GCSE MARKING SCHEME

AUTUMN 2019

GCSE
MATHEMATICS – COMPONENT 2 (HIGHER TIER)
C300UB0-1

INTRODUCTION

This marking scheme was used by WJEC for the 2019 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.

GCSE MATHEMATICS

COMPONENT 2 - HIGHER TIER

AUTUMN 2019 MARK SCHEME

Eduqas Autumn 2019 **C2 Higher Tier**		
1.* 500×1.034^{25} = (£) 1153.41	M1 A2 (3)	Or equivalent full method Must be to the nearest penny A1 for (£) 1153.40(9...)
2.* Sight of $x + 5 + x - 10 + x - 75$ (+125) $3x - 80 + 125 = 360$ or $3x - 80 = 360 - 125$ or $3x = 315$ $x = 105$	B1 B1 B1 (3)	 Implies previous B1 FT 'their $x + 5 + x - 10 + x - 75$' provided it contains at least 2 of the appropriate angle terms, simplified and correctly equated CAO. An answer 'x = 105' without previous equation is awarded B0
3.* 64 km/h is $64 \times 50 \div 80$ 40 (mph) $12 \times 1.3 + 24 \times 1.2$ or for sight of 15.6 and 28.8 44.4 (m)	M1 A1 M1 A1 (4)	 CAO FT 'their mph' for one of: • intention to calculate '$a \times 1.3 + b \times 1.2$' • correctly evaluated '$a \times 1.3$ and $b \times 1.2$' provided 'their b' > 'their a' Only FT for speeds used from the table
4(a)* $6x^2 - 16x - 21x + 56$ $6x^2 - 37x + 56$	B2 B1	B1 for any 2 terms correct FT for equivalent level of difficulty, providing at least 3 terms to consider and like terms to collect
4(b) $(w + 11)(w - 3)$ (= 0) $w = -11$ with $w = 3$	B2 B1	B1 for $(w \ldots 11)(w \ldots 3)$ STRICT FT from 'their pair of brackets'
4(c) $(b - 12)(b + 12)$	B1	
4(d) $e = (\pm)\ \frac{t^2}{3}$	B2 (9)	B1 for $e = \frac{t^x}{3}$ or $e = yt^2$, where $x \neq 0$ and $y \neq 0$

5(a)* 2.6 (cm)	B1	
5(b)* Mid points 2, 3, 4, 5, 6 2 × 4 + 3 × 2 + 4 × 1 + 5 × 0 + 6 × 3 ÷ 10 3.6 (cm)	B1 M1 m1 A1	FT 'their mid points' provided 4 lie within, including 'bounds', of the groups, allow 1 of the mid points is outside the group
5(c)* 5 × 4.7 + 23.9 ÷ 6 7.9 (cm)	M1 m1 A1 (8)	
6(a)* Sight of appropriate measurements 0.8 (m) and 1.2 (m) Full method to find the correct angle, e.g. tan x = 0.8 / 1.2 (x=) $\tan^{-1}$ 0.8/1.2 33.69...(°) or 33.7(°) or 34(°)	B1 M1 M1 A1	FT 'their 2.5 – 1.7' and 'their 2.4 ÷ 2' If M0, A0 then award SC1 for an answer of 56(.3°) (or equivalent unrounded irrespective of any labelling on the diagram
6(b)* 2.4 × 2.04 ÷ 1.7 or 2.5 × 2.04 ÷ 1.7 2.88 (m) or 2.9 (m) 3 (m)	M1 A1 A1 (7)	

