





GCSE MARKING SCHEME

AUTUMN 2023

GCSE MATHEMATICS – COMPONENT 1 (HIGHER TIER) C300UA0-1

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INTRODUCTION

This marking scheme was used by WJEC for the 2023 examination. It was finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conference was held shortly after the paper was taken so that reference could be made to the full range of candidates' responses, with photocopied scripts forming the basis of discussion. The aim of the conference was to ensure that the marking scheme was interpreted and applied in the same way by all examiners.

It is hoped that this information will be of assistance to centres but it is recognised at the same time that, without the benefit of participation in the examiners' conference, teachers may have different views on certain matters of detail or interpretation.

WJEC regrets that it cannot enter into any discussion or correspondence about this marking scheme.

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EDUQAS GCSE MATHEMATICS

AUTUMN 2023 MARK SCHEME

Component 1: Higher Tier	Mark	Comment
1.*		
$2 \times 330 \div (1 + 2 + 7)$	M1	May be seen in stages. Full method required
66 (ml)	A1	
<u> </u>	(2)	
2.* (Area of shape =)		
$2 \times \pi \times 6^2$ OR $4 \times \frac{\pi \times 6^2}{2}$	M2	M1 for $\pi \times 6^2$ or $\frac{\pi \times 6^2}{2}$
+ 12 ²	m1	FT from M2 or M1
$= 144 + 72\pi$ (cm ²)	A1	CAO
	(4)	
3.*		
700 × 7.5	M1	
5250 (g) or 5.25 kg AND	A1	CAO
No indicated or clearly implied	A1	FT 'their 700 x 7.5'.
Alternative method 1		
<u>5 × 1000</u> 700	M1	
7·1(cm ³)	A1	CAO
No indicated or clearly implied	A1	FT 'their <u>5 × 1000'</u> 700
Alternative method 2		
<u>5 × 1000</u> 7·5	М1	
666 [.] 6(cm ³) or 666 [.] 7 (cm ³)	A1	CAO
No indicated or clearly implied	A1	FT 'their <u>5 × 1000'</u> 700
	(3)	
4. 100(g) <u>< mass difference ≤ 300(g)</u>	B2	Not from incorrect working B1 for one end correct in the inequality or for sight of both values
	(2)	
5. 8 parts are red	B2	B1 for 0.4 × 20 oe
8		or writing a ratio 8 : 12 (: 21) or 12 : 8 (: 21)
$\left \frac{0}{41}\right $		
41		
	(3)	

6.*	N44	
2x + 3 = 8	A1	
x - 2.5		
$7 \times 2.5 - 5y = 10$ oe	M2	FT 'their stated/derived 2.5' M1 for $7x - 5y = 10$
<i>y</i> = 1.5	A1	-
7 *(_)	(5)	
/ .^(a)	B1	
Z IV2		
$\sqrt[7.(0)]{\sqrt{11}}$	B1	
	(2)	
8.*		
3 <i>xy</i> (<i>y</i> + 2 <i>x</i>)	B3	Mark final answer. B2 for any one of the following: • A correct answer seen then spoiled • $3x(y^2 + 2xy)$ • $3y(xy + 2x^2)$ • $xy(3y + 6x)$ • $3xy(y + mx)$ where $m \neq 0$ or $m \neq 2$ • $3xy(ny + 2x)$ where $n \neq 1$ or $n \neq 0$ B1 for any one of the following: • $3(xy^2 + 2x^2y)$ • $x(3y^2 + 6xy)$ • $y(3xy + 6x^2)$ • $3xy(y+)$ • $3xy(+ 2x)$
	(3)	
9.* 4(.0) × 10 ³	B2	B1 for: • sight of 4000 • $\frac{9 \cdot 6 \times 10^8}{2 \cdot 4 \times 10^5}$ • $4(\cdot 0) \times 10^n$ where $n > 0$. • $a \times 10^3$ where $1 < a < 10$
	(2)	
10.*(a) 0.6 on the 'Does not go on a train' branch	B1	
Use of 0.4 × = 0.28 OR 0.28 ÷ 0.4	M1	
P(Goes to the theatre) = 0.7	A1	Allow M1A1 if 0.7 seen on one of the 'Goes to the theatre' branches.
0.7, 0.3, 0.7 and 0.3 correctly placed	A1	FT 'their 0.7' only if M1 awarded. (0.28, 0.72, 0.28, 0.72 is M0A0A0)
10. (b) 0.6 × 0.3	M1	FT their tree provided both values between 0 and 1.
0.18	A1	
	(6)	

