### AQA

### GCSE MATHEMATICS

Foundation tier

### Number

Topic test – Product of primes – HCF/LCM

Mark Scheme

8300

Version 1.0

### **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.

М	Method marks are awarded for a correct method which could lead to a correct answer.
Α	Accuracy marks are awarded when following on from a correct method. It is not necessary to always see the method. This can be implied.
В	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.
Mdep	A method mark dependent on a previous method mark being awarded.
Bdep	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.

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Q	Answer	Mark	Comments		
1(a)	4, 8, 12, 16, 20 and 24	B1	ignore extra multiples		
1(b)	20	B1			
2(a)	6, 12, 18, 24, 30 and 36	B1	ignore extra multiples		
2(b)	30	B1			
r	<u> </u>		1		
3(a)	1, 2, 5 and 10	B1	any order		
3(b)	2	B1			
4(a)	1, 3 and 9	B1	any order		
4(b)	3	B1			
	$2 \times 2 \times 3 \times 7$		any order		
5	or $2^2 \times 3 \times 7$	B2	B1		
5			2 and 2 and 3 and 7		
			may be seen on diagram		
<b></b>					
	$2^3 \times 3 \times 5$		any order		
6		B2	B1		
			2 and 2 and 2 and 3 and 5		
			may be seen on diagram		
			[		
	$2 \times 5^2$		any order		
7(a)		B2	B1		
			2 and 5 and 5		

may be seen on a factor tree

any order

B1

7(b)

 $2\times5^2\times7$ 

Q	Answer	Mark	Com	ments
L		1		
	300 written as a product of factors where at least one factor is prime	M1	eg	
			3 and 100 or 3 × 10	$^{2} \text{ or } 300 \div 5 = 60$
			may be on a factor t division	ree or repeated
			allow one strand to previous value comp	be incorrect if a pletes the product
			eg 10 $\times$ 30 followed by	
			$5 \times 2 \times 5 \times 4$ implies	s 5 $\times$ 2 $\times$ 30 for M1
8	2 and 2 and 3 and 5 and 5	A1	may be on a factor tree or repeated division	
	$2^2 \times 3 \times 5^2$	A1		
	Additional Guidance			
	Allow any number of 1s included as fac			
	M1 may be awarded for correct work with no or incorrect answer, even if this is seen among multiple attempts			
	2 <sup>2</sup> .3.5 <sup>2</sup>			M1A1A1
	$2^2 + 3 + 5^2$			M1A1A0

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Q	Answer	Mark	Com	ments
			Ι	
	$2^2 \times 7$		any order	
9(a)		B2	B1	
3(a)			2 and 2 and 7	
			may be seen on a fa	actor tree
	4		B1 answer 2	
			or answer 2 (×) 2	
		B2	or (12 =) 2 (×) 2 (×) 3	
			or (1), 2, 3, 4, 6, 12	
			or (1), 2, 3, 4, 6, 7, 12, 14, 21, 28, 42, 84	
	Additional Guidance			
9(b)	Prime factor responses for B1 may be seen in repeated division, on a factor tree or in a Venn diagram			
	eg 2 2 7 in repeated division or factor tree for 28			B1
	eg 2 2 3 7 inside one circle of a Venn diagram			B1
	eg 2 2 inside the intersection of a Venn diagram			B1
	B1 can be awarded even if LCM is subsequently worked out			
	Lists of factors may be seen as factor pairs			

Q	Answer	Mark	Comments	
	$2^2 \times 3^2$		any order	
10(a)		B2	B1	
			2 and 2 and 3 and 3	
			may be seen on a factor tree	
	144		B1 any common multiple of 36 and 48	
			eg 288, 432, 576 etc	
		B2	B1 at least the first two multiples correct for each of 36 and 48 (ignore errors after first two)	
			B1 (36 =) 2 (×) 2 (×) 3 (×) 3	
			and (48 =) 2 (×) 2 (×) 2 (×) 2 (×) 3	
10(b)			or the equivalent work seen in a correct Venn diagram	
	Additional Guidance			
	Answer 144 with error(s) seen is B1 ma			
	These errors may be seen after 144			
	If they have listed both multiples and fa multiples to score	must choose		
	For B2, 144 must be chosen (eg circled of a list of multiples.	ed) not just at the end		

11(a)	Correct product using at least one prime factor eg $2 (\times) 140$ or $5 (\times) 56$ or $7 (\times) 40$ or $2 (\times) 2 (\times) 70$ or $2 (\times) 5 (\times) 28$	M1	may be implied eg in a factor tree or by repeated division
	$2 \times 2 \times 2 \times 5 \times 7$ or $2^3 \times 5 \times 7$	A1	
11(b)	28	B2	B1 2 × 2 × 7 oe

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Q	Answer	Mark	Comments	
	·			
	210		B1 any common multiple of 21 and 70	
			eg 420, 630, 840	
		B2	B1 at least the first two multiples correct for each of 21 and 70 (ignore errors after first two)	
			B1 (21 =) 3 (×) 7	
			and (70 =) 2 (×) 5 (×) 7	
12			or the equivalent work seen in a correct Venn diagram	
	Additional Guidance			
	Answer 210 with error(s) seen is B1 ma			
	These errors may be seen after 210			
	If they have listed both multiples and fa multiples to score	v must choose		
	For B2, 210 must be chosen (eg circled of a list of multiples.	ed) not just at the end		

	Alternative method 1			
13	Lists the multiples of 6 and 10 6, 12, 18, 24, 30, 10, 20, 30,	M1	must list out the multiples to at least 30	
	30	A1	may be implied by one correct number of packs	
	(Burgers) 5, (Buns) 3	B1ft	ft their multiple of 30	
	Alternative method 2			
	Lists the prime factors of 6 and 10 $6 = 2 \times 3$ $10 = 2 \times 5$	M1		
	2 × 3 × 5	A1	may be implied by one correct number of packs	
	(Burgers) 5, (Buns) 3	B1ft	ft their multiple of 30	

Q	Answer	Mark	Com	ments
	and 144		may be seen on a d	agram eg ractor tree
	from 2, 3, 4, 6, 9, 12 and 36			
	or	M1		
	(108 =) 2 (×) 2 (×) 3 (×) 3 (×) 3			
	or			
	(144 =) 2(x) 2(x) 2(x) 2(x) 3(x) 3			
	At least two common multiples of 3 and 5	M1		
	eg 15, 30, 45, 60			
14	(HCF =) 36 selected from factors		oe eg HCF = 2 (×) 2	(×) 3 (×) 3
	or <i>a</i> = 36		36 can be implied fro	om their numerator
	or (LCM =) 15 selected from multiples	M1	oe eg LCM = 3 (×) 5	
	or <i>b</i> = 15		15 can be implied from their denominator	
			oe eg $\frac{2 \times 2 \times 3 \times 3}{3 \times 5}$	
	$\frac{36}{15}$ or $\frac{12}{5}$ or $2\frac{2}{5}$ or 2.4	A1	oe	
			ignore further incorre	ect cancelling
	Additional Guidance		uidance	
	HCF = 36 and LCM = 15			M1M1M1
	HCF = 36			M1M0M1
	LCM = 15			MOM1M1

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