GCSE MARKING SCHEME

SUMMER 2018

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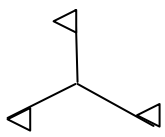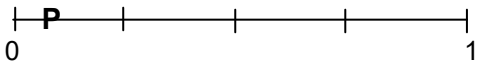**3300U40-1**

INTRODUCTION

This marking scheme was used by WJEC for the 2018 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 2018 MARK SCHEME

GCSE Mathematics Unit 2: Intermediate Tier Summer 2018	Mark	Comments
1.(a) 28	B1	Mark final answer. Allow embedded answer. B1 for 28/4 or 28/4 = 7 with <u>no</u> further work. B0 for 28/4 followed by 'x ≠ 28'.
1.(b) 4f + 3g	B2	Must be in an expression for B2. B1 for sight of (+)4f OR B1 for sight of (+)3g. Mark final answer.
1.(c) 5 x 4 +2q = 24.6 or equivalent. 2q = 4.6 (q =) 2.3	M1 A1 A1	Implies M1. FT only from 2q = k. Mark final answer. Allow 3 marks for embedded answer BUT Only two marks if contradicted by 'q ≠ 2·3'. <u>If no marks gained,</u> allow SC1 for sight of 20 (not 20p) <u>from</u> 5x4 OR allow SC1 for q = 22·3
2.(a) Two dots placed at suitable points to ensure rotational order 2.	B1	Mark correct intention. B0 if extra dots offered.
2.(b) Three dots placed at suitable points to ensure rotational order 3.	B1	Mark correct intention. B0 if extra dots offered.
2.(c)	B1	
3.(a) *(Summer Cottage Train)* Summer Cottage Bus Summer Cottage Car Summer Hotel Train Summer Hotel Bus Summer Hotel Car Winter Cottage Train Winter Cottage Bus Winter Cottage Car Winter Hotel Train Winter Hotel Bus Winter Hotel Car	B3	For all other 11 different combinations. Ignore repeats. B2 for 8, 9 or 10 other different combinations. B1 for 5, 6 or 7 other different combinations.
3.(b)	B1	P must be positioned strictly > 0 and < 0·25. C.A.O. Accept any indication for position of P.

4.	Attempt to display any 3 or 4 in a common format.
	 e.g. all decimals or all as percentages or all with a common denominator or calculation using a common value.
		M1	Method mark is for the attempt.
			 e.g. attempt to show any three as
			     0·25, 0·2(0), 0·28, 0·26. OR
			     25(%), 20(%), 28(%), 26(%) OR
			     25/100, 20/100, 28/100, 26/100 OR
			 Say, ¼×25=6·25,1/5×25=5,7/25×25=7,13/50×25=6·5

	Three values accurate.	A1	
	13/50 or equivalent AND all 4 correct.	A1	C.A.O. SC1 for a 13/50 if no marks gained.
5.	Area = 6 × 4·5 OR Perimeter = 2(6 + 4·5)	M1	Area and/or perimeter may be identified in later work but M0 if reversed.
	= 27 = 21	A2	A1 for each.
	cm^2 AND cm	U1	Both required. Must be clearly identified. Penalise -1 if not identified (by answer space or words) *(Note : Area = 21cm^2 Perimeter = 27cm in the answer space would gain M0,A0,U1)*
6.(a)	c = a + b	B1	
6.(b)	a + c + s + q = 360°	B1	
6.(c)	a + b + c + d + e = 360°	B1	
7.	An attempt to find the total of the four time periods.	M1	Allow any convincing attempt. A total has to be found. e.g. sight of 18·16 or 18h 16min etc. Not enough to simply list e.g.5 20 + 2 44 + 6 18 + 4 34
	(Sum of time periods =) 18(hr) 56(min) OR 1136(min)	A1	C.A.O. Allow 18·93(…)(hr) but mark final answer.
	÷ 4	m1	FT for m1, <u>only if</u> 'their sum of time periods' is between 17h (1020min) and 21h (1260min) inclusive.
	= 4 hours 44 minutes	A1	Allow FT A1 <u>only if</u> the sum of their time period is *x* hrs *y* min where x is <u>not</u> a multiple of 4 and y ≠ 0. OR the sum of their time period is t minutes, where t is <u>not</u> a multiple of 60. Sight of 284 (min) implies M1A1m1. Note 1: <u>If time is incorrectly added as 'decimals'.</u> 18·16 or 18h 16min is M1A0. Further work of 18·16 ÷ 4 = 4·54 (or 4h54m) is m1A0 BUT 18h 16m ÷ 4 = 4h 34m is m1A1 (FT) Note 2: <u>Incorrect use of calculator.</u> e.g. M1A0m1A0 for sight of 930·5(min) (From 320 + 164 + 378 + 274 ÷ 4)
	Alternative method *Attempt to add time periods as 'hours + min'*	*M1*	
	* 17hours (+) 116 minutes*	*A1*	
	* ÷ 4*	*m1*	*FT for m1, <u>only if</u> 'their sum of time periods' is between 17h (1020min) and 21h (1260min) inclusive.*
	* 4 hours 44 minutes*	*A1*	

