GCSE
MATHEMATICS

Practice Papers Set 4
Paper 2 Higher – Mark Scheme

8300/2H

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.
[a, b)	Accept values $a \leq$ value $< b$
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.

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 candidate intended it to be a decimal point.

Q	Answer	Mark	Comments
1	5^{11}	B1	
	Additional Guidance		

Q	Answer	Mark	Comments
2	$\begin{pmatrix} 1 \\ -10 \end{pmatrix}$	B1	
	Additional Guidance		

Q	Answer	Mark	Comments
3	$4n - 1$	B1	
	Additional Guidance		

Q	Answer	Mark	Comments
4	-21	B1	
	Additional Guidance		

Q	Answer	Mark	Comments
5	$1000 \div 3$ or $333.(…)$	M1	
	18.2(5…) or 18.26 or 18.3	A1	
	19(th) (term)	A1	
	Additional Guidance		
	For A mark to be awarded any calculations shown must be correct		

Q	Answer	Mark	Comments
6(a)	**Alternative method 1**		
	1.015 seen or 4000×1.015 or 4060	M1	
	$4000 \times 1.015^2 = 4120.90$	A1	
	Alternative method 2		
	0.015×4000 or 60 or 4060 or 0.015×4060 or 60.9	M1	
	$4000 + 60 + 60.9 = 4120.90$	A1	
	Additional Guidance		
	Allow £4120.90p		M1A1

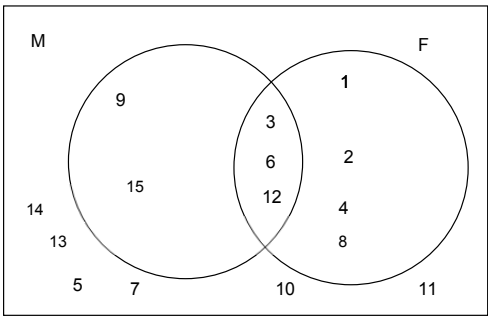| Q	Answer	Mark	Comments
6(b)	4120.9×1.014 or 4120.9×0.014 or 57.6926 or 57.69 or 57.70	M1	oe
	$4120.9 +$ their 57.6926 or 4178.5926	M1dep	
	their 4178.5926×0.0135	M1dep	oe
	56.4110001 or 56.41 or 56.42 and 57.6926 or 57.69 or 57.70 and Less	A1	
	Additional Guidance		

Q	Answer	Mark	Comments
7	$\sin 20 = \dfrac{x}{12}$ or $12 \sin 20$	M1	oe
	4.1…	A1	Accept 4 with working shown
	Additional Guidance		

Q	Answer	Mark	Comments
8	2 (×) 70 or 5 (×) 28 or 7 (×) 20	M1	May be on a diagram
	$2 \times 2 \times 5 \times 7$	A1	Any order
	$2^2 \times 5 \times 7$	A1	Any order
	Additional Guidance		

Q	Answer	Mark	Comments
9	$3a - 4 = 11$	M1	oe $11 + 4$
	$3a = 11 + 4$ or $3a = 15$ or $a = 5$	M1dep	oe $\dfrac{11 + 4}{3}$
	$6 - 4b = 14$	M1	oe $14 - 6$ or $6 - 14$
	$4b = 6 - 14$ or $4b = -8$	M1dep	oe $\dfrac{6 - 14}{4}$
	$a = 5$ and $b = -2$	A1	
	Additional Guidance		

Q	Answer	Mark	Comments
10	Width of rectangle or radius of semicircle = 7 cm seen or implied	B1	eg 14×7 or 98
	$(\frac{1}{2} \times) \pi \times 7^2$ or 49π or $\frac{49}{2}\pi$ or $[153.8, 154]$ or $[76.9, 77]$	M1	oe
	$14 \times 7 - \frac{1}{2} \times \pi \times 7^2$ or $98 - [76.9, 77]$	M1	oe
	$[21, 21.1]$	A1	Accept $98 - \frac{49}{2}\pi$
	Additional Guidance		

Q	Answer	Mark	Comments
11(a)	Mid values seen	B1	5, 15, 25 or 5.005, 15.005, 25.005 or 5.01, 15.01, 25.01
	$5 \times 18 \;(+)\; 15 \times 15 \;(+)\; 25 \times 7$	M1	Accept use of mid values 5.005, 15.005, 25.005 or 5.01, 15.01, 25.01 Allow one error eg one mid value incorrect or one calculation incorrect
	their 490 ÷ 40	M1dep	
	12.25 or 12.26	A1	SC2 for 7.25 or 7.26 or 17.25 or 17.26
	Additional Guidance		
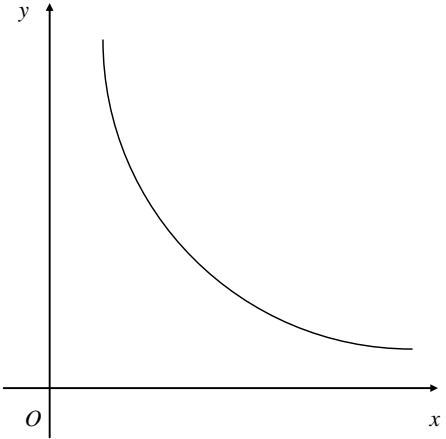
Q	Answer	Mark	Comments
11(b)	Indicates lower	B1	
	Valid reason	B1	eg £4.50 is less than £5 and £23.40 is less than £25

