OCR
RECOGNISING ACHIEVEMENT

GCSE

Mathematics A

General Certificate of Secondary Education

Unit **A502/01:** Mathematics B (Foundation Tier)

Mark Scheme for June 2013

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This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.

All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

OCR will not enter into any discussion or correspondence in connection with this mark scheme.

Annotations used in the detailed Mark Scheme.

Annotation	Meaning
	Correct
	Incorrect
BOD	Benefit of doubt
FT	Follow through
ISW	Ignore subsequent working (after correct answer obtained), provided method has been completed
M0	Method mark awarded 0
M1	Method mark awarded 1
M2	Method mark awarded 2
A1	Accuracy mark awarded 1
B1	Independent mark awarded 1
B2	Independent mark awarded 2
MR	Misread
SC	Special case
^	Omission sign

These should be used whenever appropriate during your marking.

The **M**, **A, B**, etc annotations must be used on your standardisation scripts for responses that are not awarded either 0 or full marks.
It is vital that you annotate these scripts to show how the marks have been awarded.
It is not mandatory to use annotations for any other marking, though you may wish to use them in some circumstances.

Subject-Specific Marking Instructions

1. **M** marks are for using a correct method and are not lost for purely numerical errors.
   A marks are for an accurate answer and depend on preceding **M** (method) marks. Therefore **M0 A1** cannot be awarded.
   B marks are independent of **M** (method) marks and are for a correct final answer, a partially correct answer, or a correct intermediate stage.
   SC marks are for special cases that are worthy of some credit.

2. Unless the answer and marks columns of the mark scheme specify **M** and **A** marks etc, or the mark scheme is 'banded', then if the correct answer is clearly given and is not from wrong working **full marks** should be awarded.

   Do not award the marks if the answer was obtained from an incorrect method, ie incorrect working is seen and the correct answer clearly follows from it.

3. Where follow through (**FT**) is indicated in the mark scheme, marks can be awarded where the candidate's work follows correctly from a previous answer whether or not it was correct.

   Figures or expressions that are being followed through are sometimes encompassed by single quotation marks after the word *their* for clarity, eg FT 180 × (*their* '37' + 16), or FT 300 – $\sqrt{}$(*their* '$5^2 + 7^2$'). Answers to part questions which are being followed through are indicated by eg FT 3 × *their* (a).

   For questions with FT available you must ensure that you refer back to the relevant previous answer. You may find it easier to mark these questions candidate by candidate rather than question by question.

4. Where dependent (**dep**) marks are indicated in the mark scheme, you must check that the candidate has met all the criteria specified for the mark to be awarded.

5. The following abbreviations are commonly found in GCSE Mathematics mark schemes.

   - **figs 237**, for example, means any answer with only these digits. You should ignore leading or trailing zeros and any decimal point eg 237000, 2.37, 2.370, 0.00237 would be acceptable but 23070 or 2374 would not.
   - **isw** means **ignore subsequent working** after correct answer obtained and applies as a default.
   - **nfww** means **not from wrong working**.
   - **oe** means **or equivalent**.
   - **rot** means **rounded or truncated**.
   - **seen** means that you should award the mark if that number/expression is seen anywhere in the answer space, including the answer line, even if it is not in the method leading to the final answer.
   - **soi** means **seen or implied**.

6. In questions with no final answer line, make no deductions for wrong work after an acceptable answer (ie **isw**) unless the mark scheme says otherwise, indicated by the instruction 'mark final answer'.

7. In questions with a final answer line following working space,

   (i) if the correct answer is seen in the body of working and the answer given on the answer line is a clear transcription error allow full marks unless the mark scheme says 'mark final answer'. Place the annotation ✓ next to the correct answer.

   (ii) if the correct answer is seen in the body of working but the answer line is blank, allow full marks. Place the annotation ✓ next to the correct answer.

   (iii) if the correct answer is seen in the body of working but a completely different answer is seen on the answer line, then accuracy marks for the answer are lost. Method marks could still be awarded. Use the M0, M1, M2 annotations as appropriate and place the annotation ✗ next to the wrong answer.

8. In questions with a final answer line:

   (i) If one answer is provided on the answer line, mark the method that leads to that answer.

   (ii) If more than one answer is provided on the answer line and there is a single method provided, award method marks only.

   (iii) If more than one answer is provided on the answer line and there is more than one method provided, award zero marks for the question unless the candidate has clearly indicated which method is to be marked.

9. In questions with no final answer line:

   (i) If a single response is provided, mark as usual.

   (ii) If more than one response is provided, award zero marks for the question unless the candidate has clearly indicated which response is to be marked.

10. When the data of a question is consistently misread in such a way as not to alter the nature or difficulty of the question, please follow the candidate's work and allow follow through for **A** and **B** marks. Deduct 1 mark from any **A** or **B** marks earned and record this by using the MR annotation. **M** marks are not deducted for misreads.

