

GCSE MARKING SCHEME

AUTUMN 2020

GCSE
MATHEMATICS – UNIT 1 (FOUNDATION TIER)
3300U10-1

INTRODUCTION

This marking scheme was used by WJEC for the 2020 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.

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WJEC GCSE MATHEMATICS

AUTUMN 2020 MARK SCHEME

GCSE Mathematics Unit 1: Foundation Tier	Mark	Comments
1. (a) Angle of 35° drawn at A	B1	Accept 33° to 37° Point alone is not sufficient.
1.(b) Circle radius 7cm (diameter 14 cm)	B1	Accept radius 6.8 (cm) to 7.2 (cm)
2.(a) 5433	B1	
2.(b) 174	B1	
2.(c) 75	B1	
2.(d) 6 × 7 ÷ 2 = 21	M1 A1	If no marks, award SC1 for sight of 42.
3.(a) 600	B1	
3.(b) 4000	B1	
4.(a) D	B1	
4.(b) S	B1	
5.(a) 9	B1	
5.(b) ÷ -	B1	
6.(a) 53	B1	
6.(b) 125	B1	
7.(a) 70 (%)	B1	
7.(b) 6 sectors shaded	B1	
8. 1/3 × 180(°) OR 2/3 × 180(°) or equivalent	M1	
60(°) OR 120(°)	A1	A1 for either 60(°) OR 120(°)
(180 – 60 =) 120 (°) OR (180 – 120 =) 60 (°)	B1	FT 'their 60' or 'their 120'. Two angles which add to 180(°) will get this B1. If no marks award SC1 for one angle twice the size of the other.
Alternative Method $2x + x = 180 (^{\circ}) \text{or } 3x = 180 (^{\circ})$ $x = 60 (^{\circ})$ $2x = 120 (^{\circ})$	M1 A1 B1	FT 2 × 'their x ' or 180 – 'their x '
9.(a) 16g	B1	
9.(b) (y =) 9	B1	Accept embedded answers. Mark final answer.
9.(c) (w =) 30	B1	Accept embedded answers. Mark final answer.

9.(d) $4x = 10 - 7 (=3)$ $x = \frac{3}{4}$ or equivalent.	B1 B1	FT from $4x = b$. Integer answer required if b is a multiple of 4 Mark final answer. Allow an embedded answer eg $4 \times 0.75 + 7 = 10$ for B2, but penalise -1 if contradicted by $x \neq 0.75$
10. (Factors of) 16, OR 32, OR 64,	B1	Accept any multiple of 16 which does not have a factor of 3.
(Multiples of) 4	B1	
11. 9, 13 and 14 OR 10, 13 and 15 OR 11, 13 and 16 OR 12, 13 and 17	B2	Allow in any order. B1 for 3 whole numbers with a median of 13 OR B1 for 3 whole numbers with a range of 5 Penalise -1 for any repeated numbers. e.g. 8, 13, 13 gains B2 -1 = B1 13, 13, 13 gains B1 -1 = B0.
(Parimeter =) 9x7 + 2x2 (cm) or equivalent	B1	May be implied by correct method which would lead to an answer of 62 (cm). (This is the only diagram which can gain B1.)
(Perimeter =) 8×7 + 2×3 (cm) or equivalent (Perimeter =) 62 (cm)	M1 A1	If no diagram, then B1 M1 A1 for correct calculation which leads to answer of 62 (cm).
		FT these large rectangles only:
		(Perimeter =) 8x3 + 2x7 (cm) or equivalent M1 (Perimeter =) 38 (cm) A1 OR
		B0
		(Perimeter =) 4x7 + 4x3 (cm) or equivalent M1 (Perimeter =) 40 (cm) A1
		If no diagram, allow SC1 for (8x3 + 2x7 or equivalent) = 38 (cm) OR (4x7 + 4x3 or equivalent) = 40 (cm).
Organisation and Communication	OC1	For OC1, candidates will be expected to: • present their response in a structured way • explain to the reader what they are doing at each step of their response • lay out their explanation and working in a way that is clear and logical • write a conclusion that draws together their results and explains what their answer means.
Accuracy of writing	W1	For W1, candidates will be expected to: • show all their working • make few, if any, errors in spelling, punctuation and grammar • use correct mathematical form in their working • use appropriate terminology, units, etc.
13.(a) 20(:)18 OR 8(:)18 p.m	B1	B0 for (0)8:18 or 8:18 a.m. or 20:18 a.m. Allow 20(:)18 p.m. and 08:18 p.m.

13.(b) 6 (hours) 40 (minutes)	B1	
13.(c) 265 (seconds)	B2	B1 for sight of 435 AND 170 OR B1 for sight of 300 AND 35 OR B1 for 4 minutes 25 seconds.
14.(a) Line x = −4 drawn	B1	Line must be at least 2 units long. B0 if 'extra' lines drawn unless correct line unambiguously identified.
14.(b)(i) Point C shown at (-2,-4)	B2	Allow B2 if point C not labelled but is unambiguously at the correct position (eg 'end of line'). Otherwise, B1 if Point C at (-2,y) y≠3. (BÂC = 90°) SC1 for point C at (5,-4).
14.(b)(ii) (-2,-4)	B1	FT 'their unambiguously identified position of point C'. Allow missing brackets.
15.(a) 2700	B2	B1 for sight of 27 OR sight of 100. Mark final answer.
15.(b) 0·08	B1	Mark final answer
15.(c) Correctly using a common denominator. 13 or equivalent. 18	M1 A1	Mark final answer.
Answer Yes No Not sure Number of students 150 50 100	В3	B1 for (Yes =) 150 C.A.O. B2 for (No =) 50 AND (Not sure =) 100. or FT 'their Yes' for (No =) $\frac{1}{3}(300 - \text{Yes'})$ AND (Not sure =) $\frac{2}{3}(300 - \text{Yes'})$ If B2 not gained, then B1 for (No =) 50 OR (Not sure =) 100 or FT 'their Yes' for (No =) $\frac{1}{3}(300 - \text{Yes'})$ OR (Not sure =) $\frac{2}{3}(300 - \text{Yes'})$ or B1 for 'No' + 'Not sure' = 150 or B1 if 'Not sure' = 2 × 'No'. or B1 for Yes + No + Not sure = 300.
17. a = 113 b = 67 c = 113	B1 B1 B1	C.A.O. OR FT 180 – 'their a'. OR FT = 'their a' OR FT 180 – 'their b'.
18.(Probability of Puffin Island=)1 - 0·4 - 0·15 - 0·25 = 0·2	M1 A1	An unsupported answer of 0·56 implies M1
(Number of cards showing Puffin Island =) 0·2 × 80	M1	FT 'their <u>stated</u> P(Puffin Island)' × 80, only if 'their <u>stated</u> P(Puffin Island)' < 1.
= 16	A1	16/80 is M1A0 unless 16 has been seen.
Alternative method (Number of cards showing other 3 islands =) 0·4 × 80 + 0·15 × 80 + 0·25 × 80 or equivalent = 64	M1 A1	Allow M1 for sight of 32 AND 12 AND 20.
(Number of cards showing Puffin Island =) 80 – 64	M1	FT 80 - 'their derived 64', only if 'their derived 64'<80.
= 16	A1	16/80 is M1A0 unless 16 has been seen.

19.(a) Correct construction method. e.g. (i) intersecting arcs of radii 6cm and 9cm with centres A and C respectively. OR (ii) copying the angle at B at the point A (will require AB or BA to be extended). Completed parallelogram.	M1 A1	Relevant construction arcs must be seen.
19.(b) 'measured length' × 200 = 1520 (cm) = 15·2 metres	M1 A1 B1	Allow for error in measuring line XY. Accept only in range 1480 to 1560 inclusive. FT 'their 1520' ÷ 100. Unsupported 14·8 to 15·6 inclusive gains all 3 marks.
Alternative method Sight of scale is 1cm represents 2m 'measured length' × 2 = 15·2 metres	B1 M1 A1	Allow for error in measuring line XY. Accept only in range 14.8 to 15.6 inclusive.
20.(a) 9·231	B1	
20.(b) 170	B1	
20.(c) 10	B1	



GCSE MARKING SCHEME

AUTUMN 2020

GCSE
MATHEMATICS – UNIT 2 (FOUNDATION TIER)
3300U20-1

INTRODUCTION

This marking scheme was used by WJEC for the 2020 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.

