GCSE
MATHEMATICS
8300/1F

Foundation Tier Paper 1 Non-Calculator

Mark scheme

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Version: 1.0 Final

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.

Further copies of this mark scheme are available from aqa.org.uk

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 $a \leqslant$ 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	Comments
1(a)	30	B1	

Q	Answer	Mark	Comments
1(b)	-2	B1	

Q	Answer	Mark	Comments
1(c)	-9	B1	

Q	Answer	Mark	Comments
2	$P = 2r$	B1	

Q	Answer	Mark	Comments
3	30	B1	
	20	B1	
	(30 and 20 and) 600	B1ft	ft their 30 × their 20 with B1B0 or B0B1 SC1 (31 x 18 =) 558, answer 560
	Additional Guidance		
	Answer 600 with no working		B1B1B1
	Answer 558 with neither 30 nor 20 seen		B0B0B0
	30 × 18 with answer 540 31 × 20 with answer 620 and answer 600 (ignore further work) 31 × 20 with answer 600		B1B0B1ft B0B1B1ft B0B1B0ft

Q	Answer	Mark	Comments
4	22 – 4 or 18 or 22 ÷ 2 or 11 or 4 ÷ 2 or 2	M1	oe
	their 18 ÷ 2 or their 11 – their 2	M1dep	oe
	9	A1	may be seen on diagram SC1 20 or 14
	Additional Guidance		
	Ignore units or incorrect statements eg the lines are parallel		
	Condone poor notation eg 22 – 4 ÷ 2 = 9		M1M1A1
	Embedded answer of 9		M1M1A0

Q	Answer	Mark	Comments
5	RHV RVH VRH VHR HVR HRV	B2	any order B1 3 or 4 correct or 5 correct with 1 or more incorrect
	Additional Guidance		
	Accept any unambiguous indication of R, H, V		
	Ignore repeated orders		

Q	Answer	Mark	Comments
6(a)	20 or 19 and no incorrect evaluations and 3rd box indicated	B2	oe eg 30 and 29 and no incorrect evaluations and 3rd box indicated B1 20 or 19 or incorrect values seen and correct box indicated for their values SC1 3rd box indicated but no evaluations seen
	Additional Guidance		
	14 and 39 and 1st box indicated		B1
	Ignore any incorrect statements such as 20 < 19 if the correct box is ticked as they may be checking each statement		

Q	Answer	Mark	Comments
6(b)	34	B2	B1 (60 ÷ 2 =) 30 or (their 60 ÷ 2) + 4 evaluated
	Additional Guidance		
	Condone poor notation eg 60 ÷ 2 = 30 + 4 = 34		B2
	60 ÷ 2 = 20, answer 24 60 ÷ 2 = 20, 20 + 4 = 25 60 ÷ 2 = 20, 20 + 4 (no attempt at evaluation)		B1 B1 B0
	Condone 2 ÷ 60 = 30 (recovery seen)		B1
	60 ÷ 6 = 10		B0

Q	Answer	Mark	Comments
7	**Alternative method 1 – working in £**		
	Any correct conversion from pence to pounds	B1	may be seen at any stage
	$0.49 \times \frac{400}{100}$ or 0.49×4 or $0.14 \times \frac{250}{100}$ or 0.14×2.5	M1	
	1.96 or 0.35	A1	
	2.31	A1	
	Alternative method 2 – working in pence		
	$49 \times \frac{400}{100}$ or 49×4 or $14 \times \frac{250}{100}$ or 14×2.5	M1	
	196 or 35	A1	
	231	A1	
	2.31	B1ft	ft their 231 correctly converted to £
	Additional Guidance		
	Reward correct work seen amongst multiple attempts Use the scheme that gives the better mark		
	Condone p after their final answer eg £2.31p		

