GCSE MARKING SCHEME

SUMMER 2023

GCSE
MATHEMATICS – COMPONENT 2
(FOUNDATION TIER)
C300U20-1

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.

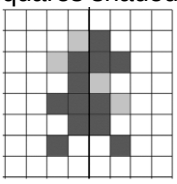
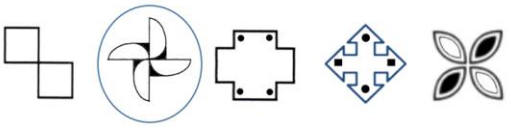
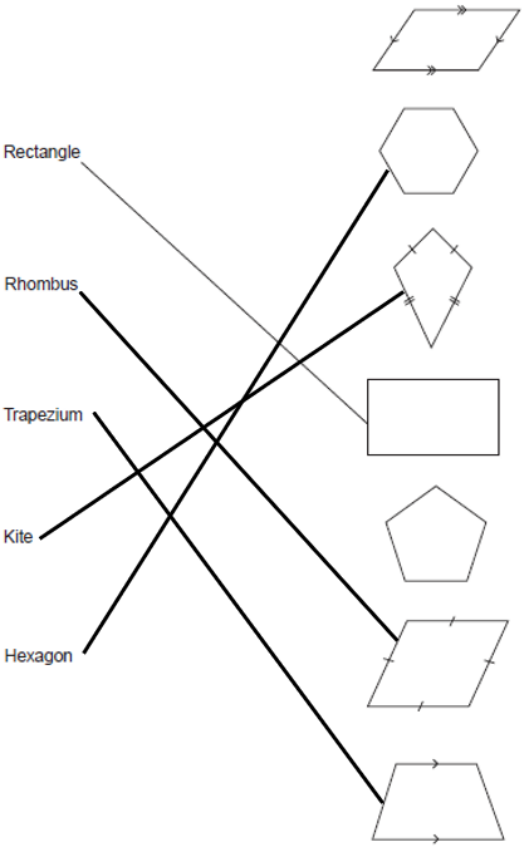
It is hoped that this information will be of assistance to centres but it is recognised at the same time that, without the benefit of participation in the examiners' conference, teachers may have different views on certain matters of detail or interpretation.

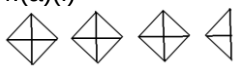
WJEC regrets that it cannot enter into any discussion or correspondence about this marking scheme.

EDUQAS GCSE MATHEMATICS

SUMMER 2023 MARK SCHEME

Component 2: Foundation Tier	Mark	
1.(a) 60(p), 86(p), (£)1.85, (£)4.23 oe	B2	Allow costs given in pounds or pence. B1 for one of the following: • One of the costs chosen incorrectly from the table but placed correctly. • Listing the correct <u>items</u> in the correct order e.g. fruit, cereal bar, coffee, salad. • The correct values in the correct order but with incorrect units e.g. 0.60p. • Three of the values placed in the correct order with one omission. • The four costs ordered from biggest to smallest correctly. <u>Note</u>: Allow £0.86p
1.(b) 69(p) or (£)0.69	B2	If units are given, they must be correct. B1 for (£)5.69 or 569(p) or (3.49 + 1.20 + 1) - 5 If no marks, award SC1 for a correct <u>saving</u> following use of one incorrect item.
1.(c)(i) 8 × (£)0.95 or 8 × 95(p) (£)7.6(0) 760(p)	M1 A1	Allow M1 if repeated addition of eight lots of 95p If units are given, they must be correct.
1.(c)(ii) 12.95 ÷ 1.85 = 7	M1 A1	<u>Note:</u> • Allow M1 A1 for an embedded answer of 1.85 × 7 = 12.95. • Award M1 A0 for 1.85 + 1.85 + 1.85 + 1.85 + 1.85 + 1.85 + 1.85 = 12.95 without sight of 7.
	(8)	

