COMPONENT 2:CALCULATOR-ALLOWED MATHEMATICS, FOUNDATION TIER

GENERAL INSTRUCTIONS for MARKING GCSE Mathematics

1. The mark scheme should be applied precisely and no departure made from it. Marks should be awarded directly as indicated and no further subdivision made. When a candidate follows a method that does not correspond to the methods explicitly set out in the mark scheme, marks should be awarded in the spirit of the mark scheme. In such cases, further advice should be sought from the Team Leader or Principal Examiner.

2. Marking Abbreviations
The following may be used in marking schemes or in the marking of scripts to indicate reasons for the marks awarded.
CAO = correct answer only
MR = misread
PA = premature approximation
bod = benefit of doubt
oe = or equivalent
si = seen or implied
ISW = ignore subsequent working

F.T. = follow through ($\surd$ indicates correct working following an error and $\surd\!\!\times$ indicates a further error has been made)

Anything given in brackets in the marking scheme is expected but, not required, to gain credit.

3. Premature Approximation
A candidate who approximates prematurely and then proceeds correctly to a final answer loses 1 mark as directed by the Principal Examiner.

4. Misreads
When the data of a question is misread in such a way as not to alter the aim or difficulty of a question, follow through the working and allot marks for the candidates' answers as on the scheme using the new data.
This is only applicable if a wrong value, is used consistently throughout a solution; if the correct value appears anywhere, the solution is not classed as MR (but may, of course, still earn other marks).

5. Marking codes

- 'M' marks are awarded for any correct method applied to appropriate working, even though a numerical error may be involved. Once earned they cannot be lost.
- 'm' marks are dependant method marks. They are only given if the relevant previous 'M' mark has been earned.
- 'A' marks are given for a numerically correct stage, for a correct result or for an answer lying within a specified range. They are only given if the relevant M/m mark has been earned either explicitly or by inference from the correct answer.
- 'B' marks are independent of method and are usually awarded for an accurate result or statement.
- 'S' marks are awarded for strategy
- 'E' marks are awarded for explanation
- 'U' marks are awarded for units
- 'P' marks are awarded for plotting points
- 'C' marks are awarded for drawing curves

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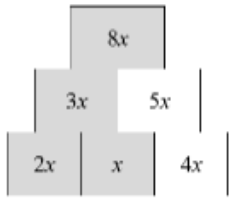
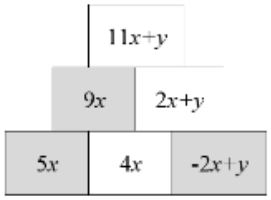
Specimen Assessment Materials Calculator-allowed Foundation	Mark	Elements linked to AOs	Comments
1. (a) (£)8.5(0) and (£)23.85	B1	1.3a	
(£)9.96	B1	1.3a	
(£)42.31	B1	1.3a	F.T their values, provided that units are consistent
(b) (£)7.67	B1	1.3a	F.T 50 – 'their 42.31'
(c) 6 × 1.99	M1	3.1c	Or equivalent
(£)11.94	A1	1.3a	SC1 for (9 × 1.99=)(£)17.91
	(6)	(5)AO1 (0)AO2 (1)AO3	
2. 12 and 24 indicated	B2	1.1	B1 for 2 correct and 1 incorrect OR 1 correct and no more than 1 incorrect
	(2)	(2)AO1 (0)AO2 (0)AO3	
3. (a) 5/7	B1	1.3a	In Q3 as a whole, penalise -1 once only if consistent use of incorrect notation.
(b) 3/7	B1	1.3a	
	(2)	(2)AO1 (0)AO2 (0)AO3	
4. 390 ÷ 3	M1	1.3b	Award M1 for sight of 130 or 1950
× 5	m1	1.3b	Accept in either order × 5, ÷ 3
650	A1	1.3b	CAO
	(3)	(3)AO1 (0)AO2 (0)AO3	
5. Strategy attempting to add 5 to the x-coordinate or subtracting 5 from the y-coordinate e.g. B shown as $(6, y)$ or D shown as $(x, 3)$	M1	3.1a	Evidence on diagram or if at least 1 correct coordinate
(6, – 3)	A1	2.1a	
	(2)	(0)AO1 (1)AO2 (1)AO3	
6. Lisa = $x + 3$	B1	2.3b	Accept $2 \times x + 3$ or $x + 3 \times 2$.
Julian = $2(x + 3)$	B1	2.3b	F.T. 2 × 'their Lisa' if Lisa $ax + b$, where b $\neq$ 0
Expansion of bracket = $2x + 6$	B1	1.3a	F.T. if $2(ax \pm b)$
(Total number of pens = $x + x + 3 + 2x + 6$=) $4x + 9$	B1	1.3a	
	(4)	(2)AO1 (2)AO2 (0)AO3	