Q	Answer	Mark	Comments
8(a)	Five numbers with mode 8 and median 12	B2	B1 five numbers with mode 8 eg 2 5 8 8 8 or 8 10 19 4 8 or five numbers with median 12 eg –3 6 12 14 20 or 7 10 18 12 16
	Additional Guidance		
	8 8 12 16 25		B2
	8 8 8 8 8		B1
	12 12 12 12 12		B1
	Do not allow bimodal sets of numbers for mode 8 but median may still be 12 eg 8 8 12 12 13 eg 7 7 8 8 10		 B1 B0
	A set of four or more than five numbers may score B1 if the mode is 8 and the median is 12 eg 8 8 11 13 20 21 eg 8 8 16 17		 B1 B1

Q	Answer	Mark	Comments
8(b)	159	B1	
	Additional Guidance		
	Mark answer line but if blank allow unambiguous selection in the list of heights		

Q	Answer	Mark	Comments
9	$\frac{50}{100} \times 14$ or 7	M1	oe eg $14 \div 2$
	$14 - 5 + 1$ or 10 or their $7 - 5 + 1$ or 3	M1	oe their 7 must be an integer, where $4 <$ their $7 < 14$ 3 implies M1M1
	$\frac{3}{10}$ or 3 : 7	A1	oe
	30	B1ft	ft their $\frac{3}{10}$ correctly converted to a percentage
	Additional Guidance		
	For the B1ft, their percentage must be correct to 2sf or better		
	30 on the answer line with no incorrect working		M2A1B1
	3 in 10 or 3 out of 10		M2A1
	3 : 10		M2A0
	$7 - 5 = 3 + 1 = 4$, answer 40 (10 implied)		M2A0B1ft

Q	Answer	Mark	Comments
10(a)	$\frac{1}{3}$	B2	B1 (may be seen in diagram) 120 or 100 or 0.4(0) may be seen in a fraction eg $\frac{120}{40}$ or $\frac{0.4}{1.2}$ or correct, but unsimplified fraction eg $\frac{20}{60}$ or their fraction written in simplest form SC1 1 : 3

Additional Guidance	
Ignore units on answer line	
Do not ignore further work after $\frac{1}{3}$ seen	
If converting to mm both values must be correct	
$\frac{1}{3}$ given as a decimal or percentage must be correct to 2sf or better	B1
B1 for simplifying their fraction can only be awarded from the use of digits 1, 12 and 4, eg	
$\frac{40}{1200}$, answer $\frac{1}{30}$	B1
$\frac{1200}{40}$, answer 30	B1
$\frac{40}{1200}$, answer $\frac{1}{3}$	B0
$\frac{2}{4}$, answer $\frac{1}{2}$	B0
$\frac{0.04}{1.2}$, answer $\frac{1}{30}$	B1
$\frac{1}{40}$ or $\frac{40}{1} = 40$	B0

Q	Answer	Mark	Comments
10(b)	180 – 112 or 68 or $3y + y + 112 = 180$	M1	oe
	their 68 ÷ (3 + 1) or their 68 ÷ 4 or $y = \frac{\text{their 68}}{4}$ or 51 or $x = 17$	M1	oe their 68 must be < 180 but not 112 51 or $x = 17$ imply M1M1
	17	A1	
	Additional Guidance		
	Check diagram for workings and answer		
	17 seen in diagram or working and 51 on answer line		M1M1A0
	180 ÷ 4		M0M0
	68 ÷ 3		M1M0
	180 – 112 = 78 and 78 ÷ 4 78 ÷ 4		M1M1 M0M1
	Embedded answer eg $4 \times 17 + 112 = 180$		M1M1A0

Q	Answer	Mark	Comments
11(a)	12.2(0) – 8.65 or answer with 55p or 355	M1	oe
	3.55	A1	accept 355p SC1 6.85 or 685p (Company B used)
	Additional Guidance		
	Answer with 55p eg 4.55 or 455p eg 455		M1A0 M0A0
	Condone £3.55p		M1A1

