GCSE MARKING SCHEME

SUMMER 2016

GCSE MATHEMATICS - LINEAR PAPER 2
FOUNDATION TIER

4370/04

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.

GCSE Mathematics - Linear Paper 2 Foundation Tier
Summer 2016 Mark Scheme

2016 Summer Linear Paper 2 (Calculator allowed) Foundation Tier	**Marks**	**Comments**
1. (a) (102.50) (chippings) 614.56 (paving stones) 319.92 (sand) 49.8(0) (cement) 1086.78**(0)**	 B1 B1 B1 B1	 F.T.
1. (b) 86 × (£)18.75 = (£) 1612.5(0) Leaving (£) 387.5(0)	M1 A1 B1	Any correct method for finding the 1612.5 F.T. 2000 – 'their 1612.5'. B1 for £387.5(0)p but B0 for 387.5(0)p
2. Weight of plate 650kg (650g) 650mg 65g Volume of bucket (5 litres) 500 cm^3 50 ml 5 cl Width of a door 80 km 80 m 80 mm (80 cm) Area bedroom (9 m^2) 900 cm^2 90 mm^2 900 cm^3	B1 B1 B1 B1	
All parts (a) – (c) marked at the same time 3. (a) Red 9, Black 11, Green 6, Yellow 14,	B2	May be inferred from their bar chart. B1 for any two/three correct frequencies If frequencies score 0, then give B1 for all 4 correct tallies
3. (b) Y(ellow)	B1	Accept 14 and Yellow, but B0 for 14 only. Y=14 gets B1. **F.T. their frequencies from part (a)**
3. (c) Both axes labelled, e.g. frequency along one axis and R(ed), B(lack), Y(ellow), G(reen) along other axis. Anywhere within the base (inc.) of the corres. bar. and uniform scale for the frequency axis starting at 0 and labelled 'frequency' OR 'number'. Four bars at correct heights (bars must be of equal width) **and any gaps must be equal.**	✓ B2 B2	B1 if no scale, but allow one square to represent 1 OR B1 if not labelled as 'frequency' or similar. If frequency scale starts with 1 at the top of the first square the starting at 0 will be implied for this axis. 0 may be implied by the other numbers in their scale. F.T. their frequencies throughout. B1 for any 2 or 3 correct bars on F.T. If no frequencies given in their working, penalise -1 for each incorrect frequency on their bars up to -4 (First and third B2s)
4. (a) **(Viewed with diagram)** Evidence of square counting 74 – 81 inclusive 370 – 405 inclusive (m^2)	 M1 A1 B1	 F.T. 'their 74 – 81' × 5 Unsupported answer in the range 370 – 405 get 3 marks.
4. (b) **(Viewed with diagram)** Lines Arc	 B1 B1	 For all 3 lines. F.T. the ends of their lines, must have opposite curvature.
5. (a) D and H	B1	
5. (b) (i) 12.1 (cm) to 12.5 (cm) inclusive	B1	
5. (b) (ii) Perpendicular through C	B1	**English:** Line should be from just to the left of the 't' in 'the line' to left of AB. **Welsh:** Left of 'n' in 'llinell' to the full stop. B0 if perpendicular AND parallel lines drawn

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6. (a) (i) Subtract 7 from previous term	B1	Accept –7, down 7, **take away 7** But B0 for take 7. **B0 for n − 7**
6. (a) (ii) Divide the previous term by 3	B1	Accept ÷3 OR **(×)**⅓ **B0 for n/3**
6. (b) (i) 7*m* (bottles)	B1	Accept 7×m, m×7, m7 Accept m = 7m etc
6. (b) (ii) $x = y/3$ OR $y/3 = x$ OR $y \div 3 = x$	B2	For **an** expression connecting x with y with x as the subject. B1 for $y=3x$
7. (a) 3/100 × (£)14000 = (£)420(.00) ISW	M1 A1	SC1 if only (£)14420 given.
7. (b) $\frac{4}{5} \times 65$ = 52	M1 A1	Ignore any units given e.g. £52 gets M1, A1
8. (Side) = 8 (cm) (Perimeter) = 32 (cm)	M1 A1	SC1 for $4 \times \sqrt{64}$ OR 8×8 (=64) **M0,A0** for Perimeter = $\sqrt{64}$ =8 Watch for 64÷2 = 32 which gets M0,A0
9. 3 or 4 angles correct and four correctly labelled. 3 or 4 angles correct, labels not fully correct. 2 angles correct and correctly labelled. 2 angles correct, labels not fully correct. 1 angle correct and correctly labelled. OR If 0 OR 1 for their diagram or no diagram, 360/90 Angles are 160°, 100°, 64° and 36°.	 B4 B3 B3 B2 B1 M1 A1	**Use the angle measurer tool. Allow + 2°.** Correct labels (Letter/word NOT the frequency OR angle). Accept labels in the form of a key. If B0 scored for the diagram, check the angles and the method to see if the M1 and the A1 can be awarded. 1 is 4° gets the M1. If only B1 is scored for the diagram, and all the angles given correctly, then cancel the B1 and award M1, A1 for 2 marks. OR SC1 for all percentages: 44·4, 27·8, 17·8, 10 OR rounded OR truncated.
All parts (a) to (d) marked together 10. (a) 29 31 34 37 42 46 55 62 Median = 39.5 (years)	M1 A1	For identifying the correct TWO middle numbers OR for arranging the 8 numbers in ascending or descending order. C.A.O. Unsupported 39.5 gets M1, A1.
10. (b) 33 (years)	B1	
10. (c) Sum of the amounts (336) Sum/8 42 (years)	M1 **m1** A1	For adding numbers that would give a total in the range 270 – 400 For dividing **their sum** in the range 270 – 400 by 8. C.A.O.
10. (d) (Mean was) 38 (years) (Range was the same) 33 (years)	B1 B1	F.T. 'their mean' from part (c)' – 4. F.T. 'their range' from part (b)'
11. (a) 2x + 7y	B2	B1 for 2x OR 7y Must be 2x + 7y for B2. **Mark final answer.**
11. (b) (11 – 3) = 8 (8 × 4) = 32	B1 B1	Accept embedded (unsupported) answers like 32/4 = 8, 8 + 3 = 11
11. (c) Subtracting or difference gives 2 oranges cost 60 (p) 1 orange costs 30 (p)	 M1 A1	**For a correct method that leads to oranges only on one side and money on the other.** M1, A1 for £(0).30(p) but M1, A0 for (0).30p Ignore cost of lemon Accept embedded answers like 0.80+0.30+0.30 = (£)1.40 **Unsupported 30(p) gets M1,A1.**

