



GCSE MATHEMATICS 8300/3H

Higher Tier

Paper 3 Calculator

Shadow paper based on November 2022 paper

Mark scheme

November 2022

Version: 1.0

Mark schemes are prepared by the Lead Assessment Writer and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all associates participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every associate understands and applies it in the same correct way. As preparation for standardisation each associate analyses a number of students' scripts. Alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

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Glossary for Mark Schemes

GCSE examinations are marked in such a way as to award positive achievement wherever possible. Thus, for GCSE Mathematics papers, marks are awarded under various categories.

If a student uses a method which is not explicitly covered by the mark scheme the same principles of marking should be applied. Credit should be given to any valid methods. Examiners should seek advice from their senior examiner if in any doubt.

M	Method marks are awarded for a correct method which could lead to a correct answer.
A	Accuracy marks are awarded when following on from a correct method. It is not necessary to always see the method. This can be implied.
B	Marks awarded independent of method.
ft	Follow through marks. Marks awarded for correct working following a mistake in an earlier step.
SC	Special case. Marks awarded for a common misinterpretation which has some mathematical worth.
M dep	A method mark dependent on a previous method mark being awarded.
B dep	A mark that can only be awarded if a previous independent mark has been awarded.
oe	Or equivalent. Accept answers that are equivalent. eg accept 0.5 as well as $\frac{1}{2}$
[a, b]	Accept values between a and b inclusive.
[a, b)	Accept values $a \leq \text{value} < b$
3.14...	Accept answers which begin 3.14 eg 3.14, 3.142, 3.1416
Use of brackets	It is not necessary to see the bracketed work to award the marks.

Examiners should consistently apply the following principles.

Diagrams

Diagrams that have working on them should be treated like normal responses. If a diagram has been written on but the correct response is within the answer space, the work within the answer space should be marked. Working on diagrams that contradicts work within the answer space is not to be considered as choice but as working, and is not, therefore, penalised.

Responses which appear to come from incorrect methods

Whenever there is doubt as to whether a student has used an incorrect method to obtain an answer, as a general principle, the benefit of doubt must be given to the student. In cases where there is no doubt that the answer has come from incorrect working then the student should be penalised.

Questions which ask students to show working

Instructions on marking will be given but usually marks are not awarded to students who show no working.

Questions which do not ask students to show working

As a general principle, a correct response is awarded full marks.

Misread or miscopy

Students often copy values from a question incorrectly. If the examiner thinks that the student has made a genuine misread, then only the accuracy marks (A or B marks), up to a maximum of 2 marks are penalised. The method marks can still be awarded.

Further work

Once the correct answer has been seen, further working may be ignored unless it goes on to contradict the correct answer.

Choice

When a choice of answers and/or methods is given, mark each attempt. If both methods are valid then M marks can be awarded but any incorrect answer or method would result in marks being lost.

Work not replaced

Erased or crossed out work that is still legible should be marked.

Work replaced

Erased or crossed out work that has been replaced is not awarded marks.

Premature approximation

Rounding off too early can lead to inaccuracy in the final answer. This should be penalised by 1 mark unless instructed otherwise.

Continental notation

Accept a comma used instead of a decimal point (for example, in measurements or currency), provided that it is clear to the examiner that the student intended it to be a decimal point.

Q	Answer	Mark	Comment
1	4	B1	

Q	Answer	Mark	Comment
2	0.0029	B1	

Q	Answer	Mark	Comment
3	$6x^5 + 12x^3$	B1	

Q	Answer	Mark	Comment
4	$20 < y < 200$	B1	

Q	Answer	Mark	Comments
5	$\frac{1}{2} \times (17 + 25) \times 13$ or 273	M1	oe any correct method to find the area of the trapezium
	$\frac{1}{2} \times 12 \times 9$ or 54	M1	oe eg $\frac{1}{2} \times 12 \times 9 \times \sin 90$
	327	A1	
	Additional Guidance		
	Up to M2 may be awarded for correct work, with no or incorrect answer, even if this is seen amongst multiple attempts		
	Ignore Pythagoras' theorem, trigonometry or perimeter calculations		
	$17 \times 13 + \frac{1}{2} \times 8 \times 13$	M1	
	Missing brackets must be recovered eg1 $\frac{1}{2} \times 25 + 17 \times 13$ and 327		M1
	eg2 $\frac{1}{2} \times 25 + 17 \times 13$		M0
$25 \times 13 = 325$		M0M0A0	

