GCSE
MATHEMATICS
8300/1F

Foundation Tier Paper 1 Non-Calculator

Mark scheme

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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

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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)	13	B1	

Q	Answer	Mark	Comments
1(b)	32	B1	

Q	Answer	Mark	Comments
1(c)	−4	B1	

Q	Answer	Mark	Comments
1(d)	−18	B1	

Q	Answer	Mark	Comments
2(a)	15	B1	

Q	Answer	Mark	Comments
2(b)	8	B1	

Q	Answer	Mark	Comments
2(c)	13	B1	

Q	Answer	Mark	Comments
2(d)	36	B1	

Q	Answer	Mark	Comments
3	48 ÷ 8 or 6 or 48 ÷ 2 or 24	M1	oe implied by 72 for Road
	their 6 + their 24 or their 6 × 5 or their 24 × $\frac{5}{4}$	M1dep	oe
	30	A1	SC2 20 SC1 60
	Additional Guidance		
	SC2 is for using Road SC1 is for using Lane		
	Check diagram for working		

Q	Answer	Mark	Comments
4(a)	[3.9, 4.1]	B1	

Q	Answer	Mark	Comments
4(b)	**Alternative method 1: reads off at '10' from graph**		
	[17.9, 18.1]	B2	B1 [7.9, 8.1] or their reading + 10
	Alternative method 2: uses their answer to part (a)		
	2 × their (a) or (their (a) + 5) × 2	M1	oe
	[17.9, 18.1]	A1ft	ft 2 × their (a) + 10

Q	Answer	Mark	Comments
5	8 × 43	M1	oe
	344	A1	
	349	A1ft	ft their 344 + 5 correctly evaluated with M1 awarded
	Additional Guidance		
	Trial and improvement is 0 or 3 marks		
	8 × 43.5 = 348		M0A0A0

Q	Answer	Mark	Comments
6	$200 \times 4 \div 5$ or 160 or 805 and 800	M2	oe eg $200 \div \frac{5}{4}$ M1 correct first step using one operator eg $5 \div 4$ or 1.25
	161	A1	
	Additional Guidance		
	M1 may be awarded for correct work with no answer or incorrect answer, even if this is seen amongst multiple attempts		
	Build up methods must be fully correct		

Q	Answer	Mark	Comments
7(a)	$25 \div 2$ or 12.5	M1	oe implied by 37.5
	$(25 \div 2 + 25) \div 8$ or 4(.6) or better or $(25 \div 2 + 25)$ evaluated and sight of the nearest multiple of 8 under/over their evaluation or 2.5	M1dep	oe multiple may be seen in a list
	5 with M2 awarded and no errors	A1	SC1 50 and 7
	Additional Guidance		
	SC1 is for two full-priced records		
	37.5 or 2.5 may be implied, eg 4 Saturdays is 32, need 5.5 more answer 5 (37.5 implied)		M1M1A1
	$37.5 \div 8 = 4.(6875)$ answer = 5 $37.5 \div 8 = 4.6$ answer = 5 (truncated) $37.5 \div 8 = 4.2$ answer = 5 (error in division) $37.5 \div 8 = 5.2$ answer = 5 (error in division)		M1M1A1 M1M1A1 M1M1A0 M1M1A0

Q	Answer	Mark	Comments
7(b)	It is greater than the answer to part (a)	B1	

Q	Answer	Mark	Comments
8	**Alternative method 1: uses only multiplication and division**		
	170 ÷ 4 × 10 or 170 ÷ 2 × 5	M2	oe eg 170 × 2.5 M1 correct first step using one operator eg 170 × 10 or 5 ÷ 2
	425	A1	SC2 125 or 1500
	Alternative method 2: uses addition or subtraction		
	170 ÷ 2 or 85	M1	oe
	170 × 3 – their 85 or 170 × 2 + their 85	M1dep	oe
	425	A1	SC2 125 or 1500
	Additional Guidance		
	SC2 is from working with onions or water		