Additional Guidance

Q	Answer	Mark	Comments
12	(Venn diagram)	B2	B1 for two correct regions Condone omission of numbers in $(M \cup F)^{/}$
	P(Multiple 3 / Factor 24) = $\dfrac{3}{7}$	M1	
	P(Factor 24 / Multiple 3) = $\dfrac{3}{5}$	M1	
	$\dfrac{3}{5} > \dfrac{3}{7}$ or $0.6 > 0.4(28\ldots)$ or P(multiple of 3…) > P(multiple of 7…)	A1	oe

Additional Guidance

If Venn diagram not used, working must be clear	

Q	Answer	Mark	Comments
13(a)	$y \; \alpha \; \dfrac{1}{x}$ or $y = \dfrac{k}{x}$	M1	oe
	$k = 3.5 \times 4.2$ or $k = 14.7$ or $y = \dfrac{14.7}{x}$	M1dep	
	2.625	A1	

Additional Guidance

Q	Answer	Mark	Comments
13(b)		B1	
	Additional Guidance		

Q	Answer	Mark	Comments
14(a)	$(2.318 \times 10^3) \div (3.8 \times 10^6)$	M1	
	6.1	A1	
	−4	A1	
	Additional Guidance		

Q	Answer	Mark	Comments
14(b)	$A \times 10^7$ where $2.0 < A < 3.0$	B2	B1 $A \times 10^6$ where $20 < A < 30$ SC1 $A \times 10^6$ or $A \times 10^8$ where $2.0 < A < 3.0$
	Additional Guidance		

Q	Answer	Mark	Comments
15	$1 = 25 + 2p - p^2$	M1	
	$p^2 - 2p - 24 \ (= 0)$	M1dep	oe
	$(p - 6)(p + 4) \ (= 0)$ or $\dfrac{2 \pm \sqrt{(-2)^2 - 4 \times 1 \times -24}}{2}$	M1	oe
	$p = 6$ and $p = -4$	A1	
	Additional Guidance		
	Allow use of q instead of p throughout		

Q	Answer	Mark	Comments
16	1.08 seen or 5.25×0.08	M1	
	5.25×1.08 or 5.67	M1	
	their $\dfrac{5.67}{0.9}$	M1	
	6.3(0)	A1	
	Additional Guidance		

Q	Answer	Mark	Comments
17(a)	$x^2 + y^2 = 9$	B1	
	Additional Guidance		

Q	Answer	Mark	Comments
17(b)	$(-3, 4)$	B1	
	Additional Guidance		

Q	Answer	Mark	Comments
17(c)	T F T	B2	B1 for 2 correct and 1 incorrect or incomplete
	Additional Guidance		

Q	Answer	Mark	Comments
18	**Alternative method 1**		
	125 and 512 or 5^3 and 8^3	B1	
	$400 \div 512 \times 125$ or $125 \div 512$	M1	oe
	97.(…) or 0.24(…)	A1	
	97.(…) and 100 and Yes 0.24(…) and Yes	A1	
	Alternative method 2		
	$\sqrt[3]{0.25}$	M1	
	0.629… or 0.63	A1	
	$5 \div 8$	M1	
	0.625 and 0.63 and Yes	A1	
	Additional Guidance		

Q	Answer	Mark	Comments
19	$\pi \times 10 \times 25$ or 250π or [785, 785.5] or 786 or $\pi \times 5 \times 12.5$ or 62.5π or [196.2, 196.4] or 196	M1	oe
	their 786 + their 196 or 312.5π or [981, 982]	M1dep	oe may be implied
	$\pi \times 10 \times 10$ or 100π or [314, 314.2] or $\pi \times 5 \times 5$ or 25π or [78.5, 78.6] or 79	M1	oe
	their [314, 314.2] − their [78.5, 78.6] or 75π or [235.4, 235.7]	M1dep	oe dependent on third M
	387.5π or [1216, 1218]	A1	
	Additional Guidance		

Q	Answer	Mark	Comments
20	$x^2 + x + 7x + 7$ or $x^2 + 8x + 7$	M1	oe
	$3x^2 + 24x + 21$	M1dep	
	$4x^2 + 10x + 10x + 25$ or $4x^2 + 20x + 25$	M1	oe
	$-x^2 + 4x - 4$	A1	oe
	$-(x - 2)^2$ so never positive	A1	
	Additional Guidance		

Q	Answer	Mark	Comments
21	3 choices for 1st digit	M1	
	$3 \times 4 \times 3 \times 2 \, (\times \, 1)$	M1dep	
	72	A1	
	Additional Guidance		

Q	Answer	Mark	Comments
22	$\dfrac{x}{h} = \dfrac{4}{9}$ or $h = \dfrac{9x}{4}$	M1	
	$\pi \times x^2 \times \dfrac{9x}{4}$	M1	
	$\left(\dfrac{1}{2} \times\right) \dfrac{4}{3} \pi \times \dfrac{3x}{2} \times \dfrac{3x}{2} \times \dfrac{3x}{2}$	M1	
	Show clearly that both are equal to $\dfrac{9\pi x^3}{4}$	A1	
	Additional Guidance		

SP/10/16