# 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.

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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.<br>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.

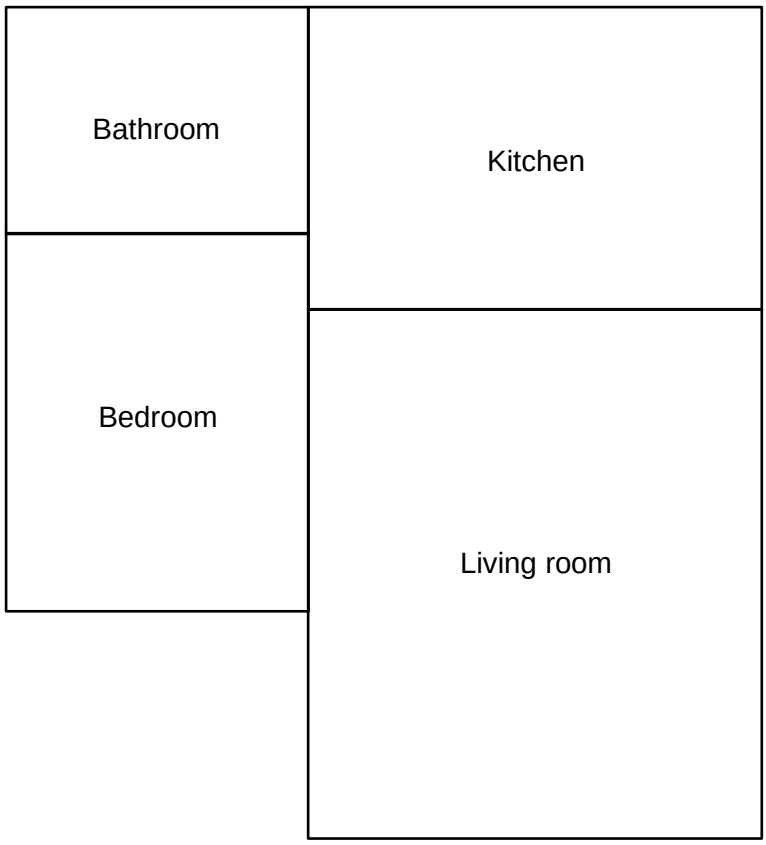
**Continental notation**

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<br>or<br>any outline dimension correctly drawn to scale<br>or<br>any room dimension or outline dimension correctly scaled and clearly related | M1 | ± 2 mm<br><br>may be on diagram |
| | At least two rooms correctly drawn to scale in correct position<br>or<br>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<br>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<br>eg 8 (feet =) 4 (cm) | | M1 |
| | Any correct outline dimension<br>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** | <br>Fully correct scale drawing with correct room labels | | |

