GCSE
MATHEMATICS

Unit 3 43603F

Mark Scheme

43603F

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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.
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, 3.149.
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)	A	B1	Accept 3.4 (m)
1(b)	6.45 or $6\frac{45}{100}$ or $6\frac{9}{20}$	B1	
1(c)	Evidence of an attempt to add any three lengths with a total shown	M1	Total does not have to be correct
	A and B and C	A1	oe $3.4 + 3\frac{1}{4} + 3.35$

2	tangent	B1	
	sector	B1	
	arc	B1	
	chord	B1	

3(a)	$28 + 94$ or $94 + 28$	M1	
	122	A1	
3(b)	$94 - 28$	M1	
	66	A1	
	70	B1ft	SC2 $90 - 30 = 60$ SC1 90 and 30 SC1 60 with no working

4(a)	[31, 35]	B1	
4(b)	[133, 137]	B1	

5(a)	165	B1	
5(b)	350 seen	M1	350 – their 165
	185	A1ft	

Q	Answer	Mark	Comments
6(a)	Two correct lines of symmetry drawn - vertical and horizontal	B2	B1 for exactly one line of symmetry drawn SC1 Both correct lines and one or two diagonals drawn
6(b)	Kite or isosceles trapezium or arrowhead drawn	B1	Need not be ruled

Q	Answer	Mark	Comments
7(a)	10	B1	
	cm^3	B1	
7(b)	$5 \times 2 \times 2$ or their 10×2	M1	oe
	20	A1ft	

Q	Answer	Mark	Comments
8(a)	Valid explanation	B1	eg if x is less than 3 then side is negative (length) if x is greater than 3 then side is positive (length) $x = 3$ gives 0 cm
8(b)	$y + 4 = 9$ or 9 seen or $(y + 4)^2 = 81$	M1	oe
	5	A1	

Q	Answer	Mark	Comments
9	A (4, 2)	B1	If no marks awarded, award SC1 for a correct circle drawn with compasses passing through A, B, C and D
	B (8, 6)	B1	
	C (4, 10)	B1	
	D (0, 6)	B1	

Q	Answer	Mark	Comments
10(a)	$35 - -23$ or $35 + 23$ or $119 - 61$	M1	$x + 35 - (x - 23)$
	58	A1	
10(b)	$x + 35 + x - 23 = 180$	M1	oe $2x + 12 = 180$
	$2x = 180 - 12$ or $2x = 168$	M1dep	$(180 - 12) \div 2$ or 84 Terms collected
	119	A1	
	$x = 84$ and an algebraic equation with both method marks awarded for correct algebra	Q1ft	Strand (ii)

11(a)	4.5	B1	
11(b)	$12\ 056 \div 1760$	M1	$6 \times 1760 = 10560$ and $7 \times 1760 = 12320$
	6.85 or 6.9	A1	$6.5 \times 1760 = 11440$ and $7 \times 1760 = 12320$ or better
	7	B1ft	Any value with 1 d.p. or more rounded to nearest whole number

Q	Answer	Mark	Comments
12	8 × 500 000 or 4 000 000	M1	1 km = 1000 m **and** 1 m = 100 cm seen or 1 km = 100 000 cm seen or implied
	8 × 500 000 ÷ 100 or 8 × 500 000 ÷ 1000 or 8 × 500 000 ÷ 100 000	M1dep	oe
	40	A1	
	Alternative method		
	or 500 000 ÷ 1000 or 500 or 500 000 ÷ 100 or 5000 or 8 ÷ 100 or 0.08 or 8 ÷ 1000 or 0.008	M1	1 km = 1000 m **and** 1 m = 100 cm seen or 1 km = 100 000 cm seen or implied
	or 500 000 ÷ 100 000 or 5 or 500 000 ÷ 1000 × 8 or 4000 or 500 000 ÷ 100 × 8 or 40 000 or 500 000 ÷ 100 ÷ 1000 or 8 ÷ 100 000 or 0.000 08	M1dep	
	40	A1	

