GCSE
MATHEMATICS
8300/1F

Foundation Tier Paper 1 Non-Calculator

Mark scheme

June 2024

Version: 1.0 Final

2 4 6 G 8 3 0 0 / 1 F / M S

Mark schemes are prepared by the Lead Assessment Writer and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all associates participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every associate understands and applies it in the same correct way. As preparation for standardisation each associate analyses a number of students' scripts. Alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

No student should be disadvantaged on the basis of their gender identity and/or how they refer to the gender identity of others in their exam responses.

A consistent use of 'they/them' as a singular and pronouns beyond 'she/her' or 'he/him' will be credited in exam responses in line with existing mark scheme criteria.

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 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.
[a, b)	Accept values a $\leqslant$ value < b
3.14 …	Accept 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.

Continental notation

Accept a comma used instead of a decimal point (for example, in measurements or currency), provided that it is clear to the examiner that the student intended it to be a decimal point.

Q	Answer	Mark	Comments
1(a)	40	B1	condone 040

Q	Answer	Mark	Comments
1(b)	624	B2	B1 answer ending with units digit 4 or addition method from 438 with no more than one error or shows correct "borrowing" with no more than one error

Q	Answer	Mark	Comments
2(a)	200	B1	accept two hundred

Q	Answer	Mark	Comments
2(b)	8000	B1	accept eight thousand

Q	Answer	Mark	Comments
2(c)	24 ÷ 8 or 3 or 5 ÷ 8 or 0.625 or 8 ÷ 5 or 1.6 or 24 × 5 or 120 or 24 ÷ 8 × 5 or 24 : 15	M1	oe eg $\frac{5}{8} \times 24$
	15	A1	
	Additional Guidance		
	8 – 5 = 3		M0

Q	Answer	Mark	Comments
3(a)	50	B1	

Q	Answer	Mark	Comments
3(b)	$\frac{3}{4} \times 16$ or 12 or $\frac{1}{4} \times 16$ or 4	M1	oe may be seen as 10 more or 12 more squares shaded on diagram
	10	A1	
	Additional Guidance		
	Allow any indication of shading		
	$\frac{12}{16}$ or $\frac{4}{16}$	M1	

Q	Answer	Mark	Comments
4(a)	6.92	B1	first answer
	7.18	B1	second answer

Q	Answer	Mark	Comments
4(b)	–5 and 4	B1	either order first answer
	–10 and –2	B1	either order second answer

Q	Answer	Mark	Comments
5(a)	line Q and line S	B1	either order, may be indicated on the diagram

Q	Answer	Mark	Comments
5(b)	(0, 3), (1, 2), (2, 1) and (3, 0) plotted with no other points plotted on the grid	B2	B1 at least two of (0, 3), (1, 2), (2, 1) and (3, 0) plotted with up to two other points plotted on the grid or at least four points plotted that would lie on the line $x + y = 3$ where each x and y are not all integers, with no other points plotted on the grid or all four correct coordinates given but not plotted, with no additional coordinates
	Additional Guidance		
	Mark intention		
	Line joining the four correct points with only the four correct points plotted		B2
	Line connecting the four correct points but without points plotted		B1

Q	Answer	Mark	Comments
6(a)	9	B1	

Q	Answer	Mark	Comments
6(b)	12	B1	accept ±12

Q	Answer	Mark	Comments
6(c)	16	B1	

Q	Answer	Mark	Comments
7(a)	SP MP with no others	B1	oe accept in words
	Additional Guidance		
	Any indication, any order		
	Do not ignore repeats		

Q	Answer	Mark	Comments
7(b)	A trial of at least 3 portions involving small and large with correct total seen or 24 and 20 chosen or 4 × 6 (= 24) and 2 × 10 (= 20)	M1	eg 2 × 6 + 10 = 22 or 3S and 2L is 38
	4 small and 2 large	A1	
	Additional Guidance		
	Ignore incorrect trials if a correct trial or the correct answer is seen		
	Any unambiguous indication eg 2L 4S		M1A1
	5 × 6 + 2 × 10 = 54		M0

