GCSE
MATHEMATICS
8300/3F

Foundation Tier Paper 3 Calculator

Mark scheme

November 2018

Version: 1.0 Final

18BG83003F/MS

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 Assessment Writer.

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 $a \leq$ 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.

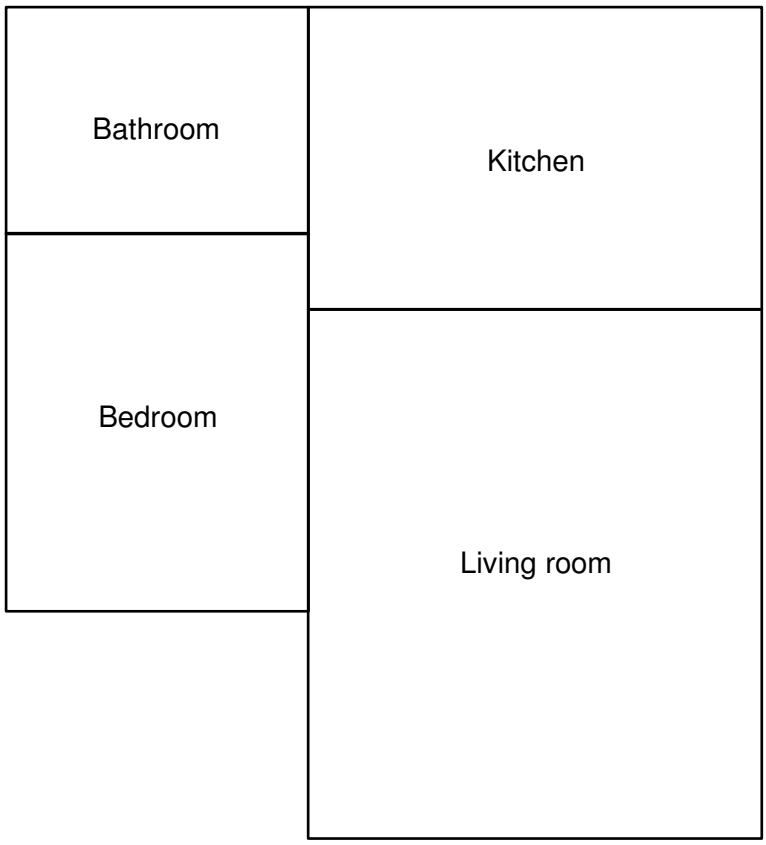
Continental notation

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.

Question	Answer	Mark	Comments
1	7.8 cm	B1	
	Additional Guidance		
2	90°	B1	
	Additional Guidance		
3	2	B1	
	Additional Guidance		
4	$\frac{3}{25}$	B1	
	Additional Guidance		
5(a)	96	B1	
	Additional Guidance		
5(b)	72	B1	
	Additional Guidance		

Question	Answer	Mark	Comments
6	Any room correctly drawn to scale or any outline dimension correctly drawn to scale or any room dimension or outline dimension correctly scaled and clearly related	M1	± 2 mm may be on diagram
	At least two rooms correctly drawn to scale in correct position or correctly drawn outline of plan to scale	M1dep	± 2 mm
	Fully correct scale drawing with correct room labels	A1	± 2 mm for outline and internal lines all lines must be ruled
	Additional Guidance		
	For 2nd method mark there should not be a gap shown between rooms correctly drawn to scale in correct position		
	Fully correct scale drawing with incorrect or missing room labels		M1M1A0
	Check original diagram for clearly related scaled dimensions eg 8 (feet =) 4 (cm)		M1
	Any correct outline dimension eg 16 (feet =) 8 (cm) or 20 (feet =) 10 (cm) or 22 (feet =) 11 (cm)		M1

Additional Guidance continues on next page

Question	Answer	Mark	Comments
6 cont	 Fully correct scale drawing with correct room labels		

Question	Answer	Mark	Comments
7	**Alternative method 1**		
	19 + 11 + 14 + 32 + 16 + 9 or 101 or 31 + 18 + 28 + 12 or 89	M1	
	their 101 – their 89 + 20	M1dep	their 101 and their 89 must come from correct additions
	16	A1	
	Alternative method 2		
	19 + 11 + 14 + 32 + 16 + 9 + 31 + 18 + 28 + 12 or 190	M1	
	(their 190 – 20) ÷ 2 or 85 or (their 190 + 20) ÷ 2 or 105	M1dep	
	16	A1	