Q	Answer	Mark	Comments
6	Alternative method 1		
	$96 \div 8 \times 3$ or 36	M1	oe $96 \div 8 \times 11$ or 132 implies M1
	96×2.5 or 240	M1	oe eg $96 \times 5 \div 2$ 23×12 implies M2
	36 and 240 and 372 or $350 - 36 - 240 = 74$	A1	oe eg1 276 and 372 eg2 36 and 240 and 22 eg3 276 and $(350 - 96 =) 254$
	Alternative method 2		
	8×2.5 or 20	M1	oe eg1 $8 \times 5 \div 2$ eg2 $8 : 3 : 20$
	$96 \div 8 \times (8 + 3 + \text{their } 20)$ or $96 \div 8 \times 3$ and $96 \div 8 \times \text{their } 20$	M1dep	oe eg 12×31 23×12 implies M2
	20 and 372 or 36 and 240 and 372 or $350 - 36 - 240 = 74$	A1	oe eg1 276 and 372 eg2 36 and 240 and 22 eg3 276 and $(350 - 96 =) 254$
	Additional Guidance		
	Up to M2 may be awarded for correct work, with no or incorrect answer, even if this is seen amongst multiple attempts		
	In Alt 1 the 2nd mark is not dependent In Alt 2 the 2nd mark is dependent		
	372 alone or 372 with no correct method		M0
	$96 \div 8 \times 11 = 132$ and $132 + 240 = 372$		M1M1A1
	$2\frac{1}{2} \times 96 = 240$ and $96 + 240 = 336$ and $96 + 36 + 240 = 372$		M1M1A1
	$2\frac{1}{2} \times 96 = 240$		M1
$2\frac{1}{2}$ of 96 = 240		M0	
$96 \div 11$		M0	

Q	Answer	Mark	Comments
7(a)	Alternative method 1		
	29	B3	B2 55 or 26 + 29 or 84 – 29 or $\frac{84 - 26}{2}$ or $\frac{58}{2}$ B1 84 – 26 or 58
	Alternative method 2		
	$26 + x$ or $84 - x$	M1	oe
	$x + 26 + x = 84$ or $2x + 26 = 84$ or $\frac{84 - 26}{2}$ or $\frac{58}{2}$	M1dep	oe eg $26 + x = 84 - x$
	29	A1	
	Additional Guidance		
	$26 + x = 84$		M1

Q	Answer	Mark	Comments
	No and gives valid reason	B1	eg No and the first term is -1 or No and the second term is zero or No and $1^2 - 2 = -1$ or or $2^2 - 4 = 0$ or No and all the terms are positive except the first two
Additional Guidance			
	Ignore incorrect or irrelevant statements alongside correct statements		
	Ignore all other statements and evaluations if $1^2 - 2 = -1$ or $2^2 - 4 = 0$ seen		
	Ticks Yes		B0
	No and $-1, 0, 3, 8, \dots$		B1
7(b)	No and $1^2 - 2 = -1$ with $2^2 - 2 = 2$		B1
	No and $4 = 2^2$		B1
	No and $2^2 - 4 = 0$ (0 is positive) (condone)		B1
	No and n^2 can be equal to $2n$ and $2^2 = 4$		B1
	No and n^2 can be equal to $2n$		B0
	No and if you put $n = 1$ it's negative		B1
	No and $n^2 = 1$ and $2n = 2$		B1
	No, all the terms are positive except when $n = 1$ or 2		B1
	No and if $n = 2$ it creates 0		B1
	No, not when $n = 1$		B0
	No, it doesn't work for the first term		B0
	No and $0.5^2 - (2 \times 0.5) = -0.75$		B0
	No and when $n = 0$ it won't be positive		B0

