AQA

GCSE
MATHEMATICS

2023 PRACTICE PAPER SET 1 Higher Tier Paper 1

Mark Scheme

8300/1H

Version 1.0

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

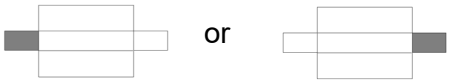
Erased or crossed out work that has been replaced is not awarded marks.

Premature approximation

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

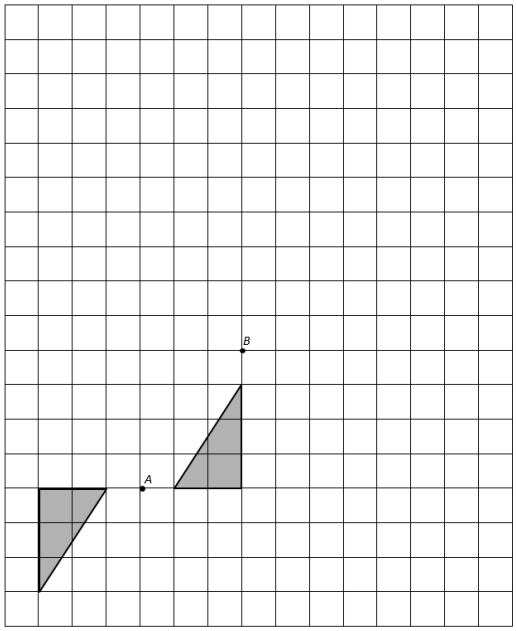
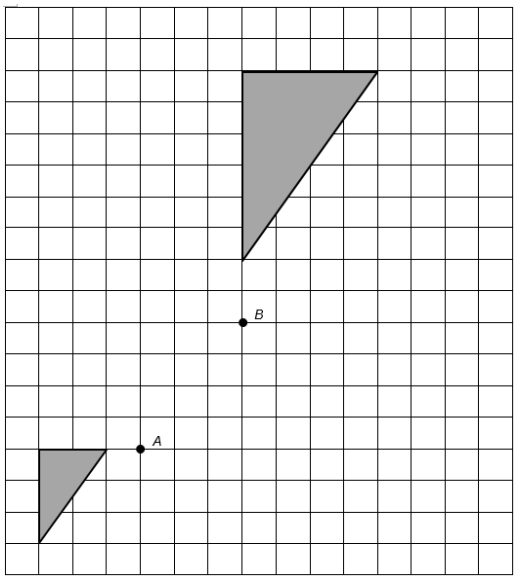
Q	Answer	Mark	Comments
1(a)	$2.33 < \text{answer} < 2.\dot{3}$	B1	eg 2.331
1(b)	$\frac{1}{5} < \text{fraction} < \frac{1}{4}$	B1	eg $\frac{21}{100}, \frac{9}{40}$
2	$4n + 11$	B1	
3	$(3 \times 10^2)^2$ or 90000	M1	
	9×10^4	A1	
4	430	B2	B1 for $6450 \div 15$ or digits 43 eg 0.43 43 000
5(a)	strong positive	B1	
5(b)	Straight ruled line of best fit	B1	Through (30, 1) to (35, 1) and (60, 6) to (65, 6)
	4	B1	
5(c)	Refers to danger when extrapolating outside the range of the data given or Refers to difficulty of interpolation at certain points eg 35 lessons suggests 1 or 2 tests	B1	oe eg line of best fit might not continue eg 20 lessons suggests 0 tests

Q	Answer	Mark	Comments
6	**Alternative method 1**		
	$\frac{35}{40}$ or $\frac{48}{40}$	M1	
	Valid comparison eg $\frac{35}{40}$ and $\frac{48}{40}$ and $\frac{40}{40}$ or $\frac{5}{40}$ and $\frac{8}{40}$	M1	oe
	$\frac{7}{8}$	A1	Must see working
	Alternative method 2		
	0.875 or 1.2	M1	87.5(%) or 120(%)
	0.875 and 1.2 and 1 or 0.125 and 0.2	M1	87.5(%) and 120(%) and 100(%) or 12.5(%) and 10(%)
	$\frac{7}{8}$	A1	Must see working
7	$2a = 9$	M1	Subtracts equations to eliminate b
	$a = 4.5$ (or $b = 6$)	A1	oe
	$a = 4.5$ and $b = 6$	A1	
8	$\frac{\sqrt{3}}{2}$	B1	

