GCSE
MATHEMATICS
8300/1F

Foundation Tier

Paper 1 Non–Calculator

Shadow paper based on 2020 paper

Mark Scheme

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.

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	5	B1	

Q	Answer	Mark	Comments
2	6000	B1	

Q	Answer	Mark	Comments
3	–9	B1	

Q	Answer	Mark	Comments
4	32 cm	B1	

Q	Answer	Mark	Comments
5	18 or 16 or 18 : 16	B1	oe ratio check diagram for perimeter counting to 18 or 16
	9 : 8	B1ft	ft if B0 awarded, a correct and full simplification of any unsimplified ratio condone $\frac{9}{8}$: 1 or 1.125: 1 or 1 : $\frac{8}{9}$ or 1 : 0.888… SC1 8 : 9
	Additional Guidance		
	9 : 8 with no working		B2
	Ignore any units given with the answer		
	20 : 12 = 10 : 6 (area)		B0B1ft

Q	Answer	Mark	Comments
6(a)	Shane and 10	B2	B1 210 or 3 min 40 or $3\frac{40}{60}$ or $3\frac{4}{6}$ or 10 in second gap
	Additional Guidance		
	If answer lines blank, up to 2 marks may be awarded from the working lines		
	Accept ten for 10 Accept 3:40		
	Do not accept 210 for Shane		
	Condone 10 and Shane		B2
	Condone incorrect time notation if recovered eg 2.40 – 2.30 = 10, answer Shane and 10 s		B2
	Dolan and 10		B1
	Shane alone does not score a mark		
	3:50 – 3:40 = 10, answer of Shane and 10		B0
	220 = 2.2(0) Unless recovered……220 s = 3.40 min, answer of Shane and 10		B0 B2
	Accept any two conversions that enable comparisons eg 220 = 60 + 60 + 60 + 40 and 3.5 = 60 + 60 + 60 + 30		B1
	3 min 40 with incorrect units eg 3 h 40 in working, answer Shane and 10 (recovered)		B1 B2

Q	Answer	Mark	Comments
6(b)	Wednesday and 8(.00) pm or Wednesday and 20.00 (h)	B2	B1 Wednesday or 8(.00) pm or 20.00 or 2 days 7 h or 48 + 7 or 24 + 24 + 7
	Additional Guidance		
	Allow 2000 or 20:00 for 20.00 Do not allow 20 or 20(00) pm for 20.00		
	Allow 8 (o'clock) in the evening for 8(.00) pm Do not allow 08.00 pm for 8(.00) pm		
	Do not ignore incorrect conversion of time eg 1800 = 8 pm		
	Mark intention eg W and 8 pm		B2
	Wed and 8 am or Wed and 8		B1
	55 – 7 = 48		B1

Q	Answer	Mark	Comments
7	342	B1	
	42	B1	
	384	B1ft	ft their 342 + their 42 if either B1B0 or B0B1 awarded
	Additional Guidance		
	If their division results in a decimal answer, allow correct rounding to 0dp or better for the B1ft eg 336 ÷ 8 = 41.5, 342 + 41.5 = 383.5 (may have answer 384)		B1B0B1ft
	Negative, fractional and decimal answers are acceptable on ft		

Q	Answer	Mark	Comments
8(a)	70	B1	
	Additional Guidance		
	If answer line blank, check diagram		
	Accept 70 people but not children or students		
	Accept 70 out of 540		B1
	Do not accept $\frac{70}{540}$		B0

Q	Answer	Mark	Comments
8(b)	(difference =) $6 - 4$ or 2 or (working in small boxes) $24 - 16$ or (S) 6×20 or 24×5 or 120 or (A) 4×20 or 16×5 or 80 or $20 + 20$	M1	oe
	40	A1	
	Additional Guidance		
	Check diagram for working		

