GCSE MARKING SCHEME

SUMMER 2019

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

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.

WJEC GCSE MATHEMATICS (NEW)

SUMMER 2019 MARK SCHEME

GCSE Mathematics **Unit 2: Intermediate Tier**	**Mark**	**Comments**
1.(a)(i) 28·34 or 1417/50 or $28^{17}/_{50}$ ISW	B2	B1 for sight of 23·04 OR sight of 5·3. If B0 allow SC1 for 28 or 28·3
1.(a)(ii) 34·8 or 174/5 or $34^{4}/_{5}$ ISW	B1	
1.(a)(iii) 125	B2	B1 for sight of 1/8 or 0·125 or 1000/8 or 1000÷8
1.(b) 440	B1	B0 for 440·0
2.(a) (19 − 18·2 =) 0·8	B2	B1 for sight of 19 OR sight of −18·2. BUT B0 for 19f − 18·2g. Mark final answer.
2.(b) 7x = 16 (x =) 16/7 (x=) 2·3 (to 1dp)	B1 B1 B1	 FT from 7x = k. Allow 16 ÷ 7 FT from any fraction that requires rounding. Mark final answer. (x =) 2·2…. implies B1B1B0. Allow an embedded 2·3, B1B1B0
3.(a) 4 hours 45 min	B1	
3.(b) 2·4 km	B1	
3.(c) 7km less than 5 miles — TRUE 1kg less than 2lb — FALSE 1 litre less than 1 pint — FALSE 8 litres less than 900cm^3 — FALSE	B2	For all 4 correct. B1 for 3 correct.
4. Two relevant (sides of one double the other) rectangles or squares considered. Perimeter AND area of 1st rectangle correctly calculated. Perimeter AND area of 2nd rectangle correctly calculated. Clear statement that the perimeter has been doubled but the area has not been doubled (and that Catrin is incorrect.)	M1 B1 B1 A2	Sketch shown or lengths stated. If M0, only the B marks are available. Ignore missing units BUT penalise −1, once only, for incorrect units. (Applies to these B1 marks.) FT 'their <u>stated</u> values' for both perimeter and area. If not A2, then A1 for correct perimeter statement for '<u>their values</u>'. OR A1 for correct area statement for '<u>their values</u>'. Accept statement that area is 4 times as big. Allow for A2 'only the perimeter has been doubled'. (implies that the area has not been doubled.) <u>*Also for A2.*</u> *'The area is not doubled so Catrin is incorrect' answers the question.* *In this case* *Award SC1 and SC1 (instead of B1 and B1) if areas correctly calculated.* Correct statements, for BOTH perimeter and area, with **<u>no</u>** supporting work gains SC1.

5. (18% of £256 =) $0{\cdot}18 \times 256$ $= (£)46.08$ (Larger share =) $\frac{2 \times 46{\cdot}08}{3}$ $= (£)30.72$ (To the nearest 10p =) (£)30.7(0)	M1 A1 M1 A1 B1	 Allow (£)46.10 FT 'their stated 18%'. If M0 allow SC1 for sight of (£)15.36 FT 'their larger share' (not 'their 18%') and only if rounding required.
5. Alternative method 1 *(Larger share of £256 =) $\frac{2 \times 256}{3}$* *$=$(£)170.66(..)* *(18% of £170.66 =) $0{\cdot}18 \times 170.66$* *$= (£)30.72$* *(To the nearest 10p =) (£)30.7*(0)	*M1* *A1* *M1* *A1* *B1*	 *Allow (£)170.70* *If M0 allow SC1 for sight of (£)85.33.* *FT 'their stated larger share'.* *FT 'their 18%' (not 'their larger share') and only if rounding required.*
5. Alternative method 2 *(Larger share of 18% =) $\frac{2 \times 18}{3}$* *$= 12(\%)$* *(12% of £256 =) $0{\cdot}12 \times 256$* *$= (£)30.72$* *(To the nearest 10p =) (£)30.7*(0)	*M1* *A1* *M1* *A1* *B1*	 *If M0 allow SC1 for sight of 6(%).* *FT 'their derived larger %'.* *FT 'their amount' only if rounding required.*
5.OCW Organisation and Communication. Accuracy of writing.	OC1 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
6.(a) $a(7b+11)$	B1	Allow $1a(7b + 11)$
6.(b) $x(x–8)$	B1	Allow $1x(x – 8)$
6.(c) $8y – 12y^2$	B2	Must be an expression for B2. B1 for sight of $8y$ or $-12y^2$. Mark final answer.
7.(a) $a = -6$ $b = -5$	 B1 B1	Values may be seen on the diagram.
7.(b) Correct shape in correct position.	B3	B2 for a correct enlargement in incorrect position. B1 for one correct side in correct position. If no marks allow SC1 for showing all the 'rays' from (1,2).