2.(a) The correct 4 squares shaded 	B2	B1 for one of the following: • A symmetrical shape with the 4 correct squares and no more than 2 extra squares. • 3 or 4 of the correct squares and no more than 1 incorrect square. • 2 correct squares and no incorrect squares.
2.(b) The correct shape unambiguously indicated 	B1	
2.(c) (Edges) 9 (Vertices) 6	B2	B1 for either correct. If no marks, award SC1 for reversed answers.
2.(d) All four of the remaining shapes matched correctly 	B2	B1 for three of the remaining shapes matched correctly OR for 2 correct with no errors.
	(7)	

3.(a) Correct inequality unambiguously indicated $\frac{1}{7} \leq \frac{1}{8}$ $\frac{1}{7} \geq \frac{1}{8}$ $\frac{1}{7} = \frac{1}{8}$ $\frac{1}{7} > \frac{1}{8}$ $\frac{1}{7} < \frac{1}{8}$	B1	
3.(b) One third unambiguously indicated	B1	Note: If they circle an option and write something different on the answer line then the answer line takes precedence.
3.(c) 2, 6, 9 in any order	B3	B2 for listing all six factors only (allow 18 to be omitted and repeats). B1 for one of the following: • Listing at least 3 correct factors with no incorrect values. • Listing 4 or 5 correct factors with no more than 1 incorrect value. • Three different numbers in the answer boxes with a sum of 17.
	(5)	
4.(a)(i) 	B1	Allow if internal lines are missing. Allow alternative representations of the half square.
4.(a)(ii) 36 + 21 + 48 + 30 + 42 oe 177 (cupcakes)	M1 A1	Allow M1 for attempting to add all the values for the five days with at most one error. CAO If no marks, award SC1 for an unsupported answer in the range 174 to 180. Note: Unsupported 177 is awarded M1A1.
4.(b) A correct explanation e.g. '(17 is) not a multiple of 3'. 'It cannot be divided by 3'. 'It goes up in 3's so cannot make 17'. '3 doesn't go into 17'. '(17 is) not in the 3 times table'. '5 would be difficult to show'. '2 would be difficult to show'. 'It can show 15 or 18 (but not 17)'.	E1	Do not allow e.g. 'Can't show 17 because one shape represents 12 and two shapes represents 24'. 'It goes up in 12's'. '3 cannot make 17'. '17 is difficult to show'. 'Each triangle is worth 3'. 'It goes up in 3's'.
	(4)	

5.(a)(i) 50·3	B1	Note: $\frac{503}{10}$ is awarded B0
5.(a)(ii) 5·4	B1	Allow embedded answer
5.(b) (Box =) 1·3 (kg) (5·5 – 1·3) ÷ 2 (Ball =) 2·1 (kg)	 B1 M1 A1	Answer lines take precedence. FT 'their 1·3' providing < 5·5. FT
	(5)	
6.(a) 0.22 × 250 = 55 ISW (for calculating value)	 M1 A1	Or equivalent complete and correct method. Allow M1 A1 for an answer of £55
6.(b) 250 ÷ 5 × 2 = 100 ISW (for calculating value)	 M1 A1	Or equivalent complete and correct method. May be seen in stages. Note: M0 if method seen but then spoiled e.g. 250 ÷ 5 × 2 − 55 If no marks, award SC1 for unsupported £20
6.(c) 250 – 55 – 100 or (1 – 0.22 – 0.4) × 250 oe = 95 (10p coins) 55 × (£)1 + 100 × (£) 0.20 + 95 × (£) 0.10 (= £55 + £20 + £9.50) or 55 × 100(p) + 100 × 20(p) + 95 × 10(p) (= 5500p + 2000p + 950p) = (£) 84.5(0) or 8450(p)	 M1 A1 M1 A1	 FT 250 – 'their 55' – 'their 100', provided 'their 55' + 'their 100' < 250 and are a whole number of coins FT. Sight of £9.50 implies M1 A1. May be seen in working. FT 'their derived 95', 'their 55' and 'their 100', provided 'their 55' + 'their 100' < 250 and are a whole number of coins Allow M1 A0 if inconsistent place value used unless corrected. FT If units are given, they must be correct.
	(8)	

<table>
<tr><td>7.(a)
(Length =) 9 (cm)

9 × ½ or 9 × 0·5 or 9 ÷ 2 or 9 × 50 oe

= 4.5 (m) or 450 (cm)</td><td>B1

M1

A1</td><td>± 2 mm. May be seen on diagram.

