# GCSE
# MATHEMATICS
# 8300/1F

Foundation Tier Paper 1 Non-Calculator

**Mark scheme**

November 2020

Version: 1.0 Final

206G8300/1F/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 Examiner.

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

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**Glossary for Mark Schemes**

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

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

| | |
|---|---|
| **M** | Method marks are awarded for a correct method which could lead to a correct answer. |
| **A** | Accuracy marks are awarded when following on from a correct method. It is not necessary to always see the method. This can be implied. |
| **B** | Marks awarded independent of method. |
| **ft** | Follow through marks. Marks awarded for correct working following a mistake in an earlier step. |
| **SC** | Special case. Marks awarded for a common misinterpretation which has some mathematical worth. |
| **M dep** | A method mark dependent on a previous method mark being awarded. |
| **B dep** | A mark that can only be awarded if a previous independent mark has been awarded. |
| **oe** | Or equivalent. Accept answers that are equivalent.<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 $\leqslant$ 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** | 12 | B1 | |

| Q | Answer | Mark | Comments |
|---|---|---|---|
| **2** | 50 000 | B1 | |

| Q | Answer | Mark | Comments |
|---|---|---|---|
| **3** | $-7$ | B1 | |

| Q | Answer | Mark | Comments |
|---|---|---|---|
| **4** | 68 cm | B1 | |

| Q | Answer | Mark | Comments |
|---|---|---|---|
| **5** | 20 or 12 or 10 : 6 | B1 | oe ratio<br>check diagram for area counting to 20 or 12 |
| | 5 : 3 | B1ft | ft if B0 awarded, a correct and full simplification of any unsimplified ratio<br>condone $\frac{5}{3}$ : 1 or $1.\dot{6}$ : 1<br>or 1 : $\frac{3}{5}$ or 1 : 0.6<br>SC1 3 : 5 |
| | **Additional Guidance** | | |
| | 5 : 3 with no working | | B2 |
| | Ignore any units given with the answer | | |
| | 18 : 16 = 9 : 8 (perimeter) | | B0B1ft |
| | Poor unit notation can score a maximum of B1 unless recovered<br>$20^2$ or $12^2$ or $5^2 : 3^2$ | | B1B0 |

| Q | Answer | Mark | Comments |
|---|---|---|---|
| 6(a) | Dan and 20 | B2 | B1 150 or 2 min 10<br>or $2\frac{10}{60}$ or $2\frac{1}{6}$<br>or 20 in second gap |
| | **Additional Guidance** | | |
| | If answer lines blank, up to 2 marks may be awarded from the working lines | | |
| | Accept twenty for 20<br>Accept 2:10 | | |
| | Do not accept 130 for Dan | | |
| | Condone 20 and Dan | | B2 |
| | Condone incorrect time notation if recovered<br>eg 2.30 – 2.10 = 20, answer Dan and 20 s | | B2 |
| | Samir and 20 | | B1 |
| | Dan alone does not score a mark<br>eg Dan and 30 on answer line, with 150 in working<br>eg Dan and 30 on answer line, no working<br>eg Dan and 2 min 30 s is more | | B1<br>B0<br>B0 |
| | 2:50 – 1:30 = 20, answer of Dan and 20 | | B0 |
| | 130 = 2.1(0)<br>Unless recovered……130 s = 2.10 min, answer of Dan and 20 | | B0<br>B2 |
| | Accept any two conversions that enable comparisons<br>eg 130 = 60 + 60 + 10 and 2.5 = 60 + 60 + 30 | | B1 |
| | 2 min 10 with incorrect units<br>eg 2 h 10 in working, answer Dan and 20 (recovered) | | B1<br>B2 |

| Q | Answer | Mark | Comments |
|---|---|---|---|
| 6(b) | Wednesday and 3(.00) pm<br>or<br>Wednesday and 15.00 (h) | B2 | B1 Wednesday or 3(.00) pm or 15.00 or 2 days 7 h or 48 + 7 or 24 + 24 + 7 |
| | **Additional Guidance** | | |
| | Allow 1500 or 15:00 for 15.00<br>Do not allow 15 or 15(00) pm for 15.00 | | |
| | Allow 3 (o'clock) in the afternoon for 3(.00) pm<br>Do not allow 03.00 pm for 3(.00) pm | | |
| | Do not ignore incorrect conversion of time eg 1300 = 3 pm | | |
| | Mark intention eg W and 3 pm | | B2 |
| | Wed and 3 am or Wed and 3 | | B1 |
| | 55 – 7 = 48 | | B1 |