Q	Answer	Mark	Comments
11(b)	7.25 × 12 or 725 × 12	M1	oe eg 7 × 12 + 0.25 × 12 accept repeated addition of twelve 7(.)25s
	Correct vertical method of long multiplication with at least one of 1450 and 7250 correct or Correct set up of grid method with at least three products correct or Correct set up of Gelosia method with at least three products correct or 10 × 725 = 7250 and 2 × 725 = 1450 attempted with at least one correct or 12 × 700 = 8400 and 12 × 20 = 240 and 12 × 5 = 60 attempted with at least one correct	M1dep	oe allow a placeholder space to be present instead of a physical zero in vertical method
	87(.00)	A1	SC2 103.8(0) or 146.4(0) or 169.2(0) or 190.8(0) or 256.2(0) or 250.2(0) or 315.6(0) SC1 8.65 × 12 or 12.2(0) × 12 or 14.1(0) × 12 or 15.9(0) × 12 or 21.35 × 12 or 20.85 × 12 or 26.3(0) × 12
	Additional Guidance		
	Condone 87.0		M2A1
	Accept answers in pence		
	Condone p after their final answer eg £87.00p		
	Method of repeated addition must have no more than one error. If broken down into groups, the one error made may be seen multiple times		

Q	Answer	Mark	Comments
12	$\frac{6}{18}$ or Converts both fractions to an appropriate common denominator with at least one correct numerator	M1	eg $\frac{33}{54}$ and $\frac{18}{54}$
	$\frac{5}{18}$	A1	oe fraction eg $\frac{15}{54}$ SC1 $\frac{17}{18}$ (oe fraction)
	Additional Guidance		
	Ignore incorrect attempt to simplify after correct answer seen		
	$\frac{22}{30}$ and $\frac{10}{30}$ not an appropriate denominator		M0

Q	Answer	Mark	Comments
13(a)	46 ÷ 2 or 23 or $4x = 46$	M1	oe
	their 23 ÷ 2 or 46 ÷ 2 ÷ 2 or 46 ÷ 4	M1dep	oe may be seen as a fraction eg $\frac{23}{2}$ or $11\frac{1}{2}$ or $\frac{46}{4}$ or $11\frac{2}{4}$
	11.5	A1	SC2 5.75 or 11 remainder 1
	Additional Guidance		
	46 ÷ 2 = 25, (25 ÷ 2 =) 12.5		M1M1A0
	46 ÷ 2 = 24, followed by 11		M1M0A0
	11.5 in working, different answer on answer line (do not ignore further work)		M1M1A0

Q	Answer	Mark	Comments
13(b)	**Alternative method 1**		
	$34 - k$ or $34 - 10$ or 24	M1	oe implied by $34 - 2k$ or $34 - 3k$
	$3k = 34 - 10$ or $3k =$ their 24 or $\frac{34-10}{3}$ or $\frac{\text{their } 24}{3}$	M1dep	oe
	8	A1	SC2 –8 or all terms seen 34, 26, 18, 10 SC1 6
	Alternative method 2		
	$10 + k$ or $34 - 10$ or 24	M1	oe implied by $10 + 2k$ or $10 + 3k$
	$10 + 3k = 34$ or $3k =$ their 24 or $\frac{34-10}{3}$ or $\frac{\text{their } 24}{3}$	M1dep	oe
	8	A1	SC2 –8 or all terms seen 34, 26, 18, 10 SC1 6
	Alternative method 3		
	One correct trial	M1	a correct trial is either a subtraction of the same value, exactly three times, from 34 and evaluated correctly or addition of the same value, exactly three times, from 10 and evaluated correctly
	Two or more correct trials	M1dep	
	8	A1	SC2 –8 or all terms seen 34, 26, 18, 10 SC1 6
	Additional Guidance		
	Accept any letter in place of k		