Q	Answer	Mark	Comments	
8	9 × 25 or 225	M1	oe in pounds	
	1000 – their 225 or 775	M1	oe in pounds their 225 must be less than 1000 775 implies M1M1	
	their 775 ÷ 60 or 12.(9…) or method to get to within one multiple of 60 for their 775 or 720 or 780	M1	oe in pounds their 775 must be less than 1000 and bigger than 60 allow one error in any build-up method 775 ÷ 60 implies M1M1M1	
	12 with no errors in working	A1		
	Additional Guidance			
	Allow mixed units for method marks			
	For build-up or build-down allow one error eg1 1000 – 250 = 750, 60, 120, 180, 240, 300, 360, 420, 480, 540, 600, 660, 720 answer 12			M0M1M1A0
	eg2 9 × 25 = 125, 1000 – 125 = 885, 60, 120, 180, 240, 300, 360, 420, 480, 540, 600, 660, 720, 760, 820, 880 answer 14			M1M1M1A0
	eg3 9 × 25 = 225, 1000 – 225 = 775, 60, 120, 180, 240, 300, 360, 420, 480, 520, 580, 640, 700, 760 answer 13			M1M1M1A0
	eg4 9 × 25 = 225, 1000 – 225 = 775, 715, 655, 595, 535, 475, 415, 375, 315, 255, 195, 135, 75, 15 answer 13			M1M1M1A0
	eg5 9 × 25 = 250, 10 × 60 = 600, 2.50 + 600 = 8.50, 9.10, 9.70 answer 12 (the 750 is implied)			M1M1M1A0

Q	Answer	Mark	Comments
9(a)	(Alina range) 14	B1	
	(Sue median) 21	B1	SC1 14 and 21 not correctly assigned

Q	Answer	Mark	Comments
9(b)	Alina and valid reason involving range	B1ft	eg Alina and lower range ft their range for Alina
	Additional Guidance		
	Quoted values must be correct for their part (a)		
	Condone "spread" for "range"		
	Part (a) Alina range 21 then indicates Sue, with Her range is lower		B1ft
	Any reason involving median		B0
	Alina, her scores are close(r) together (no mention of range)		B0
	No range calculated in part (a)		B0

Q	Answer	Mark	Comments
10	Method for finding 1% or a multiple of 5% or 1200 × 35 or 42 000 or 0.35	M1	may be implied by a correct value
	Fully correct method that would lead to the correct answer	M1dep	
	420	A1	SC2 780 SC1 digits 42
	Additional Guidance		
	Values or methods assigned to a percentage must be correct		
	Ignore a % sign after answer		

Q	Answer	Mark	Comments
11(a)	2 × 6 or 12 or 1700	M1	oe
	17(.00)	A1	accept 1700p

Q	Answer	Mark	Comments
11(b)	9.5 or $9\frac{1}{2}$ or valid reason	B1	eg shows that 9 windows cost £23 and 10 windows cost £25 or you can't have half a window
	Additional Guidance		
	Calculated values must be correct		
	(19, 21,) 23, 25 (, 27…)		B1
	Even number + 5 can't be even / can't end in a 4		B1
	There's no whole number you can times by 2 to get to 19 There's no number you can times by 2 to get to 19		B1 B0
	Even + 5 = odd, 24 is even Even + 5 = odd		B1 B0
	Costs are all always odd numbers, 24 is even Costs are all always odd numbers		B1 B0
	19 is a prime number and so doesn't divide exactly by 2 19 is a prime number		B1 B0