Q	Answer	Mark	Comments
9	7 from list 1 1 2 3 8	B3	B2 5 integers with at least two criteria • mode 1 or • median 2 **and** • total 15 B1 5 integers with any one of these criteria • mode 1 • median 2 • total 15
10(a)	Correct rectangle shaded 	B1	
10(b)	Correct two rectangles shaded 	B1	
10(c)	$2ab + ad + 2cd$	B1	oe

Q	Answer	Mark	Comments
11(a)	Ben and valid reason	B2	eg shortest time took 4.5 minutes B1 Ben with reason attempted.
11(b)	Makes 3 correct statements Must refer to all 3 boys	B3	Max B2 for only referring to 2 boys Max B1 for only referring to 1 boy B1 for each valid statement Valid statements could include: Alan started in the lead (Ben 2nd, Carl 3rd) After 2.5 minutes / 500 m Ben slowed down After 3.5 minutes / 600 m Ben increased speed After 4 minutes / 600 m Carl increased speed After 3 minutes / 800 metres Alan stopped (for 0.25 minutes) After 3.25 minutes Alan set off again Alan and Carl both finish in 5 minutes Ben and Carl both finish at the same speed Finishing order: Ben wins, Alan and Carl tie for 2nd
12(a)	Measure [3.8, 4.2]	B1	
	their [3.8, 4.2] × 80	M1	
	their [3.8, 4.2] × 80 ÷ 100	M1	
	[3.04, 3.36] or 3 or 4	A1ft	ft their [3.04, 3.36] × 80 ÷ 100
12(b)	Estimate is low as road not straight	B1	oe
	Estimate is low if average speed is lower or Estimate is high if average speed is higher	B1	oe

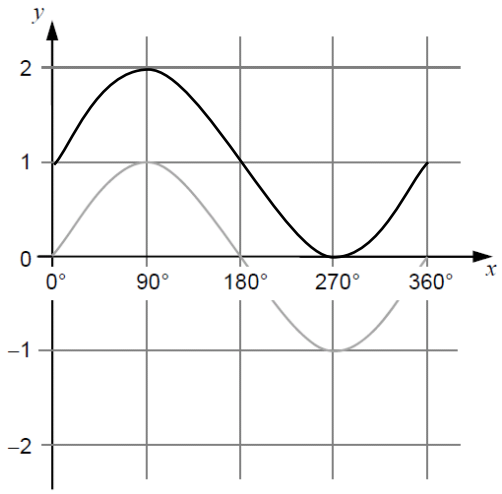
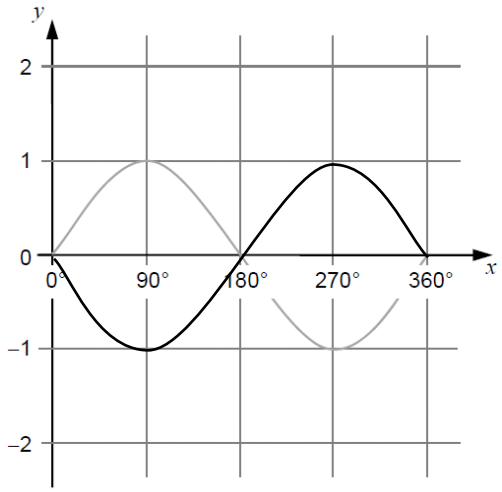
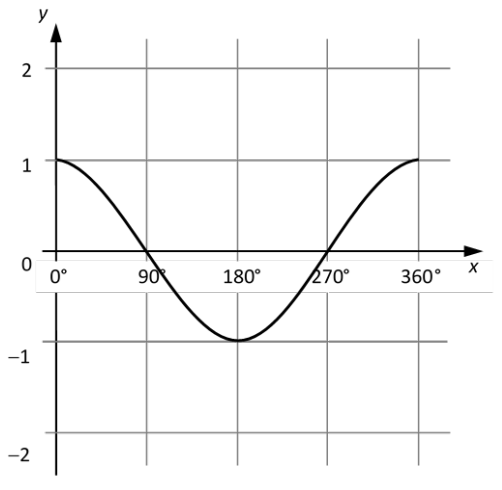
Q	Answer	Mark	Comments
13	$12x + 8 + 2x - 6 + 19$	M1	Allow one error
	$14x + 21$	A1	
	$7(2x + 3)$	A1	
14	Scale factor $\frac{20}{8}$ or $\frac{8}{20}$ or 2.5 or $\frac{2}{8}$ or $\frac{8}{4}$ or 4 or $\frac{1}{4}$	M1	oe
	5	A1	

