



**General Certificate of Secondary Education
June 2012**

**Mathematics (Linear) B
Paper 2
Foundation Tier**

4365

Final

Mark Scheme

Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation meeting attended by all examiners and is the scheme which was used by them in this examination. The standardisation meeting ensures that the mark scheme covers the students' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for the standardisation meeting each examiner analyses a number of students' scripts: alternative answers not already covered by the mark scheme are discussed at the meeting and legislated for. If, after this meeting, examiners encounter unusual answers which have not been discussed at the meeting they are required to refer these to the Principal Examiner.

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Glossary for Mark Schemes

GCSE examinations are marked in such a way as to award positive achievement wherever possible. Thus, for GCSE Mathematics papers, marks are awarded under various categories.

- M** Method marks are awarded for a correct method which could lead to a correct answer.
- M dep** A method mark which is dependent on a previous method mark being awarded.
- A** Accuracy marks are awarded when following on from a correct method. It is not necessary to always see the method. This can be implied.
- B** Marks awarded independent of method.
- B dep** A mark that can only be awarded if a previous independent mark has been awarded.
- Q** This mark is for quality of written communication. Further details of how to apply it will be in the mark scheme.
- ft** Follow through marks. Marks awarded following a mistake in an earlier step.
- SC** Special case. Marks awarded within the scheme for a common misinterpretation which has some mathematical worth.
- oe** Or equivalent. Accept answers that are equivalent.
eg, accept 0.5 as well as $\frac{1}{2}$
- [a, b]** Accept values between a and b inclusive.

Q	Answer	Mark	Comments
1(a)	4	B1	
1(b)	5 (+) 3.5 (+) 6 (+) 1.5 or 16 seen or one of $3.5 \times (a)$, $6 \times (a)$ or $1.5 \times (a)$ or any number \times their (a)	M1	oe
	their $16 \times$ their 4 or $20 +$ their $11 \times$ their 4 or (their) $20 +$ their $14 +$ their $24 +$ their 6	M1dep	oe
	64	A1 ft	Unless key = 1 ft their key \times 16 or ft $20 +$ their key \times 11
2(a)	$12 + 9.99 + 9.99$	M1	oe
	31.98	A1	
2(b)	$12 + 14.5(0)$ or $26.5(0)$ or $50 - 12$ or 38 or $50 - 14.5(0)$ or $35.5(0)$	M1	
	$50 - (12 + 14.5(0))$ or $50 -$ their $26.5(0)$ or their $38 - 14.5(0)$ or their $35.5(0) - 12$	M1dep	oe
	23.50	A1	23.5 implies M1M1A0

Q	Answer	Mark	Comments	
2(c)	$9.70 + \frac{9.70}{2}$ or $9.70 + 4.85$ oe or 9.7×1.5	M1	$14.50 - 9.70$ (= 4.80) and $9.70 \div 2$ (4.85)	$9.70 \div 2$ (= 4.85) and $14.50 - \text{their } 4.85$ (= 9.65)
	14.55 and no oe	A1	4.80 and 4.85 and No	(4.85 and) 9.65 and No
3	Likely	B1		
	Impossible	B1		
	Unlikely	B1		
4	3, 3, 4, 4, 2	B3	B2 for two criteria met eg 3, 3, 3, 4, 4 B1 for one criteria met eg 3, 3, 4, 4, 4	
5	7488	B1		
6(a)	50 (%)	B1		
6(b)	$\frac{1}{4}$	B2	B1 $\frac{4}{16}$ oe B1 wrong fraction correctly simplified	
6(c)	Shade the equivalent of 2 squares	B1		
7(a)	$285 \div 95$	M1	oe eg $95 + 95 + 95 = 285$	
	3	A1		
7(b)	£2, 50p, 10p, 10p, 10p, 5p	B1	If no B marks are awarded, SC1 for any number of coins with a total of £2.85 which may include £1 coin	
	£2, 50p, 20p, 5p, 5p, 5p	B1		
	£2, 20p, 20p, 20p, 20p, 5p	B1		