Continues on next page

<table>
<tr><th>Question</th><th>Answer</th><th>Mark</th><th>Comments</th></tr>
<tr><td rowspan="8">7 cont</td><td colspan="3">Alternative method 3</td></tr>
<tr><td>16
and
correct evaluation of the two groups after 16 moved from A to B</td><td>B3</td><td>B2 at least two correct evaluations of the two groups after numbers moved from A to B
or
a correct single evaluation of the two groups after 16 moved from A to B

B1 a correct evaluation of the two groups after a number moved from A to B</td></tr>
<tr><td colspan="3">Additional Guidance</td></tr>
<tr><td colspan="2">16 with no or insufficient working for M1 (Alt1 and Alt2)</td><td>M0</td></tr>
<tr><td colspan="2">
<table>
<tr><th>Number</th><th>A</th><th>B</th><th>Diff</th></tr>
<tr><td>19</td><td>82</td><td>108</td><td>26</td></tr>
<tr><td>11</td><td>90</td><td>100</td><td>10</td></tr>
<tr><td>14</td><td>87</td><td>103</td><td>16</td></tr>
<tr><td>32</td><td>69</td><td>121</td><td>52</td></tr>
<tr><td>16</td><td>85</td><td>105</td><td>20</td></tr>
<tr><td>9</td><td>92</td><td>98</td><td>6</td></tr>
</table>
Differences do not need to be shown
</td><td></td></tr>
<tr><td colspan="2">101 – 16 = 85 and 89 + 16 = 105 with answer 20</td><td>B2</td></tr>
<tr><td colspan="2">A correct evaluation of the two groups after 16 moved from A to B together with only one other evaluation which is incorrect, without 16 as answer</td><td>B1</td></tr>
</table>

Question	Answer	Mark	Comments
8	**Alternative method 1**		
	300 × 3 or 900	M1	hot dog sales
	300 ÷ 6 or 50 or 300 ÷ 10 or 30	M1	packs of bread rolls jars of sausages
	their 50 × 42 (÷ 100) or 2100 or 21 or their 30 × 2.5(0) or 75 or 96 or 393	M1dep	dep on 2nd M1 cost of bread rolls or cost of sausages cost of bread rolls and sausages total costs
	their 900 – (their 21 + their 75 + 240 + 57) or their 900 – their 393	M1dep	oe dep on all M marks total profit from sales – costs
	507	A1	correct money notation

Continues on next page

Question	Answer	Mark	Comments
8 cont	**Alternative method 2**		
	240 ÷ 300 or 0.8 or 42 ÷ 6 or 7 or 2.5(0) ÷ 10 or 0.25 or 57 ÷ 300 or 0.19	M1	market fee per hot dog cost of bread roll per hot dog cost of sausage per hot dog other costs per hot dog
	Any two of 240 ÷ 300 or 0.8 42 ÷ 6 or 7 2.5(0) ÷ 10 or 0.25 57 ÷ 300 or 0.19	M1dep	
	their 0.8 + their 0.07 + their 0.25 + their 0.19 or 1.31	M1dep	total cost per hot dog their values must come from correct calculations 1.69 implies M3
	(3 – their 1.31) × 300 or 1.69 × 300	M1dep	total profit for 300 hot dogs
	507	A1	correct money notation
	Additional Guidance		
	Accept working in pounds or pence for all four method marks		
	In Alt1 units must be consistent for the 4th method mark		
	In Alt2 units must be consistent for the 3rd method mark		
	Condone £507.00p		M1M1M1M1A1
	Answer £507.0		M1M1M1M1A0

