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# GCSE Mathematics

Paper 3 Foundation Tier

Mark scheme

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8300  
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Version: 1.0 Final

Mark schemes are prepared by the Lead Assessment Writer and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all associates participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every associate understands and applies it in the same correct way. As preparation for standardisation each associate analyses a number of students' scripts. Alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, associates encounter unusual answers which have not been raised they are required to refer these to the Lead 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](http://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.

|                        |                                                                                                                                        |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| <b>M</b>               | Method marks are awarded for a correct method which could lead to a correct answer.                                                    |
| <b>A</b>               | 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>B</b>               | Marks awarded independent of method.                                                                                                   |
| <b>ft</b>              | Follow through marks. Marks awarded for correct working following a mistake in an earlier step.                                        |
| <b>SC</b>              | Special case. Marks awarded for a common misinterpretation which has some mathematical worth.                                          |
| <b>M dep</b>           | A method mark dependent on a previous method mark being awarded.                                                                       |
| <b>B dep</b>           | A mark that can only be awarded if a previous independent mark has been awarded.                                                       |
| <b>oe</b>              | Or equivalent. Accept answers that are equivalent.<br>eg accept 0.5 as well as $\frac{1}{2}$                                           |
| <b>[a, b]</b>          | Accept values between a and b inclusive.                                                                                               |
| <b>[a, b)</b>          | Accept values $a \leq \text{value} < b$                                                                                                |
| <b>3.14 ...</b>        | Accept answers which begin 3.14 eg 3.14, 3.142, 3.1416                                                                                 |
| <b>Use of brackets</b> | 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.

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| Question | Answer        | Mark | Comments |
|----------|---------------|------|----------|
| 1        | 1000          | B1   |          |
| 2        | $\frac{2}{6}$ | B1   |          |
| 3        | 0.215         | B1   |          |
| 4        | capacity      | B1   |          |

| Question | Answer                                                      | Mark  | Comments                    |
|----------|-------------------------------------------------------------|-------|-----------------------------|
| 5        | <b>Alternative method 1 of 5</b>                            |       |                             |
|          | 1.7(0) ÷ 2.5 or 0.68<br>or<br>170 ÷ 2.5 or 68               | M1    | oe<br>0.51 or 51 implies M1 |
|          | their 0.68 × 3.25<br>or<br>their 68 × 3.25 or 221           | M1dep | oe                          |
|          | 2.21                                                        | A1    |                             |
|          | <b>Alternative method 2 of 5</b>                            |       |                             |
|          | 2.5 ÷ 1.7(0) or 1.47...<br>or<br>2.5 ÷ 170 or 0.0147...     | M1    | oe                          |
|          | 3.25 ÷ their 1.47...<br>or<br>3.25 ÷ their 0.0147... or 221 | M1dep | oe                          |
|          | 2.21                                                        | A1    |                             |
|          | <b>Alternative method 3 of 5</b>                            |       |                             |
|          | 3.25 ÷ 2.5 or 1.3                                           | M1    | oe                          |
|          | their 1.3 × 1.7(0)<br>or<br>3.25 × 1.7(0) ÷ 2.5             | M1dep | oe                          |
|          | 2.21                                                        | A1    |                             |

**Alternative method 4 continues on the next page**

| Question  | Answer                                                                                                                                                  | Mark   | Comments |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------|--------|----------|
| 5<br>cont | <b>Alternative method 4 of 5</b>                                                                                                                        |        |          |
|           | $2.5 \div 3.25$ or 0.769... or 0.77                                                                                                                     | M1     | oe       |
|           | 1.7(0) $\div$ their 0.769...<br>or<br>1.7(0) $\div$ their 0.77                                                                                          | M1dep  | oe       |
|           | 2.21                                                                                                                                                    | A1     |          |
|           | <b>Alternative method 5 of 5</b>                                                                                                                        |        |          |
|           | 1.7(0) $\div$ 10 or 0.17<br><b>and</b><br>$3.25 \div 0.25$ or 13                                                                                        | M1     | oe       |
|           | their 0.17 $\times$ their 13<br>or<br>1.7(0) $\div$ 10 $\times$ their 13                                                                                | M1dep  | oe       |
|           | 2.21                                                                                                                                                    | A1     |          |
|           | <b>Additional Guidance</b>                                                                                                                              |        |          |
|           | Condone 2.21p unless the £ sign has been crossed out                                                                                                    | M1M1A1 |          |
|           | (£)0.51 or 51(p) is the cost of the extra 0.75 kg of carrots<br>This implies the first M1 on Alt 1 and achieves the second M1 if added to 1.7(0) or 170 |        |          |
|           | Accept work in grams rather than kilograms                                                                                                              |        |          |
|           | Do not allow a misread of 3.25 kg                                                                                                                       |        |          |

