AQA

GCSE
MATHEMATICS

2023 PRACTICE PAPER SET 2 Foundation Tier Paper 3
Mark Scheme

8300/3F

Version 1.1

Principal Examiners have prepared these mark schemes for specimen papers. These mark schemes have not, therefore, been through the normal process of standardising that would take place for live papers.

Further copies of this Mark Scheme are available from aqa.org.uk

Glossary for Mark Schemes

GCSE examinations are marked in such a way as to award positive achievement wherever possible. Thus, for GCSE Mathematics papers, marks are awarded under various categories.

If a student uses a method which is not explicitly covered by the mark scheme, the same principles of marking should be applied. Credit should be given to any valid methods. Examiners should seek advice from their senior examiner if in any doubt.

M	Method marks are awarded for a correct method which could lead to a correct answer.
A	Accuracy marks are awarded when following on from a correct method. It is not necessary to always see the method. This can be implied.
B	Marks awarded independent of method.
ft	Follow through marks. Marks awarded for correct working following a mistake in an earlier step.
SC	Special case. Marks awarded within the scheme for a common misinterpretation which has some mathematical worth.
M dep	A method mark dependent on a previous method mark being awarded.
B dep	A mark that can only be awarded if a previous independent mark has been awarded.
oe	Or equivalent. Accept answers that are equivalent. eg accept 0.5 as well as $\frac{1}{2}$
[*a*, *b*]	Accept values between *a* and *b* inclusive.
3.14 …	Allow answers which begin 3.14 eg 3.14, 3.142, 3.1416
Use of brackets	It is not necessary to see the bracketed work to award the marks.

Examiners should consistently apply the following principles

Diagrams

Diagrams that have working on them should be treated like normal responses. If a diagram has been written on but the correct response is within the answer space, the work within the answer space should be marked. Working on diagrams that contradicts work within the answer space is not to be considered as choice but as working, and is not, therefore, penalised.

Responses which appear to come from incorrect methods

Whenever there is doubt as to whether a student has used an incorrect method to obtain an answer, as a general principle, the benefit of doubt must be given to the student. In cases where there is no doubt that the answer has come from incorrect working then the student should be penalised.

Questions which ask students to show working

Instructions on marking will be given but usually marks are not awarded to students who show no working.

Questions which do not ask students to show working

As a general principle, a correct response is awarded full marks.

Misread or miscopy

Students often copy values from a question incorrectly. If the examiner thinks that the student has made a genuine misread, then only the accuracy marks (A or B marks) up to a maximum of 2 marks are penalised. The method marks can still be awarded.

Further work

Once the correct answer has been seen, further working may be ignored unless it goes on to contradict the correct answer.

Choice

When a choice of answers and/or methods is given, mark each attempt. If both methods are valid then M marks can be awarded, but any incorrect answer or method would result in marks being lost.

Work not replaced

Erased or crossed out work that is still legible should be marked.

Work replaced

Erased or crossed out work that has been replaced is not awarded marks.

Premature approximation

Rounding off too early can lead to inaccuracy in the final answer. This should be penalised by 1 mark unless instructed otherwise.

Q	Answer	Mark	Comments
1(a)	75	B1	
1(b)	$\frac{3}{10}$	B1	
2	40	B1	
3	20 – at least one of the values or 3.99 + 1.49 + 1.49 + 2.29 or 9.26	M1	oe
	10.74	A1	
	0.5 × their 10.74	M1	
	5.37	A1ft	ft M1A0M1
4	Any 2 squares shaded	B1	
5(a)	–2.3	B1	
	–2.8	B1ft	ft their chosen card
5(b)	(+)2.3	B1	
	–2.8	B1ft	
6(a)	$\frac{1}{6}$	B1	oe fraction, decimal or percentage SC1 both fractions correct but given in words
	$\frac{2}{6}$ or $\frac{1}{3}$	B1	
	Additional Guidance		
	1 out of 6 and 1 out of 3		SC1
	Accept decimals or percentages rounded or truncated to 2 sf or better		

Q	Answer	Mark	Comments
6(b)	Both conditions met eg 3, 4, 4, 4, 6	B2	B1 five numbers with one condition met eg 4, 4, 4, 5, 6 3, 3, 4, 4, 7
	Additional Guidance		
	Allow fractions or decimals with a sum of 9 with three 4's eg 3.5, 4, 4, 4, 5.5		B2
7	8.8 ÷ 4 or 2.2	M1	
	their 2.2 × 5 or their 2.2 + 8.8	M1dep	
	11	A1	
8(a)	(8, 8) plotted	B1	Need not be labelled
8(b)	isosceles and right-angled	B2	B1 both correct and 1 incorrect or 1 correct (and 1 incorrect)
8(c)	1 : 2 or 0.5 : 1	B2	B1 3 : 6
9(a)	$\frac{2}{3}$	B1	oe fraction
9(b)	18 ÷ 2 (× 3) or 9 × 3 or $\frac{1}{3} = 9$	M1	oe
	27	A1	