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WJEC GCSE MATHEMATICS

AUTUMN 2020 MARK SCHEME

GCSE MATHEMATICS Unit 2: Foundation Tier	Mark	Comments
1. 1.98	B1	Ignore spurious units
53	B1	ignore spurious units
5.88	B1	
0.41	B1	
2.(a) 3 700 000	B1	
2.(b) 9998	B1	
2.(c) 1, 3, 5 and 15	B2	Ignore repeats. Allow 1×15 and 3×5.
		B1 for 2 correct factors with none incorrect,
		OR for 3 or 4 correct with no more than one incorrect.
3.(a) unlikely	B1	
3.(b) 20	B1	
3.(c) Rolling a 1	B1	
on the dice		
4.(a)	B2	B1 for two correct lines with one incorrect line
		OR for one correct line with no incorrect lines.
4.(b) (an) equilateral (triangle)	B1	
5.(a) 102 OR 120	B1	
5.(b) 201 OR 210	B1	
6. Three different even numbers with a sum of 24,	В3	In any order. Allow inclusion of negative numbers.
not including 8.		1500 (150 (
Possible solutions are		If B3 not awarded, award B2 for three numbers which
2, 4 (and) 18		sum to 24 which satisfy two of the three conditions:
2, 6 (and) 16		The numbers are different The numbers are different The numbers are different.
2, 10 (and) 12 4, 6 (and) 14		The numbers are even
4, 6 (and) 14		None of the numbers is 8
		If B2 not awarded, award B1 for three numbers which
		sum to 24.
7.(a) 0.12 or <u>3</u> . or equivalent	B1	Sulli to 24.
25	"	
7.(b) $\underline{3} \times 632$ or equivalent	M1	
5		
= 379.2	A1	Award M1 A0 for 1896/5 or 379 $\frac{1}{5}$.
		7.Wala Wil 70 101 1000/0 01 010 5.
7.(c) 2.5	B1	Accept 20/100 for 2/10
8. <u>3</u> 30	B1 B1	Accept 30/100 for 3/10
10	ВΙ	
<u>9</u> 0.45	B1	
(20)	B1	
(20)	יכו	

9. (Length of sides of Ivy's Cuboid B =)	B1	May be implied in further working.
3cm, 12cm, 20cm		
(Volume of Ivy's Cuboid =) 3 x 12 x 20	M1	F.T. provided two of the dimensions are correct.
= 720 (cm ³)	A1	
Alternative method (Volume of Gareth's cuboid = $3 \times 2 \times 4 =$) 24 (cm³) (Volume of Ivy's cuboid =) 24 x 6 x 5 $= 720 \text{ (cm}^3\text{)}$	B1 M1 A1	F.T. for their stated volume for 'Gareth's cuboid'
9. OCW Organisation and Communication	OC1	For OC1, candidates will be expected to:
Accuracy of writing	W1	For W1, candidates will be expected to:
10.(a)(i) 16	B1	
10.(a)(ii) 2160	B2	B1 for sight of 2155(·) OR 2150 OR 2156. Mark final answer.
10.(b) 0.62×7.8 or equivalent. $= 4.836$ ISW	M1 A1	Unsupported 4·8 implies M1. Accept 4 ²⁰⁹ / ₂₅₀ (ISW). Allow 1209/250 (ISW)
10.(c)(i) 247	B1	
10.(c)(ii) 2197	B1	
11.(a) 6 −5	B2	B1 for 6. B1 FT for correct evaluation of 'their 6' – 11 only if it leads to a <u>negative</u> answer.
11.(b) 15	B2	B1 for sight of 28·8 OR -13·8. Mark final answer.
12. <u>400</u> or <u>4</u> . 17·5 0·175	M2	M1 if incorrect place value (in either length). Digits 228 implies M1.
= 22.8() or 22.9	A1	C.A.O.
(Number of rods =) 22	B1	FT if of equivalent difficulty. (i.e. 'their 22·8' must be greater than 1 AND their 1st decimal place number greater than or equal to 5.) Answer of 22 gains all 4 marks. Unsupported answer of 23 gains M2A0B0.
12. Alternative method (trial and improvement) Working with a multiple of 17·5 or 0·175. (n × 17·5 or n × 0·175) 22 × 17·5 (= 385) or 22 × 0·175 (= 3·85) 23 × 17·5 (= 402·5) or 23 × 0·175 (= 4·025)	S1 B1 B1	Award this S1 only if n > 2 and n ≠ 4 and n ≠ 400. This implies previous S1. This implies previous S1 and previous B1 if 402·5
(Number of rods =) 22	B1	seen. Must be seen in answer space or unambiguously identified (not simply embedded). Answer of 22 gains all 4 marks. Unsupported answer of 23 gains S1B0B1B0.

13.(a)	B2	B1 for each individual shape. Ignore clearly deleted shading.
13.(b) Reflection (in the line) x = 5	B2	B1 for stating 'Reflection'. Ignore extra wording once 'reflection' (or 'reflected') seen. B1 for stating x = 5 (simply drawing the line is B0)
14.(a) $10x + 15 = 20$ OR $2x + 3 = 4$ 10x = 5 OR $2x = 1x = \underline{5} OR x = \underline{1} or equivalent$	B1 B1 B1	FT until 2 nd error. Mark final answer. Allow an embedded answer but penalise −1 if contradicted by x ≠ ½ or 0.5.
14.(b) $5(n-3)$ or $5\times(n-3)$ or $(n-3)5$ or $(n-3)\times 5$ or $5n-15$	B2	B1 for sight of $n-3\times 5$ OR sight of $5\times n-3$. B0 for unsupported $n-15$ OR unsupported $5n-3$. Allow 'n = $5(n-3)$ ' etc Mark final answer.
15.(a) YES AND a valid explanation. e.g. 'the other two angles would be (both) 20(°)' e.g. diagram showing (isosceles) triangle with angles of 140°, 20° and 20°.	E1	A valid explanation implies YES circled if not otherwise contradicted (by circling NO).
		Explanations must engage with the specific triangle given (with an angle of 140°) and not isosceles triangles in general.
15.(b) $a + b = 150$	B1	
16. $[n(G \cap S) =]$ 10 $[n(S) =]$ 13	B1 B1	Entries must be a whole numbers. $[n(\mathcal{E})]$ must be 30 (i.e. no additional 'non-Spanish'). Any blank space to be taken as 0.
17. (Length of AD or BC =) 10 (cm)	B1	May be seen on the diagram or implied in later work.
(Area of ABCD = $5 \times 10 =$) 50 (cm ²)	B1	FT 5 × 'their AD (or BC)'. The 50(cm²) may be shown as two areas of 25(cm²) for B1 B1.
(Area APB =) $\frac{\pi \times 5^2}{4}$	M1	
$= 19.6()(cm^2)$	A1	SC1 for sight of $\pi \times 5^2$ or equivalent (78·5)
(Shaded area = $50 - 19.6 = 30.3()$ or $30.4(cm^2)$	B1	FT 'their stated area ABCD' – 'their stated area APB'
		Note: Sight of (25 – 'area of APB') + 25 implies the first two B marks. [rectangle divided in half]



GCSE MARKING SCHEME

AUTUMN 2020

GCSE
MATHEMATICS – UNIT 1 (INTERMEDIATE TIER)
3300U30-1

INTRODUCTION

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WJEC GCSE MATHEMATICS

AUTUMN 2020 MARK SCHEME

GCSE Mathematics		
Unit 1 Intermediate Tier	Mark	Comments
1.(a) 20(:)18 OR 8(:)18 p.m.	B1	B0 for (0)8:18 or 8:18 a.m or 20:18 a.m. Allow 20(:)18 p.m. and 08:18 p.m.
1.(b) 6 (hours) 40 (minutes)	B1	, , ,
1.(c) 265 (seconds)	B2	B1 for sight of 435 AND 170 OR B1 for sight of 300 AND 35 OR B1 for 4 minutes 25 seconds.
2.(a) Line $x = -4$ drawn	B1	Line must be at least 2 units long. B0 if 'extra' lines drawn unless correct line unambiguously identified.
2.(b)(i) Point C shown at (-2,-4)	B2	Allow B2 if point C not labelled but is unambiguously at the correct position (eg 'end of line')
		Otherwise, B1 if Point C at $(-2,y)$ $y\neq 3$. (BÂC = 90°) SC1 for point C at $(5,-4)$.
2.(b)(ii) (-2,-4)	B1	FT 'their unambiguously identified position of point C'. Allow missing brackets.
3.(a)(i) 2700	B2	B1 for sight of 27 OR sight of 100. Mark final answer.
3.(a)(ii) 0.08	B1	Mark final answer
3.(a)(iii) Correctly using a common denominator. 13 or equivalent. 18	M1 A1	Mark final answer.
3.(b) 0.05	B1	
Answer Yes No Not sure Number of students 150 50 100	В3	B1 for (Yes =) 150 C.A.O. B2 for (No =) 50 AND (Not sure =) 100. or FT 'their Yes' for (No =) ½(300 - 'Yes') AND (Not sure =) ¾(300 - 'Yes') If B2 not gained, then B1 for (No =) 50 OR (Not sure =) 100 or FT 'their Yes' for (No =) ⅓(300 - 'Yes') OR
		(Not sure =) $\frac{2}{3}(300 - \text{Yes'})$ or B1 for 'No' + 'Not sure' = 150 or B1 if 'Not sure' = 2 × 'No'. or B1 for 'Yes' + 'No' + 'Not sure' = 300.
5.(a) $4x = 10 - 7 (=3)$ $x = \frac{3}{4}$ or equivalent.	B1 B1	FT from 4x = b. Integer answer required if b is a multiple of 4 Mark final answer. Allow an embedded answer eg 4 × 0·75 + 7 = 10 for B2, but penalise −1 if contradicted by x ≠ 0·75
5.(b) 5d – 2e	B2	Must be an expression for B2. B1 for sight of (+)5d OR sight of – 2e. B1 for 5d + – 2e. Mark final answer.
6.	B1 B1 B1	C.A.O. OR FT 180 – 'their a'. OR FT = 'their a' OR FT 180 – 'their b'.
7. AB = 13 (cm)	B1	For any indication that side of square = 13 (cm). May be seen on the diagram. No FT (but note SC1). C.A.O. Unsupported 169 (cm²) gains all 3 marks.
(Area =) 13 × 13 = 169 (cm ²)	M1 A1	If no marks gained award SC1 for a final answer of144 (cm ²)