Question	Answer	Mark	Comments
9(a)	0 and 5 identified	M1	
	5	A1	
	Additional Guidance		
	0 – 5 or 0 to 5 and answer 5		M1A1
	0 – 5 or 0 to 5 without answer 5		M1A0
	30 ÷ 6 = 5		M0A0
9(b)	$\frac{3+4}{2}$ or $\frac{30+1}{2}$ or 15.5 or (between) 15th and 16th (value) or identifies 3 and 4 or correct numbers listed in either order to at least 16th value 0, 0, 1, 1, 1, 1, 2, 2, 2, 3, 3, 3, 3, 3, 3, 4 or 5, 5, 5, 5, 5, 5, 4, 4, 4, 4, 4, 4, 4, 4, 4, 3	M1	
	3.5	A1	
	Additional Guidance		
	Correct ordered list of at least 16 terms starting from 0 or 5		M1
	1, 1, 1, 1, 2, 2, 2, 3, 3, 3, 3, 3, 3, 4, 4, 4, 4, 4, 4, 4, 4, 4, 5, 5, 5, 5, 5, 5 correct ordered list starting from 5		M1
	$\frac{3+4}{2}$ = 3.5 and 3 or 4 houses written on answer line		M1A0

Question	Answer	Mark	Comments
9(c)	**Alternative method 1**		
	185 000 + 239 000 + 136 000 or 560 000	M1	
	their 560 000 × 0.02	M1dep	oe
	11 200	A1	SC1 33 600
	Alternative method 2		
	185 000 × 0.02 or 3700 or 239 000 × 0.02 or 4780 or 136 000 × 0.02 or 2720	M1	oe
	185 000 × 0.02 + 239 000 × 0.02 + 136 000 × 0.02 or their 3700 + their 4780 + their 2720	M1dep	oe
	11 200	A1	SC1 33 600
	Alternative method 3		
	185 000 × 1.02 or 188 700 or 239 000 × 1.02 or 243 780 or 136 000 × 1.02 or 138 720	M1	oe
	(185 000 + 239 000 + 136 000) × 1.02 or 571 200 or their 188 700 + their 243 780 + their 138 720	M1dep	oe
	11 200	A1	SC1 33 600
	Additional Guidance		
	560 000 + 11 200		M1M1A0
	560 000 × 0.02 = 11 200 with 11 200 × 3		M1M0A0

Question	Answer	Mark	Comments
10(a)	$\frac{1}{5}$ or 0.2 or 20%	B1	oe fraction, decimal or percentage
	Additional Guidance		
	Ignore further working with any description of probability eg $\frac{1}{5}$ unlikely		B1
	1 : 5 in working with $\frac{1}{5}$ on answer line		B1
	1 : 5 on answer line		B0
	1 out of 5 without $\frac{1}{5}$ in working		B0
10(b)	$\frac{1}{5}$ or 0.2 or 20%	B1	oe fraction, decimal or percentage
	Additional Guidance		
	Ignore further working with any description of probability eg $\frac{1}{5}$ unlikely		B1
	1 : 5 in working with $\frac{1}{5}$ on answer line		B1
	1 : 5 on answer line		B0
	1 out of 5 without $\frac{1}{5}$ in working		B0
10(c)	$85 \times \frac{2}{5}$ or $85 \div 5 \times 2$ or 85×0.4 or $\left(\frac{2}{5} =\right) \frac{34}{85}$	M1	
	34	A1	
	Additional Guidance		
	34 out of 85 on answer line		M1A1

Question	Answer	Mark	Comments
11	729	B1	
	Additional Guidance		
12	$3\frac{3}{4}$	B1	
	Additional Guidance		

Question	Answer	Mark	Comments
13	**Alternative method 1**		
	15^2 or 225	M1	
	their 225 ÷ 9 or 25	M1dep	oe
	5	A1	
	Alternative method 2		
	$\sqrt{9}$ or 3 or $\sqrt{\frac{1}{9}}$ or $\frac{1}{3}$	M1	
	15 ÷ their 3 or 15 × their $\frac{1}{3}$	M1dep	oe
	5	A1	
	Alternative method 3		
	$\left(\frac{x}{15}\right)^2 = \frac{1}{9}$	M1	oe
	$(x^2 =) \frac{15^2}{9}$ or 25	M1dep	oe
	5	A1	
	Additional Guidance		
	$3x = 15$		M1M1
	$5^2 = 25$ without 5 on answer line		M1M1A0
	1 : 3 or 3 : 1		M1