<table>
<tr><th>Q</th><th>Answer</th><th>Mark</th><th>Comments</th></tr>
<tr><td rowspan="8">12</td><td>Two comparable values
and
Y</td><td>B2</td><td>B1 attempts to convert both to comparable form with at least one non-given value correct
eg $\left(\frac{7}{20}\text{ and }\right)\frac{8}{20}$ or $\frac{1.75}{5}$ $\left(\text{and }\frac{2}{5}\right)$
or
0.35 and 0.4
or
35% and 40%
or two values in the ratio 7 : 8</td></tr>
<tr><td colspan="3">Additional Guidance</td></tr>
<tr><td colspan="2">Accept two comparable values for “not red”
$\frac{13}{20}$ and $\frac{12}{20}$ and Y
$\frac{13}{20}$ and $\frac{12}{20}$
$\frac{13}{20}$ only</td><td>B2
B1
B0</td></tr>
<tr><td colspan="2">Two comparable values and $\frac{2}{5}$ on answer line
35% and 40%, answer 40% (implies bag Y)</td><td>B2
B2</td></tr>
<tr><td colspan="2">8 and Y</td><td>B2</td></tr>
<tr><td colspan="2">200 discs in each bag, 70 and 80, answer Y
200 discs in each bag, 70 (one non-given value correct)
70 and 50 (number of discs in each bag not specified)</td><td>B2
B1
B0</td></tr>
<tr><td colspan="2">35% and 20% (attempt to convert each to a percentage)
35% only</td><td>B1
B0</td></tr>
</table>

Q	Answer	Mark	Comments
13(a)	240 ÷ (1 + 3) or 240 ÷ 4 or 60	M1	oe
	180	A1	
	Additional Guidance		
	240 ÷ 4 and 240 ÷ 3 is choice unless the answer comes from 240 ÷ 4		
	60 : 180 or 180 : 60 with no answer chosen		M1A0

Q	Answer	Mark	Comments
13(b)	$\frac{5}{14}$	B1	oe fraction
	Additional Guidance		
	5 : 14		B0

Q	Answer	Mark	Comments
14(a)	61	B1	

Q	Answer	Mark	Comments
14(b)	40.87	B1	

Q	Answer	Mark	Comments
14(c)	4095 + 63 or 4221 – 63 or (4095 + 4221) ÷ 2 or 8316 ÷ 2 or Valid attempt to multiply 63 by 66 with no conceptual error	M1	oe from traditional method their 378 + their 3780 or their 198 + their 3960 with at least one correct and placeholder of zero correct or implied from grid method their 3600 + their 360 + their 180 + their 18 (at least three correct) from Chinese / Napier's bones method at least three values correct from 1/8, 1/8, 3/6 and 3/6 and total calculated for each diagonal with at least one carrying figure placed correctly
	4158	A1	

Q	Answer	Mark	Comments
15	6	B1	

Q	Answer	Mark	Comments
16	All 3 correct boxes indicated Odd Even Cannot tell	B3	in that order B1 for each correct box
	Additional Guidance		
	Allow any unambiguous indication eg crosses in all 3 correct boxes with all other boxes blank	B3	
	More than one box ticked in a row	B0	

Q	Answer	Mark	Comments
17	$39 - 10$ or 29	M1	oe
	their $29 - 10$ or 19 or $19n$	M1dep	oe $39 - 10 - 10$ implies M1M1 (3rd term =) 48 implies M1M1 may be implied by the difference, after their 2nd term, consistently being the correct 19 $19n$ may be seen as part of $19n + b$
	their $29 + 3 \times$ their 19 or $10 + 4 \times$ their 19 or substitutes $n = 5$ into expression of the form their $19n + b$	M1dep	oe (4th term =) 67 implies M1M1M1 b must be an integer
	86	A1	SC1 107 or 137 using Fibonacci SC1 126 using difference of 29
	Additional Guidance		
	3rd mark must be a correct method for working out the 5th term		
	Going past the 5th term eg 10, 29, 48, 67, 86, 105, without answer 86		M1M1M1A0
	$10 + 19 = 39$ 10, 39, 58, 77, 96 (not the correct 19 being added)		M0

