UNIT 1: NON-CALCULATOR, HIGHER 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 1: NON-CALCULATOR, HIGHER TIER

GCSE Mathematics Unit 1: Higher Tier	Mark	Comments
1. (a) $1 - (0{\cdot}45 + 0{\cdot}1 + 0{\cdot}25)$ $= 0{\cdot}2$	M1 A1	
(b) $0{\cdot}1 + 0{\cdot}25$ $= 0{\cdot}35$	M1 A1	
(c) $0{\cdot}1 \times 0{\cdot}25$ $= 0{\cdot}025$	M1 A1 6	
2. (a) -4	B1	
(b) Six correct plots.	B1	F.T 'their $(2, -4)$'.
Curve drawn.	B1	F.T. 'their plots'.
(c) Correct solutions <u>from their graph</u>.	B1	Answers should be accurate to within 1 small square.
(d) Line $y = -3$ drawn	B2	B1 for sight of $x^2 - 3x - 2 = -3$ or $y = -3$
Correct roots <u>from their graphs</u>.	B1	F.T. if a straight line is drawn that intersects their curve twice. Answers should be accurate to within 1 small square.
	7	
3. (a) Correct construction of 60°.	B2	With sight of accurate 'method arcs'. B1 for sight of 'method arcs' but not drawn accurately.
Correct bisector of 60°.	B1	F.T. 'their 60°'. With sight of accurate 'method arcs'. Penalise –1 if not drawn in correct position.
(b) Exterior angle = $45^{(\circ)}$	B1	
(Number of sides =) $\frac{360}{45}$	M1	
$= 8$	A1	
(c) $\begin{pmatrix} 8 \\ -2 \end{pmatrix}$	B1	
	7	
4. (a) (£)250	B2	B1 for sight of (£)400/8 or (£)50.
(b) $\frac{(£)63 \times 100}{105}$ or equivalent e.g. $63 \div 1{\cdot}05$	M1	
= (£)60	A1 4	
5. (a) 1/8	B1	
(b) 0·2222….	B1	
(c) 1	B1 3	

GCSE Mathematics Unit 1: Higher Tier	Mark	Comments
6. (a) 0·2 AND 0·16 (b) Suitable uniform scale AND correct plots. (c) 0·16 AND e.g. 'because calculated from the greatest number of throws'. (d) Yes AND e.g. 'because 0·16 (or 80/500) is close to 1/6.	B1 B1 B1 B1 4	 F.T 'their 0·2 and 0·16'. F.T 'their 0·16'. F.T 'their 0·16'.
7. (a) $1{\cdot}23 \times 10^{-1}$ (b) 5×10^{-4}	B2 B2 4	B1 for a correct value not in standard form. e.g. $12{\cdot}3 \times 10^{-2}$ B1 for a correct value not in standard form. e.g. $0{\cdot}5 \times 10^{-3}$
8. $n^2 + 3$ or equivalent.	B2 2	B1 for $n^2 \pm$ …… (not for n^2).
9. Correct enlargement	B3 3	B2 for scale factor of ½ with centre A. B1 for scale factor of ±½ anywhere.
10. (a) $y \propto 1/x^2$ OR $y = k/x^2$ $5 = k/2^2$ $y = 20/x^2$ (b) x | 2 | 0·5 | **(±)10** y | 5 | **80** | 0·2	B1 M1 A1 B2 5	 Must be in correct form, not a F.T. F.T. non-linear only. B1 for each value.
11. Sight of $4(x + 2)(x + 9)$ $(x + 2)(x + 9) = 912/4$ OR $4(x^2 + 2x + 9x + 18) = 912$ $x^2 + 11x - 210 = 0$ $(x + 21)(x - 10) = 0$ $x = 10$ or $x = -21$ Dimensions (4cm), 12(cm) and 19(cm) Statement about ignoring $x = -21$ as it leads to negative lengths Organisation and communication Accuracy of writing	B1 M1 A1 M1 A1 A1 EI OC1 W1 9	 Must be in this form. Correct intermediate steps required before A1 awarded. F.T. from equivalent level of quadratic. Must have both solutions.
12. (a) $16a^{12}$ (b) $\pm\sqrt{(h^2 - a^2)}$	B1 B1 2	

GCSE Mathematics Unit 1: Higher Tier	Mark	Comments
13. (a) $x = 0{\cdot}47878.....$ **and** $100x = 47{\cdot}878...$ with an attempt to subtract.	M1	Or $10x$ **and** $1000x$ with an attempt to subtract, or equivalent.
$474 / 990$ ISW.	A1	An answer of $\frac{47.4}{99}$ gains M1 only.
(b) $16 - 4\sqrt{3} - 4\sqrt{3} + 3$	B1	
$= 19 - 8\sqrt{3}$	B1	F.T. for addition of at least two irrational numbers.
$a = 19$ AND $b = -8$	B1	C.A.O.
(c) $\frac{1}{9}$	B2	B1 for 9^{-1} or $\frac{1}{3^2}$ or $\frac{1}{\sqrt[3]{729}}$
	7	
14.(a) Concave down curve with		*Allow appropriate marking of axes if coordinates not given.*
y-coordinate of maximum = 4	B1	
x-coordinate of maximum = -3	B1	
Points $(-7,0)$ AND $(1, 0)$ shown.	B1	
(b) Concave **down** curve that is symmetrical about the y-axis.	B1	
$(0, 3)$ indicated.	B1	
(c) A comment regarding no scale or coordinates shown.	B1	
	6	
15. Angle CAB = x	B1	May be indicated on the diagram.
(Reason) Alternate segment theorem.	E1	E1 dependent on previous B1.
Angle ABC = $\frac{180 - x}{2}$ $\left(= 90 - \frac{1}{2}x\right)$	B1	
(Reason) isosceles triangle.	E1	E1 dependent on previous B1.
	4	
16.(a) (i) Indicates sequence as 'Miss', 'Miss', 'Hit'.	S1	
$0{\cdot}7 \times 0{\cdot}7 \times 0{\cdot}3$	M1	
$= 0{\cdot}147$	A1	
(ii) Indicates three possible situations		May be indicated by $0{\cdot}3 \times 0{\cdot}7 \times 0{\cdot}7 \times 3$ or equivalent.
HMM or MHM or MMH	M1	F.T. 'their 0·147' × 3
0·441	A1	F.T. 'their 0·441'
Less than a 50% chance.	A1	
(b) Indicates that the first ball selected is returned to the box before the second ball is selected OR the two attempts are independent.	B1	
	7	