Q	Answer	Mark	Comments
8(c)	Valid criticism	B1	eg the scale on the vertical axis is incorrect eg 2500 is missing
	Additional Guidance		
	Middle bar should be taller / is too short Students bar is wrong Number of people hasn't been plotted correctly 3000 should be 2500 They missed out (or didn't label) 2500 3000 is wrong 3000 is too big a gap (implies 1000 people instead of 500) 3000 is too small a gap (implies 500 space for 1000) Arrow/circle on diagram showing the jump from 2000 to 3000 but no words From 2000 to 3000 it went up in 200 (refers to little squares) 3000 should be at the top/end (of the grid) Changes scale Scale is wrong Numbers on the side are incorrect Lacks consistency on the way up Number of people does not go up in equal amounts Uneven/unequal number of people Should go up in 500s It goes up by 1000 Was going up by 500 then went up by 1000 Starts going up in hundreds then goes up in 200s		B1
	The gap is too big Space between bars Spaces too big between numbers Numbers on the y axis are not in order (they are numerically in order) There is a gap/space on the (vertical) axis Should go up in even numbers (they are going up in even numbers) Starts (going up) in hundreds then goes up in thousands		B0

Q	Answer	Mark	Comments
9	**Alternative method 1**		
	(12 – 7) × 1100 or 5 × 1100 or 5500	M1	oe
	13 500 – 8600 or 4900	M1	oe
	5500 and 4900 and Yes	A1	
	Alternative method 2		
	(12 – 7) × 1100 or 5 × 1100 or 5500	M1	oe
	13 500 – their 5500 or 8000	M1dep	oe
	8000 and Yes	A1	
	Alternative method 3		
	(12 – 7) × 1100 or 5 × 1100 or 5500	M1	oe
	8600 + their 5500 or 14 100	M1dep	oe
	14 100 and Yes	A1	
	Alternative method 4		
	13 500 – 8600 or 4900	M1	oe
	their 4900 ÷ (12 – 7) or 980	M1dep	oe
	980 and Yes	A1	

Mark scheme and additional guidance for this question are continued on the next page

9 cont	**Alternative method 5**			
	13 500 – 8600 or 4900	M1	oe	
	their 4900 ÷ 1100 or 4.5 (or better)	M1dep	oe accept any indication of "more than 4" for 4.5	
	4.5 (or better) and (12 – 7 =) 5 and Yes	A1	their 5 must be months remaining and not 4.5 rounded	
	Additional Guidance			
	5 × 1100 = 5500, 8600 + 5500 = 14 100 and No	Alt3		M1M1depA0
	12 – 7 = 4, 4 × 1100 = 3300, 3300 + 8600 = 11 900 and No	Alt3		M1M1depA0
	4 × 1100 = 4400, 13 500 – 4400 = 8900 and Yes			M0M0depA0
	13 500 – 8600 = 4900, 4900 ÷ 1200 = 4.1 = 4 and No (4 comes from rounding, not the number of months remaining)			M1M1A0
	Further calculations that say how much more he'd need to earn (annually or monthly) must be correct (if given) to score the A1			

Q	Answer	Mark	Comments
10	4	B1	

Q	Answer	Mark	Comments
11(a)	100	B1	

Q	Answer	Mark	Comments	
11(b)	0.57	B2	B1 0.5(…) or digits 57 seen	
	Additional Guidance			
	Condone .57			B2
	Condone .5(…)			B1
	0.5.7			B1

Q	Answer	Mark	Comments
12(a)	12	B1	
	Additional Guidance		
	Accept 12 out of 50 Do not accept $\frac{12}{50}$ or 12 : 50		

Q	Answer	Mark	Comments
12(b)	21	B1	
	Additional Guidance		
	Accept 21 out of 50 Do not accept $\frac{21}{50}$ or 21 : 50		

Q	Answer	Mark	Comments
12(c)	$\frac{4}{50}$ or 0.08 or 8%	B1	oe fraction
	Additional Guidance		
	Ignore attempts to simplify or convert a correct fraction		
	Ignore probability words		
	4 out of 50 or 4 in 50 or 4 : 50 is B0 however, condone 4 out of 50 or 4 in 50 with a correct fraction, decimal or percentage (together on answer line)		B1
	but do not accept 4 : 50 with a correct fraction, decimal or percentage (together on answer line)		B0