Q	Answer	Mark	Comments
10(a)	$2(x-2)$	B1	
10(b)	$\frac{x}{5} = 10 - 1$ or $\frac{x}{5} = 9$ or $x + 5 = 50$	M1	
	x = their 9 × 5 or x = their 50 – their 5	M1	
	45	A1	
11	100 cm = 1 m and 1000 m = 1 km or 1 km = 100 000 cm or 2 × 200 000 or 400 000 or 200 000 ÷ 100 000 or 200 000 cm = 2 km	M1	Conversions can be seen or implied
	4	A1	
12(a)	–2 and 2	B1	
12(b)	2	B1ft	ft provided at least one negative answer in **(a)**
	0 next then all positive	B1ft	oe ft provided at least one negative answer in **(a)**
	Additional Guidance		
	If both terms are negative in **(a)** then must circle 'more than 4' in **(b)**		

Q	Answer	Mark	Comments
13	2 different mistakes identified	B2	B1 for each different mistake identified from It should be a straight line Point (0, 1) plotted incorrectly Two 3s on x-axis Axes not labelled Line not labelled ($y = x + 1$)
	Additional Guidance		
	Accept equivalent statements		
14	$\pi \times 5^2$	M1	Accept [78.5, 78.55]
	$\pi \times 5^2 \div 4$	M1dep	oe
	[19.62, 19.64] or 19.6	A1	Accept $\frac{169}{16}\pi$ Accept 20 with no incorrect working
15	500 × 0.03 or 15 or 500 × 1.03 or 515 or 3(%) × 2 = 6(%)	M1	oe
	500 × 0.03 × 2 or 15 × 2 or 500 × 0.06 or 530	M1	oe
	30	A1	
	Additional Guidance		
	Answer of 530 with or without 30 seen in working		M1M1A0
	Condone 500 × 1.03^2 for the first mark		M1M0A0

Q	Answer	Mark	Comments
16	**Alternative method 1**		
	18 ÷ 3 or 6	M1	
	their 6 ÷ 3 or 2	M1dep	
	their 2 × their 6 or 12	M1dep	
	180	A1	SC2 56
	Alternative method 2		
	18 ÷ 3 or 6	M1	
	their 6 ÷ 3 or 2	M1dep	
	their 2 × 5 or 10	M1dep	
	180	A1	SC2 56
	Additional Guidance		
	Special case is for the perimeter which implies 10 used		SC2
17	**Alternative method 1**		
	2× 5 or 10	M1	
	their 10 + 3 or 13	M1	their 10 cannot be 2
	(their 13 + 7) ÷ 4 or 20 ÷ 4	M1	
	5	A1	SC3 8
	Alternative method 2		
	$\frac{n+3}{5}=2$	M1	oe
	$(n=)\ 2\times 5+3$ or $(n=)\ 13$	M1	
	(their 13 + 7) ÷ 4 or 20 ÷ 4	M1	
	5	A1	SC3 8

Q	Answer	Mark	Comments
17 cont	**Additional Guidance**		
	Special case is for $((2 + 3) \times 5 + 7) \div 4$		SC3
	13 implies the first two marks		M1M1
18(a)	($\angle$PCD or $\angle$BAD =) 180 – 110 or 70 or ($\angle$CDA =) 110 or ($\angle$APB =) 50 or ($\angle$PDA or $\angle$DPC =) 180 – 95 – 50 or 35	M1	May be on diagram
	($\angle$PCD =) 180 – 110 or 70 and ($\angle$DPC =) 180 – 95 – 50 or 35 or ($\angle$CDA =) 110 and ($\angle$PDA =) 180 – 95 – 50 or 35	M1	May be on diagram
	75	A1	
	Additional Guidance		
	The angle being calculated must be clear from the diagram or working		
18(b)	20	B1	
19	$10.35 \leqslant t < 10.45$	B2	B1 1 correct bound
	Additional Guidance		
	Accept correct use of recurring decimals for 10.45		
20(a)	$\frac{5}{8}$	B1	oe