| Q | Answer | Mark | Comments |
|---|---|---|---|
| 7 | 344 | B1 | |
| | 39 | B1 | |
| | 305 | B1ft | ft their 344 – their 39 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<br>eg 234 ÷ 6 = 38.333, 344 – 38.3 = 305.7 (may have answer 306)<br>eg 344, 234 ÷ 6 = 20.3, answer 324 | | B1B0B1ft<br>B1B0B1ft |
| | Negative, fractional and decimal answers are acceptable on ft | | |

| Q | Answer | Mark | Comments |
|---|---|---|---|
| 8(a) | 160 | B1 | |
| | **Additional Guidance** | | |
| | If answer line blank, check diagram | | |
| | Accept 160 people but not adults or students | | |
| | Accept 160 out of 540 | | B1 |
| | Do not accept $\frac{160}{540}$ | | B0 |

| Q | Answer | Mark | Comments |
|---|---|---|---|
| 8(b) | (difference =) 6 – 3.5 or 2.5<br>or<br>(working in small boxes) 24 – 14<br>or<br>(S) 6 × 40 or 24 × 10 or 240<br>or<br>(A) 3.5 × 40 or 14 × 10 or 140<br>or<br>40 + 40 + 20 | M1 | oe |
| | 100 | A1 | |
| | **Additional Guidance** | | |
| | Check diagram for working | | |

<table>
<tr><th>Q</th><th>Answer</th><th>Mark</th><th>Comments</th></tr>
<tr><td rowspan="4">8(c)</td><td>Valid criticism</td><td>B1</td><td>eg the scale on the vertical axis is incorrect<br>eg 2500 is missing</td></tr>
<tr><td colspan="3">Additional Guidance</td></tr>
<tr><td colspan="2">Middle bar should be taller / is too short<br>Students bar is wrong<br>Number of people hasn't been plotted correctly<br><br>3000 should be 2500<br>They missed out (or didn't label) 2500<br>3000 is wrong<br>3000 is too big a gap (implies 1000 people instead of 500)<br>3000 is too small a gap (implies 500 space for 1000)<br>Arrow/circle on diagram showing the jump from 2000 to 3000 but no words<br>From 2000 to 3000 it went up in 200 (refers to little squares)<br>3000 should be at the top/end (of the grid)<br><br>Changes scale<br>Scale is wrong<br>Numbers on the side are incorrect<br>Lacks consistency on the way up<br>Number of people does not go up in equal amounts<br>Uneven/unequal number of people<br>Should go up in 500s<br>It goes up by 1000<br>Was going up by 500 then went up by 1000<br>Starts going up in hundreds then goes up in 200s</td><td>B1</td></tr>
<tr><td colspan="2">The gap is too big<br>Space between bars<br>Spaces too big between numbers<br>Numbers on the $y$ axis are not in order (they are numerically in order)<br>There is a gap/space on the (vertical) axis<br>Should go up in even numbers (they are going up in even numbers)<br>Starts (going up) in hundreds then goes up in thousands</td><td>B0</td></tr>
</table>

| Q | Answer | Mark | Comments |
|---|---|---|---|
| 9 | **Alternative method 1** | | |
| | (12 – 8) × 1200 or 4 × 1200 or 4800 | M1 | oe |
| | 12 500 – 7600 or 4900 | M1 | oe |
| | 4800 and 4900 and No | A1 | |
| | **Alternative method 2** | | |
| | (12 – 8) × 1200 or 4 × 1200 or 4800 | M1 | oe |
| | 12 500 – their 4800 or 7700 | M1dep | oe |
| | 7700 and No | A1 | |
| | **Alternative method 3** | | |
| | (12 – 8) × 1200 or 4 × 1200 or 4800 | M1 | oe |
| | 7600 + their 4800 or 12 400 | M1dep | oe |
| | 12 400 and No | A1 | |
| | **Alternative method 4** | | |
| | 12 500 – 7600 or 4900 | M1 | oe |
| | their 4900 ÷ (12 – 8) or 1225 | M1dep | oe |
| | 1225 and No | A1 | |

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

| | | | | |
|---|---|---|---|---|
| **9 cont** | **Alternative method 5** | | | |
| | 12 500 – 7600 or 4900 | M1 | oe | |
| | their 4900 ÷ 1200 or 4.1 (or better) | M1dep | oe<br>accept any indication of "more than 4" for 4.1 | |
| | 4.1 (or better) and (12 – 8 =) 4<br>and No | A1 | their 4 must be months remaining and not 4.1 rounded | |
| | **Additional Guidance** | | | |
| | 4 × 1200 = 4800, 7600 + 4800 = 12 600 and Yes Alt3 | | | M1M1depA0 |
| | 12 – 8 = 3, 3 × 1200 = 3600, 3600 + 7600 = 11 200 and No Alt3 | | | M1M1depA0 |
| | 3 × 1200 = 3600, 12 500 – 3600 = 8900 and No | | | M0M0depA0 |
| | 12 500 – 7600 = 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** | 3 | B1 | |