8. (Probability of Puffin Island=) 1 - 0·4 - 0·15 - 0·25 = 0·2	M1 A1	An unsupported answer of 0·56 implies M1
(Number of cards showing Puffin Island =) 0⋅2 × 80	M1	FT 'their <u>stated</u> P(Puffin Island)' × 80, only if 'their <u>stated</u> P(Puffin Island)' < 1.
= 16	A1	16/80 is M1A0 unless 16 has been seen.
Alternative method		
(Number of cards showing other 3 islands =) $0.4 \times 80 + 0.15 \times 80 + 0.25 \times 80 \text{ or equivalent}$ $= 64$	M1 A1	Allow M1 for sight of 32 AND 12 AND 20.
(Number of cards showing Puffin Island =) 80 – 64	M1	FT 80 – 'their <u>derived</u> 64', only if 'their <u>derived</u> 64' < 80.
= 16	A1	16/80 is M1A0 unless 16 has been seen.
8. OCW Organisation and Communication. Accuracy of writing.	OC1	 For OC1, candidates will be expected to: present their response in a structured way explain to the reader what they are doing at each step of their response lay out their explanation and working in a way that is clear and logical write a conclusion that draws together their results and explains what their answer means For W1, candidates will be expected to: show all their working make few, if any, errors in spelling,
9.(a) Correct construction method. e.g. (i) intersecting arcs of radii 6cm and 9cm with centres A and C respectively. OR (ii) copying the angle at B at the point A (will require AB or BA to be extended).	M1	punctuation and grammar use correct mathematical form in their working use appropriate terminology, units, etc Relevant construction arcs must be seen.
Completed parallelogram.	A1	
9.(b) 'measured length' × 200 = 1520 (cm) = 15·2 metres	M1 A1 B1	Allow for error in measuring line XY. Accept only in range 1480 to 1560 inclusive. FT 'their 1520' ÷ 100. Unsupported 14·8 to 15·6 inclusive gains all 3 marks.
Alternative method		
Sight of scale is 1cm represents 2m	B1	
'measured length' × 2	M1	Allow for error in measuring line XY.
= 15·2 metres	A1	Accept only in range 14.8 to 15.6 inclusive.
		Accept only in range 14.0 to 10.0 inclusive.
10.(a) 9·231	B1	
10.(b) 170	B1	
10.(c) 10	B1	
11(a) 5n - 3	B2	B1 for sight of 5n. Mark final answer.
11.(b) 17	B1	
11.(c) 2n + 2 OR 2(n + 1)	B2	If 2n + 2 is not their final answer allow B1 for sight of 2n + 2 in earlier work. B1 for a correct answer not simplified or incorrectly simplified e.g. n + n + 2.

12.(a)(i)		
ϵ	B1	
12.(a)(ii)		
ε	B1	
12.(b) A valid statement. e.g. 'all multiples of 6 are also multiples of 3', 'because 3 goes into 6', '6 is a multiple of 3', '3 is a factor of 6'.	E1	Allow e.g. '(set) C is a subset of (set) A', 'it is a multiple of 3', ' 6, 12, are also multiples of 3'.
13. (One part =) $(£)210 \div 3$ = $(£)70$	M1 A1	
(Total amount =) $14 \times (£)70$ OR $(£)210 + 4 \times (£)70 + 7 \times (£)70$ = $(£)980$	m1 A1	FT 'their (£)70' only if M1 gained. Allow m1 for sight of 210 AND 280 AND 490 together as the three shares. For 210 ÷ 3 × 14 M3
		= 980 A1
14.(a) 9 -7	B2	B1 for each.
14.(b) At least 6 correct plots and no incorrect plot. A smooth curve drawn through their plots.	P1 C1	FT 'their (-2,9)' and 'their (2,-7)' Allow ± '½ a small square'. FT 'their 8 plots'. OR a curve through the 6 given points and (-2,9) and (2,-7).
		Allow intention to pass through their plots.
14.(c) Line y = 1 drawn	B1	(± 1 small square horizontal or vertical.) Must be at least 2cm long.
-0.8 AND 4.8	B1	FT intersection of 'their curve' with 'their $y = 1$ ' only if exactly two points of intersection and $y \ne 0$.
		If curve drawn, but no line drawn, allow a FT from intersection of 'their curve' with line $y = 1$ only if exactly two points of intersection for B0B1. Allow \pm '1 small square'.
15. 4 5 11 12 OR 4 6 10 12 OR 4 7 9 12	В3	May be written in any order. B1 for Range = 8. B1 for Median = 8. B1 for Total = 32. Penalise –1 once only for repeated values, negatives or fractional answers e.g. 4, 8, 8, 12 earns B1 B1 B1 –1 (2 marks), 8, 8, 8, 8 earns B0 B1 B1 –1 (1 mark).

10 (-) (4)(2)	D0	D4 for (4)(2)
16.(a) $(x-4)(x-3)$	B2	B1 for $(x 4)(x 3)$. Ignore '= 0'.
(x =) 4 AND $(x =) 3$	B1	Strict FT from their brackets.
		Allow the following.
		B2 for x - 4 (=0) AND x - 3 (=0) (B1)
		(x =) 4 AND $(x =) 3$ (B1)
		B1 for x + 4 (=0) AND x + 3 (=0) (B0) (x =) -4 AND (x =) -3 (B1) FT
		(x =) -4 AND $(x =) -3$ (B1) FT
		B1 if only (x =) 4 AND (x =) 3 seen. (B1)
16(b) $25x^2 - 20x + 4$	B2	Otherwise
		B1 for sight of $25x^2 \pm kx + 4$ (allow k = 0)
		B1 for sight of 25x ² - 20x - 4
		Mark final answer.
17.(a) Correct framework	B1	
Suitable labelling on both 1st pair of branches AND	B1	Accept any unambiguous wording.
on both of at least one pair of 2 nd set of branches.		7 tooopt arry ariambiguous wording.
e.g. 'Car', 'No car', 'Before 8', 'After 8'.		
OR Titles of 'Car' and 'Before 8' with branch		
endings of 'Yes' and 'No'.		
Correct probabilities on first pair of branches	B1	Must be consistent with their lebelling
Correct probabilities on first pair of branches	ВΙ	Must be consistent with their labelling.
0·7 AND 0·3 (for 'Car', 'No car')		Allow this B1 if no headings given, <u>unless</u>
OR		contradicted by, or inconsistent with, further labelling.
0·4 AND 0·6 (for 'Before 8', 'After 8')		
	D4	Allow this D4 if as beadings siven unless
Correct probabilities on second two sets of branches	B1	Allow this B1 if no headings given, unless
0.4 AND 0.6 correctly placed (following 0.7 and 0.3)		contradicted by, or inconsistent with, further labelling.
OR		
0.7 AND 0.3 correctly placed (following 0.4 and 0.6)		Allow this B1 if only shown on one set of branches.
		Provided not contradicted on the other set of
		branches.
17.(b) 0.7×0.4 or equivalent.	M1	No FT.
= 0·28 or equivalent.	A1	M1A0 for a final answer of 0.28%.
		Mark final answer.
18.(a) PA = 12(cm) AND correct theorem given,	E1	Must use the words
e.g. 'tangents from an external point are equal in		'tangents' AND 'equal (identical / same)'.
length'.		
		Do not accept e.g. 'PA = PB'. (E0)
		Accept alternative correct answers.
18.(b) PÂO = 90(°) AND correct theorem given, e.g.	E1	Must use the words 'tangent' AND 'radius (diameter)'
'the tangent at any point on a circle is perpendicular		Allow e.g. 'radius and tangent meet at 90'. (E1)
to the radius at that point'.		Do not accept e.g. 'PA and OA meet at 90'. (E0)
18.(c) (Area PAOB =) 2 × 12 × 4 or equivalent.	M1	OR FT 'their PA' × 4 + 12 × 4
2		2 2
		M0 for 48 × 2 or 12 × 4 × 2 (= 96)
		` '
$= 48 \text{ (cm}^2)$	A1	An unsupported final answer of 48 gains both marks.
.5 (5)		If no marks gained allow SC1 for sight of 24(cm²) OR
		a correct evaluation of ('their PA' × 4) / 2.
19.(a) $y = 2.5x + 3$	B1	a solitor orangement of thou in the state of the
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	B1	
	B1	
19.(c) Line D	וטו	



GCSE MARKING SCHEME

AUTUMN 2020

GCSE
MATHEMATICS – UNIT 2 (INTERMEDIATE TIER)
3300U40-1

INTRODUCTION

This marking scheme was used by WJEC for the 2020 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.

