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 ($\checkmark$ indicates correct working following an error and $\cancel{\checkmark}$ 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 <u>data</u> 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
(b) Six correct plots.
  Curve drawn.
(c) Correct solutions <u>from their graph</u>.
 	
(d) Line $y = -3$ drawn
  Correct roots <u>from their graphs</u>.
	B1
	B1
	B1
	B1
	
	B2
	B1
	
	7
		
		F.T 'their $(2, -4)$'.
		F.T. 'their plots'.
		Answers should be accurate to within 1 small square.
		
		B1 for sight of $x^2 - 3x - 2 = -3$ or $y = -3$
		F.T. if a straight line is drawn that intersects their curve twice.
		Answers should be accurate to within 1 small square.

3. (a) Correct construction of 60°.
 	
  Correct bisector of 60°.
 	
(b) Exterior angle = $45^{(\circ)}$
  (Number of sides =) $\dfrac{360}{45}$
   $= 8$
 	
(c) $\begin{pmatrix} 8 \\ -2 \end{pmatrix}$
	B2
	
	B1
	
	B1
	M1
	
	A1
	
	B1
	7
		With sight of accurate 'method arcs'.
		B1 for sight of 'method arcs' but not drawn accurately.
		F.T. 'their 60°'. With sight of accurate 'method arcs'.
		Penalise −1 if not drawn in correct position.

4. (a) (£)250 (b) $\dfrac{(£)63 \times 100}{105}$ or equivalent e.g. 63 ÷ 1·05 $= (£)60$	B2 M1 A1 4	B1 for sight of (£)400/8 or (£)50.
5. (a) 1/8 (b) 0·2222…. (c) 1	B1 B1 B1 3	

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

For question 10(b):

x	2	0·5	**(±)10**
y	5	**80**	0·2

GCSE Mathematics Unit 1: Higher Tier	Mark	Comments
13. (a) $x = 0 \cdot 47878.....$ **and** $100x = 47 \cdot 878...$ with an attempt to subtract. $474 / 990$ ISW.	M1 A1	Or $10x$ **and** $1000x$ with an attempt to subtract, or equivalent. An answer of $\dfrac{47.4}{99}$ gains M1 only.
(b) $16 - 4\sqrt{3} - 4\sqrt{3} + 3$ $= 19 - 8\sqrt{3}$ $a = 19$ AND $b = -8$	B1 B1 B1	 F.T. for addition of at least two irrational numbers. C.A.O.
(c) $\dfrac{1}{9}$	B2	B1 for 9^{-1} or $\dfrac{1}{3^2}$ or $\dfrac{1}{\sqrt[3]{729}}$
	7	

14.(a) Concave down curve with
    y-coordinate of maximum = 4
    x-coordinate of maximum = –3
    Points $(-7,0)$ AND $(1, 0)$ shown.
	B1
	B1
	B1
		Allow appropriate marking of axes if coordinates not given.

(b) Concave **down** curve that is symmetrical about the y-axis. $(0, 3)$ indicated.	B1 B1	
(c) A comment regarding no scale or coordinates shown.	B1	
	6	

15.   Angle CAB $= x$
    (Reason) Alternate segment theorem.
 	
Angle ABC = $\dfrac{180 - x}{2}$ $(= 90 - \dfrac{1}{2}x)$
    (Reason) isosceles triangle.
	B1
	E1
	
	B1
	
	E1
		May be indicated on the diagram.
		E1 dependent on previous B1.
		
		E1 dependent on previous B1.

	4	

16.(a) (i) Indicates sequence as
    'Miss', 'Miss', 'Hit'.
    $0 \cdot 7 \times 0 \cdot 7 \times 0 \cdot 3$
    $= 0 \cdot 147$
	S1
	M1
	A1	

(ii) Indicates three possible situations
    HMM or MHM or MMH
    $0 \cdot 441$
    Less than a 50% chance.
	M1
	A1
	A1
		May be indicated by $0 \cdot 3 \times 0 \cdot 7 \times 0 \cdot 7 \times 3$ or equivalent.
		F.T. 'their $0 \cdot 147$' $\times 3$
		F.T. 'their $0 \cdot 441$'

(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	