$ \begin{array}{c} 11.^{*} \\ 2 \times \underline{2} \times \underline{9} \\ 8. & 3 \end{array} $	or 2 ÷ 4 ×	3 oe	M2	 May be seen in stages. Candidates might work in minutes. M1 for one step, e.g. 2 ÷ 4 (0.5 hours) 2 × 3 (6 hours) oe
	1.5 ho	ours oe	A1	CAO
Alternative	method 1			
Bumpo	Tonko	Timo		
o	R	2		
÷ 3	0	<u> </u>	M1	Method to find tanks and time for 3 pumps.
3	8	6		
	• + 4	÷ 4	M1	Method to find time for 2 tanks. FT.
3	2	1.5	A1	CAO
	_			
Alternative	method 2			
Pumps	Tanks	Time		
9	8	2		
÷ 9		× 9		
1	8	18	N/1	Mathematica final trades and time from the second
	÷ 4	÷ 4		Method to find tanks and time for 1 pump.
1	2	4.5		
× 3		÷ 3	M1	Method to find tanks and time for 3 pumps. FT.
3	2	1.5	A1	CAO
Alternative	method <u>3</u>			
Pumps	Tanks	Time		
9	8	2		
	÷ 8	÷ 8		
9	1	1/4		
÷ 3		× 3	M1	Method to find pumps and time for 1 tank.
3	1	3/4		
	× 2	× 2	M1	Method to find pumps and time for 2 tanks. FT.
3	2	1.5	A1	CAO
			(3)	

12.(a) 13.(a) 14.(b) 12.(a) A A A A A A A A A A A A A	B2	 B1 for either: 3 out of 4 vertices correct all vertices correct but not joined a completely correct solution with use of centre (2,1)
(i)Triangle C drawn correctly	B1	
Triangle D drawn correctly	B1	FT 'their Triangle C'
(ii)Reflection in the line $y = x$.	B1	FT 'their Triangle D' provided at least B1 awarded. Must be written as a single transformation.
	(5)	
13.*(a) Correctly rewriting the equations in the form y = mx + c y = 4x + 3 AND $y = 4x - 6.5(So lines parallel)$	В3	 B2 for: one correct equation and a correct but incomplete rearrangement of the other seen e.g. y = 4x - 6.5 and 3y = 12x + 9 both in the form y = 4x + c with an error in one constant term, provided constants aren't equal. e.g y = 4x - 6.5 and y = 4x + 9 B1 for: one correct equation y = 4x + 3 two equations of the form y = 4x + with errors in both constant terms or no constant terms. Allow all marks for equivalent complete methods e.g. 6y - 24x = 18 AND 6y - 24x = -39 or (3y = 12x + 9 AND 3y = 12x - 19.5) and a clear statement that the two equations are of the same form and the only difference is the constant, so they are parallel.
(-2, 9)	B2	B1 for each If no final coordinate given, award B2 for an unambiguous $x = -2$ and $y = 9$ seen in working B1 for one of $x = -2$ or $y = 9$ seen in working
	(5)	

14.(a)(i) <u>3125</u> <u>32</u>	B2	B1 for a fraction with either: • a numerator of 3125 • a denominator of 32 • sight of $-\frac{625}{16} \times -\frac{5}{2}$
14.(a)(ii) 105	B1	
14.(b) 250 000 oe ISW	B2	B1 for 25 x 10 000
14.(c) 4n ² – 1	B2	May be seen as $(2n)^2 - 1$ B1 for 4n ² + k or $(2n)^2$ + k where k ≠ -1
	(7)	
15.(a) (5x + 3)(x + 2)	B2	B1 for two brackets which multiply to give $5x^2 + 13x + k$ or $5x^2 + mx + 6$
15.(b) Valid response e.g. '(Dividing by a negative) he should reverse the inequality'	E1	Allow 'the answer should be $x < -2$ '.
15.(c) x ¹⁰	B2	 B1 for either: sight of x¹² sight of x'^{their 12' - 2}
	(5)	
16.(a) $\binom{5}{2}$ drawn correctly	B2	 B1 for one of the following: sight of (⁵₂), a line representing (⁵₂) without an arrow, correct t joined to correct w drawn without the resultant shown, t + w drawn, with either t or w drawn incorrectly, with resultant shown. Correct drawing of their t + w with one error in addition.
(WY =) 6a - 4b	B1	Check diagram
$(WZ =) \frac{5}{2} (6a - 4b)$ oe	B1	FTWY = 6a + 4b
(WZ =) 15 a – 10 b	B1	FTWY = 6a + 4b
	(5)	If B1 B0 B0 awarded then award SC1 for a final answer of $(YZ=) 9a - 6b$ If no marks and $WY = 6a + 4b$ then award SC1 for a final answer of $(YZ=) 9a + 6b$