Q	Answer	Mark	Comments
15		B1	May be implied from the correct final shape
		B2ft	ft their shape B1ft one correct coordinate

Q	Answer	Mark	Comments
16	$d(c-7)=3+2c$	M1	
	$cd-7d=3+2c$	M1	
	$cd-2c=3+7d$ or $c(d-2)=3+7d$	M1	Isolating c terms
	$c=\frac{3+7d}{d-2}$	A1	oe
17	12^2+5^2 or 169	M1	
	$\sqrt{12^2+5^2}$ or 13	M1dep	oe May be on diagram
	$\pi \times$ their $13^2 \times \frac{1}{2}$	M1	oe
	$84.5\pi-120$	A1	oe expression in terms of π
18	$\frac{1}{4}$	B2	B1 4 or $\frac{1}{\sqrt{16}}$ or $\frac{1}{16^{\frac{1}{2}}}$ or $\frac{1}{16}$ or 4^{-1}

Q	Answer	Mark	Comments
19	$x^2 - 6x + 6x - 36$ or $x^2 - 36$ or $3x^2 + 18x - 5x - 30$ or $3x^2 + 13x - 30$ or $3x^2 - 18x - 5x + 30$ or $3x^2 - 23x + 30$	M1	Allow one error
	$x^2 - 6x + 6x - 36$ or $x^2 - 36$ or $3x^2 + 18x - 5x - 30$ or $3x^2 + 13x - 30$ or $3x^2 - 18x - 5x + 30$ or $3x^2 - 23x + 30$	A1	Fully correct
	$3x^3 - 5x^2 - 108x + 180$	A1	
20	1.2 or 0.9	M1	May be implied
	$1.2^2 \times 0.9$	M1	oe
	1.296 or 129.6(%) or 0.296 or 29.6(%)	A1	
	29.6% increase	A1ft	ft their 1.296 with M2 awarded

Q	Answer	Mark	Comments
21	(19, 9)	B1	$\frac{15+23}{2}=19$ or $\frac{6+12}{2}=9$
	(31 – their 19) $\times \frac{2}{3}$ or 8 or (their 9 – 3) $\times \frac{2}{3}$ or 4	M1	
	their 19 – 8 or 11 or their 9 + 4 or 13	M1	
	(11, 13)	A1	
22	$\sqrt{32}=\sqrt{16\times 2}$	M1	may be embedded
	Common denominator with at least one numerator correct	M1	eg $\frac{72}{4\sqrt{2}}-\frac{12}{4\sqrt{2}}$
	$\frac{15\sqrt{2}}{2}$	A1	

Q	Answer	Mark	Comments
23(a)	Correct graph drawn 	B1	
23(b)	Correct graph drawn 	B1	
23(c)	Correct graph drawn 	B1	

Q	Answer	Mark	Comments
24(a)	$\frac{n-1}{n}$ or $\frac{n-2}{n-1}$	M1	
	$\frac{n-1}{n} \times \frac{n-2}{n-1}$ with cancelling shown	A1	
24(b)	$\frac{n-2}{n} > 0.8$ or $n-2 > 0.8n$	M1	
	$0.2n > 2$ or $n > 10$	M1dep	
	11	A1	SC1 $n = 10$
25(a)	$\overrightarrow{BE} = \frac{3}{4}\mathbf{a}$ or $\overrightarrow{AE} = \frac{7}{4}\mathbf{a}$	B1	oe
	$-\mathbf{a}$ – their $\overrightarrow{BE} + \mathbf{b}$ or – their $\overrightarrow{AE} + \mathbf{b}$	M1	
	$-\frac{7}{4}\mathbf{a} + \mathbf{b}$ or $\mathbf{b} - \frac{7}{4}\mathbf{a}$	A1	
25(b)	$\overrightarrow{EF} = \frac{3}{7}\overrightarrow{ED}$	M1	
	$-\frac{3}{4}\mathbf{a} + \frac{3}{7}\mathbf{b}$	A1ft	oe ft their $\overrightarrow{ED}$