WJEC GCSE MATHEMATICS

AUTUMN 2020 MARK SCHEME

GCSE Mathematics	Mark	Comments
Unit 2 Intermediate Tier 1.(a)(i) 16	B1	
1.(a)(i) 16 1.(a)(ii) 2160	В2	B1 for sight of 2155(·) OR 2150 OR 2156. Mark final answer.
1.(b) 0.62×7.8 or equivalent. $= 4.836$ ISW	M1 A1	Unsupported 4·8 implies M1. Accept 4 ²⁰⁹ / ₂₅₀ (ISW). Allow 1209/250 (ISW)
1.(c)(i) 247	B1	
1.(c)(ii) 2197	B1	
2.(a) 6 −5	B2	B1 for 6. B1 FT for correct evaluation of 'their 6' – 11 only if it leads to a <u>negative</u> answer.
2.(b) 15	B2	B1 for sight of 28⋅8 OR −13⋅8. Mark final answer.
3. <u>400</u> or <u>4</u> . 17·5 0·175	M2	M1 if incorrect place value (in either length). Digits 228 implies M1.
= 22.8() or 22.9	A1	C.A.O.
(Number of rods =) 22	B1	FT if of equivalent difficulty. (i.e. 'their 22·8' must be greater than 1 AND their 1st decimal place number greater than or equal to 5.) Answer of 22 gains all 4 marks. Unsupported answer of 23 gains M2A0B0.
3. Alternative method (trial and improvement) Working with a multiple of 17·5 or 0·175. (n × 17·5 or n × 0·175) 22 × 17·5 (= 385) or 22 × 0·175 (= 3·85) 23 × 17·5 (= 402·5) or 23 × 0·175 (= 4·025) (Number of rods =) 22	S1 B1 B1 B1	Award this S1 only if n > 2 and n ≠ 4 and n ≠ 400. This implies previous S1. This implies previous S1 and previous B1 if 402·5 seen. Must be seen in answer space or unambiguously identified (not simply embedded).
		Answer of 22 gains all 4 marks. Unsupported answer of 23 gains S1B0B1B0.
4.(a) All labels correctly inserted (Number) 1 2 3 4 5 Red (Colour) Yellow (Pink)	B1	Must be inserted in the table and not simply inferred from the outcomes. Accept 'R' for Red and 'Y' for Yellow.
All outcomes correctly inserted	B1	Allow 'Red' for 'R' etc. Allow '1R' for 'R1' etc.
4.(b) 2 or equivalent ISW. 15	B2	(No FT from an incorrect grid in 4a) B1 for a numerator of 2 in a fraction < 1. B1 for a denominator of 15 in a fraction < 1. Allow B2 for 0·13 Penalise −1 for incorrect notation eg '2 out of 15', '2 : 15' etc.
5.(a)	B2	B1 for either individual shape. Ignore clearly deleted shading.

5.(b) Reflection (in the line) x = 5	B2	B1 for stating 'Reflection'. Ignore extra wording once 'reflection' (or 'reflected') seen. B1 for stating x = 5 (simply drawing the line is B0)
6.(a) 10x + 15 = 20 OR 2x + 3 = 4	B1	FT until 2 nd error.
10x = 5 OR $2x = 1$	B1	
$x = \underline{5}$ OR $x = \underline{1}$ or equivalent 2	B1	Mark final answer. Allow an embedded answer but penalise -1 if contradicted by $x \ne \frac{1}{2}$ or 0.5 .
6.(b) 7(a + 3)	B1	Allow 7(1a + 3) Mark final answer.
6.(c) $5(n-3)$ or $5\times(n-3)$ or $(n-3)5$ or $(n-3)\times 5$ or $5n-15$	B2	B1 for sight of $n-3 \times 5$ OR sight of $5 \times n-3$. B0 for unsupported $n-15$ OR unsupported $5n-3$. Allow 'n = $5(n-3)$ ' etc Mark final answer.
7.(a) YES AND a valid explanation. e.g. 'the other two angles would be (both) 20(°)' e.g. diagram showing (isosceles) triangle with angles	E1	A valid explanation implies YES circled if not otherwise contradicted (by circling NO).
of 140°, 20° and 20°.		Explanations must engage with the specific triangle given (with an angle of 140°) and not isosceles triangles in general.
7.(b) NO AND a valid explanation. e.g. '120(°) + 30(°) ≠ 180(°)' 'the two angles add to 150(°), not 180(°) '120(°) + 30(°) + 120(°) + 30(°) ≠ 360(°)' 'the four angles add to 300(°), not 360(°)	E1	Allow 'the two angles must equal 180°'. Do not accept 'the four angles must equal 360°' unless it is made clear that the rhombus has two pairs of equal angles. A valid explanation implies NO circled if not otherwise contradicted (by circling YES).
7.(c) a + b = 150	B1	(a) enemigraph
8.		Entries must be a whole numbers.
$[n(G \cap S) =]$ 10 [n(S) =] 13	B1 B1	$[n(\mathcal{E})]$ must be 30 (i.e. no additional 'non-Spanish'). Any blank space to be taken as 0.
9. (Length of AD or BC =) 10 (cm)	B1	May be seen on the diagram or implied in later work.
(Area of ABCD = 5 × 10 =) 50 (cm ²)	B1	FT 5 × 'their AD (or BC)'. The 50(cm²) may be shown as two areas of 25(cm²) for B1 B1.
(Area APB =) $\frac{\pi \times 5^2}{4}$	M1	
= 19·6()(cm ²)	A1	SC1 for sight of $\pi \times 5^2$ or equivalent (78.5)
(Shaded area = $50 - 19.6 = 30.3()$ or $30.4(cm^2)$	B1	FT 'their stated area ABCD' – 'their stated <u>area</u> APB'
9. OCW		Note: Sight of (25 – 'area of APB') + 25 implies the first two B marks. [rectangle divided in half]
Organisation and Communication. Accuracy of writing.	OC1	 For OC1, candidates will be expected to: present their response in a structured way explain to the reader what they are doing at each step of their response lay out their explanation and working in a way that is clear and logical write a conclusion that draws together their results and explains what their answer means For W1, candidates will be expected to:
		 show all their working make few, if any, errors in spelling, punctuation and grammar use correct mathematical form in their working use appropriate terminology, units, etc

10.(a) $\underline{1} \times \underline{1}$ or equivalent	M1	
10.(a) $\frac{1}{6} \times \frac{1}{4}$ or equivalent	IVII	
$= \frac{1}{24} ISW$	A1	Accept 0·0416 or 0·0417 or 0·042 for M1A1 M1A0 for '1 in 24', '1:24'.
10.(b) $\frac{1}{5} + \frac{1}{10}$ or equivalent.	M1	
= <u>3</u> or equivalent. ISW	A1	
11. $(AC^2 =) 10.8^2 + 14.4^2$ $AC^2 = 324 \text{ or } (AC =) \sqrt{324}$	M1 A1	Accept equivalent of using cos rule (as cos 90 = 0).
(AC =) 18(cm)	A1	F.T. √their 324' provided M1 gained. Final answer of AC = 324 is M1A0A0. Alternative method to find AC
		A correct and complete method (using two
		trigonometric relationships) M2
		AC = 18(cm) A1
		FT 'their stated AC'. (May be shown on the diagram)
(Area ACD =) 24 × 18 2	M1	Accept equivalent of using $\frac{1}{2} \times 24 \times 18 \times \sin 90$ (as sin 90 = 1).
= 216 (cm ²)	A1	,
12.		Correct evaluation regarded as enough to identify if negative or positive. If evaluations not seen accept
		'too high' or 'too low'.
		Look out for equating $x^3 - 5x = 350$
One correct evaluation $7.2 \le x \le 7.3$	B1	$\underline{x} \qquad \underline{x^3 - 5x - 350}$
2 correct evaluations $7.275 \le x \le 7.295$,	B1	7·2 –12·75(2)
one < 0, one > 0.		7·21 –11(·2)
2 correct evaluations $7.275 \le x \le 7.285$,	M1	7·22 – 9(·7)
one < 0, one > 0.		7.23 – 8(.2)
x = 7·28	A1	7.24 $-6()$ $-5(.1)$
		7.26 $-3(\cdot 6)$ 7.275 $-1(\cdot 3)$
		7·27
		7·28
		7·29 0·9(7) 7·295 1(·7) 7·3 2·5(17)
13.(a) an expression	B1	2 5(11)
13.(b) an equation	B1	
14. (Mid-points) 2·5, (7·5), 12·5 and 17·5.	B1	Allow for sight of mid-points.
$8 \times 2.5 + (0 \times 7.5) + 7 \times 12.5 + 5 \times 17.5$	M1	F.T. 'their mid-points' including bounds, provided they
(20 + 0 + 87.5 + 87.5 = 195)		fall within the classes (including lower and upper bounds and used consistently).
÷ 20 = 9.75	m1 A1	C.A.O.
15. $(x =) \frac{360}{15}$ or $180 - \frac{(15 - 2) \times 180}{15}$	M1	May be seen in parts.
or equivalent		
= 24(°)	A1	FT 'their stated value for x' (x < 90°)
(BR =) 8 × cos 24 or 8 × sin (90 – 24)	M2	M1 for $\frac{BR}{8}$ = cos 24 or $\frac{BR}{8}$ = sin (90 – 24)
= 7.2(0)/am) an 7.24(am)	Λ 4	Accept equivalent of using sin rule (as sin 90 = 1).
= $7.3(0)$ (cm) or 7.31 (cm)	A1	Alternative method to find BR
		A correct and complete method (using two
		trigonometric relationships and possibly
		Pythagoras's theorem) M2
		BR = 7.3(0)(cm) or 7.31(cm) A1