Q	Answer	Mark	Comments
13	Parallelogram in correct position	B2	B1 answer 4 squares right or answer 3 squares down or answer 4 squares left & 3 squares up
	Additional Guidance		
	Mark intention of straight lines Mark intention for position of vertices		
	Answer not congruent to original shape		B0

Q	Answer	Mark	Comments
14(a)	$8x = 31 + 9$ or $8x = 40$ or $\frac{40}{8}$	M1	oe eg $-8x = -31 - 9$ or $-8x = -40$ or $\frac{-40}{-8}$
	5	A1	
	Additional Guidance		
	Embedded answer, eg $8 \times 5 - 9 = 31$		M1A0
	40 with no other working		M0A0
	Flow chart method, if 5 not given as the answer. $x \rightarrow \times 8 \rightarrow -9 \rightarrow 31$ and $31 \rightarrow +9 \rightarrow \div 8 \rightarrow x$		M1A0

Q	Answer	Mark	Comments
14(b)	$(3 \times 5a =)\ 15a$	B1	
	$\frac{12a}{3} = 4a$	B1	
	$19a + 2$	B1ft	ft B1B0 or B0B1 for their $15a$ + their $4a$ + 11 – 9 is in the form $pa + q$ do not award with further incorrect work eg $19a + 2 = 21a$

Q	Answer	Mark	Comments
15	**Alternative method 1**		
	4 × 10 or 40	M1	
	76 – 4 × 10 or 76 – 40 or 36	M1dep	oe
	their 36 ÷ 4 or 9	M1dep	oe
	81	A1	
	Alternative method 2		
	76 ÷ 4	M1	
	19	A1	
	their 19 – 10 or 9	M1dep	dep on M1
	81	A1	
	Additional Guidance		
	Check for working on diagram		

Q	Answer	Mark	Comments
16(a)	$\frac{6}{19}$	B2	B1 $\frac{30}{95}$ or 6 out of 19 or correctly simplified proper fraction that originally had a denominator >13
	Additional Guidance		
	Condone 6 out of 19 with $\frac{6}{19}$ (together on the answer line)	B2	
	$\frac{6}{19}$ in working and 6 out of 19 on answer line	B1	
	$\frac{30}{180} = \frac{1}{6}$	B1	
	$\frac{2}{4} = \frac{1}{2}$	B0	
	30 out of 95 with no other working	B0	
	30 out of 95 with $\frac{30}{95}$	B1	
	6 : 19	B0	

Q	Answer	Mark	Comments
16(b)	$\frac{41}{85}$	B1	oe fraction, decimal or percentage
	Additional Guidance		
	Ignore attempts to simplify or convert a correct fraction		
	Ignore probability words		
	Decimals or percentages to 2 sf or better		
	41 out of 85 or 41 in 85 or 41 : 85 is B0 however, condone 41 out of 85 or 41 in 85 with a correct fraction, decimal or percentage (together on answer line) but do not accept 41 : 85 with a correct fraction, decimal or percentage (together on answer line)		B1 B0

Q	Answer	Mark	Comments
16(c)	$\frac{24+21}{180}$ or $\frac{45}{180}$ or $45 \div 180$ or 0.25	M1	oe
	25	A1	SC1 for 75 (not car) or 46 or better (Bus) or 29 or better (Walk)
	Additional Guidance		
	Build up method: 180 = 100%, 18 = 10%, 18 = 10%, 9 = 5%, answer 25%		M1A1
	$\frac{45}{180}$ seen, then 45% of 180 attempted		M1A0
	45 out of 180 or 45 : 180 with no other working		M0A0

Q	Answer	Mark	Comments

17	$y = 4x$	B1	

Q	Answer	Mark	Comments
18(a)	$\frac{120}{100} \times 85$ or (20% =) 17	M1	oe eg $85 + \frac{1}{5} \times 85$ or $85 + 17$ or 85×12 or 120×0.85 or 1.2×85 or 68 (implies 17)
	102	A1	
	Additional Guidance		
	102% as answer		M1A0