FT ‘their 9’

FT
If units are given, they must be correct.

<u>Note:</u>
<table><tr><th>Measurement</th><th>Conversion in metres</th><th>Conversion in centimetres</th></tr><tr><td>8.8</td><td>4.4</td><td>440</td></tr><tr><td>8.9</td><td>4.45</td><td>445</td></tr><tr><td>9.1</td><td>4.55</td><td>455</td></tr><tr><td>9.2</td><td>4.6</td><td>460</td></tr></table></td></tr>
<tr><td>7.(b)
1.7 ÷ ½ or 1.7 ÷ 0.5 or 170 ÷ 50 oe

= 3.4(cm)</td><td>
M1

A1</td><td>FT ‘their 50 cm’ or ‘their 0.5 m’ for M1 only
Allow 170/50

CAO. Final answer must be in cm.
<u>Note:</u> 3.4m or 34mm is A0.</td></tr>
<tr><td></td><td>(5)</td><td></td></tr>
<tr><td>8.(a)
19</td><td>B2</td><td>B1 for the two middle numbers unambiguously indicated
13 15 <u>17 21</u> 23 31</td></tr>
<tr><td>8.(b)
The correct five numbers in any order
13 17 21 23 31</td><td>B3</td><td>B2 for any of the following:
• 120 – 105 or 15 identified
• 105 and at least two trials of the sum of 5 cards
• At least two trials finding the mean of any 5 of the numbers correctly

B1 for one of the following:
• A trial finding the mean of any 5 of the numbers correctly
• 21 x 5 or 105</td></tr>
<tr><td></td><td>(5)</td><td></td></tr>
</table>

9. 60° angle marked correctly on the diagram or indicated in working 360 – 90 – 90 – 60 (x =) 120 (°)	B1 M1 A1	 FT 'their 60' providing < 180 CAO Unsupported 120 (°) is awarded B1M1A1. Note: 360 ÷ 3 = 120 (°) is an incorrect method and is awarded M0 A0.
	(3)	
10.(a) Aaron indicated with e.g. (28 km is) between 17 and 18 miles (inclusive) or (15 miles is) 24 km or 'Aaron ran 4km more (than Jenny)'	B1	 Allow justification indicated on the graph. If both conversions are carried out, then they must both be correct.
10.(b) A clear method shown e.g. 12 miles is 19(.2)km AND 19(.2) × 3, or 18 miles is 29 km AND 29 × 2, or 36 × 8 ÷ 5 oe Accept answers in the range 54 – 58(km) inclusive.	M1 A1	 Allow M1 for e.g. 6miles = 10km AND 10 × 6 = 60km Not from incorrect working. Note: Unsupported answers in the range 54 – 58(km) are awarded M1 A1.
	(3)	
11.(a) 7x + 24	B2	Mark final answer B1 for expanding bracket correctly 4x + 24 or B1 for 7x + k providing k ≠ 0
11.(b) (f =) 15·3	B1	Allow embedded answer
11.(c) (x =) 9·75 or 9 ¾ or 39/4	B2	B1 for $\frac{3\times(24+2)}{8}$ or $\frac{3\times26}{8}$ or $\frac{78}{8}$ or $\frac{3\times24+3\times2}{8}$ or $\frac{72+6}{8}$ may be seen in stages
	(5)	
12.(a) 8·77	B2	B1 for 8·76(8…) If no marks, award SC1 for an answer of 4.84
12.(b) 0·06	B1	Do not allow trailing zeros e.g. 0·06000
	(3)	