Q	Answer	Mark	Comments	
8	56 × 68 or 3808 or 32 × 85 or 2720 or $\frac{3808}{2720}$ or $\frac{476}{340}$ or $\frac{7}{5}$	M1		
	1.4	A1		
	Additional Guidance			
	M1 may be awarded for correct work, with no or incorrect answer, even if this is seen amongst multiple attempts			
	Ignore attempts at rounding after correct answer seen			
	Condone use of units in answer eg 1.4 kg			M1A1
	$\frac{7}{5} = 1.4$ on answer line			M1A1
	$\frac{7}{5}$ and 1.4 on answer line			M1A0
	$\frac{47.6}{34}$			M1A0
	$\frac{68}{85} = 0.8$			M0A0

Q	Answer	Mark	Comments
	$-\frac{8}{5}$ or $-1\frac{3}{5}$ or -1.6	B2	B1 $\frac{8}{5}$ or $1\frac{3}{5}$ or 1.6 or $x - 5$ and $y + 8$ or possible coordinates for P and Q stated or shown on a diagram eg $P(5, 0)$ and $Q(0, 8)$ or right-angled triangle shown with 5 as horizontal length and 8 as vertical length
Additional Guidance			
	B1 may be awarded for correct work, with no or incorrect answer, even if this is seen amongst multiple attempts		
9	Ignore attempts at rounding after correct answer seen		
	Accept $\frac{8}{-5}$		B2
	Condone $\frac{-8}{5}$		B2
	$(x - 5)(y + 8)$		B1
	$x - 5$ and $y + 8$ may be seen embedded in a fraction eg $\frac{y - (y + 8)}{x - (x - 5)}$ or $\frac{y - (y + 8)}{x + (x - 5)}$		B1
	$-\frac{5}{8}$		B0
	$\frac{5}{8}$		B0

Q	Answer	Mark	Comments
10	Alternative method 1		
	$0.55 \times (200 + 20)$ or 0.55×220 or 121	M1	oe
	their 121 – 104 or 17	M1dep	
	17 : 3	A1	SC2 answer 3 : 17
	Alternative method 2		
	$(1 - 0.55) \times (200 + 20)$ or 0.45×220 or 99	M1	oe
	their 99 – 96 or 3	M1dep	
	17 : 3	A1	SC2 answer 3 : 17
	Additional Guidance		
	Up to M2 may be awarded for correct work, with no or incorrect answer, even if this is seen amongst multiple attempts		
	121 : 99 or 99 : 121		M1M0A0
	0.45 : 0.55		M0M0A0
	Beware of 121 and 99 from incorrect working		M0

Q	Answer	Mark	Comments	
11	$0.5 \times \pi \times 65$ or $0.5 \times [204, 204.204]$ or $[102, 102.102]$ or $0.5 \times \pi \times 65 + 85$ or $[187, 187.102]$	M1	oe eg 32.5π	
	$(0.5 \times \pi \times 65 + 85) \div 24$ or their $[187, 187.102] \div 24$	M1	oe their $[187, 187.1]$ can be any value	
	$[7.79, 7.80]$	A1	may be implied by 7.8	
	7.8	B1ft	ft any answer seen with greater than 2 sf SC2 4.3	
	Additional Guidance			
	Up to M2 may be awarded for correct work, with no or incorrect answer, even if this is seen amongst multiple attempts, B1ft may also be awarded			
	$\frac{150}{24} = 6.25$ answer 6.3			M0M1A0B1ft
	$\frac{150}{24} = 6.25$			M0M1A0B0ft
	$0.5 \times \pi \times 65$ and $102.1 \div 24 = 4.25$ answer 4.3			M1M1A0B1ft
SC2 for an answer of 4.3 without working is when 85 is not used				