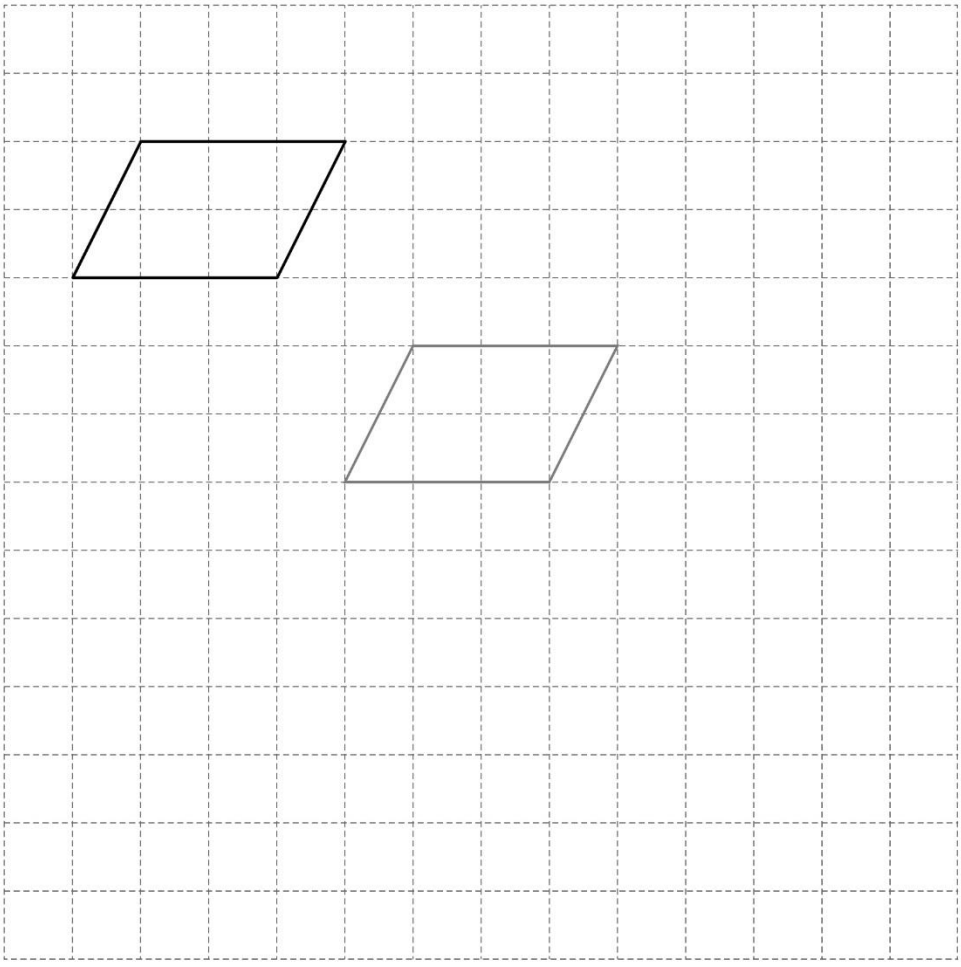
| Q | Answer | Mark | Comments |
|---|---|---|---|
| **11(a)** | 10 | B1 | |

| Q | Answer | Mark | Comments | |
|---|---|---|---|---|
| **11(b)** | 0.73 | B2 | B1 0.7(…) or digits 73 seen | |
| | **Additional Guidance** | | | |
| | Condone .73 | | | B2 |
| | Condone .7(…) | | | B1 |
| | 0.7.3 | | | B1 |

| Q | Answer | Mark | Comments |
|---|---|---|---|
| 12(a) | 29 | B1 | |
| | **Additional Guidance** | | |
| | Accept 29 out of 50<br>Do not accept $\frac{29}{50}$ or 29 : 50 | | |

| Q | Answer | Mark | Comments |
|---|---|---|---|
| 12(b) | 4 | B1 | |
| | **Additional Guidance** | | |
| | Accept 4 out of 50<br>Do not accept $\frac{4}{50}$ or 4 : 50 | | |

| Q | Answer | Mark | Comments |
|---|---|---|---|
| 12(c) | $\frac{17}{50}$ or 0.34 or 34% | B1 | oe fraction |
| | **Additional Guidance** | | |
| | Ignore attempts to simplify or convert a correct fraction | | |
| | Ignore probability words | | |
| | 17 out of 50 or 17 in 50 or 17 : 50 is B0<br>however, condone 17 out of 50 or 17 in 50 with a correct fraction, decimal or percentage (together on answer line) | | B1 |
| | but do not accept 17 : 50 with a correct fraction, decimal or percentage (together on answer line) | | B0 |