11. Unless the question asks for an answer to a specific degree of accuracy, always mark at the greatest number of significant figures even if this is rounded or truncated on the answer line. For example, an answer in the mark scheme is 15.75, which is seen in the working. The candidate then rounds or truncates this to 15.8, 15 or 16 on the answer line. Allow full marks for the 15.75.

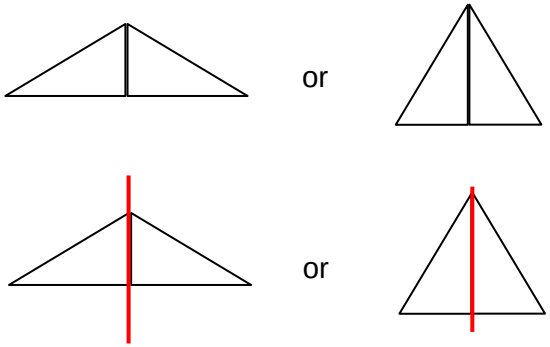
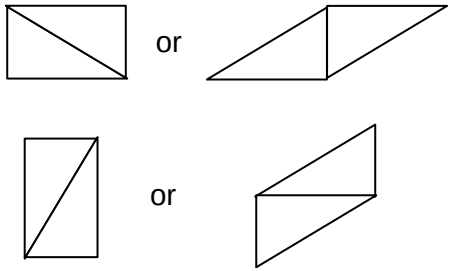
12. Ranges of answers given in the mark scheme are always inclusive.

13. For methods not provided for in the mark scheme give as far as possible equivalent marks for equivalent work. If in doubt, consult your Team Leader.

14. Anything in the mark scheme which is in square brackets […] is not required for the mark to be earned, but if present it must be correct.

Question			Answer	Marks	Part Marks and Guidance	
1	(a)		111	2	**B1** for 207 or ¯31 or 46 seen	
	(b)		5	1		
	(c)		71 [.00]	1		
	(d)		$\frac{5}{8}$	1		
	(e)		[0] .4[0] $\frac{7}{100}$	1 1		
2			Arc Radius Segment	1 1 1	Accept clear indication	eg ringed in list and arrow to box or part of circle
3	(a)		5.80 6.90 6 18.85	1 1 1 1FT	*Their* correct sum of 3 prices in final column	Penalise wrong money notation once in (a) and (b) eg 5.80p or 5.8 If table blank then mark figures beside table If no total, *their* 18.85 seen in (a) or (b) scores the mark
	(b)		1.15	1FT	20 – *their* 18.85	1.15p scores **0** but 115p scores **1**
4	(a)		32 oe	3	**M2** for 4 × [0].5 + 3 × 10 oe OR **B1** for [4 × 5 =] 20 or [3 × 10 =] 30 **B1** for [0].5 oe [cm] or 2 cm	Accept 320 mm or [0].32 m

Question			Answer	Marks	Answer
	(b)	(i)	Well expressed answer using correct angle terms and • **Angles at the centre** are all equal • Angles at the centre total 360 oe • 360 ÷ 6 [= 60] or 60 × 6 = 360 **Or** well expressed answer using correct angle terms and • [All 6] **triangles are equilateral** • Angles in a triangle add up to 180° oe • 180 ÷ 3 [= 60] or 60 × 3 = 180 **Or** well expressed answer using correct angle terms and • [3] **triangles** make a **straight line** oe • Angles on a straight line = 180° oe • 180 ÷ 3 [= 60] or 60 × 3 = 180	3	A whole turn is 360 degrees, angles at a point…. oe = regular and diameter (for long straight line) **For 2 or 1 marks** Accept “regular 3-sided”, “equal sides and equal angles” for “equilateral” but not just “equal”
			Two of • **Angles** [at the centre are] all **equal** • [Angles in] a circle = 360 or better • 360 ÷ 6 [= 60] or 60 × 6 = 360 **Or** • [All 6] triangles are **equilateral** oe • [Angles in a] triangle add up to 180° oe • 180 ÷ 3 [= 60] or 60 × 3 = 180 **Or** • [3] triangles make a **straight line** • [Angles on] a straight line = 180° oe • 180 ÷ 3 [= 60] or 60 × 3 = 180	2 – 1	**One of** • **Angles** [at the centre are] all **equal** • [Angles in] a circle = 360 or better • 360 ÷ 6 [= 60] or 60 × 6 = 360 **Or** • [All 6] triangles are **equilateral** oe • [Angles in a] triangle add up to 180° oe • 180 ÷ 3 [= 60] or 60 × 3 = 180 **Or** • [3] triangles make a **straight line** • [Angles on] a straight line = 180° oe • 180 ÷ 3 [= 60] or 60 × 3 = 180
			No relevant comment	0	