Q	Answer	Mark	Comments
8	1.5 (cm) or 6 (cm) seen or scale factor = 4 (can be indicated on diagram)	B1	Accept [1.4, 1.6] Accept [5.9, 6.1] Accept [3.6, 4.4]
	$2 \times$ their 6 \div their 1.5 oe or $2 \times$ their [3.6, 4.4]	M1	
	8	A1	Accept [7.2, 8.8]
9(a)	240	B1	
9(b)	70×3	M1	
	210	A1	
	30	B1ft	ft their 240 – their 210 provided gives +ve answer
9(c)	$\frac{80}{100} \times 90$ or 72 (from M) or $\frac{20}{100} \times 90$ or 18 (from B) or 80(%) – 50(%) or 50(%) – 20(%) or 30 %	M1	oe
	$90 \div 2$ or 45 seen or their 30% of 90	M1	oe
	their 45 – their 18 or their 72 – their 45 or $\frac{30}{100} \times 90$	M1dep	oe Dep on one M awarded
	27	A1	
10(a)	46.9148(1642...)	B1	
10(b)	50	B1ft	ft their (a) to the nearest 10

Q	Answer	Mark	Comments
11(a)	A and C in any order	B2	B1 for 1 correct (and 1 incorrect)
11(b)	C	B1	
11(c)		B1	
12(a)	132	B1	
12(b)	360 – (142 + 115)	M1	oe
	103	A1	
13	100 grams	B1	
	2 litres	B1	
	5 metres	B1	
14(a)	6	B1	
14(b)	60	B1	
14(c)	(2y =) 12 + 5 or 17	M1	
	$\frac{17}{2}$ or $8\frac{1}{2}$ or 8.5	A1	
15(a)	5 × 6.2	M1	
	31	A1	

Q	Answer	Mark	Comments
15(b)	$x + 3x + 5x + 5x$ or $14x$	M1	$7 (+) 3 \times 7 (+) 5 \times 7 (+) 5 \times 7$ oe
	their 14×7	M1dep	oe $7 + 3 \times 7 + 5 \times 7 + 5 \times 7$ or $7 + 21 + 35 + 35$
	98	A1	
16(a)	9	B1	
16(b)	7.4	B1	
16(c)	2.6	B1	
16(d)	Footballers slower or athletes faster	B1ft	Strict follow through from their (b) and (c)
	Footballers less consistent or athletes more consistent	B1ft	Strict follow through from their (b) and (c)
17	$7.2 + 6$ or 13.2	M1	$4x - 6 = 7.2$
	their $13.2 \div 4$	M1dep	$4x = 7.2 + 6$ or $x - \frac{6}{4} = \frac{7.2}{4}$
	3.3	A1	SC2 for 52.8 or 0.3 or 8.7 SC1 for 4.8
18	Lists at least 4 different combinations or $\frac{1}{2}$ or $\frac{1}{4}$ seen	M1	1A, 1B, 1C, 1D, 2A, 2B, 2C, 2D
	Lists all 8 combinations or 2×4 or 8 seen or $\frac{1}{2} \times \frac{1}{4}$	M1dep	Seen or implied eg 8 lines drawn from numbers to letters on diagram eg $1 \rightarrow A$, $1 \rightarrow B$ etc
	$\frac{1}{8}$	A1	oe

Q	Answer	Mark	Comments
19	$169 \div 65$	M1	65×2.5 or $65 \times \text{their } 2.5$ or $169 \div 2.5$
	2.6 or 2 hours 36 (minutes)	A1	162.5 or 6.5 miles to go or 67.6 (mph)
	2h 30 or 2.5 h or 150 (minutes) or 9.06 or 9.1 (not 9.10) or 6.24 or 6.4	B1	2.5h
	No	A1	
20(a)	10×78 or 780 or $78 \div 3$ or 26	M1	or 10×44 or 440
	$10 \times 78 \div 3$ or 260 or $78 \div 3 \times 2$	M1	
	520 or 52	A1	
	0.15×600 or $15 \times 600 (\div 100)$ or $\frac{600 \times 0.15}{10}$ or $\frac{600 \times 15}{10}$ or 900	M1	
	53 or 530	A1	
	520 and 530 and Hire Deal or 52 and 53 and Hire Deal	A1ft	from 3 method marks awarded and consistent answers
20(b)	$15 (\times) (3 \times 13 + 8)$ or 15×47	M1	$15 \times 3 \times 13 + 15 \times 8$ or $15 \times 39 + 15 \times 8$ $45 \times 13 + 15 \times 8$ or $585 + 120$ oe
	(£) 705	A1	