Q	Answer	Mark	Comments
18	$\frac{1}{2} \times 20 \times 6.3$	M1	oe
	63	A1	
	Additional Guidance		
	Ignore units		

Q	Answer	Mark	Comments
19	$\begin{pmatrix} 3 \\ -7 \end{pmatrix}$	B1	
	Additional Guidance		
	Condone + sign and/or fraction line eg $\begin{pmatrix} +3 \\ -7 \end{pmatrix}$	B1	
	(3, –7)	B0	

Q	Answer	Mark	Comments
20(a)	8350	B1	

Q	Answer	Mark	Comments
20(b)	8449	B1	

Q	Answer	Mark	Comments
21a	At least 3 points correctly plotted	M1	$\pm\frac{1}{2}$ square
	All 4 points correctly plotted and joined with straight lines	A1	$\pm\frac{1}{2}$ square lines may be dashed
	Additional Guidance		
	Mark intention for straight lines		
	Condone one continuous, smooth curve		
	Ignore the graph before 2015 and after 2022		
	Ignore a line of best fit		

Q	Answer	Mark	Comments
21b	[82, 90]	B1	
	Additional Guidance		
	Answer in range with or without working, with no graph or incorrect graph		B1

Q	Answer	Mark	Comments
22a	Correct statement	B1	eg she used the height instead of the slant height or she used the vertical height or she used 12 (instead of 13)
	Additional Guidance		
	Check diagram		
	For 'vertical' accept anything that implies she has used the wrong height		
	Condone 'length' to mean 'height' or 'slant height'		
	12 or 13 circled on the diagram must be accompanied by a supporting statement		
	Indicates '12' in the calculation		B1
	She should have done $\pi \times 5 \times 13$		B1
	It should be 65π		B1
	She used the wrong height / the (value of) l is wrong		B1
	She hasn't used the slant height (she used the (vertical) height)		B1
	She hasn't used the 13		B1
	She hasn't used the 13 and should be $5 \times 12 \times 13 \times \pi$		B0
	The multiplication used the wrong number(s)		B0
	She hasn't used a value for π		B0
	An incorrect statement with a correct statement eg she used 13 instead of 12 and didn't square the radius		B0

Q	Answer	Mark	Comments
22b	$\pi \times 5 \times 5$ or 25π or $3 \times 5 \times 5$	M1	oe accept [3.14, 3.142] or $\frac{22}{7}$ for π
	75	A1	
	Additional Guidance		
	$\pi 25$		M1

Q	Answer	Mark	Comments
22c	'More than' indicated or implied by statement and valid reason	B1	eg valid reasons 3.14 is greater (than 3) Beth's number is bigger (than Adam's) (the correct answer is) 78.5 (with their answer to (b) less than 78.5)
	Additional Guidance		
	If calculations are used, the outcomes must be correct		
	Accept 78 or 79 for 78.5 unless from incorrect working		
	'Less than' indicated		B0
	Do not penalise use of the same incorrect formula in (b) and (c) eg $3 \times 10 = 30$ in (b) and $3.14 \times 10 = 31.4$ in (c) with 'More than' ticked		B1
	Ignore a non-contradictory reason with a correct reason eg 3.14 is bigger than 3 and nearer the true value of pi		B1
	Acceptable reasons		
	Adam has rounded (pi) down / Adam only used 3		B1
	There is an extra 0.14 to multiply by		B1
	Her number has decimal places		B1
	Her number is to more significant figures		B1
	Non-acceptable reasons		
	3.14 will give a bigger answer / 3.14 is more accurate		B0