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16. 2·656 × 10 ⁶	B2	B1 for a correct value but not in standard form.
		Mark final answer.
		B1 for sight of 2 656 000.
		SC1 for 2·66 × 10 ⁶ or 2·7 × 10 ⁶ or 2·6 × 10 ⁶ or 2·65 × 10 ⁶
17. Sight of 24·5 AND 15·5	B1	Sight of (Greatest =) 80 OR (Least =) 76
OR Sight of 23·5 AND 14·5	ы	implies B1
ON Signit of 23°3 AND 14°3		Implies b I
2(24·5 + 15·5) – 2(23·5 + 14·5) or equivalent	M1	FT only for upper bounds of
		24·4 AND 15·4 or 24·49 AND 15·49
		(lower bounds must be 23.5 AND 14.5 else M0)
		(**************************************
= 4(cm)	A1	CAO
		If M0, award B1 and an SC1 for
		sight of (Greatest =) 80 AND (Least =) 76
Alternative method.	1	
Difference between least and greatest	B1	
length for each side = 1(cm)		
4 × 1	M1	FT only for differences of 0.9 or 0.99
44		040
= 4(cm)	A1	CAO
18.		No marks for trial and improvement.
Method to eliminate variable	M1	Allow 1 error in one term, not the term with equal
e.g. equal coefficients with appropriate addition or subtraction.		coefficients.
First variable found, $x = 4$ or $y = -1$.	A1	C.A.O.
Substitute to find the 2 nd variable.	m1	F.T. their '1 st variable'.
Second variable found	A1	F.T. their T variable.
Second variable lound	Λ1	Award no marks for unsupported correct answers.
19.(a)(i) Correct reason given.	E1	Accept any correct unambiguous wording.
e.g. 'An angle at the circumference subtended		The key word is 'diameter'.
by a diameter is a right angle'.		
' line AC is a diameter'		Allow eg 'angle in a semicircle is 90°',
		'line AC goes through the centre'.
		'opposite a diameter'
		Do not accept 'because it's a right angle'.
19.(a)(ii) $\tan x = \frac{7.5}{1}$	M1	
4.7		
$x = \tan^{-1} (7.5 / 4.7)$ or $\tan^{-1} 1.6$ or $\tan^{-1} 1.59()$	m1	Implies M1.
- 57 O/ \/°\ 0x 57 O/ \/°\ 0x 50/°\	۸.4	CAO
= $57.9()(^{\circ})$ or $57.8()(^{\circ})$ or $58(^{\circ})$	A1	C.A.O. Alternative method to find v
		Alternative method to find x A correct and complete method (using Pythagoras's
		theorem and a trigonometric relationship). M2
		$x = 57.9()(^{\circ})$ or $57.8()(^{\circ})$ or $58(^{\circ})$ CAO A1
19.(b) (y =) 58(°)	B1	Strict FT of 'their x'.
(y -) 50()	וטו	Outer 1 Of them A.
Correct circle theorem given.	E1	Accept any correct unambiguous wording.
e.g. 'angles (at the circumference) subtended by		Allow eg 'angles on the same chord (are equal)'
the same chord (or arc) are equal',		Do not accept e.g. 'they are equal' on its own.
'angles in the same segment (are equal)'.		= 1stattept e.g. they are equal of the own.
angles in the same cognitive (are equal).	1	1



GCSE MARKING SCHEME

AUTUMN 2020

GCSE
MATHEMATICS – UNIT 1 (HIGHER TIER)
3300U50-1

INTRODUCTION

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WJEC GCSE MATHEMATICS

AUTUMN 2020 MARK SCHEME

GCSE Mathematics	Mark	Comments
Unit 1: Higher Tier 1.(a) 5n - 3	B2	
1.(a) 5n - 3	DZ	B1 for sight of 5n. Mark final answer.
1.(b) 17	B1	Wark intal ariswer.
1.(c) 2n + 2 OR 2(n + 1)	B2	If 2n + 2 is not their final answer allow B1 for sight of 2n + 2 in earlier work. B1 for a correct answer not simplified or incorrectly simplified e.g. n + n + 2.
2.(a)(i) ε	B1	
2.(a)(ii)		
ε	B1	
2.(b) A valid statement.	E1	Allows a '(act) C is a subset of (act) A'
2.(b) A valid statement. e.g. 'all multiples of 6 are also multiples of 3' 'because 3 goes into 6', '6 is a multiple of 3'. '3 is a factor of 6'.		Allow e.g. '(set) C is a subset of (set) A'. 'it is a multiple of 3' ' 6, 12, are also multiples of 3'.
3.(a) 9 -7	B2	B1 for each.
3.(b) At least 6 correct plots and no incorrect plot.	P1	FT 'their (-2,9)' and 'their (2,-7)'
A smooth curve drawn through their plots.	C1	Allow ± '½ a small square'. FT 'their 8 plots'. OR a curve through the 6 given points and (-2,9) and (2,-7). Allow intention to pass through their plots. (± 1 small square horizontal or vertical.)
3.(c) Line y = 1 drawn	B1	Must be at least 2cm long.
−0·8 AND 4·8	B1	FT intersection of 'their curve' with 'their $y = 1$ ' only if exactly two points of intersection and $y \neq 0$. If curve drawn, but no line drawn, allow a FT from intersection of 'their curve' with the line $y = 1$ only if exactly two points of intersection for B0 B1. Allow \pm '1 small square'.

4. (One part =) (£)210 ÷ 3	M1	
= (£)70	A1	
(Total amount =) $14 \times (£)70$ OR $(£)210 + 4 \times (£)70 + 7 \times (£)70$ = $(£)980$	m1 A1	FT 'their (£)70' only if M1 gained. Allow m1 for sight of 210 AND 280 AND 490 together as the three shares. For 210 ÷ 3 × 14 M3
Organisation and Communication.	OC1	 = 980 A1 For OC1, candidates will be expected to: present their response in a structured way explain to the reader what they are doing at each step of their response lay out their explanation and working in a way that is clear and logical write a conclusion that draws together their results and explains what their answer means
Accuracy of writing.	W1	 For W1, candidates will be expected to: show all their working make few, if any, errors in spelling, punctuation and grammar use correct mathematical form in their working use appropriate terminology, units, etc
5. 4 5 11 12 OR 4 6 10 12 OR 4 7 9 12	B3	May be written in any order. B1 for Range = 8. B1 for Median = 8. B1 for Total = 32. Penalise –1 once only for repeated values, negatives or fractional answers e.g. 4, 8, 8, 12 earns B1 B1 B1 –1 (2 marks), 8, 8, 8, 8 earns B0 B1 B1 –1 (1 mark).
6.(a) $(x-4)(x-3)$ (x =) 4 AND $(x =) 3$	B2 B1	B1 for $(x 4)(x 3)$. Ignore '= 0'. Strict FT from their brackets. Allow the following. B2 for $x - 4$ (=0) AND $x - 3$ (=0) (B1) $(x =) 4$ AND $(x =) 3$ (B1) B1 for $x + 4$ (=0) AND $x + 3$ (=0) (B0) $(x =) -4$ AND $(x =) -3$ (B1) FT B1 if only $(x =) 4$ AND $(x =) 3$ seen. (B1)
6(b) 25x ² – 20x + 4	B2	Otherwise B1 for sight of $25x^2 \pm kx + 4$ (allow $k = 0$) B1 for sight of $25x^2 - 20x - 4$ Mark final answer.