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8.			
(Volume A =) 5 × 5 × 5 (cm^3) OR (Volume B =) 4 × 4 × 5 (cm^3)		M1	For use of Vol = l × b × h with <u>either</u> A or B.
(Volume A =) 125 (cm^3) AND (Volume B =) 80 (cm^3)		A1	C.A.O. for <u>both</u> volumes. One correct implies previous M1.
(Volume of B as a percentage of the volume of A) = $\dfrac{80}{125}$ (× 100%)		M1	FT their derived 'volumes'.
= 64(%)		A1	An answer of 64(%) gains all four marks. *Allow marks if they work with base areas (as heights are equal) but must explain in order to gain OC1 mark.*

Alternative method
(Where125 cm^3 and 80 cm^3 not shown.)
   5 × 5 × 5 (cm^3)   OR 4 × 4 × 5 (cm^3)
   $\dfrac{4 × 4 × 5}{5 × 5 × 5}$ (×100%)
   = 64(%)
		M1
		M2
		
		A1	

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 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
9.	3(4x − 7) = 27 or equivalent 4x = 16 or 12x = 48 or equivalent x = 4	M1 A1 A1	M1 for 4x − 7 = 27/3 FT from ax = b. Allow 3 marks for embedded answer BUT Only two marks if contradicted by 'x ≠ 4'. Unsupported answer of x =4 gains all three marks. If no marks gained allow SC1 for sight of 9.
10.(a)	1 − 0·36 − 0·12 − 0·24 = 0·28	M1 A1	
10.(b)	522 × ⅓ or equivalent (e.g. 522 ÷ 0·36 × 0·12) = 174	M1 A1	
11.(a)	8·27	B2	Mark final answer. B1 for sight of 8·26(……) or for sight of 8·270 or for sight of 8·30 or for sight of 8·3
11.(b)	0·0213	B2	Mark final answer. B1 for sight of 0·0212(……..) Ignore 'recurring dot'.

12.(a)	48°	B1	
12.(b)	East	B1	
12.(c)	280°	B1	

13.			*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 $x^3 - 7x = 51$*
	One correct evaluation $4 \le x \le 5$	B1	$\underline{x} \qquad \underline{x^3 - 7x - 51}$
	2 correct evaluations $4\cdot25 \le x \le 4\cdot45$, one < 0, one > 0.	B1	$\begin{array}{ll} 4 & -15 \\ 4\cdot1 & -10\cdot779 \end{array}$
	2 correct evaluations $4\cdot25 \le x \le 4\cdot35$, one < 0, one > 0.	M1	$\begin{array}{llll} 4\cdot2 & -6\cdot312 & 4\cdot25 & -3\cdot984... \\ 4\cdot3 & -1\cdot593 & 4\cdot34 & 0\cdot366... \\ 4\cdot4 & 3\cdot384 & 4\cdot35 & 0\cdot862... \end{array}$
	(x =) 4·3	A1	$\begin{array}{llll} 4\cdot5 & 8\cdot625 & 4\cdot45 & 5\cdot971... \\ 4\cdot6 & 14\cdot136 \\ 4\cdot7 & 19\cdot923 \\ 4\cdot8 & 25\cdot992 \\ 4\cdot9 & 32\cdot349 \\ 5 & 39 \end{array}$ *For this question A1 can only be awarded if M1 given.*

14.(a)	225	B2	Mark final answer. Allow $\sqrt{225}$ (= 15) as an indication of correct answer and award B2. B1 for unambiguous indication that HCF is 15. B1 only for 15^2 if not shown to be 225.
14.(b)	9·6	B2	Mark final answer. B1 for sight of 3·2.

15.	$(QR^2 =)\ 1\cdot41^2 + 0\cdot89^2$	M1	
	$(QR^2) = 2\cdot78(02)$ or $(QR) = \sqrt{2\cdot78(02)}$	A1	Allow 2·8 for 2·78.
	$(QR =)\ 1\cdot66(...)(m)$ or $1\cdot67$ (m) or $1\cdot7$(m) *OR 166·7(..) cm or 167cm*	A1	FT from M1 for the correctly evaluated square root of 'their 2.78(02)' provided their answer > 1.41 *Allow working in centimetres but penalise −1 from any A marks gained if units not shown for final answer* e.g. QR^2 = 27802 (A1) , QR = 166·74 (A1) then −1 BUT QR = 166·74 cm OR 167 cm is M1A1A1.
	Alternative method. **Correct** *use of 'two-step' trigonometric relationship.*	M2	*A partial trigonometric method is M0.*
	(QR =) $1\cdot66(...)(m)$ or $1\cdot67$ (m) or $1\cdot7$(m) *OR 166·7(..) cm or 167cm*	A1	*C.A.O.*