13.(a) Correctly plotting all 5 points	B2	And no extra plots B1 for any 3 or 4 points plotted correctly and not more than 5 points plotted in total or for 5 points plotted correctly with at most 1 extra incorrect plot
13.(b) Point (0.5,38) indicated	B1	
13.(c) A valid comment e.g. 'The more hours of exercise someone does, the lower their **resting** heart rate'. 'The less exercise someone does, the higher their **resting** heart rate'. 'There is a negative correlation'.	B1	Do not allow e.g. 'It is negative'. 'The heart rate is lower when you exercise'. 'After each hour of exercise, the resting heart rate drops'. 'As exercise increases, bpm decreases' 'The more exercise someone does, the lower their bpm'. 'The less exercise someone does, the higher their bpm'.
	(4)	
14.(a)(i) 0.55 oe	B1	
14.(a)(ii) 0.35 × 740 = 259	M1 A1	Or equivalent complete and correct method.
14.(a)(iii) 1 – (0.2 + 0.35 + 0.3) oe ÷ 3 = 0.05 oe	M1 m1 A1	FT 1 – ('their 0.55' + 0.3) Answer may be seen in the table Answers in the working space take precedence over the table. <u>Note:</u> If answers of 0.1 and 0.05 are offered without labels (or incorrectly labelled) or not given in the table then award M1 m1 A0.
14.(b)(i) 62	B1	Venn diagram takes precedence
14.(b)(ii) $\frac{31}{104}$ oe ISW	B2	B1 for $\frac{17+14}{104}$ or $\frac{31}{b}$, where b > 31 or $\frac{17+14}{b}$, where b > 31
	(9)	

15. (52 – 35.2) ÷ 3 = 5.6 (cm)	M1 A1	May be seen in stages
(85.6 – 35.2) ÷ 5.6 or *35.2 + 9 × 5.6 oe*	m1	FT 'their (52 – 35.2) ÷ 3' *<u>Note:</u> If a candidate is awarded M1 A0 and attempts repeated additions with their incorrect 5.6, there needs to be enough additions to get to a value just below or just above 85.6. They may use a mixture of + 'their 5.6' (1box) and + 'their 16.8' (3boxes) within their additions.*
10 (boxes)	A2	Not from incorrect working A1 for 9 (boxes) If no marks, from a method starting with (52 – 35.2) ÷ 4 = 4.2 award SC2 for 12 boxes from (85.6 – 52) ÷ 4.2 + 4 or (85.6 – 35.2) ÷ 4.2 SC1 for 8 boxes from (85.6 – 52) ÷ 4.2
<u>Alternative method 1</u> *(52 – 35.2) ÷ 3* *= 5.6 (cm)*	*M1* *A1*	
(85.6 – 52) ÷ 5.6 or *52 + 5.6 + 5.6 + 5.6 + 5.6 + 5.6 + 5.6 oe or*	*m1*	*FT 'their (52 – 35.2) ÷ 3'* *<u>Note:</u> If a candidate is awarded M1 A0 and attempts repeated additions with their incorrect 5.6, there needs to be enough additions to get to a value just below or just above 85.6. They may use a mixture of + 'their 5.6' (1box) and + 'their 16.8' (3boxes) within their additions.*
10 (boxes)	*A2*	*Not from incorrect working* *A1 for 6 (boxes)*
<u>Alternative method 2</u> *52 – 35.2 = 16.8 with an attempt at repeated additions to get to 85.6. At least 1 addition must be attempted.* *e.g.* *35.2 + 16.8 + ……. or 52 + 16.8 + …….* *35.2 + 16.8 + 16.8 + 16.8 (= 85.6) or* *(85.6 – 35.2) ÷ 16.8* *OR* *52 + 16.8 + 16.8 or* *(85.6 – 52) ÷ 16.8*	*M2* *m1*	*<u>Note:</u> If the answer to 52 – 35.2 is incorrect and they have attempted repeated additions with their incorrect 16.8 onto either 35.2 or 52. Marks can only be awarded if there are enough additions to get to a value just below or just above 85.6. In this case award M1 m1.* *Note: (85.6 – 35.2) ÷ 16.8 or (85.6 – 52) ÷ 16.8 implies M2. If the answer to 52 – 35.2 is incorrect but the correct divisions are shown with their incorrect 16.8 then award M1 m1.*
10 (boxes)	*A2*	*Not from incorrect working* *A1 for 1 + 3 + 3 + 3 or 4 + 3 + 3* *or 9 boxes or 6 boxes* *(as appropriate for their method)*
	(5)	