7(a)* Flour 70 × 102 ÷ 17 OR Sugar 10 × 102 ÷ 17 Flour 420 (g) Sugar 60 (g)	M1 A1 A1	 If answer reversed, allow A1 only
7(b)* 2200 – 390 – 2×268 (= 1274) $\frac{1274}{2200}$ (× 100) or equivalent 57.91(%)	B1 M1 A2	 FT 'their 2200 – 390 – 2 × 268' CAO. A1 for 57.9(090...%) or 58(%) If no marks, award SC2 for an answer of 42.09(%)
7(c)(i) Use of radius 2.5 (Area) π × 2.5^2 19.6(....cm^2) or 25π/4	B1 M1 A1	 FT 'their radius' including use of 5 (cm) for M1 only Mark final answer Accept 20 (cm^2) from correct working
7(c)(ii) Assumption: Cylinder (Curved surface) π × 5 or equivalent × 0.8 + 2 × 19.6(...) 51.7(6) (cm^2) to 52 (cm^2) or 33π/2 (cm^2)	E1 M1 M1 m1 A1 (15)	Accept, e.g. 'uniform depth', 'uncooked', 'currants not sticking out' Allow, e.g. '**all** scones have diameter 5cm and depth 0.8cm' FT 'their assumption regarding depth' FT from use of πd with d≠5 FT 2 × 'their (c)(i)' provided at lease M1 previously awarded FT from (c)(i) and 'their depth assumption', otherwise CAO
8(a) $\frac{42.58 – 31.83}{31.83}$ (× 100) or equivalent 33.8 (%)	M1 A2	(= 10.75/31.83) A1 for 33(.77...%) or 34 (%)
8(b) (1016 – 907) ÷ 1000 or equivalent 0.109 (tonnes)	M1 A1	(=109 ÷ 1000) Mark final answer
8(c) Sight of 97.5 (g) 30 × 97.5 (÷1000) 2.925 (kg)	B1 M1 A2 (9)	 FT 'their 97.5' provided 95 ≤ 'their 97.5' < 100 A1 for 2925 (g)

9(a) Initial strategy, e.g. sketch of concentric squares Correct method to find area, e.g. subtraction of areas or composite shapes $(8+2y)(8+2y) – 8 \times 8$ or $8y+8y+8y+8y+y^2+y^2+y^2+y^2$ $4y^2+ 32y$ or $4(y^2 + 8y)$ or $4y(y +8)$ or equivalent	S1 M1 A1 A1	For intention, but some sections may be missed Or equivalent Mark final answer *If the path has been built inside then MR-1 and FT*
9(b) Strategy, drawing with ¼ circles in corners OR sight of $\pi \times 1.5^2$ of a fraction or multiple of $\pi \times 1.5^2$ (or equivalent) $4 \times 8 \times 1.5 + 4 \times ¼ \times \pi \times 1.5^2 \times 0.08$ $4.4(.... m^3)$	S1 M1 m2 A1 (9)	FT from (a) if possible Accept if measurements changed to cm consistently throughout m1 for × 'digit 8' with incorrect place value CAO *If the path has been built inside then MR-1 and FT*
10. Inner cuboid (62-2-2) × (48-2-2)×4 Volume $62 \times 48 \times 4$ - (62-2-2) × (48-2-2)×4 ($11904 – 10208 mm^3$) $1.696 (cm^3)$ Mass 1.696×10.49 OR Density $18 \div 1.696$ Mass 17.7(9... g) 17.8 (g) or 18 (g) OR Density 10.6(13... g/cm^3) or 11 (g/cm^3)	B1 M1 m1 M1 A1 (5)	**Accept equivalents in cm throughout** FT 'their inner cuboid volume' provided ≠ 62 × 48 × 4 FT 'their 1.696' CAO *Alternative: treated as one long cuboid of metal* *Overall length (2×(48 +62)=) 220(mm) B1* *Volume of cuboid:* *$2\times(48 +62) \times 2 \times 4$ (= 1760 mm^3) M1* *1.76(0 cm^3) m1* *Mass OR density: FT 'their 1.76'* *Mass 1.76 × 10.49* *OR Density 18 ÷ 1.76 m1* *Mass 18(.46...g)* *OR Density 10.2(2.... g/cm^3) A1 CAO*

11(a) 5**x** – 8**y**	B1	
11(b)(i) 6**x** + 3**y**	B1	
11(b)(ii) - **x** - 3**y**	B1	FT '- (b)(i) + 5**x**' simplified correctly
11(c) States or implies 'No' with a reason, e.g. '5**x** – 8**y** is not a multiple of –**x** – 3**y**'	E1 (4)	
12(a) (2x +3)(2x + 5) (=0) x = -3/2 with x = -5/2 ISW	B2 B1	If not B2, award B1 for (2x ± 3)(2x ± 5) or (x + 5/2)(x + 3/2) **Strict FT** from 'their pair of brackets' provided equivalent level of difficulty, with at least one answer a fraction
12(b) $n^2 + 6$	B2	B1 for $n^2 \pm a$, where $a \neq 0$
12(c) x = 5.5 Total number of hours 8.75 (hours) 5(:)45 pm or 17(:)45	B2 B1 B1	B1 for sight of any one of the following: • $\frac{3x + 1}{x/2 + 6} = 2$ • $\frac{3x + 1}{2} = x/2 + 6$ • 3x + 1 = 2(x/2 +6) • 2x = 11 • at least 2 correct trials FT 'their number of hours' provided at least B1 previously awarded
12(d) $(x + 9)^2 \pm$ .... (Minimum value at x =) -9 (Minimum value is) -79	M1 A1 A1 (12)	