16.(a)	0·58 on 'Male' branch.	B1	
	0·65 and 0·35 correctly shown on both pairs of branches.	B2	B1 if correctly shown on one pair only. SC1 if 0·65 and 0·35 consistently reversed on all branches.
16.(b)	0·42 × 0·35	M1	FT 'their 0·35' (on 'uppermost train branch') provided less than 1
	= 0·147 or equivalent. ISW	A1	

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17.(a) $x = 3{\cdot}2 \times \dfrac{8{\cdot}4}{5{\cdot}6}$ OR $\dfrac{x}{3{\cdot}2} = \dfrac{8{\cdot}4}{5{\cdot}6}$ or equivalent. $x = 4{\cdot}8$	M1 A1	M1 for correct <u>use</u> of linear ratio.
17.(b) $y = 6{\cdot}3 \times \dfrac{5{\cdot}6}{8{\cdot}4}$ OR $\dfrac{y}{6{\cdot}3} = \dfrac{5{\cdot}6}{8{\cdot}4}$ or equivalent. $y = 4{\cdot}2$	M1 A1	M1 for correct <u>use</u> of linear ratio. FT a slip in the calculation (<u>not a misuse</u>) of the scale factor in part (a) if used again in (b).
17.(c) Correct strategy of comparing corresponding ratio of lengths. Indicates that $\dfrac{3{\cdot}9}{6{\cdot}5}$ (= 0·6) is not equal to $\dfrac{5{\cdot}6}{8{\cdot}4}$ (= 0·666…) or equivalent.	S1 B1	Sight of 3·9 / 6·5 (or 6·5 / 3·9) along with any pair of corresponding lengths or scale factor used (or corresponding FT lengths from their answers in 17(a) or 17(b)). Allow using FT values from 17(a) or 17(b).

Alternative method 1
    (If CD = 3·9 then) RS = 3·9 × 1·5
        = '5·85 (cm)' or/and 'which is not 6·5'
	S1
	B1	

Alternative method 2
    (If RS = 6·5 then) CD = 6·5 × 2/3
        = '4·3… (cm)' or/and 'which is not 3·9'
	S1
	B1	

18. $2x - y = 6$ or equivalent
  e.g. $12(2x - y) = 72$
 	
                  $3x + y = 16{\cdot}5$ or equivalent
  e.g. $3x + y + 3x + y = 33$
 	
  Correct method to solve simultaneous equations.
 	
              $x = 4{\cdot}5$
              $y = 3$
	B1
	
	B1
	
	M1
	
	A1
	A1
		B1 for sight of correct equation.
		
		B1 for sight of correct equation.
		
		FT 'their two simultaneous equations'.
		
		Equating a variable (if necessary) AND adding or subtracting as appropriate. Allow one slip.
		C.A.O. from 'their equations' for 1st variable.
		F.T. from substituting 'their 1st variable' if M1 gained.
		
		SC1 if x = 4·5 AND y = 3 given without using simultaneous equations method. This could happen after a B1 (or B1B1) gained or just appear with no equations shown.

19.(a)   Tan ACB = $\dfrac{6{\cdot}5}{10{\cdot}4}$
 	
        (ACB =) $\tan^{-1} 0{\cdot}625$ or $\tan^{-1}(6{\cdot}5 / 10{\cdot}4)$
                  (x) = 32(°)
	M1
	
	A1
	A1
		M1 for equivalent complete method.
		
		C.A.O. (Implies previous A1.)
		Accept an answer that rounds to 32(°)

Alternative method.
    Correct *use of 'two-step' method.*
        (x) = 32(°)
	M2
	A1
		A partial trigonometric method is M0.
		Accept an answer that rounds to 32(°)

19.(b) (DE =) $9{\cdot}4 \times \sin[22 + 32](°)$ = 7·6(…)(cm) ISW	M2 A1	FT 22° + 'their 32°'. M0 for using sin22° or sin 'their 32°' alone. M1 for $\dfrac{DE}{9{\cdot}4} = \sin54(°)$ <u>If no marks awarded</u> SC1 for a <u>correct</u> answer (1dp) using their clearly <u>stated</u> or <u>shown</u> angle (D)C(E), but not 22° or 'their 32°'.

Alternative method.
    Correct *use of 'two-step' method.*
        (DE) = 7·6(…)(cm)   ISW
	M2
	A1
		A partial trigonometric method is M0.