Specimen Assessment Materials Calculator-allowed Foundation	Mark	Elements linked to AOs	Comments
7. (2 × 1000) ÷ 400 5 (laps)	M1 A1 (2)	1.3a 1.3a (2)AO1 (0)AO2 (0)AO3	For conversion **and** division
8. (Cost of bracelets = 200 × 6.30) (£)1260 (number of bracelets sold at higher price) 60/100 × 200 OR 120 (sale of 120 bracelets =120 × (£)10 =) (£)1200 (sale of 80 bracelets = 80 × (£)4 =) (£)320 (Profit =) (£)1200 + (£)320 – (£)1260 (Profit of) (£)260	B1 B1 B1 B1 M1 A1 (6)	3.1d 3.1d 1.3a 1.3a 3.1d 1.3a (3)AO1 (0)AO2 (3)AO3	F.T. 'their 120' F.T. 200 –' their 120' but not 120 F.T. 'their 120 × (£)10' + 'their 80 (but not 120) × (£)4' – 'their (£)1260'
9. (a) $x = 4$ (b) $y = 20$ (c) $5a = 17 + 8$ $a = 5$	B1 B1 B1 B1 (4)	1.3a 1.3a 1.3a 1.3a (4)AO1 (0)AO2 (0)AO3	Allow embedded answers in all parts F.T. from 1 error for equation in the form $ma = n$, $m \neq 1$
10. (a) Suitable explanation e.g. "5 occurs more often than any other number" (b) For 2 correct values that give a range of 7 AND a median of 6.	E1 B2 (3)	1.1 2.1b (1)AO1 (2)AO2 (0)AO3	E.g. 5 is the most popular number 6 &10, 7&10, 8 &10, 9 &10,10 & 10 B1 for 2 values that either give a range of 7 or a median of 6
11. $20 = 50 – 10k$ OR $10k = p – 2q$ OR $2q – p = –10k$ $10k = 50 – 20$ OR $–10k = 20 – 50$ $k = 3$ (seconds)	M1 M1 A1 (3)	1.3a 1.3a 1.3a (3)AO1 (0)AO2 (0)AO3	20 must be evaluated if this method used. For isolating k term. 20 must be evaluated. FT their equation or formula, if of equivalent difficulty.

Specimen Assessment Materials Calculator-allowed Foundation	**Mark**	**Elements linked to AOs**	**Comments**
12. Spinner 1 Suitable explanation e.g. "Ethan has 50% chance of a yellow & Kyle has 25% chance of a red" or "probability of yellow (½) > probability of red (¼)"	B1 E1 (2)	2.4a 2.4a (0)AO1 (2)AO2 (0)AO3	
13.(a) Uniform scale on kilometre axis Plotting at least two correct points **Correct** straight line through points (b) Full explanation given e.g. "he could find what 35 miles is in km and then double it" Approximately 112 (km)	B1 P1 L1 E1 B1 (5)	1.2 2.3b 2.3b 2.1b 1.3a (2)AO1 (3)AO2 (0)AO3	F.T. their graph or accept answers in the range 110 – 113 (km)
14. (a)  (b)  	B1 B1 B1 B1 B1 (5)	3.1a 1.3a 1.3a 1.3a 1.3a (4)AO1 (0)AO2 (1)AO3	For the $5x$ For the $4x$ F.T 'their $5x$' – x For the $4x$ For the $2x + y$ F.T 'their $4x$' – $2x + y$ For the $11x + y$ F.T $9x$ + 'their $2x + y$' Must be in the form $ax + by$