Q	Answer	Mark	Comments
14	$\begin{pmatrix} 7 \\ -2 \end{pmatrix}$	B2	B1 $\begin{pmatrix} 7 \\ a \end{pmatrix}$ or $\begin{pmatrix} b \\ -2 \end{pmatrix}$ or $\begin{pmatrix} -2 \\ 7 \end{pmatrix}$ or $\begin{pmatrix} 7x \\ -2y \end{pmatrix}$ or $\begin{pmatrix} -7 \\ 2 \end{pmatrix}$ SC1 7 right 2 down or 2 down 7 right or (7, –2)
	Additional Guidance		
	B1 responses must be in vector form		
	Condone $\begin{pmatrix} \frac{7}{-2} \end{pmatrix}$		B2
	$7\rightarrow \quad 2\downarrow$ 7 across, 2 down		SC1 B0
	$\begin{pmatrix} 2 \\ 7 \end{pmatrix}$		B0
	$7\leftarrow \quad 2\uparrow$		B0

Q	Answer	Mark	Comments	
15	**Alternative method 1**			
	10 × 8 or 80	M1	oe 80 may be seen as a denominator	
	$\frac{2}{5}$ × their 80 or 32	M1	oe their 80 can be any integer >10 32 will imply M1M1 and may be seen as a numerator	
	their 80 – their 32 – 10 or $\frac{38}{80}$ or their 32 + 10 or 42	M1dep	oe calculation dep on 2nd M1 42 will imply M1M1M1dep and may be seen as a numerator	
	38	A1		
	Alternative method 2			
	10 × 8 or 80	M1	oe 80 may be seen as a denominator	
	$\frac{1}{8} + \frac{2}{5}$ or $\frac{21}{40}$ or $1 - \frac{1}{8} - \frac{2}{5}$ or $\frac{19}{40}$	M1	oe	
	their $\frac{21}{40}$ × their 80 or 42 or their $\frac{19}{40}$ × their 80	M1dep	oe calculation dep on M1M1 42 will imply M1M1M1dep and may be seen as a numerator	
	38	A1		
	Additional Guidance			
	Alt 1 $\frac{2}{5}$ × 40 = 15, 40 – 15 – 10 = 15 $\frac{2}{5}$ × 40 = 16, 16 + 10			M0M1M1depA0 M0M1M1depA0

Q	Answer	Mark	Comments
16	At least two points from (0, 1) (1, 3) (2, 5) and (3, 7)	M1	may be seen in a table of values or embedded in calculations may be implied by correct line $\pm\frac{1}{2}$ square tolerance
	Correct straight line between (1, 3) and (2, 5)	A1	$\pm\frac{1}{2}$ square tolerance
	[1.15, 1.25] from using the graph or 1.2	B1ft	oe ft x-coordinate of any line drawn that intersects the given line $\pm\frac{1}{2}$ square tolerance
	Additional Guidance		
	Ignore further work after B1 scored		
	1.2 with M0 scored 1.2 with two correct points seen but no or incorrect line		M0A0B1 M1A0B1
	For the A1, ignore incorrect lines unless used to read off for intersection and then only allow for the B1ft		
	Answer given as coordinates eg (1.2, 3.4)		B0

Q	Answer	Mark	Comments
17	segment	B1	

Q	Answer	Mark	Comments
18	4×10^5	B2	B1 400 000 oe correct answer not in standard form eg 40×10^4 or 8×10^7 or 2×10^2 or $8 \times 10^5 \div 2$ or $4 \times 10^7 \div 100$ or any value seen and then correctly converted to standard form eg 4 000 000 and 4×10^6 40 000 and 4×10^4
	Additional Guidance		
	Ignore incorrect position of commas or spacing in long numbers		
	Condone 400 000 and 4×10^5 on the answer line, in either order Condone 40 000 and 4×10^4 on the answer line, in either order		B2 B1
	400 000 only on the answer line		B1
	Do not award both marks for the correct answer from incorrect working but B1 can be awarded for one or both numbers incorrectly converted to standard form and the result of their division given correctly in standard form eg $(8 \times 10^8) \div (2 \times 10^3) = 4 \times 10^5$ eg $(0.8 \times 10^7) \div (2 \times 10^3) = 4 \times 10^5$		B1 B0
	Condone a decimal point and any number of zeros after 4 eg 4.00000×10^5		B2
	8×10^7 is implied by $(8 \div 2) \times (10^7 \div 10^a)$ or condone $(8 \div 2) \times (10^7 \times 10^a)$		B1
	2×10^2 is implied by $(8 \div 2) \times (10^b \div 10^2)$ or condone $(8 \div 2) \times (10^b \times 10^2)$		B1