Q	Answer	Mark	Comments
23	**Alternative method 1**		
	$\frac{1}{4} + \frac{1}{2}$ or $\frac{3}{4}$	M1	oe
	their $\frac{3}{4} \times 30$ or $\frac{90}{4}$	M1dep	oe
	$22\frac{1}{2}$ or 22.5	A1	allow 22 or 23 with correct working seen SC2 digits 225
	Alternative method 2		
	$\frac{1}{4} \times 30$ or 7.5 or $\frac{1}{2} \times 30$ or 15	M1	oe fractions or percentages
	their 7.5 + their 15	M1dep	oe
	$22\frac{1}{2}$ or 22.5	A1	allow 22 or 23 with correct working seen SC2 digits 225
	Additional Guidance		
	Using 568 ml instead of 1 pint – follow the spirit of the mark scheme		

Q	Answer	Mark	Comments
24	$7x - 4x$ or $3x$ or $4x - 7x$ or $-3x$ or $-22 - 29$ or -51 or $22 + 29$ or 51	M1	
	$3x = 51$ or $-3x = -51$	A1	$\frac{51}{3}$ or $\frac{-51}{-3}$ implies M1A1 implied by correct answer
	17	A1ft	ft M1A0 from an equation of the form $\pm 3x = a$ or $bx = \pm 51$
	Additional Guidance		
	Trial and improvement scores 0 or 3		
	If a follow through answer does not simplify to an integer, accept it as a fraction, mixed number or decimal to at least 1dp. eg from $3x = 7$ accept $\frac{7}{3}$ or $2\frac{1}{3}$ or 2.3 or better Ignore any attempt to convert a correct ft fraction	M1A0A1ft	
	Embedded answer	M1A1A0	

Q	Answer	Mark	Comments
25	$\frac{26(.0)}{16.4}$	M1	oe eg $\frac{13}{8.2}$ or $1\frac{9.6}{16.4}$
	$\frac{260}{164}$ or $1\frac{96}{164}$	A1	oe with no decimals eg $\frac{130}{82}$ or $\frac{2600}{1640}$ implied by correct answer
	$\frac{65}{41}$ or $1\frac{24}{41}$	B1ft	ft correct simplification of their fraction using the digits 26 and 164 SC2 $\frac{41}{65}$ SC1 $\frac{65}{106}$ (total area as denominator)
	Additional Guidance		
	Ignore units		
	Ignore an incorrect conversion of $\frac{65}{41}$ to a mixed number		M1A1B1
	$\frac{26(.0)}{16.4} = \frac{2600}{164} = \frac{650}{41}$		M1A0B1ft

Q	Answer	Mark	Comments
26a	Line joining open circles above, on or below –2 and 4	B1	condone arrows on a correct line with open circles
	Additional Guidance		
	Mark intention		
	If the student has drawn the circles on the line, they must have drawn their own line connecting the circles		
	Closed circle(s)		B0

Q	Answer	Mark	Comments
26b	$5y \geqslant 11 - 14$ or $5y \geqslant -3$ or $14 - 11 \geqslant -5y$ or $3 \geqslant -5y$ or $y + \frac{14}{5} \geqslant \frac{11}{5}$ or $-\frac{3}{5}$	M1	oe fractions or decimals may be seen in an equation or inequality
	$y \geqslant -\frac{3}{5}$ or $-\frac{3}{5} \leqslant y$	A1	oe fraction or decimal for $-\frac{3}{5}$
	Additional Guidance		
	Allow use of other inequality signs or = if recovered		
	Accept any letter for y		
	Condone $\frac{-3}{5}$ or $\frac{3}{-5}$ for $-\frac{3}{5}$		
	Ignore any attempt to convert $-\frac{3}{5}$ to a decimal		
	$y \geqslant -\frac{3}{5}$ in working and $-\frac{3}{5}$ on answer line		M1A0

Q	Answer	Mark	Comments
27	Enlarge(ment)	B1	
	$\frac{1}{2}$	B1	oe condone half
	(1, –7)	B1	condone missing bracket(s)
	Additional Guidance		
	For the third mark, a vector on its own does not imply a translation		
	Do not accept halved or half the size		
	Multiple transformations stated or implied		B0B0B0