7.(a) Correct framework	B1	
Suitable labelling on both 1 st pair of branches AND on both of at least one pair of 2 nd set of branches. e.g. 'Car', 'No car', 'Before 8', 'After 8'. OR Titles of 'Car' and 'Before 8' with branch endings of 'Yes' and 'No'.	B1	Accept any unambiguous wording.
Correct probabilities on first pair of branches 0·7 AND 0·3 (for 'Car', 'No car') OR 0·4 AND 0·6 (for 'Before 8', 'After 8')	B1	Must be consistent with their labelling. Allow this B1 if no headings given, <u>unless</u> contradicted by, or inconsistent with, further labelling.
Correct probabilities on second two sets of branches 0.4 AND 0.6 correctly placed (following 0.7 and 0.3)	B1	Allow this B1 if no headings given, <u>unless</u> contradicted by, or inconsistent with, further labelling.
OR 0·7 AND 0·3 correctly placed (following 0·4 and 0·6)		Allow this B1 if only shown on one set of branches. Provided not contradicted on the other set of branches.
7.(b) 0.7×0.4 or equivalent.	M1	No FT.
= 0·28 or equivalent.	A1	M1A0 for a final answer of 0·28%. Mark final answer.
8.(a) PA = 12(cm) AND correct theorem given, e.g. 'tangents from an external point are equal in length'.	E1	Must use the words 'tangents' AND 'equal (identical/same)'.
		Do not accept e.g. 'PA = PB'. (E0) Accept alternative correct answers.
8.(b) PÂO = 90(°) AND correct theorem given, e.g.	E1	Must use the words 'tangent' AND 'radius (diameter)'
'the tangent at any point on a circle is perpendicular		Allow e.g. 'radius and tangent meet at 90'. (E1)
to the radius at that point'.	M1	Do not accept e.g. 'PA and OA meet at 90'. (E0) OR FT 'their PA' × 4 + 12 × 4
8.(c) (Area PAOB =) $2 \times \frac{12 \times 4}{2}$ or equivalent.	IVII	2 2
_		M0 for 48 × 2 or 12 × 4 × 2 (= 96)
= 48 (cm ²)	A1	An unsupported final answer of 48 gains both marks. If no marks gained allow SC1 for sight of 24(cm²) OR a correct evaluation of ('their PA' × 4) / 2.
9.(a) $y = 2.5x + 3$	B1	
9.(b) $y = 3x - 5$	B1	
9.(c) Line D	B1	AU
10.(a) $t \alpha 1/g$ OR $t = k/g$	B1 M1	Allow $t \propto k/g$
36 = k / 25 OR k = 900	1411	FT from $y \alpha 1/x^n$ with $n \neq 1$, n>0 No FT from direct proportion
		M1 implies B1.
t = 900 / g	A1	May be seen explicitly in part (b).
		Do not allow $t \approx 900 / g$ for the A mark
10.(b) (900/20 =) 45 (days)	B1	FT 'their formula' only if non-linear.
10.(c) Sight of 900/40	M1	FT 'their formula' only if non-linear and of equivalent difficulty
22 (goats)	A1	M1 A0 for an answer of 22·5 or 23 For A1, FT for equivalent difficulty i.e. need to round down an answer with a decimal part of 0.5 or over. Allow use of trial and improvement for M1, provided
		22 or 23 seen. A0 for incorrect working e.g. 90/4 given as 22.2,
11. (a) $(\sqrt[3]{m})^2$	B1	leading to 22.
11. (a) \sqrt{m} 11. (b) $p^{\frac{1}{4}}$	B1	
P	i	

12. $6(2x+1)-4(3x-5)$ as a <u>numerator</u> within a	M1	Allow intention of brackets,
single fraction		e.g. $6 \times 2x + 1 - 4 \times 3x - 5$
(3x-5)(2x+1) as a <u>denominator</u>	M1	
h26 / (2 5) (2 + 1)	A1	CAO.
h26/(3x-5)(2x+1)	'``	Allow $26 / (6x^2 - 7x - 5)$
		(If expanded, the denominator must be correct.)
		If M1 M1 A1, penalise further incorrect work –1.
		If no marks awarded, then SC1 for sight of 26.
13. (Linear scale factor =) $\sqrt[3]{(1280 / 20)}$ (= 4)	B1	Or equivalent.
		Accept a method based on ratios e.g. 1 : 4 (from 20 : 1280 = 1 : 64 = 1 : 4 ³)
		e.g. 1 . 4 (110111 20 . 1200 – 1 . 04 – 1 . 4)
$^{3}\sqrt{(1280/20) \times 2.3}$	M1	FT their derived scale factor (from 3).
= 9·2 (cm)	A1	,
		SC1 for an answer of 18.4 (using s.f. of 8, from $\sqrt{64}$).
Alternative method (using reciprocal scale factor)	D4	On a subject of
(Linear scale factor =) $\sqrt[3]{(20 / 1280)}$ (= 1 / 4)	B1	Or equivalent. Accept a method based on ratios.
$2.3 \div \sqrt[3]{(20/1280)}$ OR $1/\sqrt[3]{(20/1280)} \times 2.3$	M1	FT their derived scale factor (from 3).
= 9.2 (cm)	A1	, , , , , , , , , , , , , , , , , , , ,
14. (a) 10x = 8·121212	M1	Or x and 100x, or equivalent. Or a complete
and 1000 <i>x</i> = 812·1212		alternative method.
with an attempt to subtract on both sides		
204/000 (- 402/405 - 424/465)	A1	An answer of 80·4/99 gains M1 only.
804/990 (= 402/495 = 134/165)	'``	ISW
Alternative method		
0.8 + 0.0121212 = 8/10 + 12/990 or equivalent	M1	
804/990 (= 402/495 = 134/165)	A1 B1	ISW
14. (b) $6\sqrt{2}$		
14. (c) $7 \times 3 + 7\sqrt{5} - 3 \times 2\sqrt{5} - 2(\sqrt{5})^2$ or equivalent	M1	
= 11 + √5	A1	Mark final answer.
- 11 ' \3	'``	Accept 11 + 1√5.
		If no marks awarded, SC1 for 3 correctly simplified
		terms i.e. 21, $7\sqrt{5}$, $-6\sqrt{5}$, -10 .
15.	D.4	
• FG = HG (since G is the midpoint of FH)	B1 B1	Do not accept indications on the diagram.
 EG is a common side Angle EGF = Angle EGH (since EG and FH 	B1	
are perpendicular)		
are perpendiculary		
SAS (or two sides and the included angle)	B1	FT from B2 previously awarded. Must be convincing.
so that EFG and EHG are congruent triangles.		Do not allow 'two sides and an angle'.
Allow alternative method	D4	Do not accept indications on the discussion
• FG = HG (since G is the midpoint of FH)	B1 B1	Do not accept indications on the diagram.
 EG is a common side EF = EH using Pythagoras 	B1	Must be convincing. An unsupported statement that
LI - LITUSING FYUNAYONAS		EF = EH, or that triangle is 'isosceles', is insufficient.
SSS (or all corresponding sides equal)	B1	FT from B2 previously awarded. Allow RHS.
so that EFG and EHG are congruent triangles.		Must be convincing.

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16.		FT until 2 nd error for equivalent level of difficulty.
Sight of $4y^2 = 3 + my^2$	B1	Squaring.
		Allow $2^2 y^2$ or $(2y)^2$ for $4y^2$.
$(4-m) y^2 = 3$ OR $4y^2 - m y^2 = 3$ or equivalent	B1	Isolating terms in y^2 .
		FT a formula with three or more terms AND with at
		least two terms in y^2 .
$y^2 = 3 / (4 - m)$ OR $y^2 = -3 / (m - 4)$	B1	Isolating y^2 .
$y = \pm \sqrt{[3/(4-m)]}$ OR $y = \pm \sqrt{[-3/(m-4)]}$	B1	Taking square root.
		Allow omission of \pm .
17. (a) $y = f(x) + 5$	B1	Correct notation required.
17. (b) $y = -f(x)$	B1	Correct notation required.
18. Sight of $x = (\sqrt{\pi}) \times r$ OR $x = \sqrt{(\pi r^2)}$ or	B1	Allow an equivalent expression,
	וט	e.g. $r = x / (\sqrt{\pi})$ or $r = \sqrt{(x^2 / \pi)}$.
equivalent		
		Allow use of 3.14 for π .
Convincing concluding organizant	E1	E1 depends on P1
Convincing concluding argument		E1 depends on B1.
e.g. x is irrational since π (and therefore $\sqrt{\pi}$) is		Accept
irrational.		e.g. multiplying an integer by $\sqrt{\pi}$ will not produce
		another integer;
		multiplying an integer by $\sqrt{\pi}$ will produce an infinite
		decimal.
		Do not accept a reason based on $\sqrt{\pi}$ not being a
		whole number.
		Consideration of a specific purposical constraint as
		Consideration of a specific numerical case gains no
All and the second and the second	ļ	credit.
Allow an alternative method		
X^2 and π r^2 both seen <u>WITH</u> a related statement	E1	For $X^2 = \pi r^{2}$, allow an equivalent equation,
about		e.g. $r^2 = \chi^2 / \pi$.
 squares of integers, or 		Allow use of 3.14 for π .
 rational / irrational numbers, or 		Do not accept a statement that 3.14 r² is not an
 (infinite) decimal numbers. 		integer or that 3.14 r ² is irrational.
e.g.		
π r^2 (or 3.14 r^2) cannot be a square number;		
multiplying an integer by π (or 3.14) cannot produce a		
square number;		
πr^2 is irrational;		
π times an integer (squared) is a decimal (or cannot		
be an integer).		
		_ , _ , _ , _
Convincing concluding argument leading to x (not x^2)	E1	Depends on previous E1
being a non-integer		
e.g. x is irrational since x ² is irrational;		
x is not an integer since x^2 is a decimal.		
		Consideration of a specific numerical case gains no
		credit.