Q	Answer	Mark	Comments
18(b)	$\frac{4}{3}$	B1	

Q	Answer	Mark	Comments
19(a)	$\frac{1}{4}$ or $\frac{60}{12}$ or (60 ÷ 12 =) 5 or 12×5	M1	oe fraction, decimal or percentage implied by $3 \times \frac{60}{12}$ or 3×5
	15	A1	
	Additional Guidance		
	Accept a fully correct ratio build up method: eg 3 : 12, 6 : 24, 9 : 36, 12 : 48, 15 : 60 with nothing on answer line		M1A0
	60 ÷ 12 = 5 and 60 ÷ 5 = 12 and 30 ÷ 2.5 = 12 (choice)		M0A0

Q	Answer	Mark	Comments
19(b)	$60 + 9$ or $72 - 3$ or 69 or $(1 -)\frac{3}{72}$	M1	oe
	$\frac{69}{72}$	A1	oe fraction, decimal or percentage
	Additional Guidance		
	Ignore attempts to simplify or convert a correct fraction		
	Ignore probability words		
	Decimals or percentages to 2 sf or better		
	Condone 69 out of 72 or 69 in 72 with a correct fraction, decimal or percentage (together on answer line) but do not accept 69 : 72 with a correct fraction, decimal or percentage (together on answer line)		M1A1 M1A0

Q	Answer	Mark	Comments
20	Graph A No correlation	B1	allow 'No' or 'None'
	Graph B Strong negative	B1	
	Additional Guidance		
	Condone incorrect spelling if intention is clear		
	Allow clear link(s) from the table to the answer line eg an arrow from 'Strong negative' to the Graph B answer line		

Q	Answer	Mark	Comments
21(a)	First term 3 and Third term 27	B2	B1 one correct or First term 3^1 or Third term 3^3 or First term –3 and Third term –27 or $3x^2 = 27$ (any letter) oe equation or $ar = 9$ and $ar^3 = 81$
	Additional Guidance		
	If answer lines are blank, mark progression first and then working lines		
	Correct answer for 1st term or 3rd term in the progression, but incorrect numerical term on answer line		B0 for that term
	Correct answer for 1st term or 3rd term in the progression, with non-contradictory algebraic term on answer line		B1 for that term
	Correct answers for 1st term and 3rd term in the progression, with non-contradictory algebraic terms on answer lines		B2
	First term 3 Third term 3^3		B1
	First term –27 Third term 45		B0
	$3x = \frac{27}{x}$ (any letter)		B1

Q	Answer	Mark	Comments
21(b)	**Alternative method 1**		
	3rd term = $7q$	M1	oe implied by a total of $12q$
	$q + 4q +$ their 3rd term $= 84$ or $12q = 84$	M1	oe their 3rd term must be a linear expression in terms of q 84 ÷ 12 implies M1M1
	7	A1ft	ft their 3rd term, which must be a linear expression in q, or their equation in the form sum of 3 linear terms in $q = 84$ allow ft answers rounded to 1dp or better
	Alternative method 2		
	84 ÷ 3 or 28	M1	oe
	$4q =$ their 28	M1dep	oe
	7	A1	
	Additional Guidance		
	For A1ft, if not an integer, the answer must be given as a decimal, fully simplified fraction or fully simplified mixed number Once awarded, ignore further incorrect conversions eg $q + 4q + 16q = 84$, $21q = 84$, $q = \frac{84}{21}$, $q = 4$ (ignore conversion)		M0M1A1ft
	Their 3rd term may first appear in their addition, eg $q + 4q + 8q = 84$ implies that $8q$ is their 3rd term		M0M1
	(3rd term $4q + 3$), $q + 4q + 4q + 3 = 84$, $q = 7.36\ldots$		M0M1A1ft
	(3rd term $13q$), $q + 4q + 8q = 84$, $q = 6.46\ldots$		M0M1A1ft
	If their 3rd term has an algebraic coefficient the 2nd mark can be awarded for a correct equation, but A1 cannot be awarded eg (3rd term nq), $q + 4q + nq = 84$		M0M1A0