Question			Answer	Marks	Part Marks and Guidance	
4	(b)		60	3	**M2** for 12 × 5 or 6 × 10 or 6 × 5 + 3 × 10 Or **B1** for 30	Accept equivalent repeated additions
	(c)		2.40	2	**M1** for 80 or [0].8 seen	**M1** may be implied by 2.4 or 2.40p
5	(a)			1 1FT	Condone good un-ruled throughout Complete isosceles triangle 8 by 3 or 6 by 4 Altitude does not need to be seen One line indicated and no extras for *their* logo that has only one line of symmetry	Mark intention Penalise consistent use of same wrong right-angled triangle once throughout question Condone triangles not joined for second mark
	(b)			2	Shapes 4 by 3 or 8 by 3 3 by 4 or 4 by 6 Joining line does not need to be seen **B1** for their logo with rotation symmetry order 2	Cannot be a square Ignore attempts at lines of symmetry For **B1** condone triangles not joined

Question			Answer	Marks	Part Marks and Guidance	
6			Orderly solution with some annotation and all of • 2790 or 3910 • 400 or 560 • 6.9[.....] or 2800 or 3920 • 7 flights oe • One correct assumption	5	All figures nfww eg 2800 **must not be** from 5 × 560	Fixed **monthly** costs **(C)** Pilot £24 000 ÷ 12 = £2000 Loan £ 790 Total £2790 Income **(I)** Per flight £140 × 4 = £560 Less fuel etc £160 Balance £400 Number of flights **C** ÷ **I** = 6.[9..] 7 flights Assumption • Always flies **full** • Maximise profit • Can fly all year round For **C** ÷ **I** accept [7 × 400] = 2800 **Annual (C)** Pilot = £24 000 Loan 790 × 12 = £9480 = £33 480 Income **(I)** Per flight £140 × 4 = £560 Less fuel etc £160 Balance £400 **C** ÷ **I** = 83.[7..] flights
			Four from • 2790 or 3910 • 400 or 560 • 6.9[.....] or 2800 or 3920 • 7 flights oe • One correct assumption Or 7 flights (even with no evidence but nfww)	4 – 3	**Two** from • 2790 or 3910 • 400 or 560 • 6.9[.....] or 2800 or 3920 • 7 flights oe • One correct assumption Or 84 flights (annual, even with no evidence but nfww)	
			Two from • 2000 (Pilot per month) • 560 (Ticket income) • 2950 (Cost of a flight) • 9480 (Annual loan cost) • 33 480 (Pilot + loan) • One correct assumption	2 – 1	**One** from • 2000 (Pilot per month) • 560 (Ticket income) • 2950 (Cost of a flight) • 9480 (Annual loan cost) • 33 480 (Pilot + loan) • One correct assumption	
			No relevant work or comment	0		

Question			Answer	Marks	Part Marks and Guidance	
7	(a)		3 correct points	2	**B1** for 1 correct	Correct intention Ignore extras
	(b)	(i)	Positive	1		Ignore strong/weak Contradictory statements score **0**
		(ii)	Because of the outlier or anomaly or E Too few crosses	1	Must state or imply only 1 outlier or anomaly; may be a description Ignore further comment	Unless their plots form outliers "Outlier**s**" implies more than 1 eg to be reliable
	(c)		C	1		
	(d)		E	1		
8	(a)		Two points correctly plotted Two ruled lines joining *their* points	1 1FT	Points must lie within circles of overlay Lines must meet with 2 mm tolerance	
	(b)		28	1		
	(c)		Reward any correct (general or comparative) statement Correct use of a growth figure from the graph or table to support one comment	1 1	Grew more in week 3 It grew quickly to start with The rate of growth slowed down at the end It grew the same in weeks 2 and 5 Growth in week 3 = 15 cm Growth in first four weeks 46 cm Growth in final four weeks 26 cm	It grew 15 cm in week 3 which was more than any other week scores both marks Once mark is awarded ignore subsequent writing

Question			Answer	Marks	Part Marks and Guidance	
9	(a)		$x \leq 7$	1	Condone $x < 7$ or in words	"7" alone or "= 7" scores **0**
	(b)			1	Condone empty or no circle and no arrowhead	
10	(a)	(i)	3	1	Condone (0, 3)	With or without brackets
		(ii)	$^-2$	1		Not ^-2x
	(b)	(i)	$^-5$ **$^-3$** **$^-1$** 3 **7**	2	**B1** for 1 correct	
		(ii)	Ruled straight line through ($^-1$, $^-3$) and (2, 3)	2	**M1** for four of *their* points correctly plotted	Use overlay Line must be straight throughout its length
	(c)		[x =] 1 [y =] 1	1FT 1FT	Follow through *their* line and intersection with given line accurate to nearest square for both marks	Correct or follow through **Not** 1x etc
11			180 "triangle" **with** "angles" "line" **with** "angles" interior oe	1 1 1 1		Ignore 'isosceles' etc <u>For the second and third mark:</u> Provided there is no implication that they add to anything other than 180 degrees eg allow 'internal', 'inside' and 'inner'

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