Q	Answer	Mark	Comment
12	Alternative method 1: ABC to DEF		
	Translation and $\begin{pmatrix} 1 \\ -6 \end{pmatrix}$ or 1 right and 6 down	B2	B1 translation or $\begin{pmatrix} 1 \\ -6 \end{pmatrix}$ or 1 right and 6 down
	Alternative method 2: DEF to ABC		
	Translation and $\begin{pmatrix} -1 \\ 6 \end{pmatrix}$ or 1 left and 6 up	B2	B1 translation or $\begin{pmatrix} -1 \\ 6 \end{pmatrix}$ or 1 left and 6 up
	Additional Guidance		
	Do not accept 'across' for left or right		
	Do not accept (6, -1)		
	Do not accept any contradicting description and vector for B2 or B1		
	Ignore fraction line shown in a correct vector		
	Accept the vector implied by addition to each coordinate oe eg Translation and $A \text{ to } D \rightarrow -2 + 1 = -1 \text{ and } 5 - 6 = -1$ $B \text{ to } E \rightarrow -3 + 1 = -2 \text{ and } 1 - 6 = -5$ $C \text{ to } F \rightarrow 1 + 1 = 2 \text{ and } 1 - 6 = -5$		B2
More than one transformation used		B0	

Q	Answer	Mark	Comment
13(a)	The probabilities don't sum to 1	B1	oe eg $0.1 + 0.3 + 0.5 = 0.9$
	Additional Guidance		
	Ignore comments about the dice, eg $0.5 + 0.5 = 1$		
	Do not accept an incorrect statement alongside a correct one eg they don't add up to 1 and $0.1 + 0.4 + 0.5 \neq 1$		B0
	All probabilities add up to 90%		B1
	It could include other colours		B0
	They don't add to a whole number		B0
	The probabilities are not zero		B0
	The only colours on the tree diagram are red, blue and green		B0

Q	Answer	Mark	Comment
13(b)	0.8	B1	

Q	Answer	Mark	Comment
13(c)	0.15	B1	

Q	Answer	Mark	Comment
14(a)	$\sqrt{529}$ or 23	M1	
	(their 23) ³ or 12 167	M1dep	12 167 implies M1M1
	8.5169 ÷ their 12 167 or 0.0007 or digits 85 169 ÷ their 12 167	M1dep	oe eg 7×10^{-4} eg 8516.9 ÷ their 12 167
	0.7	A1	oe
	Additional Guidance		
	529 × 6 or 529 ÷ 6 or 529 ÷ 2		MOMOM0A0

Q	Answer	Mark	Comment
14(b)	It is not possible to tell	B1	

Q	Answer	Mark	Comment
15(a)	Vertical line drawn from correct point on graph to horizontal axis or [25, 27]	M1	implied by mark on horizontal axis
	[9.25, 9.27] (am)	A1	SC1 9.23 (am)

Q	Answer	Mark	Comment
15(b)	70	B1	Accept [68, 72]

Q	Answer	Mark	Comment
15(c)	Correct tangent drawn where charge is 80%	M1	
	Correct gradient for their tangent	A1	
	Additional Guidance		
	No tangent drawn		M0A0

Q	Answer	Mark	Comment
16(a)	Alternative method 1		
	$R \propto \frac{1}{\sqrt{S}}$ or $R = \frac{k}{\sqrt{S}}$	M1	oe equation any letter implied by $21 = \frac{k}{\sqrt{49}}$
	$(k =) 3 \times \sqrt{49}$ or $(k =) 21$	M1dep	oe
	$R = \frac{21}{\sqrt{S}}$	A1	oe equation SC1 $R = \frac{3}{7} \sqrt{S}$ or $\frac{3}{7} R = \sqrt{S}$
	Alternative method 2		
	$R \propto \frac{1}{\sqrt{S}}$ or $cR \propto \frac{1}{\sqrt{S}}$	M1	oe equation any letter implied by $21c = \frac{1}{\sqrt{49}}$
	$(c =) \frac{1}{3\sqrt{49}}$ or $(c =) \frac{1}{21}$	M1dep	oe
	$\frac{R}{21} = \frac{1}{\sqrt{S}}$	A1	oe equation SC1 $R = \frac{3}{7} \sqrt{S}$ or $\frac{3}{7} R = \sqrt{S}$
	Additional Guidance		
	Up to M2 may be awarded for correct work, with no or incorrect answer, even if this is seen amongst multiple attempts		
$(k =) 21$ or $(k \propto) 21$ or $(c =) \frac{1}{21}$ or $(c \propto) \frac{1}{21}$		M1M1	
Condone use of α for up to M1M1A0 eg $R \propto \frac{k}{\sqrt{S}}$ $k \propto 21$ $R \propto \frac{21}{\sqrt{S}}$			