Q	Answer	Mark	Comments
22	2250	B1	may be implied by 250 or 11 250
	$\frac{5\times\text{their}2250}{9}$ $\frac{5\times\text{their }2250}{9}$ or 5×250 or $11250 \div 9$ or 1250	M1	oe
	1523	A1	
	Additional Guidance		
	Accept 0.55 or 0.56 or better for $\frac{5}{9}$		
	eg $\frac{5}{9}(2250) + 273$ (no indication that they know to multiply by $\frac{5}{9}$)		B1M0A0
	eg $\frac{5}{9} \times (2250) + 273$		B1M1A0
	eg 2240, $5 \times 2240 \div 9$		B0M1A0

Q	Answer	Mark	Comments
23	**Alternative method 1**		
	0.325 × 3 or 0.975 or 0.325 ÷ 10 or 0.0325	M1	oe
	0.0975	A1	
	Alternative method 2		
	0.09… from division of 39 by 400 or 0.09… from division of 3.9 by 40	M1	
	0.0975	A1	
	Alternative method 3		
	$39 \times \frac{1000}{400}$ or 39 × 2.5 or 39 ÷ 4 or 0.39 ÷ 4 or digits 975	M1	oe
	0.0975	A1	

Q	Answer	Mark	Comments
24	**Alternative method 1**		
	3300 ÷ (4 + 7) or 3300 ÷ 11 or 300	M1	oe accept $\frac{1}{11}$ of 3300
	7 × their 300 or 2100 or 4 × their 300 or 1200 or their 300 ÷ 6 or 50	M1dep	oe
	7 × their 300 ÷ 6 or (3300 – 4 × their 300) ÷ 6 or 2100 ÷ 6	M1dep	oe
	350	A1	
	Alternative method 2		
	3300 ÷ 6 or 550	M1	oe
	their 550 ÷ (4 + 7) or 50	M1dep	oe 3300 ÷ 66 scores M1M1
	7 × their 50 or 550 – (4 × their 50)	M1dep	oe
	350	A1	
	Additional Guidance		
	Answer 550 with 2100 or 1200 in working		M1M1M0A0
	Answer 550 with 350 in working		M1M1M1A0
	Condone incorrect representation of a division if recovered eg 11 ÷ 3300 = 300		M1

Q	Answer	Mark	Comments

25	$3x(x + 5)$	B2	B1 $x(3x + 15)$ or $3(x^2 + 5x)$
	Additional Guidance		
	Condone missing final bracket $3x(x + 5$ Condone $(3x + 0)(x + 5)$		B2 B2
	Condone multiplication signs for B1 but not B2 Condone $1x$ for x for B1 but not B2 Condone incorrect algebraic notation for B1 but not B2 eg $x(x2 + 15)$		
	Do not allow further work for B2 but ignore further work for B1 eg $3x(x + 5) = 3x(5x)$ eg $x(3x + 15) = x(18x)$		B1 B1

Q	Answer	Mark	Comments
26(a)	36 ÷ 9 × 2 (= 8) or 36 ÷ 4 = 9 and 8 ÷ 4 = 2 or 36 ÷ 9 = 4 and 8 ÷ 2 = 4 or 9 × 4 = 36 and 2 × 4 = 8	B1	oe eg 8 ÷ 2 = 4 and 9 × 4 = 36
	Additional Guidance		
	4 × 2 (= 8)		B0
	9 : 2 (=) 36 : 8 with no other working		B0
	9 : 2 (=) 36 : 8 with multiplication by 4 shown by arrow(s)		B1
	9 : 2 (=) 18 : 4 (=) 36 : 8		B1
	Do not condone incorrect representation of a division eg 9 ÷ 36 = 4		B0
	Do not condone incorrect mathematical representation eg 36 ÷ 9 = 4 × 2 = 8		B0
	36 ÷ 8 = 4.5, 4.5 × 2 = 9		B1
	36 × 2 = 72, 72 ÷ 9 = 8		B1