Q	Answer	Mark	Comments
9(a)	$2 + 2 + 3 + 4 + 9$ or 20 or $1 + 1 + 1 + 2 + 3 + 4 + 4 + 9$ or 25	M1	oe
	20 : 25	A1	oe
	4 : 5 or 0.8 : 1 or 1 : 1.25	A1ft	ft their ratio written in its simplest form with M1 awarded if it can be simplified SC2 5 : 4
	Additional Guidance		
	SC2 is for correct ratio reversed		
	Condone any ratio simplified to unitary form, with M1 awarded, for A1ft eg1 20 : 19 answer 1 : $\frac{19}{20}$ or $\frac{20}{19}$: 1 eg2 20 : 19		M1A0A1ft M1A0A0ft
	20 : 15 simplified to 4 : 3		M1A0A1ft

Q	Answer	Mark	Comments
9(b)	$\frac{1}{5}$	B1	oe fraction, decimal or percentage
	Additional Guidance		
	Ignore simplification or conversion attempts after correct probability seen		
	Ignore use of probability words		
	1 : 5 or 1 in 5 (chance)		B0

Q	Answer	Mark	Comments
10	**Alternative method 1: substitutes first**		
	4^2 or 16 or 32 or 3×4 or 12 or 24	M1	oe implied by 28
	$2 \times (4 \times 4 + 3 \times 4)$	M1dep	oe
	56	A1	
	Alternative method 2: multiplies out first		
	$2 \times a^2$ or $2 \times 3a$	M1	oe
	$2 \times 4 \times 4 + 2 \times 3 \times 4$	M1dep	oe
	56	A1	
	Alternative method 3: factorises first		
	$2a(a + 3)$ or $2 \times a$ or $a + 3$	M1	oe
	$2 \times 4 \times (4 + 3)$	M1dep	oe
	56	A1	
	Additional Guidance		
	Inclusion of a can score a maximum of one mark eg1 $4^2 = 16$ $16 \times 2 = 32a$ eg2 $56a$		M1 only M1 only
	$2 \times 4^2 + 2 \times 3a$ is not enough for the second mark of Alt 2		M1M0A0

Q	Answer	Mark	Comments
11	Correct circle drawn	B1	mark intention, but must have been an attempt with compasses and not free-hand

Q	Answer	Mark	Comments
12(a)	240 ÷ 8 × 350	M2	oe M1 correct first step using one operator eg 240 × 350 or 84 000
	10 500	A1	

Q	Answer	Mark	Comments
12(b)	2600 ÷ (3 + 2 + 5) or 260	M1	oe
	their 260 × 5	M1dep	oe 2600 ÷ 2 implies M2
	1300	A1	SC2 780 or 520 or 6500
	Additional Guidance		
	SC2 is for working out the number of teas / hot chocolates or for the misconception that 2600 was the number of hot chocolates		
	Answer 780 : 1300 : 520		M1M1A0

Q	Answer	Mark	Comments
13	180 – 74 or 106 or $2x + 74 = 180$	M1	oe oe equation
	their 106 ÷ 2 or $x = (180 - 74) \div 2$	M1dep	oe
	53	A1	

Q	Answer	Mark	Comments
14(a)	2 or 4 or 7 or 49	M1	
	2 and 4 and 7	M1	accept 49 for 7
	57 with 2 and 4 and 7 seen	A1	accept 49 for 7 condone 60 with 2 and 4 and 7 seen
	Additional Guidance		
	Ignore multiplication and/or addition of the given numbers		
	57 from multiplication and addition of values other than 2, 4 and 7		M0M0A0

Q	Answer	Mark	Comments
14(b)	Overestimate and correct reason **or** Underestimate and used 1 and 3 and 6 in part (a) and correct reason	B1	oe eg every number rounded up
	Additional Guidance		
	Every number (was over .5 so) had to be rounded up		B1
	I rounded them up		B1
	(All) the numbers were closer to the higher number		B1
	I rounded up		B0
	The number was bigger than the real answer		B0