Q	Answer	Mark	Comment
16(b)	$\frac{\text{their } 21}{\sqrt{9}}$ or $\frac{\text{their } 21}{3}$	M1	oe
	7	A1ft	ft their equation of the form $R = \frac{k}{\sqrt{S}}$ $cR = \frac{1}{\sqrt{S}}$
	Additional Guidance		
	$k = 42$ in part (a) then $R = \frac{42}{\sqrt{9}}$ and $R = 14$		M1A1ft

	Answer	Mark	Comment
17	$BOD = 2 \times 28$ or 56	M1	oe eg $BOC = 56$ may be seen on diagram
	$OBD = 90$	M1	may be seen on diagram or implied by further working or answer
	34	A1	
	Additional Guidance		
	90 can be implied by a square angle sign		
	180 – 146 implies M1M1		

Q	Answer	Mark	Comment	
18	$15g - 10$	B1		
	their $15g + 7g - hg = h^3 +$ their 10 or $22g - hg = h^3 +$ their 10	M1	collects terms after expansion	
	$g(\text{their } 15 + 7 - h) = h^3 +$ their 10 or $g(22 - h) = h^3 +$ their 10 or $\frac{h^3 + 10}{22 - h}$	M1dep	factorises	
	$g = \frac{h^3 + 10}{22 - h}$	A1	oe in the form $g =$ eg $g = \frac{-h^3 - 10}{h - 22}$	
	Additional Guidance			
	$g = \frac{h^3 + 10}{22 - h}$ in working, with $\frac{h^3 + 10}{22 - h}$ on answer line		B1M1M1A1	
	$15g - 2$ $22g - hg = h^3 + 2$ $g(22 - h) = h^3 + 2$ $g = \frac{h^3 + 2}{22 - h}$	B0 M1 M1 A0		

Q	Answer	Mark	Comment
19	$x^2 + y^2 = 169$ or $x^2 + y^2 = 13^2$	B1	oe equation
	Additional Guidance		
	$(x - 0)^2 + (y - 0)^2 = 13^2$	B1	
	$x^2 + y^2 = 13^2$ followed by incorrect working	B1	

Q	Answer	Mark	Comment
20(a)	0.85×0.8^2 or 0.85×0.64	M1	oe
	0.544 or 0.54 or $\frac{68}{125}$	A1	oe fraction decimal or percentage
	Additional Guidance		
	Ignore any attempt to convert a correct answer		M1A1

Q	Answer	Mark	Comment
20(b)	Alternative method 1		
	(late, on time \Rightarrow) $(1 - 0.75) \times 0.75$ or 0.25×0.75 or 0.1875 or (on time, late \Rightarrow) $0.75 \times (1 - 0.8)$ or 0.75×0.2 or 0.15	M1	may be seen on tree diagram
	$(1 - 0.75) \times 0.75 + 0.75 \times (1 - 0.8)$ or $0.1875 + 0.15$	M1dep	oe
	0.3375 or $\frac{27}{80}$	A1	oe fraction, decimal or percentage Accept 0.338 or 0.34 with M1 scored
	Alternative method 2		
	(late, late \Rightarrow) $(1 - 0.75)^2$ or 0.25^2 or 0.0625 or (on time, on time \Rightarrow) 0.75×0.8 or 0.6	M1	may be seen on tree diagram
	$1 - (1 - 0.75)^2 - 0.75 \times 0.8$ or $1 - 0.0625 - 0.6$	M1dep	oe
	0.3375 or $\frac{27}{80}$	A1	oe fraction, decimal or percentage Accept 0.338 or 0.34 with M1 scored
	Additional Guidance		
	Up to M2 may be awarded for correct work, with no or incorrect answer, even if this is seen amongst multiple attempts		

