GCSE MARKING SCHEME

SUMMER 2016

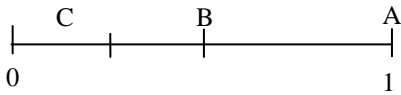**GCSE MATHEMATICS - LINEAR PAPER 1 FOUNDATION TIER**

4370/03

INTRODUCTION

This marking scheme was used by WJEC for the 2016 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.

Summer 2016 Linear Paper 1 (Non calculator) Foundation Tier	Marks	Comments
1. (a) (i) 46**(,)**008	B1	B0 for 46.008
1. (a) (ii) eight million (and) six hundred thousand	B1	**Accept eight point six million** eighty six hundred thousand' gets B0
1. (b) (i) 38 and 52	B1	Accept either order OR 38 + 52 = 90
1. (b) (ii) 42 and 24	B1	Accept 24 + 18 = 42 OR equivalent
1. (b) (iii) 24	B1	**6÷4 = 24 gets B0**
1. (b) (iv) 64	B1	Accept 8^2, 8×8 but NOT 8
1. (c) 6700	B1	Accept written in words
1. (d) 1, 7, 11, 77 **Accept 1×77, 7×11.**	B2	B1 for any 3 correct factors and up to 1 incorrect **OR B1 for all 4 correct and 1 incorrect.**
1. (e) (i) 7652	B1	Do NOT allow commas e.g. 7, 6, 5, 2 gets B0. But B1 for 7,652.
1. (e) (ii) 2576	B1	Do NOT allow commas e.g. 2,5,7, 6 gets B0. But B1 for 2,576.
Parts (i) and (ii) marked together 2. (a) (i) 51 (ii) 18	B2	For both correct. B1 for either 51 OR 18 correct
2. (b) 80 OR 8 ten(s) OR tens OR eighty	B1	B0 for 1 ten OR B0 for 10

2. (c) (0) 52**(%)**
     (0) 51**(%)**
     (0) ·51, $\frac{13}{25}$, 55(%)
	B1
	 B1
	
	 B1
		
		 Accept equivalent. F.T. their values.

2. (d) 40×10 OR $42\cdot2 \times 10$ OR 40×11 OR
     42×11 OR 42×10
      400, 422, 440, 462, 420
	M1
	
	 A1
		
		 F.T their estimates for simple calculations
		 SC1 for unsupported 400 only
		 Penalise extra working (towards actual answer) M0A0

3. (£)9.35 + (£)8.85 = (£)18.2(0)
   Sam and Nick pay (£) 21.8(0)
 	
   Nick pays ((£) 21.8(0) – £1.50)/2 =
                     (£)10.15
 Look for (in the most part)
 	
 Strand 1: For 1 mark
 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 explanations and working in a way that is clear and logical
 • write a conclusion that draws together their results and explains what their answer means
 	
 Strand 2: For 1 mark
 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
	✓
	 B1
	 B1
	
	 M1
	 A1
	 QWC 2
		OR B1 for (40 – 9.35) = (£) 30.65
		 F.T. £40 – 'their £18.2(0)' OR F.T. 'their (£)30.65' – (£)8.85 evaluated correctly.
		 Any correct method. F.T. 'their £21.8(0)'
		
		 Nick pays (£)21.80/2 + (£)1.50/2 gets M1
		
		 QWC2 Presents relevant material in a coherent and logical manner, using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar.
		
		 QWC1 Presents relevant material in a coherent and logical manner but with some errors in use of mathematical form, spelling, punctuation or grammar
		 OR
		 evident weaknesses in organisation of material but using acceptable mathematical form, with few if any errors in spelling, punctuation and grammar.
		