Question	Answer	Mark	Comments
14(a)	–8	B1	
	0	B1ft	ft their –8
	Additional Guidance		
	Mark answer line first If either part of answer line is blank look for terms in working		
	–20 and –6		B0B1ft
	–20 and –16		B0B0ft
14(b)	÷ 5 then + 1	M1	implied by 2nd term 25 or correct first term for their 25
	6	A1	
	Additional Guidance		
	6, 25 with no working seen or on dotted lines		M1A1
	2nd term 23 and 1st term 5.6 is the correct first term for their 25		M1A0
	25 with no incorrect working		M1
15	Rotation	B1	
	90° anticlockwise or 270° clockwise or $\frac{1}{4}$ turn anticlockwise or $\frac{3}{4}$ turn clockwise	B1	
	Origin or (0, 0) or *O*	B1	
	Additional Guidance		
	Accept rotate etc for rotation		
	Do not accept turn for first B1		
	Combined transformations		B0B0B0

Question	Answer	Mark	Comments
16	**Alternative method 1**		
	260 × 0.4(0) or 104(.00) or 260 × 40 or 10 400	M1	oe cost of claim
	260 ÷ 52 or 5	M1	oe number of gallons
	their 5 × 5.36 or 26.8(0)	M1dep	oe dep on 2nd M1 cost of petrol
	77.20	A1	
	Alternative method 2		
	260 ÷ 52 or 5	M1	oe number of gallons
	52 × 0.4(0) or 20.80 or 52 × 40 or 2080	M1	oe claim per gallon
	their 20.80 – 5.36 or 15.44 or their 2080 – 536 or 1544	M1dep	dep on 2nd M1 claim per gallon – cost per gallon
	77.20	A1	
	Alternative method 3		
	5.36 ÷ 52 or 0.10… or 536 ÷ 52 or 10.(…)	M1	cost of petrol per mile
	0.4 – their 0.10… or [0.2969, 0.3] or 40 – their 10.(…) or [29.69, 30]	M1dep	claim per mile – cost per mile
	their [0.2969, 0.3] × 260 or their [29.69, 30] ÷ 100 × 260	M1dep	
	77.20	A1	

Additional Guidance on next page

Question	Answer	Mark	Comments

16 cont	**Additional Guidance**	
	Accept working in pounds or pence for all three method marks	
	Condone £77.20p	M1M1M1A1
	77.2	M1M1M1
	Answer £77.2	M1M1M1A0

17	[4.5, 4.9] (cm) or [45, 49] (mm)	M1	measurement
	their measurement ÷ 1.5 or [4.5, 4.9] ÷ 1.5 or [45, 49] ÷ 15 or [3, 3.3] or 200 ÷ 1.5 or 133.(3…)	M1	oe
	600 or 613.(...) or [626, 627] or 640 or 653.(...) or correct answer from their [4.5, 4.9] (cm) or their [45, 49] (mm), rounded or truncated	A1	SC2 [600, 660]
	Additional Guidance		
	600 on answer line with no working or measurement shown		M1M1A1
	4.7 cm measured 4.5 ÷ 1.5 = 3 and 600 0.2 × 200 = 40 with answer 640 (incorrect scaling method of 0.2 cm)		M1M1A0
	Measurement of 4.7 cm with answer 640 (incorrect answer for their measurement)		SC2
	200, 200, 200 marked on diagram implies 4.5 and 3		M1M1
	200 × 3 without measurement shown implies 4.5 and 3		M1M1

Question	Answer	Mark	Comments
18	**Alternative method 1**		
	(total number of presents =) 12	B1	
	83.4(0) ÷ their total number of presents	M1	
	6.95	A1	
	Alternative method 2		
	83.4(0) ÷ 4 or 20.85 or 83.4(0) ÷ 3 or 27.80	M1	
	their 20.85 ÷ 3 or their 27.80 ÷ 4	M1dep	
	6.95	A1	
	Additional Guidance		

Question	Answer	Mark	Comments
19(a)	**Alternative method 1**		
	$\frac{8}{5}$ and $\frac{5}{5}$ or any correct ratio using integers or $\frac{1.6}{1.6+1}$ or $\frac{1.6}{2.6}$	M1	oe fractions with common denominators eg 16 : 10
	$\frac{8}{13}$	A1	oe fraction eg $\frac{4000}{6500}$
	Alternative method 2		
	6500 ÷ (1.6 + 1) or 2500 or 6500 ÷ (1.6 + 1) × 1.6 or 4000 or $\frac{2500}{6500}$ or $\frac{5}{13}$ or $\frac{1}{2.6}$	M1	oe
	$\frac{8}{13}$	A1	oe fraction eg $\frac{4000}{6500}$
	Additional Guidance		
19(b)	1 : 0.625 or 1 : $\frac{5}{8}$	B1	oe fraction
	Additional Guidance		
	0.625 in working 1 : 0.6		B0
20	up	B1	
	Additional Guidance		

