(=8000) **OR** (771 + 880 + 1161 + 1108) ÷ 4 (=980) **OR** (956 + 1130 + 1208 + 1184) ÷ 4 (=1119.5) **OR** (771 + 956) ÷ 2 (=863.5) **OR** (880 + 1130) ÷ 2 (=1005) **OR** (1161 + 1208) ÷ 2 (=1184.5) **OR** (1108 + 1184) ÷ 2 (=1146)
	A4	Full process to calculate range	1	K	1208 – 771 (=437) **OR** 1161 – 771 (=390) **OR** 1208 – 956 (=252) **OR** 956 – 771 (=185) **OR** 1130 – 880 (=250) **OR** 1208 – 1161 (=47) **OR** 1184 – 1108 (=76)
	I7	Correct conclusion with consistent and accurate figures	1	L	e.g. Yes **and** 1049.75 **or** 1050 **and** 437 **OR** Yes **and** 8398 **and** 8000 **and** 437 **OR** Yes **and** 980 **and** 1119.5 (or 1120) **and** 390 **and** 252 **OR** Yes / No **and** 863.5 (or 864) **and** 1005 **and** 1184.5 (or 1185) **and** 1146 **and** 185 **and** 250 **and** 47 **and** 76 Accept No supported by accurate figures

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q5(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: quarter 1 – quarter 4, 2014, 2015, number of families Tolerance for plotting ± 1 square **NB** Possible comparative bar chart at the end of the mark scheme

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q5(c)	I6	Makes one comment about one year	1 or	Q	e.g. In 2014 the numbers increased until quarter 3 then decreased e.g. the range in 2014 was 390
	I7	Makes a complex, comparative statement about the 2 years	2	QR	e.g. in both years the numbers increased until quarter 3 then decreased e.g. the numbers in 2015 were more consistent as the range in 2014 was 390 and in 2015 was 252 e.g. in 2015 the number for each quarter is bigger than the number for the corresponding quarter in 2014
Total marks for question			**8**		

Section C: The wedding

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q6	R2	Starts to work with conversion factor	1 or	A	E.g. 55 ÷ 0.3 (=183.33..) **or** 25 × 0.3 (=7.5) **or** 40 × 0.3(=12)
	A4	Process to find combination of lengths	2 or	AB	'183.33..' ÷ 40 (=4.583..) lengths of 40 feet **OR** '183.33..' ÷ 25 (=7.33..) lengths of 25 feet **OR** 55 ÷ '7.5' (=7.33..) **OR** 55 ÷ '12' (=4.583..) **OR** Finds combination of lengths using calculations to at least 55 m or 183.33… feet e.g. 4 × 12 + 7.5 (=55.5) **or** 5 × 12(=60) **or** 4 × 40 + 25(=185)
	I7	Indicates valid combination with supporting accurate figures	3	ABC	E.g. [183, 184] (feet) **AND** 4 lengths of 40 feet and 1 length of 25 feet **OR** 5 lengths of 40 feet **OR** any other valid combination
	A5	Evaluates the effectiveness of their answer	1	D	E.g. Comments on more efficient to buy the longer lengths **or** comments on how close their answer is to 55 m, etc.
		Total marks for question	**4**		

examples of valid combinations			
5 × 40	= 200	2 × 40 + 5 × 25	= 205
4 × 40 + 1 × 25	= 185	1 × 40 + 6 × 25	= 190
3 × 40 + 3 × 25	= 195	8 × 25	= 200

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q7(a)	R2	Uses consistent units	1	E	E.g. 0.085 (kg) **or** 500 (g) **or** 0.595 (kg) may be seen in subsequent working
	A4	Full process to work out figures to compare	1 or	F	E.g. (3 + 2 + 2) × 85 (=595) oe **OR** '500' ÷ (3 + 2 + 2) (=71.42...) oe **OR** '500' – (3 × 85) – (2 × 85) (=75) **OR** (3 + 2 + 1) × 85 (=510) oe
	I7	Correct conclusion from accurate figures	2	FG	E.g. No **and** 595(g) oe **OR** No **and** (list would need to be) 71(.42… g of plain flour) **OR** No **and** 75 available, need 170 g for last tier **OR** No **and** 95(g) short
Q7(b)	R1	Begins to substitute into formula	1 or	H	3.14×15^2 (=706.5) **OR** 2 × 3.14× 15 × 11 (=1036.2)
	A4	Completes substitution	2 or	HJ	'706.5' + '1036.2' (=1742.7) oe
	I6	Correct conclusion from accurate figures	3	HJK	Yes **and** [1742, 1744] (cm^2) Accept 1700 from correct process NB Using π in full, answer is 1743.58…(cm^2)
Total marks for question			**6**		

Question	Skills Standard	Process	Mark	Mark Grid	Evidence
Q8	R1	Measures an appropriate length	1 or	L	17.5 (cm) o.e. **OR** 13 (cm) oe **OR** 3.5 (cm) oe
	A4	Identifies scale factor	2 or	LM	E.g. 7 ÷ 3.5(=2) **OR** 3500 ÷ 17.5 (=200) may be implied by subsequent working
	I7	Process to find one dimension of marquee for the scale drawing	3	LMN	15 ÷ 2(=7.5) oe **OR** 12 ÷ 2(=6) oe May be seen on diagram
	R1	Draws a rectangle on the plan	1	P	Draws any rectangle in correct orientation next to the wall (± allow gap of up to 5mm)
	I6	Engages with constraints	1	Q	Draws any rectangle at least 1 cm from the circle (± 2mm)
	I6	Fully correct rectangle	1	R	Draws rectangle with lengths 7.5cm and 6cm (± 2mm) NB Award LMN if this mark is awarded
Total marks for question			**6**		

Example training programme for question 3

Time	Monday 5th September
10 am – 12 pm	session 1
12 pm – 1 pm	**Lunch**
1 pm – 3 pm	session 2
3 pm – 5 pm	session 3

Time	Tuesday 6th September
10 am – 12 pm	session 4
12 pm – 1 pm	**Lunch**
1 pm – 2.30 pm	Assessment

Day 1 has 5.25 hours training
Day 2 needs 7 – 5.25 hours of training i.e. one session plus 90 minute assessment

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