16. $h - k = 2g$ or $2g = h - k$ or $-2g = -h + k$ $\frac{h-k}{2} = g$ or $g = \frac{h-k}{2}$ or $g = \frac{-h+k}{-2}$	B1 B1	F.T. only from $2g = \pm h \pm k$, stated or implied. Mark final answer. Note Allow B1B0 for $g = (h - k) \div 2$ or $g = (-h + k) \div -2$ with or without brackets. Allow B1B0 for $\frac{h-k}{2}$ or $\frac{-h+k}{-2}$ ('g' missing)
	(2)	
17.(a) Correct translation i.e. 3 squares to the right and 4 down Vertices (4, -3) (0, -2) (1, -4)	B2	B1 for a correct horizontal or vertical translation
17.(b) Correct rotation Vertices (1, 3) (1, 4) (4, 4) (4, 2) (3, 2) (3, 3)	B2	B1 for a 90° anticlockwise rotation about (0,0)
	(4)	
18.*(a) $\frac{675}{45 \times 60}$ oe 0.25 (N/cm^2)	M1 A1	
18.*(b) $0.75 \times (45 \times 60)$ or 675×3 2025 (N)	M1 A1	FT 'their 2700' from (a) if necessary
	(4)	

19.*(a)(i) 2014 and 2016	B1	
19.(a)(ii) No and valid explanation e.g. one of the following: 'There is no data for 2009' 'The data is only for even-numbered years.' 'The lines joining the points on a time-series graph have no value.' 'The graph shows 'households' and Jane mentions 'people''.	E1	Allow one of the following: 'There is no point on 2009' 'We can't tell the % exactly between the even years' 'It could be higher or lower between the plotted points'
19.(b)(i) All points correctly plotted	P1	Check overlay for tolerance Allow if plots are correct but incorrectly joined.
19.(b)(ii) 2018	B1	FT 'their plotted points' providing at least 5 points correctly plotted and a unique solution
19.(b)(iii) Comment that includes words indicating internet keeps on increasing whereas desktop ownership decreases (after 2014)	E1	A comment does not need to mention the years but must imply computer ownership **and** internet connection. Allow 'the county will follow a similar trend to Eduvale'
	(5)	
20.*(a) $8.2^2 - \pi \times \left(\frac{8.2}{2}\right)^2$ oe	M3	M2 for sight of (area of circle =) $\pi \times \left(\frac{8.2}{2}\right)^2 \ (= 52.81....)$ oe or M1 for sight of (area of square =) 8.2^2 (= 67.24) AND for (radius of circle =) 4.1 (look on diagram) May be embedded in an incorrect calculation
14.4 or 14.42 to 14.46 (cm^2)	A1	Accept 14 only if from correct working
20.(b) 7 × 9·8 × 16 1097·6 or 1098 (cm^3)	M2 A1	M1 for 7 × 9·8 (=68.6)
	(7)	