Question	Answer	Mark	Comments
21	109.5 in the correct position	B1	oe
	110.5 in the correct position	B1	oe Allow $110.4\dot{9}$ answers reversed score B0B1
	Additional Guidance		
	110.4999…		B1
	110.4999		B0
22	Any correct value	M1	11, 23, 37, 53, 71, 91, 113, 137, 163
	Selects 91 as the only incorrect value with no errors in values given	A1	oe eg stops at 91
	91 and 13 (is a factor) or 91 and 7 (is a factor) or 91 and 13 × 7	A1	oe eg 91 ÷ 7 = 13
	Additional Guidance		
	Ignore incorrect evaluations for first mark		
	Ignore all values for n greater than 9		
	Do not allow 11 within a list of prime numbers eg 2, 3, 5, 7, 11…		
	Error in list eg <u>12</u>, 23, 37, 53, 71, 91, 113, 137, 163 with 12 and 91 selected as not prime (not valid as incorrect)		M1A0A0
	Error in list eg <u>12</u>, 23, 37, 53, 71, 91, 113, 137, 163 with only 91 selected as not prime (not valid as incorrect conclusion from their list)		M1A0A0
	$9^2 + 9 + 1 = 91$ is incorrect working		M0A0A0

Question	Answer	Mark	Comments
23	**Alternative method 1 – Elimination**		
	$2t + c = 3.4(0)$ and $2t + 8c = 14.6(0)$	M1	oe $8t + 4c = 13.6(0)$ and $t + 4c = 7.3(0)$ allow one error in scaling equations
	$8c – c = 14.6(0) – 3.4(0)$ or $7c = 11.2(0)$	M1dep	oe $8t – t = 13.6(0) – 7.3(0)$ or $7t = 6.3(0)$
	$c = 1.6(0)$ or 160	A1	$t = 0.9(0)$ or 90
	(Tea) £0.90 or 90p and (Coffee) £1.60 or 160p	A1	must be correct units
	Alternative method 2 – Substitution		
	$t = \frac{3.4(0) – c}{2}$ or $t = 7.3(0) – 4c$	M1	oe $c = 3.4(0) – 2t$ or $c = \frac{7.3(0) – t}{4}$
	$\frac{3.4(0) – c}{2} + 4c = 7.3(0)$ or $2(7.3(0) – 4c) + c = 3.4(0)$	M1dep	oe $t + 4(3.4(0) – 2t) = 7.3(0)$ or $2t + \frac{7.3(0) – t}{4} = 3.4(0)$
	$c = 1.6(0)$ or 160	A1	$t = 0.9(0)$ or 90
	(Tea) £0.90 or 90p and (Coffee) £1.60 or 160p	A1	must be correct units

Continues on next page

Question	Answer	Mark	Comments
23 cont	**Alternative method 3**		
	A correctly evaluated trial of a value for tea and a value for coffee satisfying one statement and then substituted into the other statement	M1	eg £1 + £1 + £1.40 = 3.4(0) and £1 + 4 × £1.40 = 6.6(0)
	A different correctly evaluated trial	M1dep	
	(Tea) 0.9(0) or 90 and (Coffee) 1.6(0) or 160 or a correctly evaluated trial with (Tea) 0.9(0) or 90 and (Coffee) 1.6(0) or 160	A1	
	(Tea) £0.90 or 90p and (Coffee) £1.60 or 160p	A1	must be correct units
	Additional Guidance		
	Ignore incorrect trials alongside correct trials		
	Condone £1.60p or £0.90p		
	Allow working in pence		
	In Alt1 the 2nd method mark can be scored following one error in scaling equations in the 1st method mark		
	Both prices correct with no or insufficient working		M1M1A1A1
	Tea 160p and Coffee 90p on answer line with no or insufficient working		M1M1A1A0
	One price correct (with other price incorrect) and no or insufficient working eg Tea 90p and Coffee 140p with no or insufficient working		M0M0A0A0

