GCSE

MATHEMATICS

2023 PRACTICE PAPER SET 1 Foundation Tier Paper 2

Mark Scheme

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

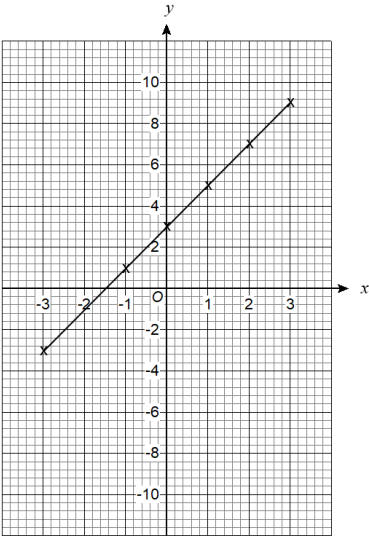Erased or crossed out work that is still legible should be marked.

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	1500	B1	
2	2	B1	
3	4	B1	
4	0.7	B2	B1 $\frac{7}{10}$ or 0.07
5	1, 2, 3, 4, 6 and 12	B2	B1 for 4 or 5 correct (and 1 incorrect)
6(a)	4	B1	
6(b)	2 + 3 + 4 + 4 + 6 + 1 + 1	M1	Allow one error or omission
	21	A1	
6(c)	7 − 1 or 1 − 7	B1	oe
7	48 × 4 or 192	M1	
	6.50 × 3 or 19.50	M1	211.50 implies M2
	their 192 + their 19.50 + 14	M1dep	
	225.50	A1	
8	[17, 21]	B2	B1 for [15, 17] or [21, 23] B1 for scale factor [9, 12]
9	0.7^3 or 0.7 × 0.7 × 0.7	M1	
	0.343	A1	

Q	Answer	Mark	Comments
10	30, 18, 2	B3	Any order B2 three numbers with two of these criteria • a multiple of 15 • two numbers in the ratio 9 : 1 • sum of 50 B1 a multiple of 15 or two numbers in the ratio 9 :1 or three numbers with a sum of 50

Q	Answer	Mark	Comments
11(a)	<table><tr><td></td><td>2</td><td>3</td><td>4</td><td>5</td></tr><tr><td>2</td><td>0</td><td>1</td><td>2</td><td>3</td></tr><tr><td>3</td><td>1</td><td>0</td><td>1</td><td>2</td></tr><tr><td>4</td><td>2</td><td>1</td><td>0</td><td>1</td></tr><tr><td>5</td><td>3</td><td>2</td><td>1</td><td>0</td></tr></table>	B2	B1 for 5 or more correct
11(b)	No and suitable explanation.	B2ft	eg 10 ways to lose and only 6 to win More ways to lose ft their table in (a) B1 for No and a comment which is correct but not complete for example There are 6 ways to win Evens would be half each or Gives a full explanation but does not make a decision B1 for the chance is unlikely

Q	Answer	Mark	Comments
12(a)	390 ÷ 37.5 or 10.4	M1	oe
	10.40	A1	
12(b)	No, their monthly pay is more and 4 × 7 = 28 and not 31	B2	oe B1 for partial working eg No, their monthly pay is more and 4 × 7 = 28 or More than 4 weeks in a month

Q	Answer	Mark	Comments
13(a)	−1 3 7 9	B2	B1 for 2 or 3 correct
13(b)	At least 2 of their points correctly plotted	M1	
	Straight ruled line drawn from (−3, −3) to (3, 9) 	A1	
13(c)	Draws the line $y = x$ on the grid or $-x = 3$ or $0 = x + 3$	M1	oe
	−3	A1	oe

Q	Answer	Mark	Comments
14	59.4 ÷ 60 or 0.99 or 5940 ÷ 60 or 99	M1	cost per song oe
	20 ÷ 1.04 or 2000 ÷ 104 or 19.2…..	M1	ft their 99 + 5
	19	A1	

Q	Answer	Mark	Comments
15	16 or 25 or 49	B2	B1 any square of 2 digits B1 any number of 2 digits whose digits add up to a prime number

Q	Answer	Mark	Comments
16	**Alternative method 1**		
	5400 × 0.27 or 1458	M1	1.27 seen
	6858	A1	
	Alternative method 2		
	5400 ÷ 10 × 2 + 5400 ÷ 10 ÷ 2 + 5400 ÷ 100 × 2 or 1458	M1	
	6858	A1	
	Alternative method 3		
	5400 ÷ 10 × 3 − 5400 ÷ 100 × 3 or 1458	M1	
	6858	A1	