Q	Answer	Mark	Comments
13(a)	(180 − 32) ÷ 2 or 148 ÷ 2	M1	180 − 90 − 16
	74	A1	
13(b)	180 − 107 or 73 or 107 − 90 or 17	M1	oe
	180 − their 73 − their 73 or 17 × 2	M1dep	oe (90 − their 73) × 2
	34	A1	

Q	Answer	Mark	Comments
14	Fully correct sketch any orientation using grid	B2	B1 for at least 1 correct face

Q	Answer	Mark	Comments
15	1 m = 1000 mm or 1 m = 100 cm or 1 cm = 10 mm seen or implied	M1	eg 2.05 m or 205 cm or 2050mm 0.85 m or 850 mm 210 cm or 2.1 m or 2 m 10 cm (5.8 cm or 0.058 m) (1.5 cm or 0.015 m) Each length can make one 2 m 5 cm piece or 14 of the 2 m 5 cm pieces needed
	2×85 or 170 seen	M1	oe Each length can make two 85 cm pieces or 4 lengths for 7 of the 85 cm pieces needed
	1 pack makes 4 lengths of 2 m 5 cm and 2 lengths of 85 cm	A1	1 pack makes 2 frames or 18 lengths needed altogether
	4 packs	Q1	Strand (iii) Dependent on method marks awarded
	Alternative method		
	$85 + 205 + 205$ or 495 or $0.85 + 2.05 + 2.05$ or 4.95 or $850 + 2050 + 2050$ or 4950	M1	
	495×7 or 3465 **and** 5×210 or 1050	M1	Consistent units
	$3465 \div 1050 = 3.3$ and 4 packs	A1	
		Q0	

Q	Answer	Mark	Comments
16(a)	Correct 90° clockwise rotation	B2	B1 for a 90° anticlockwise rotation
16(b)	Correct enlargement	B2	B1 for any enlargement
16(c)	$\frac{1}{2} \times 9 \times 6$ or $\frac{1}{2} \times 3 \times 2 \times 3^2$	M1	oe
	27	A1ft	ft their triangle

17(a)	1, 0, 4	B2	B1 for 2 correct
17(b)	their 5 points plotted correctly	M1	$\pm\frac{1}{2}$ square
	Fully correct smooth curve	A1	$\pm\frac{1}{2}$ square

18	$2 \times \pi \times 7$ or [43.9, 44]	M1	oe 14π
	$2 \times \pi \times 7 \div 4$ or [10.9, 11] or $2 \times \pi \times 7 \times 3$ or [131.9, 132]	M1dep	oe $7\pi / 2$ oe 42π
	$2 \times \pi \times 7 \div 4 \times 3$ or [32.9, 33]	M1dep	oe $21\pi / 2$
	[46.9, 47]	A1	$10.5\pi + 14$ oe SC2 for [23.4, 23.5] or [30.4, 30.5] SC1 for [16.4, 16.5]

Q	Answer	Mark	Comments
19	18^2 and 12^2 seen or 324 and 144 or 180	M1	oe
	$\sqrt{18^2 - 12^2}$ or $\sqrt{180}$ or $6\sqrt{5}$	M1dep	
	13.41(…) or 13.42	A1	
	13.4	B1ft	ft any 2 d.p. or better

Q	Answer	Mark	Comments
20	$2\frac{4}{7} \times 5\frac{3}{5}$ or $\frac{18}{7} \times \frac{28}{5}$	M1	oe 14.4 or $\frac{72}{5}$ or $\frac{504}{35}$
	$14\frac{2}{5}$	A1	oe mixed fraction

Q	Answer	Mark	Comments
21	$\pi \times 4 \times 4 \times 9$ or 144π	M1	[452, 453] or 450
	$\pi \times 10 \times 10 \times 36$ or 3600π	M1	[11 300, 11 320]
	$3600\pi \div 144\pi$	M1dep	[11 300, 11 320] ÷ [452, 453] or 450
	25	A1	Condone [24.9, 25.1] SC2 for [24.9, 25.1] using incorrect formulae
	Alternative method		
	Ratio (SF) of radii = 2.5	M1	
	Ratio (SF) of height = 4	M1	
	2.5 **×** 2.5 **×** 4	M1dep	
	25	A1	Condone [24.9, 25.1] SC2 for [24.9, 25.1] using incorrect formulae