		 QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar

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4. (a) C B A ├──┼───┼─────────┤ 0 1	B1 B1 B1	A should be at 1. B should be at the middle. C should be between 0 (exclusive) and 0.25 (exclusive). English: The ¼ mark is to the left of the 't' in '..**t**he result..' Welsh: The ¼ mark is to the left of the 'i' in ...ma**i** Letters must be seen on scale (i.e. not probabilities) **Accept 5 for A, 2 for B and 3 for C**	
4. (b) likely	B1		
5. (a) 3c	B1		
5. (b) ($T =$) 7	B2	B1 for either (21 AND −12) OR −2 B0 for 21A, (−)12B and/or (−)2C	
5. (c) y is 4 times x OR 'y = 4 times x' OR y = 4x OR x is 1/4 times y OR 'x = 1/4 times y OR x = y/4 OR 'x = ¼ of y OR (x,4x) OR (¼y,y)	B2	B1 for ×4 OR 'times 4' **OR y=×4** OR B1 for ÷4 OR 'divide by 4'	
5. (d) (x =) 6	B1	Accept embedded answers, e.g. 10 − 6 = 4	
5. (e) 21	B1		
6. A(5, −5), B (−2, 4) and C(−4, −3) plotted.	B3	B1 for each. Reversed coordinates get B0 every time. Letters A,B,C not needed as long as the point is identified.	

7. (Hours worked =) 6×75 OR $6 \times 1¼$
         = 450 (mins) OR = 7½ (hours)
         OR 7 hours 30 minutes
         OR 6 hours 90 minutes
         OR 7:30
 (Charge =) (£)40 × 7½ + (£)87
 	
 = (£) 387
 	
 Alternative Method
 (Cost of 1 machine =)(40 × (£)1.25) = 50
 (Cost of 6 machines =) (50 × 6) = (£) 300
 (Total cost =) (£) 300 + (£) 87
 (£) 387
	✓
	 M1
	 A1
	
	 M1
	
	 A1
	
	 M1
	 A1
	 M1
	 A1
		Allow M1 for 6 × 1.15
		 OR 6.90 OR 7.3(0)
		 Hours not required at this stage.
		
		 M1 for
		 40×7.3(0) + (£)87 OR
		 40×7hrs 30 mins + (£)87
		
		 FT 'their derived 7½'.
		 Hours required. Must be some conversion attempt.
		 M0 for use of 'their 450/100.
		 If no marks, SC1 for (£)137. (1¼×40 + 87)
			• 7hrs 30mins' with no method shown gets M1A1.
			 • '7 hours 30' with no method shown gets M1,A1
			 • 1hour 15mins x 6 gets M1, but A0 unless answer is 7½ or equivalent.
			
			 •1hr 15mins x 6 = 7 hours M1A0 then
			 40 x 7 + 87 = £367 M1,A0
			 (The whole number, 7, is over simplifying)

8. (a) (i) 10:00	B1	Accept 10.00 OR 10 (a.m.) (Decimal point is acceptable in a specific time)	
8. (a) (ii) 00:30	B1	Accept (0)0.30 OR 12:30 am	

8. (b) 16:59 − 04:32
       = 12 hours 27 minutes
       OR 12:27
	M1
	 A1
		M1, A0 for 12.27
		 (Decimal point is NOT acceptable in a time interval)	

8. (c) 09:39 − 03:07
       = 6 hours 32 minutes
       OR (0)6:32
	M1
	 A1
		M1, A0 for (0)6.32	

8. (d) (0)9:21 (on 11th March)	B1	Accept (0)9.21	
8. (e) 10.43 − 5.78 = 4.65 (m)	M1 A1	SC1 for 4.45 (m) (10.43 − 5.98)	

Summer 2016 Linear Paper 1 (Non calculator) Foundation Tier	Marks	Comments

9.   S (OR triangular prism)
    T (OR hexagon)
    Q (OR cone)
    P (OR cuboid)
	B3	All correct
		B2 for any 3 correct
		B1 for any 2 correct.

10. (a) Missing inside segments = **2 or 3 (and 6)**
    Perimeter = 6+3+3+2+6+3+6+3+8
    If the sum of their figures is 40 then M1
 	
                = 40 (cm)
	S1
	M1
	
	A1
		One of 2 or 3 in correct place gets S1
		Attempt to add ALL sides of the shape
		FT 'their 2' for possible M1
		The M1, A0 can be implied by their answer.
		If the 2 is not shown on diagram but is in the sum of sides for the perimeter then award S1 here.
		C.A.O.