Q	Answer	Mark	Comments	
21(a)	147	B1	May be seen on diagram	
	Corresponding	Q1	oe eg (y is) alternate and x is opposite Check part (b) Strand (i)	
21(b)	147	B1 ft	May be seen on diagram ft their (a)	
	Alternate or (vertically) opposite	Q1	oe eg x is corresponding and y is opposite Strand (i)	
22	380 + 400 + 420 or 1200 seen		M1	
	28 + 32 + 36 or 96 seen		M1	352 + 368 + 384 or 1104 seen
	$\frac{7}{100} \times 1200$	$\frac{96}{1200} \times 100 (\%)$	M1	$\frac{93}{100} \times 1200$ $\frac{1104}{1200} \times 100(\%)$
	84	8 (%)	A1	1116 92 (%)
	84 < 96	8(%) > 7 (%)	Q1 ft	1104 < 1116 92 (%) (< 93 (%))
	and No			and No
		Strand (iii) for calculating 93%, 7% of total number of pupils and correct comparison with total number of present, absent; or working out $\frac{\text{total present / absent}}{\text{total of whole school}} \times 100(\%)$ and correct comparison with total of school		

Q	Answer	Mark	Comments	
This Alt mark scheme has been provided even though it is only correct for the numbers in the question. Change of numbers may render it incorrect.				
Alt 22	380 – 28 or 352 or 400 – 32 or 368 or 420 – 36 or 384	M1	100(%) – 93(%) or 7(%)	
	$\frac{\text{their } 352}{380} \times 100(\%)$ or $\frac{\text{their } 368}{400} \times 100(\%)$ or $\frac{\text{their } 384}{420} \times 100(\%)$	$\frac{93}{100} \times 380$ or $\frac{93}{100} \times 400$ or $\frac{93}{100} \times 420$	M1	$\frac{28}{380} \times 100(\%)$ or $\frac{32}{400} \times 100(\%)$ or $\frac{36}{420} \times 100(\%)$
	92.6(...)(%) or 92(%) or 91.4(...)(%)	353.4 or 372 or 390.6	A1	7.3(...)(%) or 7.4(%) or 8(%) or 8.5(...)(%) or 8.6(%)
	92.6(...) (%) and 92 (%) and 91.4(...) (%)	353.4 and 372 and 390.6	A1	7.3(...)(%) or 7.4(%) and 8(%) and 8.5(...)(%) or 8.6(%)
	All numbers are below 93(%) and no	353.4 > 352 and 372 > 368 and 390.6 > 384 and no	Q1ft	All numbers are above 7(%) and no

Q	Answer	Mark	Comments
23	Correct trial such that $\text{root} < \text{trial} \leq 5$	M1	eg $4^3 - 3 \times 4 = 52$ (too big) Obtains $3 < x \leq 5$ or better (need not be stated)
	Improved correct trial	M1	$3 < \text{trial} < 1^{\text{st}} \text{ trial}$ or $3 < \text{trial} < \text{root}$ eg $3.5^3 - 3 \times 3.5 = 32.(3\dots)$ or 32.4 (too small)
	Obtains $3.8 \leq x \leq 3.9$ or better	A1	$3.6 \rightarrow 35.(8\dots)$ or 35.9 $3.7 \rightarrow 39.(5\dots)$ or 39.6 $3.8 \rightarrow 43.(4\dots)$ or 43.5 $3.9 \rightarrow 47.(6\dots)$
	Tests 3.85 (or 3.84) and concludes 3.8	Q1	$3.85 \rightarrow 45.5(16625)$ $3.84 \rightarrow 45.1(03104)$ Using 2 dp to ensure 1 dp Strand (ii)
24	$(AC^2 =) 23^2 + 31^2 (=1490)$	M1	
	$\sqrt{23^2 + 31^2}$ or $\sqrt{\text{their } 1490}$	M1 dep	
	38.6(...) or 39	A1	
25	Suitable question with time frame	B1	
	Suitable response section	B1	No gaps, no overlap and final category open-ended
26(a)	$3x \geq 16 + 5$ or $3x \geq 21$	M1	oe $x \geq \frac{21}{3}$
	$x \geq 7$	A1	oe
26(b)	$-2 \leq 2y \leq 6$	B1	

Q	Answer	Mark	Comments
27	Correct heights plotted or shown	B1	
	Fully correct frequency polygon	B1	Midpoints used and straight lines intended to join them Allow midpoints to be at [24.5, 26] [34.5, 36] etc SC1 for one height plotted incorrectly but midpoints used in an otherwise correct frequency polygon