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12. (a) 28/100 × (£)42 = (£)11.76 ISW	M1 A1	C.A.O. Ignore subsequent work, e.g. £42 – £11.76 = £30.24. But M1, A0 for 11.76%.
12. (b) 6 loaves cost = 6 × (£)1.24 = (£)7.44 **AND** 14 baguettes cost = £16.54 – £7.44 = (£)9.1(0) One baguette costs 910/14 65p OR 65 OR £(0).65(p) **OR .65**	✓ M1 A1 m1 A1	For the complete method that leads to the total cost of the baguettes. C.A.O. Dependent on the M1. (Cannot be awarded if M0). F.T. their "£9.10", but £16.54/14 gets m0. (0).65p OR £65 get A0. If F.T. leads to fractional pence, allow A1 for any correct answer, rounded or truncated.
12. (c) 30/50, 18/50, 21/50 2/5 = 20/50 OR 60/100, 36/100, 42/100 2/5 = 40/100 **(Differences =** 10/50, 2/50, 1/50) (OR 20/100, 4/100, 2/100) Nearest is 21/50 (OR 42/100)	B1 M1 A1	Common denominator with at least 2 correct equivalents **Accept percentages and/or decimals throughout** All 4 fractions given correctly with a common denominator
13. **Both parts (a) & (b) marked together** (a) **Overlay** Plots **(within ½ small square)** Line 13. (b) 11 (radians)	 P1 L1 B1	 **P0 for Line Segments** A valid attempt at drawing a line/curve through the points Answers in the range 10.5 – 11.5 inclusive. Outside this range gets B0 unless justified by their line/curve.
14. Units used = 1353 Cost per unit × 19.3 Cost of electricity = (£)261.12(9) OR (£)261.13 (Cost inc.VAT) = 1.05 × (£) 261.12(9) OR VAT = 5/100 × (£) 261.12(9) (=(£)13.05(645)) + 261.12(9) Total = £274.18 OR £274.19 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, particularly £ and p , etc.	✓ B1 M1 A1 M1 A1 QWC 2	For the correct difference of meter readings 'Their units' × 19.3 OR for 154052.6 – 127939.7 in pence or in £. ADDITION of the 2 meter readings **(281992.3)** can possibly get B0, M1, A0, then F.T. for VAT. **C.A.O.** but accept 26112.9 (p) OR 26113 (p) **DIVISION of the units by 19.3 gets M0, A0, then F.T.** F.T. 5% of 'their (£) 261.12(9)' AND add 'their 261.12' **Must be to2 d.p. and £.** 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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15.(a) 3.1	B2	B1 for evidence of 228÷74 or 3.08(1…) or 3 or 3.10
15.(b) 125 (kg) and 137 (kg)	B2	B1 for 125.4 and 136.8, or 125 or 137
16.(a) 870 (hundredweight)	B1	
16.(b) (USA 28 tons) 28×20×100 (= 56 000 pounds) OR (UK 26 tons) 26×20×112 (= 58 240 pounds) OR (for sight of) 26×112 - 28×100 = 112 (Difference in pounds 20×112 or 58240–56000=) 2240 (Percentage difference, compared with USA) (100 ×) 2240/56000 or (100 ×) 58240/56000 - 1 (× 100) or equivalent 4(%)	✓ M1 A1 M1 A1	*Appropriate working leading to 112 must be seen, e.g. 2912 – 2800 = 112, not for sight of the '112' given in the question* CAO. Must be seen (Note: 58240 ÷ 56000 - 1 =1.04 – 1 = 0.04) FT their difference '58240-56000' correctly evaluated provided at least M1 previously awarded Allow M1 for (100 ×) 112/2800 (also FT for A1) CAO, including FT from 100 × 112/2800 = 4(%) Award M1, A0, M1, A1 for an unsupported 4% (not from 3.9 rounded to 4, the later marks are M0, A0) ***Note to markers: Watch for answers that round to 4% from incorrect working, probably from a denominator of 58240, award finally M0, A0***
17.(a) 100	B1	Do not accept 30 + 70 as a final answer
17.(b) Bryn, with a reason, e.g. 'Bryn has cut more (branches with diameters) between 30mm and 40mm', 'Bryn because he cut 40 of the thicker branches', 'Bryn because Luke only cut 20 of the thicker branches', 'Bryn because he cut 40 between 30mm and 40mm', 'Bryn because he cut 40, Luke only cut 20 (of the branches with diameter 30mm to 40mm)'	E1	Allow 'Bryn because more at 40(mm)', or 'Bryn because more at 30(mm), 'Bryn because more at 35(mm)', Bryn with a taller bar at the end of the graph'
17.(c) Sight of mid points 5, 15, 25, 35 (Total number of branches is) 150 10×5 + 30×15 + 70×25 + 40×35 (=50+450+1750+1400 =3650) ÷150 24(.333…. mm)	✓ B1 B1 M1 m1 A1	Stated or implied. Accept embedded within incorrect working e.g. 150/4, or sight of 37.5 FT provided their mid points are within or at the bounds of the intervals *(all upper bounds used gives 4400÷150, all lower bounds used gives 2900÷150)* Intention to divide their Σfx by 'their 150' provided 'their 150' ≠4 ('their 150' from attempt 10+30+70+40, i.e. similar order) CAO *Luke selected, MR-1 then:* *Mid points 5, 15, 25, 35* *B1* *Total number of branches 150* *B1* *5×30 + 15×30 + 25×70 + 35×20* *M1* *÷ 150* *m1* *20(.33… mm)* *A1* *With appropriate FT*
17. (d) Explanation that there is a need to find which group contains the 75(.5)th branch, they must mention or imply looking at the 75(.5)th branch OR Explanation such as 'less than half of the branches had diameters less than 20mm and less than half had diameters greater than 30mm, (so the median is between 20mm and 30mm)', 'there is equal area either side of 25mm'	E1	FT half 'their 150' (+0.5) provided this lies in the group 20mm to 30mm Allow '75(.5th) branch (is in the group 20mm to 30mm)', '75(.5th) value', '75(.5th) reading', '75 is halfway' Do not allow '75' without text Do not accept 'more branches are cut between 20mm and 30mm', or definition of the median without reference to the frequency diagram, or an answer of 25mm without relevant explanation or reason