10. (b) Area = 6×3+2×3+9×3
    OR 3×3 + 3×8 + 6×3 OR 4×3×3 + 3×5
             = 51
    If the sum of their areas is 51 then M1
             cm²
	M1
	
	A1
	
	U1
		Attempt to add a correct set of areas of the shape
		(You may need to scroll up to see the diagram)
		F.T. if missing sides (even incorrect) are clearly indicated
		Independent of all other marks.

11. Parts (a) and (b) marked together
   With diagram
   (a) (x =) 180 – 53
      (x =) = 127(°)
	
	M1
	A1
		Look at diagram **also**, but written work takes precedence.
		For any correct method that finds x

(b)(y =) 180 – 53 – 48 | OR (y =) 127(°) – 48 = 79(°)	M1 A1	For any correct method that finds y F.T. 'their 127(°)' provided M1 awarded in part (a).
12. (a) 50 (miles)	B1	
12. (b) (Before stopping,) slope is steeper OR after stopping slope is less steep **'The steeper the line the faster the speed'.**	B1	Do not accept 'More miles in less time'.

12. Parts (c) and (d) marked together
  (c) Line starting at (13:00,120) passing through
     (14:00,90) and intersecting John's journey.
	B2	B1 for a line starting at (13:00, 120) going to at least the point (14:00, 90).
		OR for line starting at (12:00,120) ending at least through (13:00,90)
		Award SC1 for a line starting at (13:00, 0) going to at least the point (14:00, 30).

12. (d) 18 ± 3 (mins)	B1	FT their line from Cardigan starting at **(13:00,120)** provided the lines cross after John has left the cafe.

13. (a) 7·0 (cm)
      7·0 × 15
        = 105 (km)
	B1
	M1
	A1
		Allow 6·8 – 7·2
		FT 'their 7·0'× 15
		Unsupported answers in the range 102−108 get 3 marks

13. (b) 024(°)	B1	Allow ± 2°.
14. 105(°) **H1**	B3	Allow even if contradicted on the diagram B2 for sight of 75(°) (including as a final response or incorrectly placed on the diagram) B2 for sight of 105(°) in working not as an answer or contradicted as a final response in the answer space B2 for working: 38 + 67 or 180 – 75, or the intention of either calculation, allowing missing brackets 180 – (180 – 38 - 67) (= 38 + 67) or 180 – (180 – 38 – (180 – 113) (= 180 – 75), or OR B1 for any further unambiguous correct angle indicated on the diagram: 113(°), 67(°), 38(°) or 142(°), or B1 for working: 180 – 38 – 67 or 113 – 38 or 180 – 38 –(180 -113), or equivalent

Summer 2016 Linear Paper 1 (Non calculator) Foundation Tier	Marks	Comments
15. 400×7÷10 or 400 - 400×3÷10 or equivalent 280(cm)	M1 A1	May be implied in further calculation *Incorrect working leading to 280 is M0 A0, e.g.* *3/10 × 400 + 2/5 × 400 = 120 + 160 = 280*
280 ×⅗ or 280 – 280×2÷5 or 280 – 112 168(cm)	M1 A1	FT 'their 280' provided < 400 May be implied in further calculation
56 (cm)	B1	FT 'their 168' ÷ 3 correctly evaluated (rounded or truncated) provided **either** at least M1 previously awarded **or** 'their two stages of calculations' previously attempted (However if 3/10 & 2/5 used throughout SC marks may be awarded instead of possible B1 if a higher mark can be awarded) *For consistent use of 3/10 and 2/5 award:* *SC3 for an answer of 16(cm from 400 × 3/10 × 2/5 ÷3), or* *SC2 for workings equivalent to 400 × 3/10 × 2/5 ÷3 (may be in stages), or* *SC1 for an answer of 48(cm from 400 × 3/10 × 2/5)*
16. (a) Descriptions of no correlation, e.g. 'no relationship', 'no correlation', 'none', 'no connection'	B1	Do not accept '(all) scattered (about)', or 'random', or 'neutral', 'no pattern' Allow if a correct response is given with one of the phrases listed above. Do not allow a correct response with an incorrect response, e.g. 'none but slightly positive'
16.(b) | Name	Height (cm)	Mark
Dewi	145	80
Charlotte	163	80
Henri	176	92
Gareth	145	34		B3	All entries correct **Accept mark entries as a fraction of 100, or written as a percentage** B2 for any 5, 6 or 7 entries correct, or if the correct entries in the table but they are in reversed columns, OR B1 for any 3 or 4 entries correct, or for any 5, 6 or 7 reversed entries in the table