21.*(a) $5x = 8$ $x = 1.6$ or $\frac{8}{5}$ ISW	 B1 B1	 FT from $ax = 8$, $a \neq 1$ or $5x = b$ Accept $\frac{8}{a}$ or $\frac{b}{5}$ but if on FT either simplifies to an integer the answer must be given as an integer. 'x =' can be omitted but must not be wrong if there. Correct answer implies first B1.
21.(b) (number of apples =) $x + 2$ si $30x + 25(x + 2) = 545$ oe $55x + 50 = 545$ oe $x = 9$	 B1 M1 m1 A1	 Not implied by use of numerical trials. Note: Do not award B1 for x + 2 = 545 oe. FT 'their $x + 2$' providing binomial in x; brackets may be omitted Expands the brackets and simplifies CAO (no FT as needs to be an integer answer) If M0 A0 award either: SC2 for an answer of 9 if unsupported or from trials. SC1 if 9 only seen in embedded working.
21.(c) $(x + 1)(x + 4)$	 B2	 B1 for a pair of brackets that expand to give $x^2 + 5x \pm$ a OR $x^2 \pm$ b$x + 4$
	(8)	
22*. Use of right-angled triangle with trigonometry with 3° or 87° correctly indicated with 2.5 used as a side (vertical height =) $2.5\tan 3°$ or $\frac{2.5}{\tan 87°}$ 0.1(3…) (km)	 S1 M2 A1	Degree symbol may be omitted throughout; lengths may be in metres throughout Angle may be marked on diagram; trig ratio used may not be correct at this stage M1 for $\tan 3° = \frac{?}{2.5}$ or $\tan 87° = \frac{2.5}{?}$ Not from wrong working e.g. 2.5sin(3) If units are stated, they must be correct but ISW any attempt at a unit change after a correct answer has been seen Unsupported 0.1(3…) is awarded S1 only
Alternative method *Use of right-angled triangle with trigonometry with 3° or 87° correctly indicated with 2.5 used as a side* *(vertical height =)* $\frac{2.5 \times sin\ 3}{sin\ 87}$ *0.1(3...) (km)*	*S1* *M2* *A1*	*Angle may be marked on diagram; trig ratio used may not be correct at this stage* *M1 for* $\frac{2.5}{sin\ 87} = \frac{x}{sin\ 3}$ *oe* *Unsupported 0.1(3…) is awarded S1 only*
	(4)	

23*(a) 3000×1.04^5	M1	Or equivalent full and complete method
= (£)3649.95(87..) or (£)3649.96 or (£)3650	A1	
$\frac{3649.96-3000}{3000}(\times 100)$ oe AND $\frac{3\times190}{3000}(\times 100)$oe OR $\frac{3649.96-3\times190}{3000}$ (x 100)	M2	FT 'their 3649.96' provided M1 previously awarded M1 for either $\frac{3649.96-3000}{3000}(\times 100)$ or $\frac{3\times190}{3000}(\times 100)$ providing M1 previously awarded
A indicated AND 2.7(%) or 2.66...(%)	A1	FT. Allow 2(%) or 2.6(%) or 3(%).
Valid assumption e.g. 'Account A interest rate stays the same' 'Account A interest rate **does not** vary' 'Account A interest rate **does not** go up or down'	E1	Do not allow 'Account A, interest rate can vary' 'Account A interest rate is not guaranteed'
Alternative method *$1.04^5 \times 100 - 100$ oe*	*M2*	*= 1.2166.... $\times$ 100 – 100* *M1 for 1.04^5*
21.7(%) or 21.66....(%)	*A1*	Allow 21(%) or 21.6(%) or 22(%)
(3 $\times$ 190) ÷ 3000 ($\times$ 100) (=19%)	*M1*	*FT providing M1 previously awarded*
A indicated AND 2.7(%) or 2.66...(%)	*A1*	*FT providing M1 M1 previously awarded* Allow 2(%) or 2.6(%) or 3(%)
Valid assumption e.g. *'Account A interest rate stays the same'* *'Account A interest rate **does not** vary'* *'Account A interest rate **does not** go up or down'*	*E1*	*Do not allow* *'Account A - interest rate can vary'* *'Account A interest rate is not guaranteed'*
23.(b) Valid impact based on assumption e.g. 'Even if the interest rate went up, the answer would still be account A but the difference would be more.' 'If the interest rate went down, account A may not have the greater increase.' 'If the interest rate doesn't stay the same, then Account A could have even more money than B or less than B'	E1	If no valid assumption is made then this mark cannot be awarded. E0E1 not allowed. Allow 'the answer could be different'. Do not allow 'the answer could be wrong'.
	(7)	