Q	Answer	Mark	Comments
26(b)	**Alternative method 1**		
	$2 \times \pi \times 36$ or $\pi \times 72$ or 72π or [226, 226.224]	M1	oe condone [3.14, 3.142] for π
	$2 \times \pi \times 8 \div 4$ or $\pi \times 16 \div 4$ or 4π or [12.56, 12.6]	M1	oe arc length of quarter circle condone [3.14, 3.142] for π
	$(2 \times \pi \times 4 \div 2) + (2 \times 8)$ or $4\pi + 16$ or [28.56, 28.6]	M1dep	oe dep on 2nd M1 this does not imply M1M1M1
	$76\pi + 16$	A1	
	Alternative method 2		
	$2 \times \pi \times 36$ or $\pi \times 72$ or 72π or [226, 226.224]	M1	oe condone [3.14, 3.142] for π
	$2 \times \pi \times 36$ and $2 \times \pi \times 8 \div 4$ or 72π and 4π or $2 \times \pi \times 36 + 2 \times 8$ or $72\pi + 16$ or [242, 242.224]	M1dep	oe eg 72π and [12.56, 12.6] or [226, 226.224] and 4π
	$2 \times \pi \times 36 + 2 \times \pi \times 8 \div 4$ or $72\pi + 4\pi$ or 76π or [238.76, 238.8]	M1dep	oe eg 72π + [12.56, 12.6] or [226, 226.224] + 4π
	$76\pi + 16$	A1	

Additional guidance for this question is on the next page

26(b) cont	**Additional Guidance**	
	Condone $4(19\pi + 4)$	M1M1M1A1
	Condone, for example, $\pi 72$ for up to M1M1M1	
	$36\pi + 4\pi + 16$	M0M1M1A0 on alt 1
	$1296\pi + 4\pi + 16$	M0M1M1A0 on alt 1
	$72\pi + 64\pi + 16$	M1M1M0A0 on alt 2
	$1296\pi + 64\pi + 16$	M0M0M0A0
	Using πr^2 instead of $2\pi r$ throughout	M0M0M0A0
	$76\pi + 16$ in working with incorrect further work, eg $76\pi + 16 = 92\pi$	M1M1M1A0

Q	Answer	Mark	Comments
27	**Alternative method 1**		
	cos and $\frac{12}{24}$ oe identified	M1	
	60	A1	
	Alternative method 2		
	sin and $\frac{\sqrt{24^2 - 12^2}}{24}$ identified or tan and $\frac{\sqrt{24^2 - 12^2}}{12}$ identified	M1	
	60	A1	
	Additional Guidance		
	Accept an embedded answer, eg cos 60 = $\frac{12}{24}$ with no further working		M1A1
	$180 \div 3 = 60$		M0A0

Q	Answer	Mark	Comments
28	**Alternative method 1**		
	$4a = b + 5$ or $4a - 5$	M1	
	$b = 4a - 5$ or $b = -5 + 4a$ or $4a - 5 = b$ or $-5 + 4a = b$	A1	
	Alternative method 2		
	$a - \frac{5}{4} = \frac{b}{4}$ or $4\left(a - \frac{5}{4}\right)$	M1	
	$b = 4\left(a - \frac{5}{4}\right)$	A1	
	Additional Guidance		
	Flow chart method, with incorrect final answer: $b \rightarrow +5 \rightarrow \div 4 \rightarrow a$ and $a \rightarrow \times 4 \rightarrow -5 \rightarrow b$		M1A0
	Condone × signs for M1 but not A1 Condone $a3$ for M1 but not A1		

Q	Answer	Mark	Comments
29(a)	4.8×10^6	B1	
	Additional Guidance		
	Do not ignore further work		
	Ignore leading/trailing zeros eg 4.800000×10^6		B1
	Condone $10^6 \times 4.8$		B1
	$4.8 + 10^6$		B0

Q	Answer	Mark	Comments
29(b)	0.00067	B1	
	Additional Guidance		
	Do not ignore further work		
	Ignore additional zeros before the decimal point or after the 7		
	Accept .00067		B1
	0.006.7		B0