<table>
<tr><th>Q</th><th>Answer</th><th>Mark</th><th>Comments</th></tr>
<tr><td rowspan="5">13</td><td>Parallelogram in correct position</td><td>B2</td><td>B1 answer 4 squares left<br>or<br>answer 3 squares up<br>or<br>answer 4 squares right & 3 squares down</td></tr>
<tr><td colspan="3">Additional Guidance</td></tr>
<tr><td colspan="2"></td><td>B2</td></tr>
<tr><td colspan="2">Mark intention of straight lines<br>Mark intention for position of vertices</td><td></td></tr>
<tr><td colspan="2">Answer not congruent to original shape</td><td>B0</td></tr>
</table>

| Q | Answer | Mark | Comments |
|---|---|---|---|
| 14(a) | $6x = 13 + 11$ or $6x = 24$ or $\frac{24}{6}$ | M1 | oe eg $-6x = -13 - 11$ or $-6x = -24$ or $\frac{-24}{-6}$ |
| | 4 | A1 | |
| | **Additional Guidance** | | |
| | Embedded answer, eg $6 \times 4 - 11 = 13$ | | M1A0 |
| | 24 with no other working | | M0A0 |
| | Flow chart method, if 4 not given as the answer.<br>$x \rightarrow \times 6 \rightarrow -11 \rightarrow 13$ and $13 \rightarrow +11 \rightarrow \div 6 \rightarrow x$ | | M1A0 |

| Q | Answer | Mark | Comments | |
|---|---|---|---|---|
| 14(b) | $(2 \times 4a =)\ 8a$ | B1 | | |
| | $\left(\frac{15a}{3} =\right)\ 5a$ | B1 | | |
| | $13a + 2$ | B1ft | ft B1B0 or B0B1 for<br>their $8a$ + their $5a + 9 - 7$<br>is in the form p$a$ + q<br>do not award with further incorrect work<br>eg $13a + 2 = 15a$ | |
| | **Additional Guidance** | | | |
| | $13a + c$ could come from incorrect working<br>eg $8a + 4 + 9 + 5a - 7 = 13a + 16$ (their $8a$ is $8a + 4$)<br>eg $8a + 4 + 9 + 5a - 7 = 13a + 6$ (their $8a$ is $8a + 4$)<br>eg $8a + 9 + 5a - 7 = 13a + 16$<br>eg $13a + 16$ (no other working) | | | B0B1B0ft<br>B0B1B1ft<br>B1B1B0ft<br>B1B1B0ft |
| | $6a + 9 + 5a - 7 = 11a + 2$ | | | B0B1B1ft |
| | $8a + 9 + 12a - 7 = 20a + 2$ | | | B1B0B1ft |
| | $8a + 9 + 5 - 7 = 8a + 7$ | | | B1B0B1ft |
| | $8a + \frac{15a}{3} + 7$ | | | B1B0B0ft |
| | $6a + 9 + 12a - 7 = 18a + 2$ | | | B0B0B0ft |
| | $6a + 5a + 16 = 11a + 16$ | | | B0B1B0ft |

| Q | Answer | Mark | Comments |
|---|---|---|---|
| 15 | **Alternative method 1** | | |
| | $4 \times 10$ or 40 | M1 | |
| | $68 - 4 \times 10$<br>or $68 - 40$ or 28 | M1dep | oe |
| | their $28 \div 4$ or 7 | M1dep | oe |
| | 49 | A1 | |
| | **Alternative method 2** | | |
| | $68 \div 4$ | M1 | |
| | 17 | A1 | |
| | their $17 - 10$ or 7 | M1dep | dep on M1 |
| | 49 | A1 | |
| | **Additional Guidance** | | |
| | Check for working on diagram | | |