	Ignore any attempt to convert a correct answer	M1M1A1
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Q	Answer	Mark	Comment
21(a)	-2	B1	may be seen on diagram

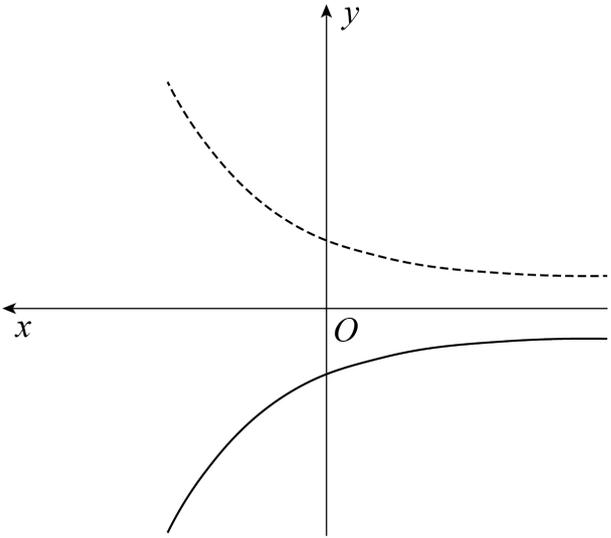
Q	Answer	Mark	Comment
21(b)	(2, -1)	B1	may be seen on diagram

Q	Answer	Mark	Comment	
22	$\frac{6}{2(x+2)}$ or $\frac{(5x-6)(x+2)}{2(x+2)}$ or $\frac{2 \times 3x(x+2)}{2(x+2)}$	M1	oe one correct term with possible common denominator	
	$\frac{6}{2(x+2)}$ and $\frac{(5x-6)(x+2)}{2(x+2)}$ and $\frac{2 \times 3x(x+2)}{2(x+2)}$	M1dep	oe all terms correct with common denominator may be a single fraction	
	$\frac{6}{2(x+2)} + \frac{5x^2 + 10x - 6x - 12}{2(x+2)}$ $+ \frac{6x^2 + 12x}{2(x+2)}$	M1dep	oe all terms correct with common denominator and brackets on numerator expanded	
	$\frac{11x^2 + 16x - 6}{2(x+2)}$	A1	SC3 $11x^2 + 16x - 6 (= 0)$ or $\frac{11x^2 + 16x - 6}{2x+2}$	
	Additional Guidance			
	Do not award A mark if further incorrect simplification is seen after a correct answer			
2(x + 2) can be 2x + 4 throughout				

Q	Answer	Mark	Comment	
23	$\frac{1}{3} \times 12^2 \times 28 \times \pi$ or 1344π or [4222, 4222.301]	M1	oe	
	$\frac{2}{3} \times 9^3 \times \pi$ or 486π or [1526.8, 1527]	M1		
	$28 \times \frac{9}{12}$ or 21 or $\left(\frac{9}{12}\right)^3$	M1	oe implied by 567π or [1781, 1781.3]	
	$\frac{1}{3} \times 12^2 \times 28 \times \pi - \frac{1}{3} \times 9^2 \times \text{their}$ $21 \times \pi$ or $\frac{1}{3} \times 12^2 \times 28 \times \pi - \frac{1}{3} \times 12^2 \times 28$ $\times \left(\frac{9}{12}\right)^3 \times \pi$ or $1344\pi - 567\pi$ or their [4222, 4222.301] – their [1781, 1781.3] or 777π or [2440.7, 2441.301]	M1dep	dep on 1st and 3rd M1	
	291π or [913.7, 914.501]	A1		
	Additional Guidance			
	All values may be seen on diagrams			