Specimen Assessment Materials Calculator-allowed Foundation	**Mark**	**Elements linked to AOs**	**Comments**
15.(a) 84 – 0·06 × 84 OR 0·94 × 84 (= 78·96 kg or 79 kg)	M1	3.1d	
78·96 × 0·972 OR 78·96 – 0·028 × 78·96 OR 0.028 × 0·94 × 84	M1	3.1d	F.T. their 78·96 or 79 provided the value is < 84
76·7(4912 kg) or 76·7(88 kg) or 76·8(kg) or 77(kg)	A1	1.3a	Or 76·75 or 76·74 *If no marks, then SC1 for an answer of 76·6(08) from a reduction of 8·8%. No F.T. to (b)*
(b) (84 – 76·74912)/84 × 100 or equivalent full method	M1	1.3a	F.T. their '76.7', provided ≠ 76·6(08) from 8·8%
8·632% rounded or truncated from correct working	A1	1.3a	Accept an answer of 8·333..% from using 77kg, or 8·69…% from using 76·7, …
	(5)	(3)AO1 (0)AO2 (2)AO3	
16. For use of 9 hours	B1	3.1d	
(Fishing Boats R Us) 45 + 30 × 8	M1	3.1d	F.T. their whole number of hours. Award M0 A0 for use of 8.15
(£) 285	A1	1.3b	
(Ocean Blue Boats) (£)288	B1	1.3b	F.T. their whole number of hours. Award B0 for use of 8.15
Choice of company with valid reason e.g. "go with Fishing Boats R Us as they are cheaper " or "could use either as there's not much between them"	E1	3.4b	F.T. their prices for Fishing Boats R Us AND Ocean Blue Boats.
	(5)	(2)AO1 (0)AO2 (3)AO3	

Specimen Assessment Materials Calculator-allowed Foundation	**Mark**	**Elements linked to AOs**	**Comments**
17. He spends (£)100 on rent OR $\frac{1}{4}+\frac{2}{5}$ and (£)160 on food leaving (£)140 OR $\frac{13}{20}$ Frac. remaining 140/400 OR or $1-\frac{13}{20}$ $\frac{7}{20}$ I.S.W.	M1 A1 M1 A1 (4)	1.3b 1.3b 1.3b 1.3b (4)AO1 (0)AO2 (0)AO3	F.T. for second M1,A1 *Decimals or % equivalents* *0·25 + 0·4(0) = 0·65* *1- 0·65 = 0·35 First M1, A1 possible* *F.T. for second M1,A1* *but must be fractions for second M1,A1.* $\frac{35}{100}$ *M1* $=\frac{7}{20}$ *A1* Incorrect method of Subtracting at each stage : Spends (£)100 on rent Leaving £300. 2/5 of £300 = 120 leaving (£)180 F.T. for second M1,A1 Frac. remaining $\frac{180}{400}=\frac{9}{20}$ Possible 4 marks then –1 if any A marks awarded
18. (a) $\frac{95}{250}\times 100$ 38 (%) (b) Cost of newspapers = £29.04 – 4·12 × 6 Cost of 1 newspaper = (£29.04 – 4·12 × 6) ÷ 4 = (£) 1.08	M1 A1 M1 m1 A1 (5)	1.3a 1.3a 1.3b 1.3b 1.3b (5)AO1 (0)AO2 (0)AO3	 Award M1 for sight of (£)4.32 C.A.O
19. 35 × 45 × 20 31500 31500 ÷ (100 × 15) 21 (cm)	M1 A1 M1 A1 (4)	3.1d 1.3a 3.1d 1.3a (2)AO1 (0)AO2 (2)AO3	 Seen or implied in further calculations F.T. their 31500

Specimen Assessment Materials Calculator-allowed Foundation	**Mark**	**Elements linked to AOs**	**Comments**
20. (a) 48000 /16 /25 /8	M2	3.1c	M1 for dividing 48000 by two of 16, 25 or 8. *Accept alternative methods involving multiplication, e.g.* *25 x 16 = 400* *48000/400 (= 120)* *120/8 (M1 for 2 of the 3 steps)*
= 15	A1	1.3a	C.A.O.
Correct interpretation of their answer: e.g. (Assumption is) that each examiner works for 15 hours a day.	E1	3.3	
(b) **Reason**: e.g. It is unlikely that all examiners will work for as long as 15 hours in one day. OR It is unlikely that the examiners will be able to work at the same rate for 15 hours in one go. AND **Effect**: e.g. 8 days is too short a time to complete the marking.	E2	3.4b 3.5	F.T. 'their 15', if appropriate. Reason is AO3.4b, effect is AO3.5. E1 for reason only.
	(6)	(1)AO1 (0)AO2 (5)AO3	
21. No AND reason (both the same) 1/6	B1	2.5a	1/6 must be seen. Accept NO with appropriate sight of 1/6. Accept reference to 1/6 in words.
No AND reason (1/6 × 1/6=)1/36	B2	2.5a	B1 for No AND reason may be based on sample space or, gives 1/6×1/6 without stating 1/36, or, gives 1/6×1/6 with an incorrect response, e.g. 2/36 or, sight of 1/36 with no conclusion Do not accept incorrect probability with statement 'No' without working
	(3)	(0)AO1 (3)AO2 (0)AO3	
22. Calculating original amount e.g. sight of 492 × 100/ 60 OR '60% is 492'	M1	3.1b	
(£) 820	A1	1.3a	
0·98 × 'their 820'	M1	3.1b	
(£)803.6(0)	A1	1.3a	
	(4)	(2)AO1 (0)AO2 (2)AO3	