19. (a) 1/11×6/10 or equivalent	M1	
= 6/110 (= 3/55)	A1	ISW
19. (b) 6/11×5/10 + 4/11×3/10 [+ 1/11×0/10]	M2	FT use of consistent incorrect denominator e.g. 120 Full method for finding P(R, R) + P(G, G) [+ P(Y,Y)]
= 42/110 (= 21/55)	A1	M1 for sight of 6 /11×5/10 or 4/11×3/10 ISW If no marks, SC1 for an answer of 53/121 (method with replacement)
19. (c) 1 – 7/11×6/10 or equivalent	M2	FT use of consistent incorrect denominator e.g. 120 M1 for 7/11×6/10
= 68/110 (= 34/55)	A1	ISW
Alternative method 1 1 – [6/11×5/10 + 6/11×1/10 + 1/11×6/10] or equivalent	M2	FT use of consistent incorrect denominator e.g. 120 Full method for finding 1 – [P(R,R) + P(R,Y) + P(Y,R)]. Allow M1 if any one of the three subtracted products is omitted.
= 68/110 (= 34/55)	A1	ISW
Alternative method 2 4/11×3/10 + 4/11×7/10 + 7/11×4/10 or equivalent	M2	FT use of consistent incorrect denominator e.g. 120 Full method for finding P(G,G) + P(G,G') + P(G',G). Allow M1 for the sum of any two of these three products
		NB: P(1 st sock green) is equivalent to P(G,G) + P(G,G') or to P(G,G) + P(G',G) (i.e. credit cannot be given for <u>only</u> P(1 st sock green)=4/11 without considering compound events)
= 68/110 (= 34/55)	A1	ISW
Alternative method 3 4/11×3/10 + 4/11×6/10 + 4/11×1/10 + 6/11×4/10 + 1/11×4/10 or equivalent	M2	FT use of consistent incorrect denominator e.g. 120 Full method for finding P(G,G) + P(G,R) + P(G,Y) + P(R,G) + P(Y,G). Allow M1 for the sum of any two of the following P(G,G) P(G,R) + P(G,Y) P(R,G) + P(Y,G)
		NB: P(1 st sock green) is equivalent to P(G,G)+P(G,R)+P(G,Y) or to P(G,G)+P(R,G)+P(Y,G) (i.e. credit cannot be given for only P(1 st sock green)=4/11 without considering compound events)
= 68/110 (= 34/55)	A1	ISW
		If no marks, SC1 for an answer of 72/121 [from 1 – 7/11×7/11] (method with replacement)



GCSE MARKING SCHEME

AUTUMN 2020

GCSE MATHEMATICS – UNIT 2 (HIGHER TIER) 3300U60-1

INTRODUCTION

This marking scheme was used by WJEC for the 2020 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.

WJEC GCSE MATHEMATICS

AUTUMN 2020 MARK SCHEME

GCSE Mathematics Unit 2 Higher Tier	Mark	Comments
1.(a) $\frac{1}{6} \times \frac{1}{4}$ or equivalent	M1	
$6 4 = \underline{1} ISW$	A1	Accept 0·0416 or 0·0417 or 0·042 for M1A1 M1A0 for '1 in 24', '1:24'.
1.(b) $\frac{1}{5} + \frac{1}{10}$ or equivalent.	M1	
= <u>3</u> or equivalent. ISW 10	A1	
2. $(AC^2 =) 10 \cdot 8^2 + 14 \cdot 4^2$ $AC^2 = 324$ or $(AC =) \sqrt{324}$ (AC =) 18(cm)	M1 A1 A1	Accept equivalent of using cos rule (as cos 90 = 0). F.T. √'their 324' provided M1 gained. Final answer of AC = 324 is M1A0A0. Alternative method to find AC A correct and complete method (using two trigonometric relationships) AC = 18(cm) A1 FT 'their stated AC'. (May be shown on the diagram)
(Area ACD =) $\frac{24 \times 18}{2}$ = 216 (cm ²)	M1 A1	Accept equivalent of using $\frac{1}{2} \times 24 \times 18 \times \sin 90$ (as $\sin 90 = 1$).
Organisation and Communication Accuracy of writing	W1	For OC1, candidates will be expected to: • present their response in a structured way • explain to the reader what they are doing at each step of their response • lay out their explanation and working in a way that is clear and logical • write a conclusion that draws together their results and explains what their answer means For W1, candidates will be expected to: • show all their working • make few, if any, errors in spelling, punctuation and grammar • use correct mathematical form in their working • use appropriate terminology, units, etc.
3. One correct evaluation $7 \cdot 2 \le x \le 7 \cdot 3$ 2 correct evaluations $7 \cdot 275 \le x \le 7 \cdot 295$, one < 0, one > 0. 2 correct evaluations $7 \cdot 275 \le x \le 7 \cdot 285$, one < 0, one > 0. $x = 7 \cdot 28$	B1 B1 M1	Correct evaluation regarded as enough to identify if negative or positive. If evaluations not seen accept 'too high' or 'too low'. Look out for equating $x^3 - 5x = 350$ x $x^3 - 5x - 350$ 7·2 $-12 \cdot 75(2)$ 7·21 $-11(\cdot 2)$ 7·22 $-9(\cdot 7)$ 7·23 $-8(\cdot 2)$ 7·24 $-6(\cdot 6)$ 7·25 $-5(\cdot 1)$ 7·26 $-3(\cdot 6)$ $7 \cdot 275$ $-1(\cdot 3)$ 7·27 $-2(\cdot 1)$ $7 \cdot 284$ $0(\cdot 04)$ 7·28 $-0 \cdot 5(7)$ $7 \cdot 285$ $0 \cdot 1(9)$ 7·29 $0 \cdot 9(7)$ $7 \cdot 295$ $1(\cdot 7)$ 7·3 $2 \cdot 5(17)$

4.(a) an expression	B1	
4.(b) an equation	B1	
4.(b) an equation		
5. (Mid-points) 2·5, (7·5), 12·5 and 17·5. 8 × 2·5 + (0 × 7·5) + 7 × 12·5 + 5 × 17·5 (20 + 0 + 87·5 + 87·5 = 195)	B1 M1	Allow for sight of mid-points. F.T. 'their mid-points' including bounds, provided they fall within the classes (including lower and upper bounds and used consistently).
÷ 20 = 9.75	m1 A1	C.A.O.
6. (x =) 360 or 180 - (15 - 2) x 180 15 15 15 or equivalent	M1	May be seen in parts.
= 24(°)	A1	
(BR =) $8 \times \cos 24$ or $8 \times \sin (90 - 24)$	M2	FT 'their stated value for x' ($x < 90^{\circ}$) M1 for $\underline{BR} = \cos 24$ or $\underline{BR} = \sin (90 - 24)$ 8
= 7·3(0)(cm) or 7·31(cm)	A1	Accept equivalent of using sin rule (as sin 90 = 1).
		Alternative method to find BR A correct and complete method (using two trigonometric relationships and possibly Pythagoras's theorem) BR = 7·3(0)(cm) or 7·31(cm) Al
7. 2·656 × 10 ⁶	B2	B1 for a correct value but not in standard form. Mark final answer. B1 for sight of 2 656 000. SC1 for 2.66 × 10 ⁶ or 2.7 × 10 ⁶ or 2.6 × 10 ⁶ or 2.65 × 10 ⁶
8. Sight of 24·5 AND 15·5 OR Sight of 23·5 AND 14·5	B1	Sight of (Greatest =) 80 OR (Least =) 76 implies B1
2(24.5 + 15.5) - 2(23.5 + 14.5) or equivalent	M1	FT only for upper bounds of 24·4 AND 15·4 or 24·49 AND 15·49 (lower bounds must be 23·5 AND 14·5 else M0)
= 4(cm)	A1	CAO If M0, award B1 and an SC1 for sight of (Greatest =) 80 <u>AND</u> (Least =) 76
Alternative method. Difference between least and greatest length for each side = 1(cm)	B1	
4 × 1	M1	FT only for differences of 0.9 or 0.99
= 4(cm)	A1	CAO
 Method to eliminate variable e.g. equal coefficients with <u>appropriate</u> addition or subtraction. 	M1	No marks for trial and improvement. Allow 1 error in one term, not the term with equal coefficients.
First variable found, $x = 4$ or $y = -1$. Substitute to find the 2^{nd} variable. Second variable found	A1 m1 A1	C.A.O. F.T. their '1st variable'. Award no marks for unsupported correct answers.