Q	Answer	Mark	Comments
20(b)	**Alternative method 1**		
	$20 \div 5$ or 4 or $5 \div 20$ or $\frac{1}{4}$ or $8 \div 5$ or $\frac{8}{5}$ or $5 \div 8$ or $\frac{5}{8}$	M1	oe
	32	A1	
	Alternative method 2		
	$\frac{20}{y} =$ their $\frac{5}{8}$	M1	oe
	32	A1ft	ft their cos x from **(a)**
	Alternative method 3		
	$\cos^{-1}$ (their $\frac{5}{8}$) or [51.3, 51.4]	M1	This could be on the diagram or seen in part **(a)**
	32	A1ft	ft their cos x from **(a)**
21	3×21 or 63	M1	
	4×22 or 88	M1	
	their 88 – their 63	M1dep	dependent on M2
	25	A1	
22(a)	3	B1	
22(b)	–5 or (0, –5)	B1	

Q	Answer	Mark	Comments
23(a)	0	B1	
23(b)	4×4 or 16	M1	May be implied from a diagram or as the denominator of a fractional answer
	7 (and 7) and 8 or 3	M1	May be shown by exactly three outcomes above 6 in a list, grid or table or as the numerator of a fractional answer
	$\frac{3}{16}$ or 0.1875 or 18.75%	A1	oe fraction, decimal or percentage
	Additional Guidance		
	For M1, their (sample space) diagram or table may be blank		
	A 4×4 grid with correct values for at least the three numbers over 6 seen or implied. This may be ticks or other indication in the right position on a (sample space) diagram		M1M1

24	**Alternative method 1 – Eliminating c**		
	$3a - a = 46 - 24$ or $2a = 22$	M1	oe elimination of one variable
	$a = 11$	A1	oe
	$c = 6.50$	A1	Oe (condone 6.5 as answer)
	Alternative method 2 – Eliminating a		
	$6c - 2c = 39 - 13$ or $4c = 26$	M1	oe elimination of one variable
	$c = 6.50$	A1	oe (condone 6.5 as answer)
	$a = 11$	A1	oe

Q	Answer	Mark	Comments
24 cont	**Alternative method 3 - Substitution**		
	$3 \times (24 - 2c) + 2c = 46$ or $72 - 4c = 46$ or $4c = 26$	M1	oe substitution of one variable
	$c = 6.50$	A1	oe (condone 6.5 as answer)
	$a = 11$	A1	oe
	Additional Guidance		
	$a = 11$ and $c = 6.50$		M1A1A1
	One correct value with one incorrect value (or no second value) and no working eg $a = 11$ and $c = 3.20$ or eg $a = 11$		M1A1A0
	Embedded, correct values in both equations eg $3 \times 11 + 2 \times 6.5 = 46$ and $11 + 2 \times 6.5 = 24$		M1A1A0
	Embedded, correct values in one equation only eg $3 \times 11 + 2 \times 6.5 = 46$		M1M0A0

Q	Answer	Mark	Comments
25	**Alternative method 1**		
	$\frac{\pi \times 3.6 \times 1.2}{4}$ or [3.39, 3.4]	M1	
	$\frac{\text{their}\left[3.39,3.4\right]}{1.2 \times 3.6}$ (× 100) or [0.785, 0.787] or 0.79	M1dep	
	[78.5, 78.7] or 79	A1	
	Alternative method 2		
	$\frac{\pi \times 3.6 \times 1.2}{4}$ or [3.39, 3.4]	M1	
	$\frac{1.2 \times 3.6 - \text{their}\left[3.39,3.4\right]}{12 \times 3.6}$ (× 100) or [21.3, 21.6] or 21	M1dep	
	[78.5, 78.7] or 79	A1	
	Additional Guidance		
	[0.784, 0.785) or [78.4, 78.5) implies M2 – the value may be outside the limits for A1 due to premature rounding		
	Clear statement or intention to convert pi/4 to a percentage implies M2		

Q	Answer	Mark	Comments
26	**Alternative method 1**		
	32 + 368 or 400	M1	
	$\frac{32}{\text{their } 400}$ or 0.08	M1	oe eg 8%
	8% and the (company) A is correct or Two correct comparable values and (company) A is correct	A1	eg 0.08 and 0.04 $\frac{32}{400}$ and $\frac{16}{400}$ 32 : 400 and 16 : 400
	Alternative method 2		
	32 + 368 or 400	M1	
	$\frac{\text{their } 400}{32}$ or 12.5	M1	
	Two correct comparable values and (company) A is correct	A1	eg 12.5 and 25 $\frac{400}{32}$ and $\frac{400}{16}$ 300 : 32 and 300 : 16
	Alternative method 3		
	32 + 368 or 400	M1	
	0.04 × their 400	M1dep	
	16 from correct method and 32 and (company) A is correct	A1	
	Additional Guidance		
	In alt 2, 12.5% and 25% instead of 12.5 and 25 cannot get the accuracy mark		M1M1A0
	32/368 and 8.7% and A is correct		M0M1A1