| Question | Answer | Mark | Comments |
|---|---|---|---|
| 7 | **Alternative method 1** | | |
| | 19 + 11 + 14 + 32 + 16 + 9 or 101<br>or<br>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<br>or<br>(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<br>and<br>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<br>or<br>a correct single evaluation of the two groups after 16 moved from A to B<br><br>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<br>or<br>300 ÷ 10 or 30 | M1 | packs of bread rolls<br><br>jars of sausages |
| | their 50 × 42 (÷ 100) or 2100 or 21<br>or<br>their 30 × 2.5(0) or 75<br>or<br>96<br>or<br>393 | M1dep | dep on 2nd M1<br>cost of bread rolls or cost of sausages<br><br><br>cost of bread rolls and sausages<br><br>total costs |
| | their 900 – (their 21 + their 75 + 240 + 57)<br>or<br>their 900 – their 393 | M1dep | oe<br>dep on all M marks<br>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<br>or<br>42 ÷ 6 or 7<br>or<br>2.5(0) ÷ 10 or 0.25<br>or<br>57 ÷ 300 or 0.19 | M1 | market fee per hot dog<br><br>cost of bread roll per hot dog<br><br>cost of sausage per hot dog<br><br>other costs per hot dog |
| | Any two of<br>240 ÷ 300 or 0.8<br>42 ÷ 6 or 7<br>2.5(0) ÷ 10 or 0.25<br>57 ÷ 300 or 0.19 | M1dep | |
| | their 0.8 + their 0.07 + their 0.25 + their 0.19<br>or 1.31 | M1dep | total cost per hot dog<br>their values must come from correct calculations<br>1.69 implies M3 |
| | (3 – their 1.31) × 300<br>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) | $\frac{3+4}{2}$<br>or<br>$\frac{30+1}{2}$ or 15.5<br>or<br>(between) 15th and 16th (value)<br>or<br>identifies 3 and 4<br>or<br>correct numbers listed in either order to at least 16th value<br>0, 0, 1, 1, 1, 1, 2, 2, 2, 3, 3, 3, 3, 3, 3, 4<br>or<br>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<br>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<br>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<br>or<br>239 000 × 0.02 or 4780<br>or<br>136 000 × 0.02 or 2720 | M1 | oe |
| | 185 000 × 0.02 + 239 000 × 0.02 + 136 000 × 0.02<br>or<br>their 3700 + their 4780 + their 2720 | M1dep | oe |
| | 11 200 | A1 | SC1 33 600 |
| | **Alternative method 3** | | |
| | 185 000 × 1.02 or 188 700<br>or<br>239 000 × 1.02 or 243 780<br>or<br>136 000 × 1.02 or 138 720 | M1 | oe |
| | (185 000 + 239 000 + 136 000) × 1.02 or 571 200<br>or<br>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 $85 \times 0.4$ 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<br>or<br>$\sqrt{\frac{1}{9}}$ or $\frac{1}{3}$ | M1 | |
| | 15 ÷ their 3<br>or<br>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<br>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<br>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<br>or 270° clockwise<br>or $\frac{1}{4}$ turn anticlockwise<br>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)<br>or<br>260 × 40 or 10 400 | M1 | oe<br>cost of claim |
| | 260 ÷ 52 or 5 | M1 | oe<br>number of gallons |
| | their 5 × 5.36 or 26.8(0) | M1dep | oe<br>dep on 2nd M1<br>cost of petrol |
| | 77.20 | A1 | |
| | **Alternative method 2** | | |
| | 260 ÷ 52 or 5 | M1 | oe<br>number of gallons |
| | 52 × 0.4(0) or 20.80<br>or<br>52 × 40 or 2080 | M1 | oe<br>claim per gallon |
| | their 20.80 – 5.36 or 15.44<br>or their 2080 – 536 or 1544 | M1dep | dep on 2nd M1<br>claim per gallon – cost per gallon |
| | 77.20 | A1 | |
| | **Alternative method 3** | | |
| | 5.36 ÷ 52 or 0.10…<br>or 536 ÷ 52 or 10.(…) | M1 | cost of petrol per mile |
| | 0.4 – their 0.10… or [0.2969, 0.3]<br>or<br>40 – their 10.(…) or [29.69, 30] | M1dep | claim per mile – cost per mile |
| | their [0.2969, 0.3] × 260<br>or<br>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<br>or<br>[4.5, 4.9] ÷ 1.5<br>or<br>[45, 49] ÷ 15<br>or<br>[3, 3.3]<br>or<br>200 ÷ 1.5 or 133.(3…) | M1 | oe |
| | 600 or 613.(...) or [626, 627] or 640 or 653.(...)<br>or<br>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<br>4.5 ÷ 1.5 = 3 and 600<br>0.2 × 200 = 40 with answer 640 (incorrect scaling method of 0.2 cm) | M1M1A0 |
| Measurement of 4.7 cm with answer 640<br>(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<br>or<br>83.4(0) ÷ 3 or 27.80 | M1 | |
| | their 20.85 ÷ 3<br>or<br>their 27.80 ÷ 4 | M1dep | |
| | 6.95 | A1 | |
| | **Additional Guidance** | | |
| | | | |