Question	Answer	Mark	Comments
24(a)	Plots at least 3 points correctly	M1	Plots within the correct 2 mm vertical square
	Fully correct with all points joined	A1	
	Additional Guidance		
24(b)	[4200, 4500]	B2	B1 Any indication the 2018 figure is being increased for 2019 eg a point plotted for 2019 that is greater than 3780
	Additional Guidance		
	Answer in range with or without working		B2
	4300 – 4350 on answer line (both values in range)		B2
	4400 – 4600 on answer line (one value in range)		B1
	Answer outside of range but between 3780 and 4200		B1
	Answer outside of range but greater than 4500		B1

Question	Answer	Mark	Comments
25	**Alternative method 1**		
	(600 ×) 0.8 or 480	M1	oe
	600×0.8^2 or 384 or 600×0.8^3 or 307.2(0) or 600×0.8^4 or 245.76 or 600×0.8^5 or [196, 197]	M1dep	
	[196, 197] and incorrect	A1	oe eg 196.61 and no 196.61 still owed
	Alternative method 2		
	600 × 0.2 or 120	M1	oe
	120 × 0.8 or 96 or 96 × 0.8 or 76.8(0) or 76.8(0) × 0.8 or 61.44 or 61.44 × 0.8 or [49.15, 49.16]	M1dep	oe eg (600 – 120) × 0.2 or 480 × 0.2
	[403, 404] and incorrect	A1	oe eg paid off 403.39(2)
	Alternative method 3		
	0.8	M1	
	0.8^5 or 0.327 68 or 0.3277 or 0.328 or 0.33	M1dep	
	0.327 68 (or 0.3277 or 0.328 or 0.33) and incorrect	A1	oe
	Additional Guidance		
	Ignore units		
	Full marks can be awarded for a correct explanation eg 120 and 96 calculated with a comment 'as soon as the payment is below 120 a month it cannot be paid off in five months'		

Question	Answer	Mark	Comments
26	1	B1	
	Additional Guidance		
27	$0.9 \times \pi \div 2$ or $0.9\pi \div 2$ or 0.45π or $0.9 \times$ [3.14, 3.142] $\div 2$ or [2.82, 2.83] $\div 2$ or $2.8 \div 2$ or 1.4…	M1	Large semicircle
	$0.9 \div 3 \times \pi \div 2$ or $0.3\pi \div 2$ or 0.15π or $0.9 \div 3 \times$ [3.14, 3.142] $\div 2$ or 0.94… $\div 2$ or 0.47…	M1	Small semicircle May be implied from using 1.4… for three small semicircles in next mark
	their 1.4… + 3 × their 0.47… + 2 × 0.75 or $0.9\pi + 2 \times 0.75$ or 2 × their 1.4… + 2 × 0.75 or 4.3…	M1dep	oe dep on both marks
	305 ÷ their 4.3… or [70.4, 70.94]	M1dep	dep on previous mark
	71 with working	A1	
	Additional Guidance		
	0.9π or 2.8… with no evidence of incorrect method		M1M1
	$0.45\pi \div 2$		M0

Question	Answer	Mark	Comments
28	**Alternative method 1**		
	$\frac{1}{2}x > 3 - 8$ or $\frac{1}{2}x > -5$ or $8 - 3 > -\frac{1}{2}x$ or $5 > -\frac{1}{2}x$ or $8 + \frac{1}{2}x > 3$	M1	oe
	$x > -10$	A1	oe $-10 < x$
	Alternative method 2		
	$16 > 6 - x$ or $16 - 6 > -x$ or $10 > -x$ or $x > 6 - 16$ or $16 + x > 6$	M1	oe
	$x > -10$	A1	oe $-10 < x$
	Additional Guidance		
	Answer using incorrect sign eg $x < -10$ or $x = -10$		M1A0

Question	Answer	Mark	Comments
29	$\cos x = \frac{9}{10}$	M1	oe eg $\sin x = \frac{\sqrt{10^2 - 9^2}}{10}$ $\tan x = \frac{\sqrt{10^2 - 9^2}}{9}$
	25.8… or 26	A1	
	Additional Guidance		
	$\cos = \frac{9}{10}$ $x = 25.8$ (recovered)		M1A1
	$\cos = \frac{9}{10}$		M0A0