17. (a) 32	B2	May be seen in stages. B1 for one of the following: • 2^5 • $(\sqrt[3]{8})^5$ • $\sqrt[3]{(8^5)}$
$17.(b)$ $\frac{6}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}}$ $2\sqrt{2}$	M1	• (2 ³) ^{5/3}
$\frac{17.(c)}{\frac{9 \times 10^8}{3 \times 10^2}} \text{ or } \frac{900\ 000\ 000}{300}$	M2	M1 for $\frac{9 \times 10^8}{300}$ or $\frac{9 \times 10^8}{298}$ or $\frac{8 \cdot 85 \times 10^8}{300}$ or $\frac{8 \cdot 9 \times 10^8}{298 \text{ or } 300}$ or $\frac{2 \times 10^8 + 7 \times 10^8}{3 \times 10^2}$ or $\frac{2 \times 10^8 + 7 \times 10^8}{300}$
3 × 10 ⁶	A1	CAO An answer of 3 000 000 is awarded M2 A0
Tea Coffee Milkshake Totals Small 5 36 20 61 Medium 18 3 6 27 Large 30 42 40 112 Totals 53 81 66 200	(7) B4	If the values are not in in the table they must be clearly identified. B4 for the whole table completed correctly. If not B4, award B3 for the 4 values in the shaded cells correct along with at least one circled correct pair (forming a correct total of 200): • 18, 30, 20, 40, 36 and 3 • 18, 30, 20, 40, 53 and 81 • 18, 30, 20, 40, 53 and 81 • 18, 30, 20, 40, 112 and 27 If not B3, award B2 for any one of the following correct values: • 18, 30, 20 and 40 • 18, 30, 53 and 81 • 30, 20, 40, 112 and 27 If not B2, award B1 for one of the following correct values: • 18 and 30 • 18, 20 and 40 • 30, 20 and 40
$\frac{18+3}{200}$ or $\frac{27-6}{200}$	M1	FT 'their 18' + 'their 3' provided non-zero or FT 'their 27' – 6, provided non-zero
21_0e ISW 200	A1	SC1 for 21/134 or 21/27
	(6)	

19.(a) For a correct method that produces two prime factors from the set {2, 2, 2, 3, 3, 7} before the second error.	M1	Must be a method that involves only division.
2, 2, 2, 3, 3, 7	A1	CAO for sight of the six correct factors (ignore 1s)
		FT provided of equivalent difficulty (e.g. must be at least two 3s)
HCF = 126	B2	B1 for 2 × 3 × 3 × 7 oe
		126 on answer space implies M1A1B2
		If no marks, award SC1 for a common factor > 9
19.(b) 14	B1	
	(5)	
20. XOZ = 180 - (2 × 34)	M1	May be seen in stages or on the diagram.
112 (°)	A1	
XYZ = 56(°)	B1	FT 'their 112' provided M1 awarded
 A complete proof with at least two valid angle properties appropriately stated e.g. two radii make an isosceles triangle an angle at the centre is twice the angle at the circumference 	E1	At least one of the angle properties must be a Circle Theorem.
Alternative method		Extending XO or ZO to a point C on the
XCZ= 180(°) – 90(°) – 34(°)	М1	circumference to create a right-angle triangle May be seen in stages or on the diagram.
56(?)	A1	
XCZ= XYZ = 56(°)	B1	
 A complete proof with at least two valid angle properties appropriately stated e.g. an angle in a semi-circle is 90° angles in the same segment are equal 	E1	At least one of the angle properties must be a Circle Theorem.
	(4)	