| Q | Answer | Mark | Comments |
|---|---|---|---|
| 16(a) | $\frac{11}{36}$ | B2 | B1 $\frac{22}{72}$ or 11 out of 36<br>or correctly simplified proper fraction that originally had a denominator >13 |
| | **Additional Guidance** | | |
| | Condone 11 out of 36 with $\frac{11}{36}$ (together on the answer line) | | B2 |
| | $\frac{11}{36}$ in working and 11 out of 36 on answer line | | B1 |
| | $\frac{22}{150} = \frac{11}{75}$ | | B1 |
| | $\frac{2}{4} = \frac{1}{2}$ | | B0 |
| | 22 out of 72 with no other working | | B0 |
| | 22 out of 72 with $\frac{22}{72}$ | | B1 |
| | 11 : 36 | | B0 |

| Q | Answer | Mark | Comments |
|---|---|---|---|
| 16(b) | $\frac{41}{78}$ | B1 | oe fraction, decimal or percentage |
| | **Additional Guidance** | | |
| | Ignore attempts to simplify or convert a correct fraction | | |
| | Ignore probability words | | |
| | Decimals or percentages to 2sf or better | | |
| | 41 out of 78 or 41 in 78 or 41 : 78 is B0<br>however, condone 41 out of 78 or 41 in 78 with a correct fraction, decimal or percentage (together on answer line)<br>but do not accept 41 : 78 with a correct fraction, decimal or percentage (together on answer line) | | B1<br>B0 |

| Q | Answer | Mark | Comments |
|---|---|---|---|
| 16(c) | $\frac{17+13}{150}$ or $\frac{30}{150}$ or 30 ÷ 150<br>or 0.2 | M1 | oe |
| | 20 | A1 | SC1 for 80 (not car)<br>or 49 or better (Bus)<br>or 31 or better (Walk) |
| | **Additional Guidance** | | |
| | Build up method:<br>150 = 100%, 15 = 10%, 30 = 20%, answer 20%<br>150 = 100%, 15 = 10%, 15 × 2 = 10% × 2, 30 = 25%, answer 25%<br>150 = 100%, 15 = 10%, 30 = 15%, answer 15% | | M1A1<br>M1A0<br>M0A0 |
| | $\frac{30}{150}$ seen, then 30% of 150 attempted | | M1A0 |
| | 30 out of 150 or 30 : 150 with no other working | | M0A0 |

| Q | Answer | Mark | Comments |
|---|---|---|---|
| 17 | $y = 3x$ | B1 | |

| Q | Answer | Mark | Comments |
|---|---|---|---|
| 18(a) | $\frac{110}{100} \times 80$ or (10% =) 8 | M1 | oe eg $80 + \frac{1}{10} \times 80$ or $80 + 8$ or $8 \times 11$ or $110 \times 0.8$ or $1.1 \times 80$ or 72 (implies 8) |
| | 88 | A1 | |
| | **Additional Guidance** | | |
| | 88% as answer | | M1A0 |

| Q | Answer | Mark | Comments |
|---|---|---|---|
| 18(b) | $\frac{7}{4}$ | B1 | |

| Q | Answer | Mark | Comments |
|---|---|---|---|
| 19(a) | $\frac{2}{5}$ or $\frac{30}{5}$ or (30 ÷ 5 =) 6 or $5 \times 6$ | M1 | oe fraction, decimal or percentage implied by $2 \times \frac{30}{5}$ or $2 \times 6$ |
| | 12 | A1 | SC1 18 |
| | **Additional Guidance** | | |
| | Accept a fully correct ratio build up method:<br>eg 2 : 5, 4 : 10, 6 : 15, 8 : 20, 10 : 25, 12 : 30 with nothing on answer line<br>eg 2 : 3, 4 : 6, 6 : 9, 8 : 12, 10 : 15, 12 : 18 with nothing on answer line | | <br>M1A0<br>M1A0 |
| | 30 ÷ 5 = 6 and 30 ÷ 3 = 10 and 30 ÷ 2 = 15 (choice) | | M0A0 |
| | 6 must not come from 2 × 3 | | |

| Q | Answer | Mark | Comments | |
|---|---|---|---|---|
| 19(b) | $30 + 3$ or $35 - 2$ or $33$<br>or $(1 -) \frac{2}{35}$ | M1 | oe | |
| | $\frac{33}{35}$ | A1 | oe fraction, decimal or percentage | |
| | **Additional Guidance** | | | |
| | Ignore attempts to simplify or convert a correct fraction | | | |
| | Ignore probability words | | | |
| | Decimals or percentages to 2sf or better | | | |
| | Condone 33 out of 35 or 33 in 35 with a correct fraction, decimal or percentage (together on answer line)<br>but do not accept 33 : 35 with a correct fraction, decimal or percentage (together on answer line) | | | M1A1<br>M1A0 |