10.(a)(i) Correct reason given. e.g. 'An angle at the circumference subtended	E1	Accept any correct unambiguous wording. The key word is 'diameter'.
by a diameter is a right angle'. ' line AC is a diameter'		Allow eg 'angle in a semicircle is 90°', 'line AC goes through the centre'. 'opposite a diameter' Do not accept 'because it's a right angle'.
10.(a)(ii) $\tan x = \frac{7.5}{4.7}$	M1	Bo not assopt boodso it ou right unglo.
$x = tan^{-1} (7.5 / 4.7)$ or $tan^{-1} 1.6$ or $tan^{-1} 1.59()$	m1	Implies M1.
= 57·9()(°) or 57·8()(°) or 58(°)	A1	C.A.O. <u>Alternative method to find x</u> A correct and complete method (using Pythagoras's theorem and a trigonometric relationship). M2 $x = 57.9()(^{\circ})$ or $57.8()(^{\circ})$ or $58(^{\circ})$ CAO A1
10.(b) (y =) 58(°)	B1	Strict FT of 'their x'.
Correct circle theorem given. e.g. 'angles (at the circumference) subtended by the same chord (or arc) are equal', 'angles in the same segment (are equal)'.	E1	Accept any correct unambiguous wording. Allow eg 'angles on the same chord (are equal)' Do not accept e.g. 'they are equal' on its own.
11. 2 ⁴⁰⁰	B2	B1 for (2 ¹⁰⁰) ⁴ OR sight of 2 ⁴
12. (Height =) $\frac{3 \times 5533}{825}$ OR $\frac{5533}{\frac{1}{2} \times 825}$	M2	M1 for $5533 = 1/3 \times \text{height} \times 825$ or equivalent.
= 20.1(2 cm)	A1	Allow an answer of 20(cm) from correct working.
Alternative method (finding the radius first):		4"
Use $A = \pi r^2$ to evaluate r or r^2 .		Allow use of π = 3·14, 3·142 or 3·14(59). When using the π button on the calculator, r = 16·2(05) OR r^2 = 262·6().
		There will be no FT for any radius other than r = 16cm, from working seen.
(Height =) $\frac{3 \times 5533}{\pi \times 16.2(05)^{2}} OR \frac{5533}{\frac{1}{3} \times \pi \times 16.2(05)^{2}} OR$ $\frac{3 \times 5533}{\pi \times 262.6()} OR \frac{5533}{\frac{1}{3} \times \pi \times 262.6()}$	М2	M1 for $5533 = 1/3 \times height \times \pi \times 16.2(05)^2$ or equivalent. Allow M1 for use of $r = 16$ (cm)
= 20·1(2 cm)	A1	Allow an answer of 20(cm) from correct working. Accept an answer in the range 20·10 to 20·143(cm) FT base radius = 16 cm: Allow an answer in the range 20·6(cm) to 20·65(cm) OR 21(cm) from correct working.
13.(a) $(2x+9)(2x-9)$	B2	B1 for (2x 9)(2x 9)
13.(b) $(7x-4)(x+2)$ 13.(c) $(x+3)^2(x+7)$ OP $(x+3)(x+3)(x+7)$	B2 B2	B1 for $(7x 4)(x 2)$
13.(c) $(x+2)^2(x+7)$ OR $(x+2)(x+2)(x+7)$		B1 for $(x + 2)^2(x + 2 + 5)$ OR $(x + 2)[(x + 2)^2 + 5(x + 2)]$ OR $(x + 7)(x^2 + 4x + 4)$ OR $(x + 2)(x^2 + 9x + 14)$. Allow B1 for $(x + 2)^2(x + k)$ where $k \neq 0$, 2 or 7.
14. – ½ or equivalent	B2	B1 for -2 or ½.
15. $2n^2 + 1$ or equivalent	B2	B1 for sight of $2n^2$ OR for sight of consistent 2^{nd} difference 4.
= 20 001	B1	FT from their $2n^2 \pm k$, where $k \neq 0$ OR from their $2n^2 \pm an$, where $a \neq 0$ OR from their $2n^2 \pm an \pm k$, where $a \neq 0$, $k \neq 0$. An unsupported answer of 20 001 gains all 3 marks. If no marks, award SC1 for an unsupported answer of 20 000.
	1	20000.

Г		
16. Use of 7175 AND (1)·2345 or (1)23·45(÷100) 7175 × 1·2345	B1 M1	Or aquivalent complete method
7175 X 1°2545	IVI I	Or equivalent complete method. FT for 'their 7175' provided 7170 ≤ x < 7180
		and 'their 1·2345' provided 1·234 ≤ y < 1·235
		Sight of (£)8857·53(75) or (£)8857·54 implies B1M1.
= (£)8858	A1	CAO.
17.(a) General cosine curve with appropriate	M1	Ignore curve shown for values x< 0° or x> 360°.
orientation and position.		
Correct sketch with curve passing through (0°,1), (90°,0) and (270°,0) and approximately (180°,-1) and (360°,1) AND 90(°), 180(°), 270(°), 360(°) indicated on the x-axis AND -1 and 1 indicated on the y-axis.	A1	Accept 180° as mid-way between 0° and 360° if unlabelled. Accept 360° as unlabelled provided the sketch does not exceed 360°.
90 180 270 360		
17.(b) 46(°) AND 314(°)	B2	B1 for sight of one correct angle.
OR		Allow embedded answers.
45·6(°) AND 314·4(°)		If more than two answers offered award B1 for sight
OR 45·57(29°) AND 314·4(27°).		of one correct angle.
45.57(29) AND 314.4(27).		If no marks, awarded SC1 for truncated answers
		45(°) AND 315(°) OR 45·5(°) AND 314·5(°).
18. 0·7×0·2×0·1×6	M2	M1 for sight of 0·7×0·2×0·1 OR 0·014 OR 7/500
		or equivalent.
= 0.084 or equivalent	A1	Fractional answer: 21/250 or equivalent. (ISW)
19. Sight of $25x^2 + 15x - 15x - 9$	B1	Or equivalent.
$25x^2 - 19x - 9 = 0$	B1	'= 0' required, but may be implied by an attempt to
		use the quadratic formula or if $a = 25, b = -19,$ c = -9 used in the quadratic formula.
		c — 7 used in the quadratic formula.
$-(-19) + \sqrt{(-19)^2 - 4 \times 25 \times (-9)}$	M1	This substitution into the formula must be seen
$x = \frac{-(-19) \pm \sqrt{(-19)^2 - 4 \times 25 \times (-9)}}{2 \times 25}$		for M1, otherwise award M0A0A0.
		FT 'their derived quadratic equation' of equivalent
		difficulty $(a, b \text{ and } c \text{ must be non-zero})$.
		Allow one slip in substitution for M1 only, but must be correct formula.
		De Correct Iorniula.
10 ± .√1241		
$x = \frac{19 \pm \sqrt{1261}}{50}$	A1	Can be implied from at least one correct value of <i>x</i>
50		evaluated, provided M1 awarded.
x = 1.00 with $x = 0.22$ (analysis to 2dn)	A1	CAO for their quadratic equation.
x = 1.09 with $x = -0.33$ (answers to 2dp)	Α1	Ono for their quadratic equation.

20.		A correct and complete method involving multiple trigonometric relationships leading to the correct answer may be seen at any stage to gain the method mark(s).
$(x =) \frac{12}{\sin 46} \times \sin 34$	M2	M1 for $\frac{x}{\sin 34} = \frac{12}{\sin 46}$ or equivalent.
(x =) 9.3(28cm) OR 9.32(cm)	A1	
(Area of sector ACB=) $\frac{46}{360} \times \pi \times 9.3(28)^2$	M1	FT 'their derived 9·3(28)'.
= 34·9(3cm ²)	A1	Answers in the range 34·7(cm²) to 35(cm²) or equivalent range on FT.
(Area of ACE=) ½×9·3(28)×12×sin(100) = 55·1(2cm²)	M1 A1	FT 'their derived 9·3(28cm) Answers in the range 54·95(cm²) to 55·13(cm²) or equivalent range on FT.
(Area of the shaded region BCE = 55·1 – 34·9) = 20·18(8cm²) OR 20·2(cm²)	B1	FT 'their 34·9(cm²)' and 'their 55·1(cm²)' provided previous M1, M1 (from area calculations) awarded AND 'area of the shaded region' > 0. This answer must be derived from the subtraction of 'their areas'.

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