AQA Qualifications

GCSE

M

Unit 3 43603F

Mark scheme

43603F
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Mark schemes are prepared by the Lead Assessment Writer and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all associates participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every associate understands and applies it in the same correct way. As preparation for standardisation each associate analyses a number of students' scripts: alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Assessment Writer.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

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.

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.
Q	Marks awarded for Quality of Written Communication
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, 3.149.
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 candidate has used an incorrect method to obtain an answer, as a general principle, the benefit of doubt must be given to the candidate. In cases where there is no doubt that the answer has come from incorrect working then the candidate should be penalised.

Questions which ask candidates to show working

Instructions on marking will be given but usually marks are not awarded to candidates who show no working.

Questions which do not ask candidates to show working

As a general principle, a correct response is awarded full marks.

Misread or miscopy

Candidates often copy values from a question incorrectly. If the examiner thinks that the candidate 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)	30	B1	
1(b)	Hexagon	B1	
2	$\frac{20}{100} \times 320$ or 320 ÷ 5 or 32 (× 2) seen	M1	oe or 10% is 32
	64	A1	
	65	B1	
	$\frac{1}{2}$ of 130 miles	Q1ft	Strand (iii) Correct conclusion from their answers ft their 64 and 65 Allow ft only if M1 awarded oe
3(a)	Fully correct constructed circle drawn with radius [5.9, 6.1]	B2	B1 for any circle centre *P* (must be constructed and not freehand)
3(b)	Sector drawn [58°, 62°] degrees	B2	B1 for any sector

4	64 × 2.5 or 160 or 93 × 2.5 or 232.5 or 232.50	M1	oe 93 – 64 or 29
	64 × 2.5 + 152 or 312 or 93 × 2.5 + 137 or 369.5	M1dep	oe 29 × 2.5 or 72.5 or 72.50 or 152 – 137 or 15
	64 × 2.5 + 152 or 312 and 93 × 2.5 + 137 or 369.5	M1dep	oe 29 × 2.5 or 72.5 or 72.50 and 152 – 137 or 15
	their 369.5 – their 312	M1dep	oe 72.5 – 15
	57.50	Q1	Strand (i) 57.5 implies M4Q0

5(a)	Either correct rectangle drawn *A*, *B*, (7, 2) and (3, 2) or *A*, *B*, (7, 8) and (3, 8) (ignore labels)	B2	B1 for (7, 2) and (3, 2) plotted or for (7, 8) and (3, 8) plotted B1 for any rectangle with area 12 cm^2 B1 for any rectangle with vertices *A* and *B*.

5(b)	*C*(7, 2) and *D*(3, 2) or *C*(7, 8) and *D*(3, 8)	B2ft	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

6(a)	A, B and D	B2	B1 for 2 correct and no incorrect

6(b)	C and D	B2	B1 for 1 correct and no incorrect

7(a)	South or S	B1	

7(b)	North-East or NE	B1	

8(a)	360 – 108 – 90	M1	oe
	162	A1	

8(b)	Correct reason	B1	eg 137 + 43 = 180 180 – 137 = 43 180 – 43 = 137 or Angles (on a straight line) add up to 180 or Supplementary

9	(180 – 70) ÷ 2 or 55 or 180 – 70 – 70 or 40	M1	oe
	70, 40	A1	any order
	55, 55	A1	

10(a)	26 ÷ 4 or 6.5 or 26 × 20 × $\frac{1}{4}$ or 130	M1	
	26 – their 6.5 or 26 ÷ 4 × 3 or (520 – 130) ÷ 20 or 390 ÷ 20 or (520 – their 130) ÷ 20 or their 390 ÷ 20	M1dep	oe
	19.5	A1	

10(b)	Any trial with correct factors giving 168 except 1 × 168 or any correctly evaluated product such that 10 ≤ rows ≤ 13 and 10 ≤ seats ≤ 16	M1	2 (×) 84 or 168 ÷ 2 = 84 3 (×) 56 or 168 ÷ 3 = 56 4 (×) 42 or 168 ÷ 4 = 42 6 (×) 28 or 168 ÷ 6 = 28 7 (×) 24 or 168 ÷ 7 = 24 8 (×) 21 or 168 ÷ 8 = 21 12 (×) 14 or 168 ÷ 12 = 14 oe
	A different trial with correct factors giving 168 except 1 × 168 or a different correctly evaluated product such that 10 ≤ rows ≤ 13 and 10 ≤ seats ≤ 16	M1dep	
	12 rows 14 seats	A1	SC2 for 12 seats and 14 rows SC2 for 12 and 14 as final working