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

<table>
<tr><th>Q</th><th>Answer</th><th>Mark</th><th>Comments</th></tr>
<tr><td rowspan="11">21(a)</td><td>First term 2<br>and<br>Third term 8</td><td>B2</td><td>B1 one correct<br>or First term $2^1$<br>or Third term $2^3$<br>or First term $-2$ and Third term $-8$<br>or $4x^2 = 16$ (any letter) oe equation<br>or $ar = 4$ and $ar^3 = 16$</td></tr>
<tr><td colspan="3">Additional Guidance</td></tr>
<tr><td colspan="2">If answer lines are blank, mark progression first and then working lines</td><td></td></tr>
<tr><td colspan="2">Correct answer for 1st term or 3rd term in the progression, but incorrect numerical term on answer line</td><td>B0 for that term</td></tr>
<tr><td colspan="2">Correct answer for 1st term or 3rd term in the progression, with non-contradictory algebraic term on answer line</td><td>B1 for that term</td></tr>
<tr><td colspan="2">Correct answers for 1st term and 3rd term in the progression, with non-contradictory algebraic terms on answer lines</td><td>B2</td></tr>
<tr><td colspan="2">First term 2<br>Third term $2^3$</td><td>B1</td></tr>
<tr><td colspan="2">First term $-2$<br>Third term 10</td><td>B0</td></tr>
<tr><td colspan="2">$4x = \frac{16}{x}$ (any letter)</td><td>B1</td></tr>
</table>

| Q | Answer | Mark | Comments | |
|---|---|---|---|---|
| 21(b) | **Alternative method 1** | | | |
| | 3rd term = $9p$ | M1 | oe implied by a total of $15p$ | |
| | $p + 5p$ + their 3rd term = 90<br>or $15p = 90$ | M1 | oe their 3rd term must be a linear expression in terms of $p$<br>90 ÷ 15 implies M1M1 | |
| | 6 | A1ft | ft their 3rd term, which must be a linear expression in $p$, or their equation in the form sum of 3 linear terms in $p$ = 90<br>allow ft answers rounded to 1dp or better | |
| | **Alternative method 2** | | | |
| | 90 ÷ 3 or 30 | M1 | oe | |
| | $5p$ = their 30 | M1dep | oe | |
| | 6 | 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<br>Once awarded, ignore further incorrect conversions<br>eg $p + 5p + 25p = 90$, $31p = 90$, $p = \frac{90}{31}$, $p = 3$ (ignore conversion) | | | M0M1A1ft |
| | Their 3rd term may first appear in their addition, eg $p + 5p + 10p = 90$ implies that $10p$ is their 3rd term | | | M0M1 |
| | (3rd term $5p + 4$), $p + 5p + 5p + 4 = 90$, $p = 7.8$ | | | M0M1A1ft |
| | (3rd term $10p$), $p + 5p + 10p = 90$, $p = 5.625$ | | | M0M1A1ft |
| | Sum $15p$ and/or answer 6 may come from incorrect 3rd term, eg<br>eg1 (3rd term $10p$), $p + 5p + 10p = 15p$, ($15p = 90$), $p = 6$ receives 2nd mark only; they have an incorrect 3rd term and an incorrect total for their 3 terms, but their answer is correct for their total, so equating to 90 is implied even if not seen | | | M0M1A0ft |
| | eg2 (3rd term $10p$), $p$, $5p$, $10p$, $15p = 90$, $p = 6$ | | | M0M0A0ft |
| | If their 3rd term has an algebraic coefficient the 2nd mark can be awarded for a correct equation, but A1 cannot be awarded<br>eg (3rd term $np$), $p + 5p + np = 90$ | | | M0M1A0 |

| Q | Answer | Mark | Comments |
|---|---|---|---|
| 22 | 2160 | B1 | may be implied by 240 or 10 800 |
| | $\frac{5 \times \text{their } 2160}{9}$<br>or $5 \times 240$<br>or $10\,800 \div 9$<br>or 1200 | M1 | oe |
| | 1473 | A1 | |
| | **Additional Guidance** | | |
| | Accept 0.55 or 0.56 or better for $\frac{5}{9}$ | | |
| | eg $\frac{5}{9}(2160) + 273$ (no indication that they know to multiply by $\frac{5}{9}$) | | B1M0A0 |
| | eg $\frac{5}{9} \times (2160) + 273$ | | B1M1A0 |
| | eg 2130, $5 \times 2130 \div 9$ | | B0M1A0 |