Q	Answer	Mark	Comments
15(a)	$20 \div 2$ (= 10)	B1	oe eg you halve it
	Additional Guidance		
	Ignore any attempt to find an area or volume		
	r is half of d		B1
	d is double r		B1
	10×2 (= 20)		B1
	$20 - 10 = 10$		B0
	Radius is smaller than diameter		B0

Q	Answer	Mark	Comments
15(b)	10^3 or $10 \times 10 \times 10$ or 1000	M1	[1300, 1334] or [3100, 3142] or [4030, 4192] implies 1000
	$\frac{4000}{3}\pi$	A1	oe in terms of π condone a multiplication sign SC1 $\frac{32000}{3}\pi$
	Additional Guidance		
	SC1 is from using diameter instead of radius		
	Accept 1333(. …) for $\frac{4000}{3}$		
	$4000\pi \div 3$ (1000 implied)		M1A0
	Ignore simplification or conversion attempts after correct answer		

Q	Answer	Mark	Comments
16(a)	$20 = \frac{800}{w}$ or $(w =) \frac{800}{d}$	M1	oe
	800 ÷ 20	M1dep	oe
	40	A1	

Q	Answer	Mark	Comments
16(b)	It is greater than the answer to part (a)	B1	

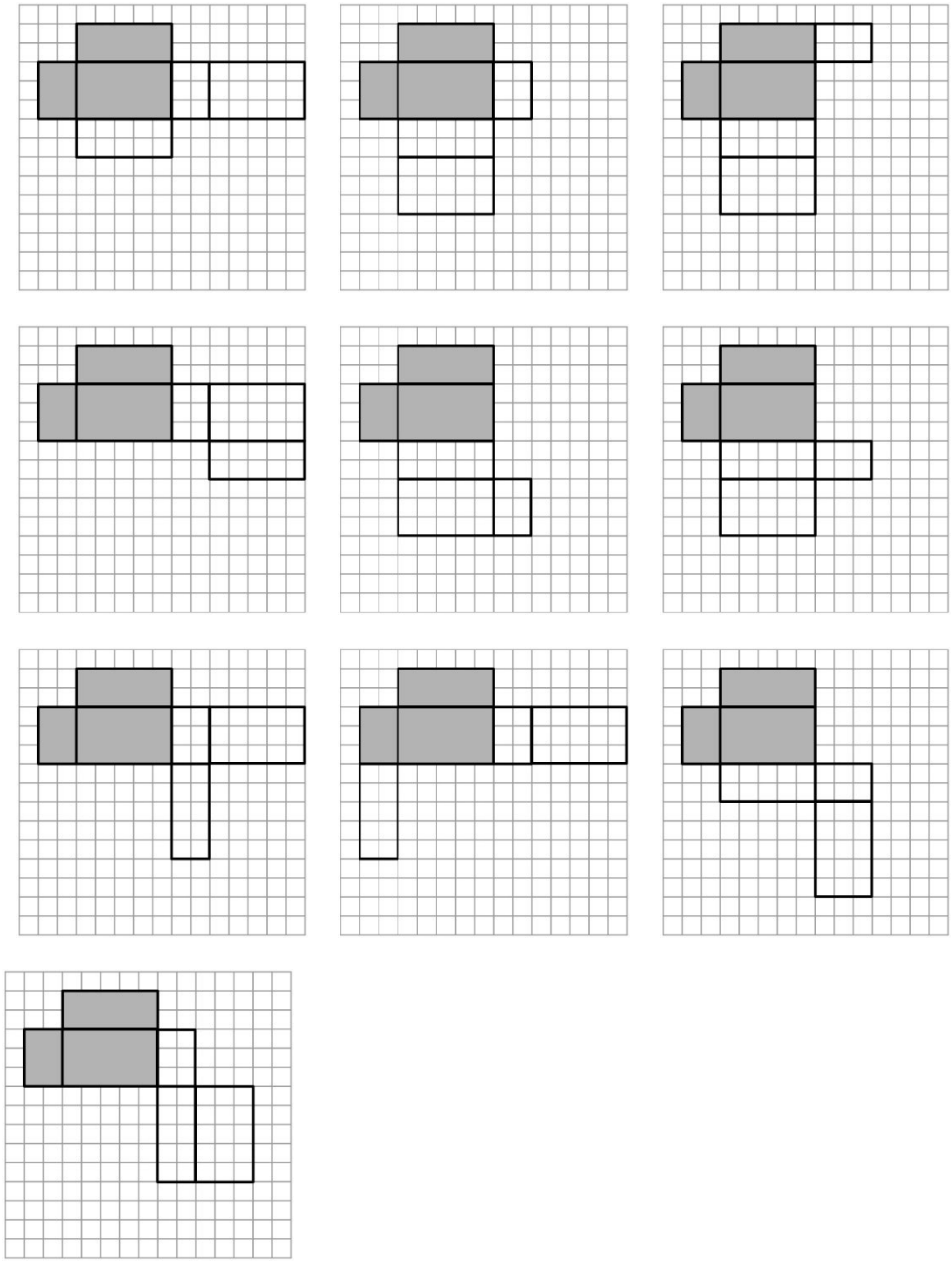
Q	Answer	Mark	Comments
17	The chord could be longer than, equal in length to or shorter than the radius.	B1	

