UNIT 2: CALCULATOR-ALLOWED, INTERMEDIATE 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.

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 (√ indicates correct working following an error and ✗ 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

UNIT 2: CALCULATOR-ALLOWED, INTERMEDIATE TIER

GCSE Mathematics Unit 2: Intermediate Tier	Marks	Comments
1. 360 – (46 + 117 + 34) = 163(°) (x =) 17(°)	M1 A1 B1 3	 F.T. 180 – 'their 163'.
2.(a) –9 (b) 12 (c) $3(n-7)$	B1 B1 B1 3	
3. (Original mean =) 13 (New total =) 5 × 14 = 70 New number = 18	B1 M1 A1 B1 4	 F.T. 5 × 'their 13 + 1'. F.T. 'their <u>derived</u> new total' – 'their original total'.
4. 4 × 4 × 4 64 (cm³) 64 / (8×4) or 32*h*=64 2 (cm)	M1 A1 M1 A1 4	*Alternative method:* *4 × 4 M1* *16 (cm²) A1* *16/8 M1* *2 (cm) A1*
5. (a) 3 or 4 angles correct and correctly labelled. 3 or 4 angles correct, labels not fully correct. 2 angles correct and correctly labelled. 2 angles correct, labels not fully correct. 1 angle correct and correctly labelled. OR <u>If 0 OR 1 for their diagram or no diagram,</u> 360/120 Angles are 54°, 72°, 105° and 129° (b) More girls in class B than in class A. Equal number of girls and boys in class B. Ratio of Girls : Boys = 3 : 1 in class A.	 B4 OR (B3) (B3) (B2) (B1) (M1) (A1) B1 B1 B1 7	Use overlay Allow ±2° Correct labels (Words NOT the frequency OR angle). If only B1 is scored for the diagram, and all the angles given correctly, then cancel the B1 and award M1, A1 for 2 marks. If B0 scored for the diagram, check the angles and the method to see if the M1 and the A1 can be awarded. (1 is) 3° gets the M1. OR SC1 for all correct percentages: 15, 20, 29·2 or 29, 35·8 or 36.
6. $x+2x+3x=180$ $x=30$ Three angles are 30(˚), 60(˚), 90(˚)	M1 A1 A1 3	 *SC1 for the answers of 30(˚), 60(˚) and 90(˚) without forming an equation* *SC1 for the answers of 60(˚), 120(˚) and 180(˚) from equating to 360*
7.(a) All 13 numbers placed correctly and no extra. (b) $\frac{4}{13}$	B4 B2 6	B3 for 10,11 or 12 correct OR all correct but omission of numbers outside A∪B. B2 for 8 or 9 correct. B1 for 6 or 7 correct. *Any duplicates are marked as incorrect.* F.T. 'their diagram'. B1 for a numerator of 4 OR a denominator of 13 in a fraction less than 1.

GCSE Mathematics Unit 2: Intermediate Tier	Marks	Comments
8. (a) 4·38 (b) 81 000 (c) 0.074	B2 B1 B1 4	B1 for 4·37(7.....)
9. (a) Correct reflection in $x = 1$ (b)Clockwise rotation of 90° about the origin.	B2 B3 5	B1 for reflection in $y = 1$ or for sight of line $x = 1$. For all four components. B2 for any three, B1 for any two. (Penalise '¼ turn' –1 only.)
10. Total of interior angles 5 × 180(°) = 900(°) 900 – sum of 4 angles given (594°) (=306) ÷3 (Each of the 3 angles is) 102(°)	M1 A1 M1 m1 A1 5	Or equivalent full method F.T. 'their 900' provided >594 Unique division by 3, no further operations Alternative: Corresponding exterior angles are 66(°), 30(°), 20(°) and 10(°) B1 Remaining exterior angles = 360 – sum of exterior angles found (126°) (=234°) M1 ÷ 3 m1 (Each of the remaining 3 exterior angles =) 78(°) A1 (Each of the remaining 3 interior angles =) 102(°) A1 *F.T. provided B1, M1, m1, 180 – 'their 78'*
11. (a) 2, 2, 2, 2, 3, 3. $2^4 \times 3^2$ (b) (i) 12 OR $2^2 \times 3$ (ii) 720 OR $2^4 \times 3^2 \times 5$	M1 A1 B1 B1 B1 5	For a method that produces 2 prime factors from the set {2,2,2,2,3,3}. C.A.O. for the sight of the six correct factors and no extras (ignore 1s). F.T. their answer if at least one index form used with at least a square. Allow $(2^4)(3^2)$ or $2^4 . 3^2$. Inclusion of 1 as a factor is B0. F.T. 'their answer to (a)' if of equivalent difficulty. F.T. 'their answer to (a)' if of equivalent difficulty.
12.(a) $2n < 11$ $n < 11/2$ OR $n < 5{\cdot}5$ (b) 5	B1 B1 B1 3	Use of '=' is B0 unless restored for final answer. Implies 1st B1. F.T. their answer to (.a)
13. One correct evaluation $4 \le x \le 5$ 2 correct evaluations $4{\cdot}65 \le x \le 4{\cdot}85$, one < 0 one > 0. 2 correct evaluations $4{\cdot}75 \le x \le 4{\cdot}85$, one < 0 one > 0. $x = 4{\cdot}8$	 B1 B1 M1 A1 4	*Correct evaluation regarded as enough to identify if negative or positive. If evaluations not seen accept 'too high' or 'too low'.* x — $x^3 - 7x - 75$ 4 — –39 4·1 — –34·779 4·2 — –30·312 4·3 — –25·593 4·4 — –20·616 4·5 — –15·375 4·6 — –9·864 — 4·65 — –7·005... 4·7 — –4·077 — 4·75 — –1·078... 4·8 — 1·992 — 4·85 — 5·134... 4·9 — 8·349 5 — 15

GCSE Mathematics Unit 2: Intermediate Tier	Marks	Comments
14.(a) 0.35 0.8 0.2 0.8 on the correct branches (b) 0.65 × 0.2 = 0.13	B2 M1 A1 4	B1 for any two correct entries. Accept fractions
15. Sight of (Perimeter of bed A=) $2x + 2y = 18$ AND (Perimeter of bed B=) $4x + 2y + 6 = 34$ or equivalent Correct method to solve equations simultaneously. $x = 5$ $y = 4$ (Area of B =) 10 × 7 = 70(m^2) Organisation and communication Accuracy of writing	B1 M1 A1 A1 M1 A1 OC1 W1 8	 F.T. 'their equations' if of equivalent difficulty. Both values consistent with 'their equations'. F.T. 'their derived values for x and y'. $2x \times (y + 3)$
16. $(x - 5)(x + 4)$ $x = 5$ AND $x = -4$	B2 B1 3	B1 for $(x \ldots 5)(x \ldots 4)$. Strict F.T. from their brackets
17. (a) (0 , 2) (b) 7 units (c) $y = \frac{-x}{7} + 3$	B1 B1 B1 3	
18. (a) *AD* = 16 × sin56° = 13·2(64...)(cm) OR 13·3(cm) (b) (*EC* =) 9·7(...) tan x = $\frac{9{\cdot}7(\ldots)}{15}$ x = 32·9...(°) or 33(°)	M2 A1 B1 M1 A1 6	M1 for sin56° = *AD*/16 C.A.O. Allow 13 from correct work but penalise final answer –1 for premature approximation F.T. 23 – 'their *AD*'. F.T. 'their *EC*'