Q	Answer	Mark	Comment																	
24	0.75 or 0.9 or 1.05	M1	oe																	
	$150\,000 \times 0.75$ or 112 500	M1	M3 for																	
	their $112\,500 \times 0.9^3$ or 82 012.5(0) or their $112\,500 \times 0.9^4$ or 73 811.25	M1dep	$150\,000 \times 0.75 \times 0.9^3$ or 82 012.5(0) or $150\,000 \times 0.75 \times 0.9^4$ or 73 811.25																	
	$120\,000 \times 1.05^4$ or 145 860.75 or $120\,000 \times 1.04^5$ or [153 153.78, 153 153.79]	M1	oe																	
	82 012.5(0) and 73 811.25 and 145 860.75 and [153 153.78, 153 153.79]	A1	value of boat at years 4 and 5 value of house at years 4 and 5																	
	Additional Guidance																			
	73 811.25 and 153 153.78... with no values for year 4		M4A0																	
	73 811.25 and 153 153.78... with no method or other correct working or evaluations		M1M0M0M1A0																	
	112 500 implies M2																			
	$75\,000 + 15\,000 + 15\,000 + 7\,500 = 112\,500$		M1M1																	
$75\,000 + 15\,000 + 7\,500$		M0M1																		
Values by year																				
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;">Year</th> <th style="width: 35%;">Boat value (£)</th> <th style="width: 50%;">Flat value (£)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>112 500</td> <td>126 000</td> </tr> <tr> <td>2</td> <td>101 250</td> <td>132 300</td> </tr> <tr> <td>3</td> <td>91 125</td> <td>138 915</td> </tr> <tr> <td>4</td> <td>82 012.5(0)</td> <td>145 860.75</td> </tr> <tr> <td>5</td> <td>73 811.25</td> <td>[153 153.78, 153 153.79]</td> </tr> </tbody> </table>			Year	Boat value (£)	Flat value (£)	1	112 500	126 000	2	101 250	132 300	3	91 125	138 915	4	82 012.5(0)	145 860.75	5	73 811.25	[153 153.78, 153 153.79]
Year	Boat value (£)	Flat value (£)																		
1	112 500	126 000																		
2	101 250	132 300																		
3	91 125	138 915																		
4	82 012.5(0)	145 860.75																		
5	73 811.25	[153 153.78, 153 153.79]																		

Q	Answer	Mark	Comment	
25	8.35 or 8.45 or 15.15 or 15.25 or 114.5 or 115.5	B1		
	8.35 and 15.15 and 115.5 chosen	B1		
	0.5 × their 8.35 × their 15.15 × sin their 115.5	M1	their 8.35 must be [8.3, 8.35] their 15.15 must be [15.1, 15.15] their 115.5 must be [115.5, 116]	
	[57.0896, 57.1] with correct bounds seen	A1ft	condone 57 with B1B1 scored ft their three bounds within M1 ranges which are not 8.4 or 15.2 or 115	
	Additional Guidance			
	Accept 8.349 for 8.35 or 15.149 for 15.15 or 110.49 for 115.5			
	8.35 and 15.15 and 115.5 used and answer 57.08...			B1B0M1A1ft
	8.35 and 15.15 and 115 used and answer 57.325... or 57.3			B1B0M1A0ft
	8.3 and 15.1 and 115 used, with or without answer 56(.79...)			B0B0M1A0ft
57.0(8...) or 57 with no working			B0B0M0A0	

Q	Answer	Mark	Comment
26(a)	Reflection of given graph in the x -axis	B1	mark intention
	Additional Guidance		
			

Q	Answer	Mark	Comment
26(b)	Translation downwards of given graph which must go through $(0, -1)$	B1	mark intention, but must be negative for negative values of x and be positive for positive values of x drawn below dashed line
	Additional Guidance		
	