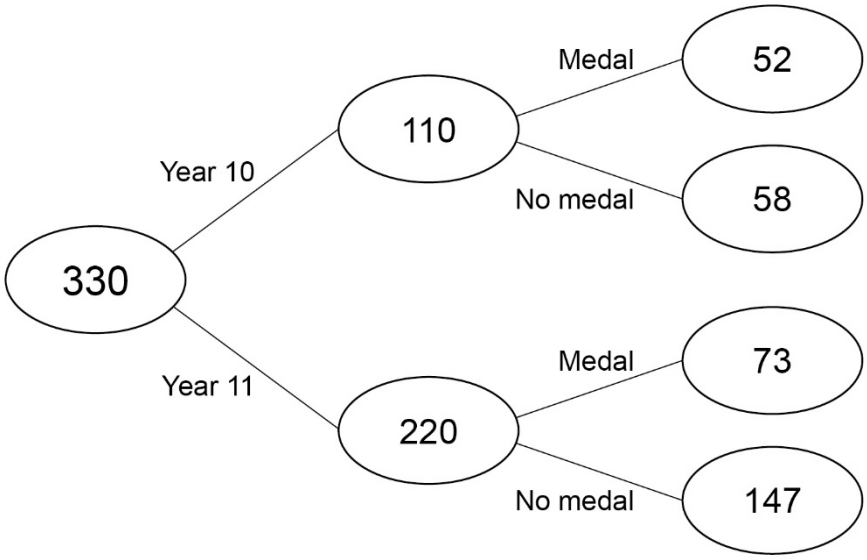
Q	Answer	Mark	Comments
18	11 × 8.5	M1	oe
	93.5	A1	oe accept 93 or 94 with 93.5 seen SC1 digits 935

Q	Answer	Mark	Comments
19	True May be true True	B3	B1 for each
	Additional Guidance		
	Any unambiguous indication, but if a tick and a cross are used in the same row, mark the tick		
	A row with more than one tick is incorrect for that row		