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	✓	
18. (2010: £3400 to BRL) 2.86 × 3400 9724 (BRL)	M1 A1	May be implied in later working
(2014: 9724 BRL to) 9724 ÷ 3.71 (£)2621(.024..)	M1 A1	FT 'their derived 9724', provided ≠ 3400
(Ava makes a loss) Loss AND (£)779	A1	FT 3400 - 'their 2621(.024)' rounded to the nearest pound provided both M marks awarded A0 for sight of (£)778.98 or (£)778(.9…), or for (£)779 without indication of loss.
		Alternative: *(2010: £3400 to BRL) 2.86 × 3400* *M1* *9724 (BRL)* *A1* *(May be implied in later working)* *(2014: £3400 to BRL 3.71 × 3400 = 12614 BRL)* *(**AND** Difference in BRL 12614 – 9724 =) **2890 (BRL)** A1* *(FT 12614 - 'their derived 9724')* *(Difference in £ is) 2890 ÷ 3.71 (= 778.975…)* *M1* *(FT 'their 2890')* *(£)779 AND Loss* *A1* *OR* *(Difference in exchange rates) 3.71 – 2.86 (= 0.85) M1* *(Difference in BRL) 0.85 × 3400* *M1* *(FT 'their 3.71 – 2.86')* *2890 (BRL) A1 CAO* *(Difference in £ is) 2890 ÷ 3.71 (= 778.975…) M1* *(FT 'their 2890')* *(£)779 AND Loss A1* *If no marks award SC1 for interpretation GAIN **and** 1010 (from 3400 ÷ 2.86 × 3.71)*
19. π × d = 10 or 2 × π × r = 10 or sight of (maximum diameter) 3.18(…m)	B1	OR a correctly evaluated trial for 1 of these values of d giving C **approximately** as given below: d: 0.9 | 1.8 | 2.7 | 3.6 | 4.5 C: 2.83 | 5.65 | 8.48 | 11.31 | 14.14
Diameter (of the pond is 3×0.9 =) 2.7 (Left over edging) 10 - π × 2.7 Answer 1.51 or 1.52 (metres)	B1 M1 A1	CAO. Must be 2 d.p., an answer not rounded to 2 d.p. implies previous marks, but is A0