| Question | Answer | Mark | Comments |
|---|---|---|---|
| 19(a) | **Alternative method 1** | | |
| | $\frac{8}{5}$ and $\frac{5}{5}$<br>or<br>any correct ratio using integers<br>or<br>$\frac{1.6}{1.6+1}$ or $\frac{1.6}{2.6}$ | M1 | oe fractions with common denominators<br><br>eg 16 : 10 |
| | $\frac{8}{13}$ | A1 | oe fraction eg $\frac{4000}{6500}$ |
| | **Alternative method 2** | | |
| | 6500 ÷ (1.6 + 1) or 2500<br>or<br>6500 ÷ (1.6 + 1) × 1.6 or 4000<br>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<br>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<br>Allow $110.4\dot{9}$<br>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<br>eg stops at 91 |
| | 91 and 13 (is a factor)<br>or<br>91 and 7 (is a factor)<br>or<br>91 and 13 × 7 | A1 | oe<br>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** | | |
| | $2t + c = 3.4(0)$<br>and<br>$2t + 8c = 14.6(0)$ | M1 | oe<br>$8t + 4c = 13.6(0)$<br>and<br>$t + 4c = 7.3(0)$<br>allow one error in scaling equations |
| | $8c – c = 14.6(0) – 3.4(0)$<br>or $7c = 11.2(0)$ | M1dep | oe<br>$8t – t = 13.6(0) – 7.3(0)$<br>or $7t = 6.3(0)$ |
| | $c = 1.6(0)$ or 160 | A1 | $t = 0.9(0)$ or 90 |
| | (Tea) £0.90 or 90p<br>and<br>(Coffee) £1.60 or 160p | A1 | must be correct units |
| | **Alternative method 2 – Substitution** | | |
| | $t = \frac{3.4(0) - c}{2}$<br>or<br>$t = 7.3(0) – 4c$ | M1 | oe<br>$c = 3.4(0) – 2t$<br>or<br>$c = \frac{7.3(0) - t}{4}$ |
| | $\frac{3.4(0) - c}{2} + 4c = 7.3(0)$<br>or<br>$2(7.3(0) – 4c) + c = 3.4(0)$ | M1dep | oe<br>$t + 4(3.4(0) – 2t) = 7.3(0)$<br>or<br>$2t + \frac{7.3(0) - t}{4} = 3.4(0)$ |
| | $c = 1.6(0)$ or 160 | A1 | $t = 0.9(0)$ or 90 |
| | (Tea) £0.90 or 90p<br>and<br>(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<br>£1 + £1 + £1.40 = 3.4(0)<br>and<br>£1 + 4 × £1.40 = 6.6(0) |
| | A different correctly evaluated trial | M1dep | |
| | (Tea) 0.9(0) or 90<br>and (Coffee) 1.6(0) or 160<br>or<br>a correctly evaluated trial with<br>(Tea) 0.9(0) or 90<br>and (Coffee) 1.6(0) or 160 | A1 | |
| | (Tea) £0.90 or 90p<br>and<br>(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<br>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<br>Any indication the 2018 figure is being increased for 2019<br>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 |
| | $600 \times 0.8^2$ or 384<br>or $600 \times 0.8^3$ or 307.2(0)<br>or $600 \times 0.8^4$ or 245.76<br>or $600 \times 0.8^5$ or [196, 197] | M1dep | |
| | [196, 197] and incorrect | A1 | oe eg 196.61 and no<br>196.61 still owed |
| | **Alternative method 2** | | |
| | 600 × 0.2 or 120 | M1 | oe |
| | 120 × 0.8 or 96<br>or 96 × 0.8 or 76.8(0)<br>or 76.8(0) × 0.8 or 61.44<br>or 61.44 × 0.8 or [49.15, 49.16] | M1dep | oe eg (600 – 120) × 0.2<br>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<br>or 0.328 or 0.33 | M1dep | |
| | 0.327 68 (or 0.3277 or 0.328<br>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 $0.45\pi$<br>or $0.9 \times$ [3.14, 3.142] $\div 2$<br>or [2.82, 2.83] $\div 2$ or $2.8 \div 2$<br>or 1.4… | M1 | Large semicircle |
| | $0.9 \div 3 \times \pi \div 2$ or $0.3\pi \div 2$<br>or $0.15\pi$<br>or $0.9 \div 3 \times$ [3.14, 3.142] $\div 2$<br>or 0.94… $\div 2$<br>or 0.47… | M1 | Small semicircle<br>May be implied from using 1.4… for three small semicircles in next mark |
| | their 1.4…<br>+ 3 × their 0.47…<br>+ 2 × 0.75<br><br>or $0.9\pi + 2 \times 0.75$<br><br>or 2 × their 1.4… + 2 × 0.75<br><br>or 4.3… | M1dep | oe<br>dep on both marks |
| | 305 ÷ their 4.3…<br>or<br>[70.4, 70.94] | M1dep | dep on previous mark |
| | 71 with working | A1 | |
| | **Additional Guidance** | | |
| | $0.9\pi$ or 2.8… with no evidence of incorrect method | | M1M1 |
| | $0.45\pi \div 2$ | | M0 |

| Question | Answer | Mark | Comments |
|---|---|---|---|
| 28 | **Alternative method 1** | | |
| | $\frac{1}{2}x > 3 - 8$<br>or $\frac{1}{2}x > -5$<br>or $8 - 3 > -\frac{1}{2}x$<br>or $5 > -\frac{1}{2}x$<br>or $8 + \frac{1}{2}x > 3$ | M1 | oe |
| | $x > -10$ | A1 | oe $-10 < x$ |
| | **Alternative method 2** | | |
| | $16 > 6 - x$<br>or $16 - 6 > -x$<br>or $10 > -x$<br>or $x > 6 - 16$<br>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<br>eg<br>$\sin x = \frac{\sqrt{10^2 - 9^2}}{10}$<br>$\tan x = \frac{\sqrt{10^2 - 9^2}}{9}$ |
| | 25.8… or 26 | A1 | |
| | **Additional Guidance** | | |
| | $\cos = \frac{9}{10}$ $x = 25.8$ (recovered) | | M1A1 |
| | $\cos = \frac{9}{10}$ | | M0A0 |