| Q | Answer | Mark | Comments |
|---|---|---|---|
| 23 | **Alternative method 1** | | |
| | 0.275 × 3 or 0.825<br>or<br>0.275 ÷ 10 or 0.0275 | M1 | oe |
| | 0.0825 | A1 | |
| | **Alternative method 2** | | |
| | 0.08… from division of 33 by 400<br>or<br>0.08… from division of 3.3 by 40 | M1 | |
| | 0.0825 | A1 | |
| | **Alternative method 3** | | |
| | $33 \times \frac{1000}{400}$<br>or 33 × 2.5<br>or<br>33 ÷ 4<br>or<br>0.33 ÷ 4<br>or<br>digits 825 | M1 | oe |
| | 0.0825 | A1 | |

| Q | Answer | Mark | Comments |
|---|---|---|---|
| 24 | **Alternative method 1** | | |
| | 2400 ÷ (3 + 5)<br>or 2400 ÷ 8<br>or 300 | M1 | oe accept $\frac{1}{8}$ of 2400 |
| | 5 × their 300 or 1500<br>or<br>3 × their 300 or 900<br>or<br>their 300 ÷ 6 or 50 | M1dep | oe |
| | 5 × their 300 ÷ 6<br>or<br>(2400 – 3 × their 300) ÷ 6<br>or<br>1500 ÷ 6 | M1dep | oe |
| | 250 | A1 | |
| | **Alternative method 2** | | |
| | 2400 ÷ 6 or 400 | M1 | oe |
| | their 400 ÷ (3 + 5) or 50 | M1dep | oe 2400 ÷ 48 scores M1M1 |
| | 5 × their 50<br>or 400 – (3 × their 50) | M1dep | oe |
| | 250 | A1 | |
| | **Additional Guidance** | | |
| | Answer 400 with 1500 or 900 in working | | M1M1M0A0 |
| | Answer 400 with 250 in working | | M1M1M1A0 |
| | Condone incorrect representation of a division if recovered<br>eg 8 ÷ 2400 = 300 | | M1 |

| Q | Answer | Mark | Comments |
|---|---|---|---|
| 25 | $2x(x + 3)$ | B2 | B1 $x(2x + 6)$ or $2(x^2 + 3x)$ |
| | **Additional Guidance** | | |
| | Condone missing final bracket $2x(x + 3$<br>Condone $(2x + 0)(x + 3)$ | | B2<br>B2 |
| | Condone multiplication signs for B1 but not B2<br>Condone $1x$ for $x$ for B1 but not B2<br>Condone incorrect algebraic notation for B1 but not B2 eg $x(x2 + 6)$ | | |
| | Do not allow further work for B2 but ignore further work for B1<br>eg $2x(x + 3) = 2x(3x)$<br>eg $x(2x + 6) = x(8x)$ | | B1<br>B1 |

| Q | Answer | Mark | Comments |
|---|---|---|---|
| 26(a) | $21 \div 7 \times 2$ (= 6)<br>or<br>$21 \div 3 = 7$ and $6 \div 3 = 2$<br>or<br>$21 \div 7 = 3$ and $6 \div 2 = 3$<br>or<br>$7 \times 3 = 21$ and $2 \times 3 = 6$ | B1 | oe eg $6 \div 2 = 3$ and $7 \times 3 = 21$ |
| | **Additional Guidance** | | |
| | $3 \times 2$ (= 6) | | B0 |
| | 7 : 2 (=) 21 : 6 with no other working | | B0 |
| | 7 : 2 (=) 21 : 6 with multiplication by 3 shown by arrow(s) | | B1 |
| | 7 : 2 (=) 14 : 4 (=) 21 : 6 | | B1 |
| | Do not condone incorrect representation of a division eg $7 \div 21 = 3$ | | B0 |
| | Do not condone incorrect mathematical representation<br>eg $21 \div 7 = 3 \times 2 = 6$ | | B0 |
| | $21 \div 6 = 3.5$, $3.5 \times 2 = 7$ | | B1 |
| | $21 \times 2 = 42$, $42 \div 7 = 6$ | | B1 |

