

8300

GCSE MATHEMATICS

Foundation and Higher tier – Questions by Topic – Mark Scheme

Geometry

Area and perimeter – Finding areas and perimeters using grids

v1.0

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

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. e.g. 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 e.g. 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.

Q1.	Please note, actual measurements may have changed slightly on export/printing. 15	B1 [1]
Q2.	Please note, actual measurements may have changed slightly on export/printing. 7 cm by 3 cm rectangle drawn	
	Additional Guidance Mark intention Allow a 7 cm by 3 cm rectangle drawn that does not use the given side	B1 [1]
Q3.	Please note, actual measurements may have changed slightly on export/printing. 3 or 4 identified or 4 by 3 rectangle drawn on grid or triangle base 4, height 3 drawn on grid	
	12	M1
	Additional Guidance	A1
	$\frac{3 \times 4}{2}$	
	3 + 4 + 5 = 12 (perimeter of triangle, not area of rectangle)	M1A0
	For drawings, mark intention Ignore units	M1A0
		[2]
Q4.	Attempt to count shaded squares	
	or 5×2 (+ 3) or 3×3 (+ 4) or 5×3 (– 2) or $35 - 22$	
	<i>Answer [9, 15] implies M1</i>	
	13	M1
		A1
	cm²	
	<i>Units mark</i>	B1
		[3]
Q5.	6 by 4 rectangle	
	<i>B1 for a rectangle with perimeter 20 cm</i> <i>B1 for a rectangle with area 24 cm²</i>	B2
Q6.		[2]

4 × 5 rectangle

B1 for a rectangle with perimeter 18 cm

B1 for a rectangle with area 20 cm²

B2

[2]

Q7.

Rectangle drawn with an area of 10

any orientation

B1 10 seen

or

any polygon drawn different from the given shape with an area of 10

B2

Additional Guidance

B1 may be awarded for correct work with no shape or incorrect shape, even if this is seen amongst multiple shapes

Mark intention

10 may be seen on the diagram

Draws the given shape reflected or in a different orientation

B0

[2]

Q8.

Area of rectangle = 24 squares

Can be on diagram

B1

Evidence of counting whole and part squares for irregular shape *or* area of B [34, 39] stated *or* clear indication of 24 whole squares plus parts e.g. rectangle drawn

'24+' is not sufficient.

B1

Correct conclusion that shape B is larger and a statement that area of B is larger than 24 either implicitly or explicitly,

Strand (iii)

ft if B1 awarded, 2 areas stated and a correct conclusion for those areas.

Q1ft

[3]

Q9.

Attempt to count squares

or any area calculation e.g. 4 × 7

Evidence of counting areas e.g. dots or numbers in shaded squares

M1

[22, 27]

A1 for [19, 22) or (27, 30]

A2

[3]

Q10.

Evidence seen of counting full and half squares or rectangle/T-shape drawn.

No evidence and answer in the range [12, 16]

5 × 4 = 20

[13, 15]	M1	
	A1	
		[2]
Q11.		
15 and 9 seen or implied		
<i>Ratio of 5 : 3 seen or implied</i>		
	B1	
75 ÷ 15 or 5		
or 75 ÷ their 15		
<i>for their 15, allow [14, 16]</i>		
<i>for their 9, allow [8, 10]</i>		
or 75 × 9 or 675		
or 75 × their 9		
<i>75 ÷ 5</i>		
<i>or 75 × 3</i>		
	M1	
75 ÷ 15 × 9		
or 5 × 9		
or 75 ÷ their 15 × their 9		
<i>75 ÷ 5 × 3</i>		
<i>oe</i>		
	M1dep	
45		
	A1ft	
		[4]
Q12.		
(a) (1, 3)		
	B1	
(b) Plot at (5, 3) or lines drawn to form rectangle		
<i>letter D need not be seen</i>		
	B1	
(c) 3 + 4 (= 7)		
<i>oe ± 1 mm for each length</i>		
	M1	
14		
	A1	
		[4]
Q13.		
(a) (1, 6)		
	B1	
(b) Mark at (6, 4)		
<i>Accept cross, dot etc</i>		
<i>Mark must be intended to be on line BC</i>		
	B1	
(c) 2 × their 4 + 2 × their 5 or 8 + 10		
<i>4 or 5 must be correct</i>		
	M1	
18		
SC1 22		
	A1	
		[4]

Q14.

20 or 12 or 10 : 6

*oe ratio**check diagram for area counting to 20 or 12***B1**

5 : 3

*ft if B0 awarded, a correct and full simplification of any unsimplified ratio**condone $\frac{5}{3}$: 1 or 1.6 : 1**or $1 : \frac{3}{5}$ or 1 : 0.6
SC1 3 : 5***B1ft****Additional Guidance**

5 : 3 with no working

B2

Ignore any units given with the answer

18 : 16 = 9 : 8 (perimeter)

B0B1ft

Poor unit notation can score a maximum of B1 unless recovered

20² or 12² or 5² : 3²**B1B0****[2]****Q15.**

(a) Either correct rectangle drawn

*A, B, (7, 2) and (3, 2)**or A, B, (7, 8) and (3, 8)**(ignore labels)**B1 for (7, 2) and (3, 2) plotted**or for (7, 8) and (3, 8) plotted**B1 for any rectangle with area 12 cm²**B1 for any rectangle with vertices A and B.***B2**

(b) C(7, 2) and D(3, 2)

*or C(7, 8) and D(3, 8)**B1 for correct coordinates with incorrect order ie D and C reversed**ft their rectangle or square ABCD**for up to B2**ft their rectangle or square ABDC**for up to B1***B2ft****[4]****Q16.**

Perimeter A = 20 (cm) or

Perimeter B = 14 (cm)

M1

20 : 14

A1

10 : 7

ft simplifying their ratio

Q17.

area A = 24(cm²) or
area B = 6 (cm²)

24 : 6

4 : 1

ft simplifying their ratio

B1ft
[3]

M1

A1

B1ft
[3]