



General Certificate of Secondary Education

Mathematics 4307

Specification B

Module 1 Tier H 43051H

Final

Mark Scheme

2010 examination - June series

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 candidates' 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 candidates' 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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The following abbreviations are used on the mark scheme:

M	Method marks awarded for a correct method.
A	Accuracy marks awarded when following on from a correct method. It is not necessary always to see the method. This can be implied.
B	Marks awarded independent of method.
E	Marks awarded for an explanation.
M dep	A method mark which is dependent on a previous method mark being awarded.
ft	Follow through marks. Marks awarded for correct working following a mistake in an earlier step.
SC	Special Case. Marks awarded for a common misinterpretation which has some mathematical worth.
oe	Or equivalent.

MODULE 1 HIGHER TIER

43051H

1(a)	All 7 points plotted correctly (2, 10.5) (3, 10.2) (5, 8.5) (6, 8.1) (7, 7) (9, 6.1) (10, 6.3)	B2	B1 for 5 or 6 plotted correctly $\pm \frac{1}{2}$ sq Ignore extras
1(b)	The more time spent training, the less time it took to complete the test	B1	Must mention 'training' and 'test' oe

2(a)	$1 < w \leq 2$	B1	
2(b)	One correct midpoint used leading to one correct fx	B1	
	$(10 \times 0.5) + (17 \times 1.5)$ $+ (3 \times 2.5) + (7 \times 3.5)$ $+ (3 \times 4.5)$ or $5 + 25.5 + 7.5 + 24.5 + 13.5$ or 76	M1	Attempt at $\sum fx$ with x 's used on or between the class boundaries for at least 4 products
	their $76 \div 40$	M1 dep	dep on M1 Accept incorrect $\sum f$ if clear evidence shown of adding the values
	1.9	A1	Allow 2 from correct working seen

3(a)	Plotted at upper class boundaries	B1	Must be increasing graph
	Heights correct 12, 35, 56, 72, 80	B1	$\pm \frac{1}{2}$ square Must be increasing graph
	Curve or straight lines through all their points	B1	Must be increasing graph Must have at least 4 points to join Ignore line to left of their first point
3(b)	Reading off cf graph at 168 with value eg '26' or correct interpolation from table giving $12 + 14 = 26 \quad (12 + \frac{3}{5} \times 23)$	B1	ft from an increasing graph
	Girls = 40	B1	
	$40 - \text{their } 26$	M1	Their 26 must be from increasing graph with points joined and an attempt at reading from 167 to 169 inclusive
	'12'	A1 ft	ft from their reading subtracted from 40

4(a)	The numbers of pupils from each year group in the sample are in proportion to the total number of pupils in the year group	B1	oe
4(b)	$(80 \div 10 = 8 \text{ so}) \text{ yr } 3 = 96 \div 8$ or $\frac{96}{400} \times 50$	M1	or $\frac{96}{80} \times 10$ oe M1 may be implied from one correct answer or correct decimal (12.625 or 15.375) providing it is not from a clearly incorrect method
	12, 13 and 15	A2	A1 for one correct

5	$\frac{1}{2} \times \frac{1}{10}$ or $\frac{3}{10} \times \frac{1}{6}$ or $\frac{1}{5} \times \frac{1}{12}$ or $\frac{1}{20}$ or $\frac{3}{60}$ or $\frac{1}{60}$	M1	One correct product seen Accept decimals $\frac{1}{6} = 0.16$ or 0.17 or better $\frac{1}{12} = 0.083$ or better
	$\frac{1}{2} \times \frac{1}{10}$ and $\frac{3}{10} \times \frac{1}{6}$ and $\frac{1}{5} \times \frac{1}{12}$ or $\frac{1}{20}$ and $\frac{3}{60}$ and $\frac{1}{60}$	M1 dep	All 3 correct products seen or correct totals oe Decimals 0.05 and 0.05 and 0.016 or better
	$\frac{1}{20} + \frac{3}{60} + \frac{1}{60}$	M1 dep	oe Adding three correct products
	$\frac{7}{60}$	A1	oe Accept decimal that rounds to 0.117 to 3 dp or 11.7% SC2 for $\frac{53}{60}$ or 0.883 arrives on time
	Alternative method		
	$\frac{1}{2} \times \frac{9}{10}$ or $\frac{3}{10} \times \frac{5}{6}$ or $\frac{1}{5} \times \frac{11}{12}$	M1	Accept decimals $\frac{5}{6} = 0.83$ or better $\frac{11}{12} = 0.916$ or 0.917 or better
	$\frac{1}{2} \times \frac{9}{10} + \frac{3}{10} \times \frac{5}{6} + \frac{1}{5} \times \frac{11}{12}$ or $\frac{9}{20} + \frac{15}{60} + \frac{11}{60}$ or $\frac{53}{60}$	M1 dep	oe Adding three correct products
	$1 - \frac{53}{60}$	M1 dep	oe
$\frac{7}{60}$	A1	oe SC2 for $\frac{53}{60}$ arrives on time	