13. $2x + 5 = 3x^2 + 4x - 7$ $3x^2 + 2x - 12 = 0$	M1 A1	Must be equated to zero. '=0' may be implied in further work to solve, if no further work and not '=0' then A0 FT provided their quadratic does not factorise and equivalent level of difficulty
$x = \frac{-2 \pm \sqrt{(2^2 - 4\times3\times-12)}}{2\times3}$	m1	Use of correct quadratic formula, allow 1 slip in substitution (not a slip with the formula)
$x = \frac{-2 \pm \sqrt{148}}{6}$ or $x = \frac{-1 \pm \sqrt{37}}{3}$	A1	*Alternative using x = (y - 5)/2* M1 Correct substitution of $x = (y - 5)\div2$ A1 $3y^2 - 26y + 7 = 0$ m1 Allow 1 slip in substitution into the quadratic formula A1 Correct simplification of $b^2 - 4ac$
x = 1.69… **and** x = -2.36...	A1	
x = 1.69 with y = 8.39 **and** x = -2.36 with y = 0.28	A1 (6)	FT provided M1, m1 previously awarded using their values of x in 2x + 5 or equivalent to find y-values to 2 d.p. Accept answers given as coordinates
14. $BD^2 = 10.8^2 + 12.3^2 - 2\times10.8\times12.3\times\cos112°$	M1	
$BD^2 = 367.455...$	A1	
BD = 19.169(...cm) or BD = 19.2 (cm) or BD = 19.17 (cm)	A1	
(Area DAB =) ½ ×10.8×12.3×sin112°	M1	
(Area DBC =) ½×21.5×19.169...×sin75°	M1	FT 'their derived BD'
(Area DAB + DBC = 61.58... +199.04... =) 260.6 (cm^2) to 261 (cm^2)	A1 (6)	FT provided at least one of the previous two M marks have been awarded

15(a) (9) ÷ 60 ÷ 60 × 1000 Reading from graph 16 (seconds)	M1 M1 A2	 FT from 'their 2.5(m/s)' provided at least M1 previously awarded A1 for 2.5(...m/s)
15(b) Reasonable statement, e.g. 'tangent at t = 22 is almost parallel to the gradient during this period'	E1	Do not accept, e.g. 'positive gradient' Allow, e.g. 'gradient of the tangent is positive', 'the tangent follows the trend'
15(c) Attempt to find at least one point, i.e. value of v for $0 < t \leq 60$ At least 2 correct plots or 2 appropriate values of v Suitable curve between 10 and 60, or 3 values of v evaluated in the interval $10 \leq t \leq 60$, Two times with difference of 2.5 m/s	S1 P1 C1 B1 (9)	 (20 and 51 seconds, allow 20 and 50 seconds)
16(a) $1/3\times\pi\times 16r^2 \times h = 4/3\times\pi\times r^3$ (h =) $\frac{r}{4}$	M2 A2	M1 for $1/3\times\pi\times (4r)^2 \times h = 4/3\times\pi\times r^3$, allow for $1/3\times\pi\times 4r^2 \times h = 4/3\times\pi\times r^3$ A1 for correct rearrangement but unsimplified form or $r = 4h$, or FT from M1 to A1 for (h =) r *Alternative:* $1/3\times\pi\times 16r^2 \times r/4$ M2 (or $1/3\times\pi\times (4r)^2 \times r/4$ M1) $4/3\times\pi\times r^3$ A2 (or A1 for 1 stage of simplification)
16(b) Sight of 8 : 343 or $(7/2)^3$ or equivalent 445.9 (cm^3)	B1 B2 (7)	 B1 for $3.5^3 \times 10.4$ or equivalent

t	(0)	10	20	30	40	50	60
v	(7)	7.1	7.4	7.9	8.6	9.5	10.6

17. sin BÂC = $\frac{4.1}{2 \times 3.6}$	M1	
180 – 93 – $\sin^{-1}$ 4.1/7.2 or 180 -93 – 34.7(...) or equivalent	m1	
Convincing 52.3(°)	A1	
States: Angle in a semi-circle AND angles in the same segment	E1	If no marks award SC1 for sight of ($\sin^{-1}$ 4.1/7.2 =) 34.7(....) *Alternatives:* • *using angles from the same chord and cos* • *finding BAC, then CAD = 87 – BAC (cyclic quadrilateral), DBC = CAD (angles on the same arc)*
	(4)	