Q	Answer	Mark	Comments
19(a)	243	B2	B1 3^{12-7} or 3^5 oe single index or $3 \times 3 \times 3 \times 3 \times 3$ oe multiplication string or 531 441 seen as 3^{12} or as a numerator or 2187 seen as 3^7 or as a denominator or 3^n correctly evaluated, where n is an integer $\geqslant 4$

Additional Guidance	
Condone 3^5 and 243 on the answer line, in either order	B2
3^5 only on the answer line	B1
Do not allow a misread	
12 – 7 is insufficient for B1 unless 3^{12-7} or 3^5 is also seen	
Do not award B1 for a correct evaluation of 3^n not ascribed to a particular value of n eg a list 3, 9, 27, 81 … does not score the mark unless 81 is identified as 3^4	

Q	Answer	Mark	Comments
19(b)	2^{13}	B2	B1 2^{3+6+4} or (8 =) 2 × 2 × 2 or 2^3 or ($2^6 \times 2^4$ =) 2^{6+4} or ($2^6 \times 2^4$ =) 2^{10} or 2^9 (× 2^4) or 2^7 (× 2^6) or 8192

Additional Guidance	
8192 and 2^{13} on answer line, in either order	B2
8192 only on the answer line	B1
Correctly combined powers can be implied eg 8 = 2^4 with answer 2^{14} implies $2^6 \times 2^4 = 2^{10}$	B1
Evaluations other than 8192 do not score eg 8 × 1024 without seeing 8 × 2^{10} eg 8 × 64 × 16	B0 B0
Do not award B1 for 8192 if it is in a list of powers of 2 unless it is indicated or it is the highest power evaluated	
Changing terms to numbers with a base of 8 scores zero unless converted to a number with a base of 2	

Q	Answer	Mark	Comments
20	Valid criticism referring to one or both sets not being labelled	B1	eg the circles should be labelled or the labels are missing
	Valid criticism referring to the numbers not adding to 98	B1	eg the numbers add to 99 or 48 should be 47 SC1 no written criticisms, but circles labelled correctly and 48 changed to 47 on diagram
	Additional Guidance		
	Accept both statements written in one criticism		
	For more than two criticisms mark the best two unless contradicted		
	Condone written corrections as criticisms eg Add labels		B1
	Criticism 1 - There is no A label and Criticism 2 - There is no F label		B1B0
	Didn't label the diagram		B1
	There are no subjects		B1
	The diagram doesn't have labels/headings/titles		B1
	The diagram doesn't have a label/heading/title		B0
	It doesn't show how many study French		B0
	48 is wrong/one of the numbers is wrong		B1
	There's an extra student		B1
	It doesn't add up correctly/the total is wrong		B1
	It doesn't add up		B0
	The numbers are wrong		B0
	Do not accept an incorrect statement eg The number doing Art and French should be 47		B0
	If a value is used as evidence it must be correct eg the total is 100, not 98		B0