 by grouping the data the modal group has changed . changed' 'By grouping the data information has been lost' (21.(b) 	
'By grouping the data information has been lost' 21.(b)	
losť 21.(b)	
21.(b)	
Check the diagram. $100 (18 \pm 20 \pm 10 \pm 12 \pm 10)$ or $100 = 70$ M1 Allow one error with the frequencies	i i
= 30 A1 CAO	
Histogram completed with group of B1 FT 'their 30' provided M1 awarded or the	
frequency density 0.3 frequencies seen with at most one error	
Any suitable comparison e.g. E1 Do not allow comparisons that include the data	
'(More) Year 11 students spend more time from the histograms.	
on their phones (than Year 7 students)'	
(More) Year 7 students spend less than	
students)'	
(5)	
22.(a)	
B ₁ = 1.2 × 1000 (=1200) B1	
22.(b)	
$B_2 (= 1.2 \times B_1) = 1440$ BI	
$B_3 = 1.2 \times B_2$ or $B_3 = 1.2^2 \times B_1$ or M1 FT 'their $B_2' \times 1.2$	
$B_3 = 1.2^3 \times 1000$	
1728 oe ISW A1	
(4)	
23.(a)	
5 × 4 × 3 M1	
60 A1	
23.(b) May be seen in stages	
$4 \times 1 \times 3 \times 2$ or $2 \times 60 \div 5$ M1 FT 'their 60' Allow 2/5 of 60.	
24	

24.(a)		
Tangent drawn at time 8 seconds	M1	
<u>Difference in y</u> Difference in x	m1	
Correctly evaluated gradient from their tangent	A1	Accept answer written as an improper fraction (unless it gives a whole number), mixed number or decimal.
		If answer given as a decimal, it must be correct to 1 decimal place – rounded or truncated.
24.(b) $\frac{0+16}{2} \times 4 + \frac{16+24}{2} \times 4 + \frac{24+28}{2} \times 4 + \frac{28+30}{2} \times 4 + \frac{30+30}{2} \times 4$	M2	M1 for the sum of the areas of the 5 trapezia with one error - (possibly repeated) of the vertical heights used.
2 2 (32 + 80 + 104 + 116 + 120)		Accept equivalent with vertical strips split into triangles and rectangles
= 452 (m)	A1	FT from M1
$\frac{Alternative method}{\frac{1}{2} \times 4 \times (0 + 30 + 2(16 + 24 + 28 + 30))}$	М2	Award M1 if only one value is incorrect.
2 = 452 (m)	A1	FT from M1
	(6)	
25.(a) $h^{-1}(x) = \sqrt{x-3}$	B2	B1 for $x^2 = y - 3$ or equivalent
Valid explanation e.g. 'You cannot find the square root of a negative number, so the smallest value of <i>x</i> is 3'.	E1	
25.(b) $fg(x) = (x-4)^2 + 5$	B1	
$gf(x) = (x^2 + 5) - 4$	B1	
$(x-4)^2 + 5 - ((x^2+5) - 4)$	M1	FT 'their $fg(x)$ ' and/or ' $gf(x)$ ' provided of equivalent difficulty
$(x^2 - 8x + 16 + 5 - x^2 - 1 =) 20 - 8x$	A1	Must not be from incorrect working.
	(7)	

26.		FT until 2 nd error for equivalent level of difficulty
$9e^2 = 7 - de^2$	B1	Squaring both sides Allow 3 ² e ² or (3e) ² for 9e ²
$9e^2 + de^2 = 7$	B1	Isolating terms in e ²
$e^2(9+d) = 7$	B1	Factorising
$e^2 = \frac{7}{9+d}$	B1	Isolating e ²
$e = (\pm) \sqrt{\frac{7}{9+d}}$	B1	Taking square root. Mark final answer.
	(5)	
27. 10x = 3.4545 and 1000x = 345.4545 <u>with</u> an attempt to subtract on both sides	M1	Or x and 100x or equivalent. Or a <u>complete</u> alternative method.
$\frac{342}{990} \left(= \frac{19}{55} \right)$	A1	ISW An answer of <u>34.2</u> gains M1 only 99
<u>Alternative method</u> $0.3 + 0.04545 = \frac{3}{10} + \frac{45}{990}$	M1	
$\frac{342}{990} \left(= \frac{19}{55} \right)$	A1	ISW
	(2)	
$\begin{array}{c} 28. \\ \underline{12 - w} \\ 10 - 5 \end{array} \text{or} \underline{w - 12} \\ 10 - 5 \end{array}$	S1	
$\frac{w-12}{10-5} = -1.5 \text{ or } \frac{12-w}{10-5} = 1.5$	M1	Implies S1 Allow for $w - 12 = 1.5$
<i>w</i> = 4.5 (m/s)	A1	CAO An answer of $w = 19.5$ is awarded S1 M1 A0 provided no incorrect working seen.
Alternative method Use of $y = u + at with u = 12$ $a = -15$ $t = 5$	S 1	Allow S1 and M1 for use of $a = 1.5$
12 - 1.5 × 5	M1	Implies S1
w = 4.5 (m/c)	Λ1	640
<u>w - 4.3 (III/S)</u>	(3)	

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