| Q | Answer | Mark | Comments |
|---|---|---|---|
| 26(b) | **Alternative method 1** | | |
| | $2 \times \pi \times 21$ or $\pi \times 42$<br>or $42\pi$<br>or [131.88, 132] | M1 | oe<br>condone [3.14, 3.142] for $\pi$ |
| | $2 \times \pi \times 6 \div 4$ or $\pi \times 12 \div 4$<br>or $3\pi$<br>or [9.4, 9.43] | M1 | oe arc length of quarter circle<br>condone [3.14, 3.142] for $\pi$ |
| | $2 \times \pi \times 6 \div 4 + 2 \times 6$<br>or $3\pi + 12$<br>or [21.4, 21.43] | M1dep | oe<br>dep on 2nd M1<br>this does not imply M1M1M1 |
| | $45\pi + 12$ | A1 | |
| | **Alternative method 2** | | |
| | $2 \times \pi \times 21$ or $\pi \times 42$<br>or $42\pi$<br>or [131.88, 132] | M1 | oe<br>condone [3.14, 3.142] for $\pi$ |
| | $2 \times \pi \times 21$ and $2 \times \pi \times 6 \div 4$<br>or $42\pi$ and $3\pi$<br>or<br>$2 \times \pi \times 21 + 2 \times 6$ or $42\pi + 12$<br>or [143.88, 144] | M1dep | oe eg $42\pi$ and [9.4, 9.43]<br>or [131.88, 132] and $3\pi$ |
| | $2 \times \pi \times 21 + 2 \times \pi \times 6 \div 4$<br>or $42\pi + 3\pi$ or $45\pi$<br>or [141, 141.43] or [153, 153.43] | M1dep | oe<br>eg $42\pi$ + [9.4, 9.43]<br>or [131.88, 132] + $3\pi$ |
| | $45\pi + 12$ | A1 | |

**Additional guidance for this question is on the next page**

| | | |
|---|---|---|
| **26(b) cont** | **Additional Guidance** | |
| | Condone $3(15\pi + 4)$ | M1M1M1A1 |
| | Condone, for example, $\pi 42$ for up to M1M1M1 | |
| | $21\pi + 3\pi + 12$ | M0M1M1A0 on alt 1 |
| | $441\pi + 3\pi + 12$ | M0M1M1A0 on alt 1 |
| | $42\pi + 36\pi + 12$ | M1M1M0A0 on alt 2 |
| | $441\pi + 36\pi + 12$ | M0M0M0A0 |
| | Using $\pi r^2$ instead of $2\pi r$ throughout | M0M0M0A0 |
| | $45\pi + 12$ in working with incorrect further work, eg $45\pi + 12 = 57\pi$ | M1M1M1A0 |

| Q | Answer | Mark | Comments |
|---|---|---|---|
| **27** | **Alternative method 1** | | |
| | cos and $\frac{9}{18}$ oe identified | M1 | |
| | 60 | A1 | |
| | **Alternative method 2** | | |
| | sin and $\frac{\sqrt{18^2 - 9^2}}{18}$ identified<br>or tan and $\frac{\sqrt{18^2 - 9^2}}{9}$ identified | M1 | |
| | 60 | A1 | |
| | **Additional Guidance** | | |
| | Accept an embedded answer, eg cos 60 = $\frac{9}{18}$ with no further working | | M1A1 |
| | $180 \div 3 = 60$ | | M0A0 |

| Q | Answer | Mark | Comments | |
|---|---|---|---|---|
| 28 | **Alternative method 1** | | | |
| | $3c = d + 2$<br>or $3c - 2$ | M1 | | |
| | $d = 3c - 2$ or $d = -2 + 3c$<br>or $3c - 2 = d$ or $-2 + 3c = d$ | A1 | | |
| | **Alternative method 2** | | | |
| | $c - \frac{2}{3} = \frac{d}{3}$<br>or $3\left(c - \frac{2}{3}\right)$ | M1 | | |
| | $d = 3\left(c - \frac{2}{3}\right)$ | A1 | | |
| | **Additional Guidance** | | | |
| | Flow chart method, with incorrect final answer:<br>$d \rightarrow +2 \rightarrow \div 3 \rightarrow c$ and $c \rightarrow \times 3 \rightarrow -2 \rightarrow d$ | | | M1A0 |
| | Condone × signs for M1 but not A1<br>Condone $c3$ for M1 but not A1 | | | |

| Q | Answer | Mark | Comments |
|---|---|---|---|
| 29(a) | $3.6 \times 10^5$ | B1 | |
| | **Additional Guidance** | | |
| | Do not ignore further work | | |
| | Ignore leading/trailing zeros eg $3.60000 \times 10^5$ | | B1 |
| | Condone $10^5 \times 3.6$ | | B1 |
| | $3.6 + 10^5$ | | B0 |

| Q | Answer | Mark | Comments |
|---|---|---|---|
| 29(b) | 0.0092 | B1 | |
| | **Additional Guidance** | | |
| | Do not ignore further work | | |
| | Ignore additional zeros before the decimal point or after the 2 | | |
| | Accept .0092 | | B1 |
| | 0.009.2 | | B0 |