Q	Answer	Mark	Comments
20(a)	6×10^{-3}	B2	condone extra zeros which do not affect the value eg 6.0×10^{-3} B1 correct value not in standard form (allow value written as $a \times 10^{n}$) eg 0.006 or 0.6×10^{-2} **or** given calculation with 0.6 written as 6×10^{-1} eg $6 \times 10^{-1} \div 100$ **or** value whose only non-zero digit is 6 correctly converted to standard form answer eg $0.0006 = 6 \times 10^{-4}$
	Additional Guidance		
	$6 \times 10^{-1} \div 10^{2}$	B1	

Q	Answer	Mark	Comments
20(b)	1.2×10^{8}	B2	condone extra zeros which do not affect the value eg 1.20×10^{8} B1 120 000 000 or 120 million or 12×10^{7} or 120×10^{6} or $1.2 \times 10^{a} \times 10^{b}$ where $a + b = 8$ or value whose only non-zero digits are 12 correctly converted to standard form answer eg $12\,000\,000 = 1.2 \times 10^{7}$

Q	Answer	Mark	Comments
21	Fully correct net	B2	B1 one or two correctly sized rectangles drawn in appropriate positions
	Additional Guidance		
	Mark intention but must be wholly on the grid. Ignore any 'tabs' drawn		
	B2 examples 		

Q	Answer	Mark	Comments
22	330 ÷ (1 + 2) or 110 or 220	M1	oe
	110 in Year 10 and 220 in Year 11	A1	
	52 in Year 10 Medal and 73 in Year 11 Medal	B1	
	Year 10 Medal + Year 10 No medal = Year 10 and Year 11 Medal + Year 11 No medal = Year 11	B1ft	ft their values
	Additional Guidance		
	Diagram takes precedence		
	If the values are given as probabilities, with the required value as the numerator, withhold the first A mark or B mark		
			M1A1B1B1

Q	Answer	Mark	Comments
23	Correct method to divide by $\frac{1}{2}$	M1	implied by 0.4 or $\frac{2}{5}$ or $\frac{1}{2.5}$
	Correct method to add two fractions with different denominators	M1	implied by $\frac{7}{15}$
	$\frac{2}{3}$	A1	oe fraction eg $\frac{10}{15}$ SC2 $\frac{14}{15}$ oe fraction
	Additional Guidance		
	SC2 is from $\left(\frac{4}{15}+\frac{1}{5}\right) \div \frac{1}{2}$		
	Ignore incorrect simplification of a correct fraction to another fraction eg $\frac{10}{15}=\frac{4}{5}$		M1M1A1
	Correct answer in working but answer given as a decimal		M1M1A0

Q	Answer	Mark	Comments
24	$\frac{2}{5}$	B1	

Q	Answer	Mark	Comments
25	1	B1	

Q	Answer	Mark	Comments
26	$x^2 + 2x - 5x - 10$	M1	oe with brackets expanded four terms in any order with three correct from x^2 $(+)2x$ $-5x$ -10 terms may be seen in a grid implied by $x^2 - 3x + k$ $(k \neq 0)$ or $ax^2 - 3x - 10$ $(a \neq 0)$
	$x^2 - 3x - 130$ $(= 0)$	M1dep	oe expression/equation with brackets expanded eg $x^2 + 2x - 5x - 10 = 120$
	For their three-term quadratic, correctly factorises or correctly substitutes into the quadratic formula or correctly completes the square to the form $x = \ldots$ for their quadratic or -10 and 13	M1	do not accept $x^2 - 3x - 10$ $(= 0)$ as their three-term quadratic eg $(x + 10)(x - 13)$ $(= 0)$ eg $\frac{--3 \pm \sqrt{(-3)^2 - 4 \times 1 \times -130}}{2 \times 1}$ eg $(x =)\ 1.5 \pm \sqrt{\left(\frac{3}{2}\right)^2 + 130}$
	13	A1	SC1 31.5 oe
	Additional Guidance		
	The first and third marks may be awarded for correct work with no answer or incorrect answer, even if this is seen amongst multiple attempts		
	SC1 is for using the perimeter		
	Trial and improvement is 0, 3 (for -10 and 13) or 4 marks		