



# **General Certificate of Secondary Education**

## **Mathematics 4307** *Specification B*

**Module 1 Tier H 43051H**

## **Mark Scheme**

*2009 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.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of candidates' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

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**The following abbreviations are used on the mark scheme:**

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

**MODULE 1 HIGHER TIER**

**43051H**

**Note: Probability - Accept fraction, decimal or percentage. Do not accept ratio.**

1(a)	Suitable key from 00 to 99  <table style="margin-left: auto; margin-right: auto;"> <tr><td style="border-right: 1px solid black; padding: 2px 10px;">1</td><td style="padding: 2px 10px;">8</td><td></td><td></td></tr> <tr><td style="border-right: 1px solid black; padding: 2px 10px;">2</td><td style="padding: 2px 10px;">1</td><td style="padding: 2px 10px;">4</td><td style="padding: 2px 10px;">5</td></tr> <tr><td style="border-right: 1px solid black; padding: 2px 10px;">3</td><td style="padding: 2px 10px;">3</td><td style="padding: 2px 10px;">7</td><td></td></tr> <tr><td style="border-right: 1px solid black; padding: 2px 10px;">4</td><td style="padding: 2px 10px;">1</td><td style="padding: 2px 10px;">2</td><td style="padding: 2px 10px;">3</td></tr> <tr><td style="border-right: 1px solid black; padding: 2px 10px;">5</td><td style="padding: 2px 10px;">0</td><td style="padding: 2px 10px;">4</td><td></td></tr> </table>	1	8			2	1	4	5	3	3	7		4	1	2	3	5	0	4		B1	eg ...1... ...8.....represents .....18.....lessons
		1	8																				
2	1	4	5																				
3	3	7																					
4	1	2	3																				
5	0	4																					
		B2	Fully correct  B1 correct but unordered B1 one error (a value misplaced or missing or extra)																				
1(b)	No or cannot tell with a valid explanation or No, median = 37 or No, only 4 drivers passed in under 30 lessons (out of 11) or No, mean = 35...	B1	eg <b>cannot tell</b> as sample size is too small Must be factually correct eg mean = 37 B0																				

2(a)	$\sum fx$ ie "0" + 27 + 36 + (or 100) (or 244)	M1	$(0 \times 144) + (1 \times 27) + (2 \times 18) + \dots$
	$\frac{\sum fx}{\sum f} = \frac{\text{their "100"}}{200}$	M1 dep	$200 \div 100 = 0.5$ M1M1A1 $200 \div 100 = 2$ M1M0A0
	0.5 or $\frac{1}{2}$	A1	1.22 SC2 with no working
2(b)	$\frac{18+8+2+1}{200}$	M1	$\frac{56}{200}$ M0 oe
	$\frac{29}{200}$	A1	oe 0.145 Ignore subsequent working

3	Pr (C) = 0.2	B1	$60 \times 0.1 (= 6)$ or $60 \times 0.3 (= 18)$
	$1 - (0.3 + \text{their } C + 0.1)$	M1	$60 \times (0.3 + 0.1 + 0.2)$ or $6 + 12 + 18$
	Pr (B) = 0.4	A1	36
	$60 \times \text{"their Pr (B)"}$	M1	$60 - \text{their } 36$
	24	A1 ft	$\frac{24}{60}$ lose A1
	If both methods used partially, mark best method (award best marks) (Not choice)		

4	$\frac{3071}{8495} \times 500$ (180.75...)	M1	oe
	181 or 180	A1	Must be integer

5(a)	To remove seasonality To obtain the trend	B1	
5(b)	There are 4 days each week	B1	
5(c)(i)	$\frac{21+20+26+33}{4}$	M1	
	25 correct, written down and plotted at correct position	A1	$\pm \frac{1}{2}$ sq
5(c)(ii)	Extend trend to locate next moving average value "26.5"	M1	Must see a written value between 24 and 27 plotted at correct horizontal position
	$\frac{20+26+33+x}{4} = \text{their } 26.5$	M1	Point must come from middle column  <b>Alternate:</b> Extend trend to Tues Week 4 seen and read off "27" and extend back to Tues Week 1 Obtain average Tuesday component from trend line seen $\frac{-1+1-2}{3} \left( = -\frac{2}{3} \right)$
	their "27"	A1 ft	their "26 $\frac{1}{3}$ "

6(a)	Histogram heights or freq polygon heights correct	B1	Within classes or on boundaries, $\pm \frac{1}{2}$ sq
	Widths correct (no gaps)	B1	Freq polygon midpoints $\pm \frac{1}{2}$ sq joined with straight lines Ignore extremities
6(b)	0 to less than 2.50	B1	

7(a)	As the number of books increase so does the total weight	B1	Positive correlation
7(b)(i)	Circle around (4, 7)	B1	
7(b)(ii)	Stronger box ticked	M1	If no box ticked stronger must be in reason
	The points would be closer to the line of best fit	A1	The points would not be as spread out Can get M1 or M1A1 if no box ticked

8	0.26 or $\frac{13}{50}$	B1	oe
	16	B1	

9(a)	22, 54, 80, 95, 100	B1	
9(b)	Plotting all points at upper class boundaries	B1	Must be an increasing non linear function for (b) and (c) $\pm \frac{1}{2}$ sq
	Their heights $\pm \frac{1}{2}$ sq	B1	Must be an increasing non linear function $\pm \frac{1}{2}$ sq
	Joined by smooth curve, or a polygon, through their points	B1	Ignore anything before (10, 22) $\pm \frac{1}{2}$ sq
9(c)(i)	Correctly locating and subtracting quartiles "19 – 10.5" $\pm \frac{1}{2}$ sq	M1	
	"8.5"	A1 ft	
9(c)(ii)	100 – their "64"	M1	Linear interpolation OK $5 + 15 + (\frac{3}{5} \times 26)$
	"36"	A1 ft	(35.6 must round to 36)

10(a)	$\frac{3}{5}$ seen	B1	
	$\frac{3}{5} \times \frac{2}{5}$	M1	
	$\frac{6}{25}$	A1	oe 0.24
10(b)	$\frac{2}{5} \times \frac{4}{5}$	M1	
	their $\frac{6}{25} + \left(\frac{2}{5} \times \frac{4}{5}\right)$	M1 dep	
	$\frac{14}{25}$	A1	oe 0.56