8. P(Alison chooses letter R) = 2/10 or equivalent. P(Sarfraz chooses letter R) = ¼ or equivalent. Use of 2/10 × 100 OR ¼ × 100 20 AND 25 clearly implying that Sarfraz is the most likely to choose letter R	B1 B1 M1 A1	B1 for sight of 2/10 if unambiguously for Alison. B1 for sight of 1/4 if unambiguously for Sarfraz. As probability not asked for, allow e.g. '2 chances in 10' and 'one chance in four'. B1 marks may be implied in subsequent work. Calculation may be done in stages. There is no requirement to tick the box as long as there is no contradiction. Do <u>not</u> accept, on its own, e.g. 'Sarfraz has less letters to choose from' for the A1.
8. <u>Alternative method</u> *P(Alison chooses letter R) = 2/10* or equivalent. *P(Sarfraz chooses letter R) = ¼* or equivalent. *Attempting to give probabilities in a common format.* *Correct common format* *e.g. 4/20 AND 5/20 or 0·2 AND 0·25* *clearly implying that Sarfraz is the most likely to choose letter R*	*B1* *B1* *M1* *A1*	*B1 for sight of 2/10 if unambiguously for Alison.* *B1 for sight of 1/4 if unambiguously for Sarfraz.* *As probability not asked for, allow* *e.g. '2 chances in 10' and 'one chance in four'* *There is no requirement to tick the box as long as there is no contradiction.* *Do <u>not</u> accept, on its own, e.g.* *'Sarfraz has less letters to choose from' for the A1.*
9.(a) 3n + 5 or equivalent	B2	B1 for sight of 3n. B0 for −3n Mark final answer.
9.(b) $3t = r + 8$ or $r + 8 = 3t$ or $-3t = -r - 8$ $t = \frac{r+8}{3}$ or $\frac{r+8}{3} = t$ or $t = \frac{-r-8}{-3}$	B1 B1	F.T. only from $3t = \pm r \pm 8$, stated or implied. ($3t = r + 8$ will have already gained the previous B1.) B1B0 for $-t = \frac{-r-8}{3}$ or equivalent. Mark final answer. *<u>Note</u>* *Allow B1B0 for t = (r + 8) ÷ 3 with or without brackets.* *Allow B1B0 for $\frac{r+8}{3}$ ('t' missing)*
9.(c) 6x + 4 = 46 OR 3x + 2 = 23 6x = 42 OR 3x = 21 (x =) 7	B2 B1 B1	B1 for (x + 5) + (2x – 3) + (x + 5) + (2x – 3) = 46 or equivalent e.g. (x + 5) + (2x – 3) = 23 FT collection of 'their terms' if of equivalent difficulty. (linear equation only.) FT <u>only</u> from ax = b. Allow a fraction from a FT value unless x is a whole number. (x =) 7 gains all four marks. Each B mark implies all previous B marks. Mark final answer.
9.(c) <u>Alternative method</u> *A trial showing correct values and understanding of perimeter. (e.g. 2(4 + 5) + 2(2×4 – 3) = 28)* *An <u>improved</u> trial.* *(x =)7*	*B1* *B1* *B2*	*Consistent use of x AND correct evaluation.* *Dependent on first B1.* *If 1st trial is using '7' award B1B1 followed by B1 if left embedded but B2 if shown as x = 7.* *B1 for an implied / embedded 'x = 7' but not shown as x = 7.* *(x =) 7 gains all four marks.* *Mark final answer.*