Q	Answer	Mark	Comments
17	$\begin{pmatrix} 6 \\ 1 \end{pmatrix}$	B1	

Q	Answer	Mark	Comments
18	**Alternative method 1**		
	1.95 ÷ 4 or 4.48 ÷ 9	M1	unit cost of a roll
	1.95 ÷ 4 and 4.48 ÷ 9	M1	
	(0.)4875 and (0.)497… and pack of 4	A1	
	Alternative method 2		
	4 ÷ 1.95 or 9 ÷ 4.48	M1	rolls per £
	4 ÷ 1.95 and 9 ÷ 4.48	M1	
	2.1... and 2.0… and pack of 4	A1	
	Alternative method 3		
	1.95 ÷ 4 or 0.4875	M1	equivalent cost of 9 rolls
	their 0.4875 × 9	M1	
	4.38(75) and pack of 4	A1	
	Alternative method 4		
	4.48 ÷ 9 or 0.497…	M1	equivalent cost of 4 rolls
	their 0.497… × 4	M1	
	[1.98, 1.99] and pack of 4	A1	
	Alternative method 5		
	1.95 × 9 or 4.48 × 4	M1	scaling to 36 rolls oe
	1.95 × 9 and 4.48 × 4	M1	oe
	17.55 and 17.92 and pack of 4	A1	oe

Q	Answer	Mark	Comments
19	2 (×) 150 or 3 (×) 100 or 5 (×) 60	M1	oe Correct product with at least one prime factor
	2 × 2 × 3 × 5 × 5	A1	oe

| **20** | Fully correct | B2 | B1 20 and 19 in correct positions |

| **21** | 2, 3 and 4 chosen | M1 | Maybe implied from a diagram |
| | 24 | A1 | |

| **22** | 15 minutes or $\frac{1}{4}$ hour | B1 | oe |
| | 52 (miles) | B1 | |

Q	Answer	Mark	Comments
23	$\binom{16}{8}$ or $\binom{12}{-3}$ or $\binom{-12}{3}$	M1	
	$\binom{4}{11}$	A1	SC1 Answer $\binom{4}{y}$ or $\binom{x}{11}$

Q	Answer	Mark	Comments
24(a)	$4 \leqslant t < 6$	B1	
24(b)	**Alternative method 1**		
	$18 + 10 + 16 + 12$ or 56 and 60×0.9 or $(18 + 10 + 16 + 12) \div 60 \times 100$ or $93.3…$	M1	oe
	56 and 54 and Yes or 93(.33)(%) and Yes	A1	
	Alternative method 2		
	4 and 60×0.1 or $4 \div 60 \times 100$ or 6.66	M1	oe
	4 and 6 and Yes or 6(.66)(%) or 7(%) and Yes	A1	

Q	Answer	Mark	Comments
25(a)	Use of cos, or cos chosen ie circled in SOHCAHTOA	M1	
	$\cos x = \dfrac{7}{12}$ or $\sin x = \dfrac{\sqrt{12^2 - 7^2}}{12}$ or $\tan x = \dfrac{\sqrt{12^2 - 7^2}}{7}$ $x = \cos^{-1}\left(\dfrac{7}{12}\right)$ or $x = \sin^{-1}\left(\dfrac{\sqrt{12^2 - 7^2}}{12}\right)$ or $x = \tan^{-1}\left(\dfrac{\sqrt{12^2 - 7^2}}{7}\right)$	M1	oe
	54(.3 ….)	A1	
25(b)	Use of tan or tan chosen eg circled TOA in SOHCAHTOA	M1	
	$\tan 42 = \dfrac{y}{35}$ or $\tan 48 = \dfrac{35}{y}$ or $y = 35 \tan 42$ or $y = \dfrac{35}{\tan 48}$	M1	oe $x = 47.1\ldots$ and $35^2 + y^2 = 47.1^2$ 47.1 cos 48 or 47.1 sin 42
	31.5 (…)	A1	

26	$y^2 - 3y + 8y - 24$	M1	Allow 1 error
	$y^2 + 5y - 24$	A1	

Q	Answer	Mark	Comments
27	8 and 80	B1	
	their 8 × 10 + their 80 × 2 or 80 + 160 or 240	M1	
	their 240 + 155 or 395	M1	
	their 395 ÷ 0.5 − their 8 − their 80 or their 395 × 2 − their 8 − their 80 or 790 − their 8 − their 80 or 702	M1	
	702	A1	

Q	Answer	Mark	Comments
28	100(%) − 20(%) or 80(%) or 1 − 0.2 or 0.8	M1	Implied by 7200
	9000×0.80^4	M1	oe eg 9000 × 0.80 or 7200 and their 7200 × 0.80 or 5760 and their 5760 × 0.80 or 4608 and their 4608 × 0.80
	3686(.40)	A1	Accept 3686 with full method seen

Q	Answer	Mark	Comments
29	$\pi \times 30^2 \times 160$	M1	452 389…. or 144 000π [452 160 , 452 389]
	their 452 389 ÷ 1000 or their 452 389 ÷ 1000 ÷ 0.1	M1	452.3… or 144π [452.150, 452.389] 4523.8…. [4521.6, 4524]
	their 4523.89 ÷ 60 (÷ 60) or (60 × 60 =) 3600 or 0.1 × 60 × 60 or 360	M1dep	75.398… or 1.25… [75.36, 75.4] or [1.25, 1.0526]
	[75.36, 75.4] and Yes or [1.25, 1.0526] and Yes or 3600 and 4523.8…. and Yes or 452.3… and 360 and Yes	A1	oe