Amount	After a decrease of	
	40%	2%
£**820**	£492	£**803.6(0)**

Specimen Assessment Materials Calculator-allowed Foundation	**Mark**	**Elements linked to AOs**	**Comments**
23. (a) Valid reason or explanation, e.g. 'approximates to a rectangle with an area of 6×20'	E2	2.1b	Sight of the word rectangle and area of 6×20 for E2. Needs to be precise in reference to rectangle, not vague referring to edges or banks of the pond being extra. Award E1 for explanation without reference to 6×20.
(b) Correct strategy e.g. considers 2 semi-circles and a rectangle	S1	3.1d	
Method of calculating area	M1	3.1d	Idea of splitting up the area
Accuracy in establishing missing lengths / dimensions	M1	1.3b	e.g. $\pi r^2 + l \times w$ e.g. Sight of diameter 6m or radius 3m AND length of rectangle =20–3–3 20–6(=14)m, or $\pi \times 3^2 + 14 \times 6$
Value for their area	A1	1.3b	e.g. 112(.27… m^2)
Justification of their method e.g. "having a rectangle and 2 semi-circles is more like the sketch than using a rectangle as Eliza has done"	E1 (7)	3.4a (2)AO1 (2)AO2 (3)AO3	
24. (a) Reason, e.g. 'outside the juice bar', 'mostly younger people use juice bars'	E1	2.5b	
(b) Two appropriate criticisms e.g. 'No under 15s', '30 appears in two boxes', 'may object to giving their age'	E2 (3)	2.5b (0) AO1 (3) AO2 (0) AO3	
25. $6x - 2 = 4x + 5$ $2x = 7$ $x = 7/2$ (3·5) Length of side of square = 4 × 3·5 + 5 or 6 × 3·5 – 2 =19 (cm)	B1 B1 B1 M1 A1 (5)	2.2 1.3a 1.3a 2.2 1.3a (3) AO1 (2) AO2 (0) AO3	

Specimen Assessment Materials Calculator-allowed Foundation	Mark	Elements linked to AOs	Comments
26. $7n - 1$	B2	1.3a	B1 for $7n \pm \ldots$ Allow change of letter
	(2)	(2) AO1 (0) AO2 (0) AO3	
27. (a) Midpoints 52, 56, 60 and 64	B1	1.3b	
52×12 + 56×32 + 60×14 + 64×2 (=3384)	M1	1.3b	F.T. their midpoints, provided within interval
/60	m1	1.3b	
56.4 (cm)	A1	1.3b	F.T. their sum of products, division by 60
(b) Strategy to look back that 32 out of 60 are size 2, e.g. '(table shows) about half customers are size 2	S1	2.5a	
Conclusion to give Salesman is correct	E1	2.5a	
	(6)	(4) AO1 (2) AO2 (0) AO3	
28. Straight lines parallel to all 4 sides and 3cm away (±2mm)	B2	2.3b	B1 for straight lines parallel to 2 sides and 3cm away (±2mm), OR straight lines parallel to all 4 sides but not at 3cm
Arcs with radius 3cm (±2mm) at all 4 vertices joining the straight lines	B2	2.3b	B1 for arcs with radius 3cm (±2mm) at least 2 vertices but not joined to straight lines, OR arcs at all 4 vertices but not at 3cm or not joined to straight lines
	(4)	(0) AO1 (4) AO2 (0) AO3	
29. (Height of tree =) Tan 56° × 19 + 1·8(m)	M3	3.1d	Award M2 for tan 56° × 19 OR sight of 28·168658….(m) Award M1for tan 56° = opposite/19 Accept rounded or truncated from working
(Height of tree =) 29·968658….. (m)	A1	1.3b	Accept rounded or truncated from working F.T from their rounded or truncated 28·168…
	(4)	(1) AO1 (0) AO2 (3) AO3	
30. (a) 10/0·2	M1	1.3a	
= 50	A1	1.3a	
N/m^2	U1	1.1	
(b) $10/x$ (N/m^2)	B1	2.3b	
	(4)	(3)AO1 (1)AO2 (0)AO3	