6	Teenagers text = 24	B1	
	Adults text = 6	B1	
	$60 - (30 + \text{their } 6 + 9)$	M1	their 6 must be an integer
	15	A1 ft	for integer value only and with telephone = 30

7	1, 2, 6, 7 and 9 or 0, 4, 6, 7, 8 in any order	B2	B1 for 2 conditions met with different single digit numbers eg 1, 3, 6, 7, 9 (mean incorrect) or all conditions met but repeated digit eg 1, 3, 6, 6, 9
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8(a)	$0.15 + 0.25$ or 0.4 seen (provided no contradiction in box for p(4))	M1	or 15% + 25% or 40%
	$1 - (0.15 + 0.25 + 0.08 + \text{their } 0.4)$ or $1 - \text{their } 0.88$	M1 dep	$100 - (15 + 25 + 8 + \text{their } 40) = 12$ is awarded M1 M0 A0
	0.12	A1	If answer 12 must be 12% → M1 M1 A1
8(b)	'All equally likely' circled	M1	
	Explains that every result is equally likely each throw/or throws independent/or starts again each throw/random	A1	oe

9(a)	Secondary	M1	
	Daniel did not collect the data himself/someone else collected the original data	A1	Not 'He got it off the internet'
9(b)	A hypothesis/question referring to the change in the elephant population numbers eg Have the number of elephants decreased/increased/stayed the same (over the last 50 years)? Are the number of elephants decreasing/increasing? Are there more/less elephants now?	B1	

10(a)	$\frac{2}{3}$	B1	
10(b)	$\frac{1}{3}$ labelled on all branches where A wins	B1	oe decimals to 2 dp or better
	$\frac{2}{3}$ labelled on all branches where D wins	B1	oe
10(c)	$\frac{2}{3} \times \frac{1}{3} \times \frac{2}{3}$ or $\frac{1}{3} \times \frac{2}{3} \times \frac{2}{3}$ or $\frac{4}{27}$	M1	
	$\left(\frac{2}{3} \times \frac{1}{3} \times \frac{2}{3}\right) + \left(\frac{1}{3} \times \frac{2}{3} \times \frac{2}{3}\right)$ or $\frac{4}{27} + \frac{4}{27}$ or $\frac{4}{27} \times 2$	M1 dep	Allow $\left(\frac{2}{3} \times \frac{1}{3} \times \frac{2}{3}\right) \times 2$ in any order for M2
	$\frac{8}{27}$ or 0.296	A1	

11	1 cm ² = 10 tomatoes or 1 box = 10	M1	oe $5\frac{1}{2} + 1\frac{1}{2} = 70$
	Over 130 3.6 cm ² × 10	M1	
	36	A1	
	Alternative method 1		
	175 small squares = 70 tomatoes or 2.5 small squares = 1 tomato	M1	
	Over 130 90 ÷ 2.5 or $90 \times \frac{70}{175}$	M1	
	36	A1	
	Alternative method 2		
	1 row of 5 = 2 tomatoes	M1	oe
	Over 130 18 × 2	M1	
	36	A1	
	Alternative method 3		
	Frequency density every 2 cm = 1 oe	M1	May be marked on axis
	20 × 1.3 + 50 × 0.2 or 26 + 10 oe	M1	
	36	A1	
	Alternative method 4		
	One bar or part bar correctly labelled with area eg 13 on 130 - 140 or 2 on 150 - 160	M1	
13 + 13 + 2 + 4 + 4	M1	oe	
36	A1		