Q	Answer	Mark	Comments
21	A	B1	

Q	Answer	Mark	Comments
22	**Alternative method 1: using different time periods**		
	450 ÷ 30 or 15 or 250 ÷ 10 or 25	M1	oe for any section of the basic rate or the overtime rate eg $\frac{450-150}{30-10}$
	15 and 25	A1	implied by any ratio equivalent to 3 : 5 do not allow as a ratio in the wrong order eg 25 : 15
	3 : 5 or $\frac{3}{5}$: 1 or 1 : $\frac{5}{3}$	B1ft	oe fully simplified ft full simplification of their two values
	Alternative method 2: using equal time periods		
	Four correct readings from equal time periods of at least 5 hours from the two sections of the graph	M1	eg at 5 and 10 hours and at 35 and 40 hours if a reading from 30 is used, there may only be 3 readings a reading of 0 from 0 may be implied
	15 and 25 or correct totals for their equal time periods	A1	eg 10 hours = 150 and 10 hours = 250 implied by any ratio equivalent to 3 : 5 must not be seen as a ratio in the wrong order eg 250 : 150
	3 : 5 or $\frac{3}{5}$: 1 or 1 : $\frac{5}{3}$	B1ft	oe fully simplified ft full simplification of their two values

Additional Guidance for this question is on the next page

	Additional Guidance	
22 cont	In alt 2, only three readings are needed if a reading from 30 hours is included in both time periods or a reading of 0 is used eg readings of 300 from 20, 450 from 30 and 700 from 40	M1
	Readings from 10, 20, 30 and 40 should be 150, 300, 450 and 700 For readings from other numbers of hours not giving a multiple of £10 allow the multiple of 10 above or below the reading or any value between, which can then be used to score all three marks eg allow [220, 230] for a reading at 15 hours eg alt 1 readings of 70 at 5 hours, 380 at 25 hours, 450 at 30 hours and 700 at 40 hours, followed by hourly rates of 15.50 and 25 and an answer of 31 : 50 eg alt 2 readings of 370 at 25 hours, 450 at 30 hours, 580 at 35 hours and 700 at 40 hours, followed by totals of 80 and 120 or hourly rates of 16 and 24 and an answer of 2 : 3	M1A1B1ft M1A1B1ft
	For $1\frac{2}{3}$ allow 1.67 or better with correct rounding	
	450 : 250 = 45 : 25 does not get the mark for 25, but gets the final mark if simplified to 9 : 5	
	Ignore units throughout eg answer £3 : £5	M1A1B1
	15 : 25	M1A1B0
	25 : 15 or 25 : 10 not simplified	M1A0B0
	25 : 15 with answer 5 : 3 or 25 : 10 with answer 5 : 2	M1A0B1ft
	Answer 5 : 3 without working implies	M1A0B1ft
	15 : 17.5	M1A0B0
	15 : 17.5 followed by 6 : 7	M1A0B1ft
	20 : 25	M1A0B0
	20 : 25 followed by 4 : 5	M1A0B1ft
	3 : 5 in working with answer 1.5 : 2.5	M1A1B0
	30 : 10 = 3 : 1	M0A0B1ft

Q	Answer	Mark	Comments
23(a)	Two fractions less than 1 with product $\frac{3}{10}$	B1	eg $\frac{3}{5}$ and $\frac{1}{2}$ or $\frac{6}{10}$ and $\frac{5}{10}$ either order
	Additional Guidance		
	Accept negatives if each processed fraction is less than 1 eg $-\frac{3}{2}$ and $-\frac{1}{5}$ eg $\frac{-1}{-2}$ and $\frac{3}{5}$ eg $\frac{-3}{-2}$ and $\frac{1}{5}$	B1 B1 B0	
	Do not accept decimals within the fractions eg $\frac{0.6}{1}$ and $\frac{0.5}{1}$	B0	
	$\frac{11}{10}$ and $\frac{3}{11}$	B0	
	$\frac{3}{10}$ and $\frac{1}{1}$	B0	
	0.6 and 0.5	B0	