Summer 2016 Linear Paper 1 (Non calculator) Foundation Tier	Marks	Comments
17. (% of daily calories 25% of 1920 =) 480 (calories)	✓ B1	
(Number of bags needed) 480÷160	M1	FT 'their 480' provided attempt at 1920×25÷100 or 1920÷4 or equivalent is seen or implied
(=) 3	A1	May be implied in later working
(Number of almonds eaten 3 × 20) ×20	m1	
60 (almonds)	A1	FT 'their 3'×20 evaluated provided attempt to find 25% of 1920 and M1, m1 previously awarded
		Alternatives
		(% of daily calories 25% of 1920 =) 480 (calories) ***B1***
		160÷20 ***M1***
		= 8 (calories per almond) ***A1***
		(May be implied in later working)
		(Number of almonds) 480÷8 ***m1***
		(FT 'their 25% of 1920'÷ 'their 160÷20')
		60 (almonds) ***A1***
		(FT provided attempt to find 25% of 1920 and M1, m1 previously awarded)
		or
		(Number of bags in a full daily allowance is)
		1920÷160 ***M1***
		= 12 (bags) ***A1***
		(May be implied in later working)
		(Number of bags 25% of allowance is ¼×12=) 3 (bags) ***B1***
		(FT 'their ¼ × 1920÷160 provided M1 previously awarded)
		(Number of almonds eaten) 3 × 20 ***m1***
		(FT 'their ¼ × 1920÷160'×20 provided M1 previously awarded)
		(Previous B1 & m1 calculations may be seen in either order)
		*60 (almonds) **A1***
		(FT provided attempt to find 25% of 1920÷160 and M1, m1 previously awarded)
		or
		20 (almonds) with 160 (calories) used as a ratio ***M1***
		e.g. sight of 40 almonds is 320 calories or similar
		Use of ratio or multiples that lead to 1920 (calories) ***m1***
		240 (almonds is 1920 calories) ***A1***
		(Number of almonds is) ¼ × 240 ***M1***
		(FT provided M1, m1 previously awarded)
		60 (almonds) ***A1***
		(FT provided M1, m1 previously awarded AND attempt to find the number of almonds in 1920 calories)
		If no marks, and no incorrect logic seen, then award SC2 for an answer of 60 almonds
H7		

Summer 2016 Linear Paper 1 (Non calculator) Foundation Tier	Marks	Comments
18.(a) $5x - 3x = 65 - 17$ $\qquad 2x = 48$ $\qquad\quad x = 24$ **H8a**	B1 B1 B1	FT until 2nd error, then stop marking Must be simplified if possible for this final B1 mark
18(b) $\quad x/4 = 28 - 12$ or $x/4 = 16$ or $x + 12 \times 4 = 28 \times 4$ $\qquad\qquad\qquad x = 64$ **H8b**	M1 A1	Mark final answer *Accept embedded answer, e.g. 64/4 + 12 = 28*
18(c) $\quad y^2 + 8y$ **H8c**	B2	$y \times y$ must be written as y^2 & $8 \times y$ as 8y for B2 B1 for $y \times y + 8 \times y$, or B1 for 1 correct term, e.g. $2y + \mathbf{8y} = 10y$ or $y + \mathbf{8y} = 9y$ BUT do not accept from incorrect working, e.g. B0 for '$y + 8 = 8y$' Mark final answer, e.g. B1 only for '$y^2 + 8y = 8y^3$'
18.(d) $\quad 10x < 34$ or $10x < 42 - 8$ $\quad x < 34/10$ or $x < 3.4$ or $x < 3^4/_{10}$ or $x < 3^2/_5$ or equivalent **H8e**	B1 B1	Do not accept '=' FT from 1 error only. ISW *If '=' used but replaced by '<' to give final correct answer, allow B2* *Note: $10x < 42 + 8$ must lead to $x < 5$ to be awarded B0,B1*