11(a)	46	B1	

11(b)	1.5 seen or implied or 14 seen	B1	oe
	28 × 1.5 or 28 + 14	M1	Attempt to multiply speed by time eg 28 × 1.3 or 36.4 or 90 × 28 or 2520 or 130 × 28 or 3640
	42	A1	

12(a)	Equation	B1	

12(b)	Formula	B1	

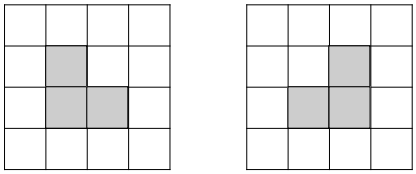
12(c)	Expression	B1	

12(d)	Expression	B1	

	Alternative Method 1		
13	$\sqrt{64}$ or 8 seen	B1	
	$5x - 2$ = their 8 or $9 - y$ = their 8	M1	
	$x = 2$	A1ft	
	$y = 1$	A1ft	SC2 for $x = 13.2$ and $y = -55$ SC1 for $x = 13.2$ or $y = -55$
	Alternative Method 2		
	$(5x - 2)(9 - y) = 64$	B1	
	$5x - 2 = 9 - y$ or $y = 9 - (5x - 2)$	M1	oe
	$(5x - 2)(9 - (9 - (5x - 2)) = 64$ or $(5x - 2)^2 = 64$ or $25x^2 - 20x - 60 = 0$ or $x = 2$	M1	oe
	$x = 2$ and $y = 1$	A1	

14(a)	4 × 5.1 or 20.4 or 4 × 9.4 or 37.6 or 4 × 3.7 or 14.8	M1	
	20.4 and 37.6 and 14.8	A1	Any order SC1 for 1.275, 2.35 and 0.925

14(b)	4 × 4 × 4 or 4^3 or 5.1 × 9.4 × 3.7 or 177(.378) or their (20.4 × 37.6 × 14.8) or 11 352(.192)	M1	
	64	A1	

15(a)		B2	Drawings can be anywhere on the grids B1 for shapes reversed or B1 for one correct

15(b)	6 × 2 + 3 or 4 + 7 + 4 or 2 + 2 + 2 + 2 + 7 or 28 or 13	M1	
	15	A1	SC1 for 17

16	Equilateral	B1	
	Valid reason	B1	eg $6x + 4$ is the same as $2(3x + 2)$ or $6x + 4 = 2(3x + 2)$ or $AB = AC = BC$ or three sides equal or all sides equal

17	$2 \times \pi \times 3$ or 6π	M1	oe
	18.(…) and yes	A1	

18	Reflection	B1	Accept Reflect or Reflected
	$x = 5$	B1	

19(a)	$x + y = 180$	B1	oe $y = 180 - x$ or $x = 180 - y$ or $2x + 2y = 360$

19(b)	$y = 1.5x$	B1	oe $2y = 3x$ or $y = \frac{3}{2}x$ or $x = \frac{2}{3}y$ or $\frac{x}{y} = \frac{2}{3}$ or $\frac{y}{x} = \frac{3}{2}$

20(a)	10 × 10 or 100	M1	4 × 10 or 40
	$\frac{1}{2}$ × 3 × 3 or 4.5 or 3 × 3 or 9	M1	4 × 3 or 12 or $\frac{1}{2}$ × 3 × 3 or 4.5 oe
	$\frac{1}{2}$ × 3 × 3 × 4 or 4.5 × 4 or 9 × 2 or 18	M1dep	$\frac{1}{2}$ × (10 + 4) × 3 or 21 or 12 + 4.5 + 4.5 or 21 oe dependent on 2nd M1
	100 – 18 = 82	A1	40 + 21 + 21 = 82 oe

20(b)	82% of £750 seen or implied or (£) 615	M1	
	their 615 × 0.9 or 553.5	M1	oe multiplier 1.9 seen
	their 615 + 553.5 or their 615 × 1.9	M1	
	1168.50 or 1169 or 1170	A1	1168.5 implies M3A0 SC2 (£) 1425 SC1 (£) 675

21	$5^2 + 9^2$ or 25 + 81 or 106	M1	
	$\sqrt{5^2+9^2}$ or $\sqrt{25+81}$ or $\sqrt{106}$	M1dep	
	10.29 …	A1	Allow 10 or 10.2 if correct working shown
	10.3	B1ft	ft their 2 d.p. answer

22	Fully correct locus	B3	B2 for two correct straight lines or two correct semi-circles or one correct straight line and one correct semicircle B1 for one correct straight line or one correct semicircle B1 for correct shape but incorrect size