<table>
<tr><td>10. Intent to square at least two of the three values.</td><td>S1</td><td>(Note:
$12{\cdot}8^2 = 163{\cdot}84$, $22{\cdot}7^2 = 515{\cdot}29$ and $25{\cdot}6^2 = 655{\cdot}36$)</td></tr>
<tr><td>Comparing $(25{\cdot}6)^2$ with $(12{\cdot}8)^2 + (22{\cdot}7)^2$ or
Any intent to compare any other relevant values.
(e.g. $(25{\cdot}6)^2 - (22{\cdot}7)^2$ with $(12{\cdot}8)^2$ or
$\sqrt{[(12{\cdot}8)^2 + (22{\cdot}7)^2]}$ (with 25·6))</td><td>M1</td><td>The comparison attempted must show <u>both</u> intended calculations e.g. $(25{\cdot}6)^2$ AND $(12{\cdot}8)^2 + (22{\cdot}7)^2$
unless intention is to compare with a given side
e.g. $\sqrt{[(12{\cdot}8)^2 + (22{\cdot}7)^2]}$ with 25·6</td></tr>
<tr><td>Correct evaluation of value(s) to be compared.
(e.g 'sight of 655·36 WITH 679·13' or
'sight of 140·07 WITH 163·84' or
'sight of 26·06 (WITH 25·6)')</td><td>A1</td><td>C.A.O. but allow evaluated answers to be given to the nearest whole number. e.g. 655 WITH 679.</td></tr>
<tr><td>Statement that it is NOT possible</td><td>A1</td><td>Allow FT if M1 awarded.
If all marks gained ISW.</td></tr>
<tr><td><u>10. Alternative method 1</u>
Intent to use two right-angled trig ratios using 2 <u>different pairs</u> of given sides</td><td>S1</td><td>i.e. In order to find the value of either the same angle OR two different angles, whilst sufficient to show that it isn't a right-angled triangle.</td></tr>
<tr><td>Correct right-angled trig ratio used twice, using 2 <u>different</u> given sides, in order to compare
• the values of the same angle or
• the sum of the two angles with 90°.</td><td>M1</td><td></td></tr>
<tr><td>Correct evaluation of value(s) to be compared.
e.g. sight of any two of 30(°), 27.5…(°) and 29.4…(°)
OR sight of 30(°) and 60.58…(°) (and the sum to be compared with 90°)</td><td>A1</td><td>CAO
<table><tr><th>Ratio</th><th>Opp</th><th>Adj</th><th>Hyp</th><th>Angle</th></tr><tr><td>Sin</td><td>12.8</td><td></td><td>25.6</td><td>30(°)</td></tr><tr><td>Cos</td><td></td><td>22.7</td><td>25.6</td><td>27.5…(°)</td></tr><tr><td>Tan</td><td>12.8</td><td>22.7</td><td></td><td>29.4…(°)</td></tr><tr><td>Sin</td><td>22.7</td><td></td><td>25.6</td><td>62.46…(°)</td></tr><tr><td>Cos</td><td></td><td>12.8</td><td>25.6</td><td>60(°)</td></tr><tr><td>Tan</td><td>22.7</td><td>12.8</td><td></td><td>60.58…(°)</td></tr></table></td></tr>
<tr><td>Statement that it is NOT possible</td><td>A1</td><td>If comparing the sum of two angles (with 90°), the sum must be shown.
Allow FT if M1 awarded.
If all marks gained ISW.</td></tr>
<tr><td><u>10. Alternative method 2</u> (using the cosine rule)

(cos A =) $(12.8^2 + 22.7^2 - 25.6^2) / (2{\times}12.8{\times}22.7)$
(= 2377/58112 or 0·0409..)