Q	Answer	Mark	Comments
23(b)	Two decimals less than 1 with product 0.06	B1	eg 0.3 and 0.2 or 0.60 and 0.10 or 0.5 and 0.12 or 0.75 and 0.08 either order
	Additional Guidance		
	Accept negatives eg –0.3 and –0.2	B1	
	Condone negative integers eg –6 and –0.01	B1	
	0.06 and 1	B0	
	6 and 0.01	B0	
	$\frac{3}{10}$ and $\frac{2}{10}$	B0	

Q	Answer	Mark	Comments
24	**Alternative method 1**		
	Pair of arcs, equal radii (± 2 mm), centre *B*, intersecting *AB* and *BC*	M1	oe eg single arc, centre *B*, intersecting *AB* and *BC* or single arc, centre *B*, radius *BC* (± 2 mm), intersecting *AB*
	Pair of intersecting arcs, equal radii (± 2 mm), centres the intersections on *AB* and *BC* and angle bisector drawn from *B* at least to the intersection of their arcs	A1	dashed line or condone solid line
	Correct region R shown as the area between *AB* and a straight line from *B* to within 2mm of *AD*	B1	R may be labelled or shaded arcs not required for this mark only SC1 angle bisector for a different angle correctly constructed with arcs
	Alternative method 2		
	Concentric arcs from *B*, each intersecting *AB* and *BC*	M1	intersections with *AB* and *BC* must be seen, but full arcs are not necessary
	Two lines from the *AB* intersection of one arc to the *BC* intersection of the other arc and angle bisector drawn from *B* at least to the intersection of their lines	A1	dashed line or condone solid line
	Correct region R shown as the area between *AB* and a straight line from *B* to within 2mm of *AD*	B1	R may be labelled or shaded arcs not required for this mark only SC1 angle bisector for a different angle correctly constructed with arcs
	Additional Guidance		
	Mark any correct construction, ignoring incorrect attempts		
	Unless shaded incorrectly, ignore construction arcs or other lines in the region labelled		
	Bisector drawn with no construction arcs, but region correctly identified		M0A0B1

Q	Answer	Mark	Comments
	20^2 (× π) or 400 (× π) or 15^2 (× π) or 225 (× π)	M1	oe
	$\frac{3}{4}$ × 20^2 (× π) or 300 (× π) or $\frac{1}{3}$ × 15^2 (× π) or 75 (× π)	M1dep	oe
	$\frac{3}{4}$ × 20^2 (× π) or 300 (× π) and $\frac{1}{3}$ × 15^2 (× π) or 75 (× π)	M1dep	
25	300 (× π) and 75 (× π) and 4	A1	Accept P = 4Q for 4 SC2 40 (× π) and 30 (× π) and 30 (× π) and 10 (× π) and answer 3
	Additional Guidance		
	Answer 4 with no working		M0A0
	Condone inconsistent use of π eg 300π and 75 and 4		M3A1
	Condone, for example, π400 for 400π		
	Allow use of a numerical value for π for method marks and for the A mark with answer 4		
	Ignore units throughout		

Q	Answer	Mark	Comments
26	$2w = \frac{4}{5} \times 15$ or $2w = \frac{60}{5}$ or $2w = 12$ or $\frac{2w}{15} = \frac{12}{15}$ or $\frac{w}{3} = \frac{2}{1}$ or $\frac{w}{2} = \frac{3}{1}$ or $\frac{w}{15} = \frac{4}{5} \div 2$ or $\frac{w}{15} = \frac{2}{5}$ or $2w \times 5 = 4 \times 15$ or $10w = 60$ or $\frac{4}{5} \div \frac{2}{15}$	M1	oe in the form $aw = n$ where a is an integer and n is an integer, fraction or decimal oe in the form $\frac{bw}{x} = \frac{c}{x}$ where x is a common denominator oe calculation
	6	A1	
	Additional Guidance		
	Embedded answer 6 eg $\frac{2 \times 6}{15} = \frac{4}{5}$		M1A0

Q	Answer	Mark	Comments
27	600 g	B1	

Q	Answer	Mark	Comments
28	$\frac{18}{5}$	B1	