(A =) 87(.6557…°)

Statement that it is NOT possible</td><td>

M2

A1

A1</td><td><u>NOTE</u> The cosine rule is not on the intermediate tier specification, but as it is a common question, it may be seen by Higher tier candidates.
M1 for $25.6^2 = 12.8^2 + 22.7^2 - 2{\times}12.8{\times}22.7{\times}\cos A$

If all marks gained ISW.</td></tr>
<tr><td>11.(a) $A \cap B$</td><td>B1</td><td></td></tr>
<tr><td>11.(b) B'</td><td>B1</td><td></td></tr>
<tr><td>12
Four numbers with a range of 10.
Four numbers with a total of 36.
Four numbers with a median of 8.
Possible answers for all three marks are
5,5,11,15 or 5,6,10,15 or 5,7,9,15 or 5,8,8,15</td><td>
B1
B1
B1</td><td>B0 if all four original numbers used.</td></tr>
</table>

13. (number of females in Porth =) $\frac{90}{360} \times 128$ OR (number of males in Porth =) $\frac{120}{360} \times 72$ (number of females in Porth =) 32 (number of males in Porth =) 24 (Probability from Porth =) $\frac{56}{200}$ or equivalent ISW	M1 A1 A1 A1	Or equivalent *Answers may be seen on the diagram.* An answer of 32 implies M1. An answer of 24 implies M1. FT ('their 32' + 'their 24') /200 provided M1 gained. Penalise incorrect notation −1. e.g. '56 in 200'.
14. $\sin(QPR) = \frac{9{\cdot}6}{16{\cdot}7}$ (QPR =) $\sin^{-1}(9.6/16{\cdot}7)$ or $\sin^{-1}(0{\cdot}57..)$ = 35·1(°) or 35·09(°) or 35·089(…°)	M1 m1 A1	 Implies M1. Allow any answer that rounds to 35(°)
14.Alternative method. ***Correct** use of 'two-step' method.* *(x)* = 35·1(°) or 35·09(°) or 35·089(…°)	 M2 A1	 *A partial trigonometric method is M0.* Allow any answer that rounds to 35(°)
15. 7x + 2y = (£)41.5(0) AND 4x + 3y = (£)29.75 Method to eliminate variable (Attempt at equal coefficients and subtraction) First variable found x =(£) 5 or y = (£)3.25. Substitute to find the 2nd variable. Second variable found.	B1 M1 A1 m1 A1	Allow use of other letters to denote variables. B0 for using 4150 and 2975. FT 'their equations' if of equal difficulty. Allow 1 error in one term, not one with equal coefficients. C.A.O. (for their equations if FT.) F.T. their '1st variable'. FT answers should be given to the nearest penny (rounded or truncated). If M0, award SC2 (with possible B1) for both answers of (£) 5 AND (£)3.25.
16. One correct evaluation $1 \le x \le 2$ 2 correct evaluations $1{\cdot}55 \le x \le 1{\cdot}75$, one < 0, one > 0. 2 correct evaluations $1{\cdot}55 \le x \le 1{\cdot}65$, one < 0, one > 0. x = 1·6	 B1 B1 M1 A1	*Correct evaluation regarded as enough to identify if 'too high' or 'too low'. If evaluations not seen accept 'too high' or 'too low'.* x $2x^3 + x - 10$ (or check $2x^3 + x = 10$) 1 −7 1·1 −6·238 1·2 −5·344 1·3 −4·306 1·4 −3·112 1·45 − 2·452... 1·5 −1·75 1·55 − 1·002... **1·6 −0·208 1·65 0·634**... **1·7 1·526** 1·75 2·468... 1·8 3·464 (1·62 0·123..) 1·9 5·618 (1·63 0·291..) 2 8 (1·64 0·461..)
17. 85% ≡ 6154 $\frac{6154}{85} \times 100$ OR $\frac{6154}{0{\cdot}85}$ = 7240	B1 M1 A1	Accept any indication. Implies the B1.
18. x = 54(°) Opposite angles (of a) cyclic quad. (add up to 180°). y = 108(°) Angle at the centre (is twice the angle at the circumference).	B1 E1 B1 E1	 Dependent on an attempt at 180 – 126. FT 2 × 'their 54' only if less than 360° Dependent on an attempt at 2 × 'their 54'.