| Question | Answer                                                                                                   | Mark | Comments                                                                                                                                                                                                                                                                 |
|----------|----------------------------------------------------------------------------------------------------------|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6a       | BHS    RHS<br>BHP    RHP<br>BCS    RCS<br>BCP    RCP                                                     | B2   | B1 for<br>four additional correct combinations with<br>no errors or repetitions<br>or<br>five additional correct combinations with<br>at most one error or repetition<br>or<br>six or seven additional correct<br>combinations with at most two errors or<br>repetitions |
|          | <b>Additional Guidance</b>                                                                               |      |                                                                                                                                                                                                                                                                          |
|          | Do not allow repetition of BHS for B2                                                                    |      |                                                                                                                                                                                                                                                                          |
|          | Ingredients may be written as full words                                                                 |      |                                                                                                                                                                                                                                                                          |
|          | Accept letters or words in any order eg BPC for BCP                                                      |      |                                                                                                                                                                                                                                                                          |
|          | Do not accept tree diagrams without combinations listed                                                  |      |                                                                                                                                                                                                                                                                          |
| 6b       | $\frac{2}{8}$ or $\frac{1}{4}$                                                                           | B1ft | ft their (a) with at least three additional<br>combinations, at least one of which<br>contains cheese and pickle<br>ignore further working if attempting to<br>simplify                                                                                                  |
|          | <b>Additional Guidance</b>                                                                               |      |                                                                                                                                                                                                                                                                          |
|          | $\frac{2}{8}$ or $\frac{1}{4}$ is B1, if not $\frac{2}{8}$ or $\frac{1}{4}$ refer to (a) for possible ft |      |                                                                                                                                                                                                                                                                          |
|          | BHS, BHS, BHP, BCS, BCP, RHS, RHP, RCS and RCP in (a)<br>with answer $\frac{2}{9}$                       |      | B1ft                                                                                                                                                                                                                                                                     |
|          | Answer given only as decimal or percentage                                                               |      | B0                                                                                                                                                                                                                                                                       |

| Question | Answer                                                                                                                      | Mark                                   | Comments                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|----------|-----------------------------------------------------------------------------------------------------------------------------|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7a       | Right-angled triangle ABC drawn with<br>$A$ at $(-3, -2)$<br>and<br>$B$ at $(1, -2)$<br>and<br>$C$ at $(-3, 4)$ or $(1, 4)$ | B3                                     | B2 for<br>$A$ , $B$ and $C$ correctly plotted with no triangle drawn<br>or<br>$A$ and $B$ correctly plotted and a right-angled triangle drawn with $A$ and $B$ at two of the vertices<br>or<br>$C$ plotted on the line $y = 4$ and a right-angled triangle drawn with $C$ at one of the vertices<br>or<br>$A$ and $B$ correctly plotted with $C$ plotted at $(k, 4)$ with $k \neq -3$ or $1$ and triangle $ABC$ drawn<br>B1 for<br>$A$ and $B$ correctly plotted<br>or<br>$C$ plotted on the line $y = 4$<br>or<br>a right-angled triangle drawn |
|          | Additional Guidance                                                                                                         |                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|          |                                                                                                                             | Condone incorrect or omitted labelling |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

|    |                                                                   |      |                   |
|----|-------------------------------------------------------------------|------|-------------------|
| 7b | <b>Alternative method 1</b>                                       |      |                   |
|    | $\frac{1}{2} \times \text{their base} \times \text{their height}$ | M1   |                   |
|    | 12                                                                | A1ft | ft their triangle |
|    | <b>Alternative method 2</b>                                       |      |                   |
|    | Evidence of counting squares seen                                 | M1   |                   |
|    | 12                                                                | A1ft | ft their triangle |

| Question | Answer                                                                                 | Mark | Comments                                                    |
|----------|----------------------------------------------------------------------------------------|------|-------------------------------------------------------------|
| 8a       | <b>Alternative method 1</b>                                                            |      |                                                             |
|          | $\times 7$ in first box<br>and<br>$-2$ in second box<br>and<br>$q$ in Output           | B2   | B1 for any two correct<br><br>accept $q = 7r - 2$ in Output |
|          | <b>Alternative method 2</b>                                                            |      |                                                             |
|          | $-\frac{2}{7}$ in first box<br>and<br>$\times 7$ in second box<br>and<br>$q$ in Output | B2   | B1 for any two correct<br><br>accept $q = 7r - 2$ in Output |
|          | <b>Additional Guidance</b>                                                             |      |                                                             |
|          | Do not accept $7r - 2$ alone in Output                                                 |      |                                                             |
|          | Accept $= q$ in Output                                                                 |      |                                                             |
|          | Condone $7 \times$ in first box                                                        |      |                                                             |
| 8b       | $3(x + 5)$                                                                             | B1   | oe $3x + 15$<br>Accept $y = 3(x + 5)$ or $y = 3x + 15$      |
|          | <b>Additional Guidance</b>                                                             |      |                                                             |
|          | Ignore further work if attempting to solve eg $3x + 15 = 0$ , $x = -5$                 |      | B1                                                          |
|          | Do not ignore further work if attempting to simplify eg $3x + 15 = 18x$                |      | B0                                                          |
|          | $(y =) x + 5 \times 3$                                                                 |      | B0                                                          |
|          | Do not accept $(x + 5)^3$ or $3 \times (x + 5)$ or $(x + 5) \times 3$ or $x^3 + 15$    |      | B0                                                          |

| Question | Answer                                                                             | Mark  | Comments |
|----------|------------------------------------------------------------------------------------|-------|----------|
| 9        | <b>Alternative method 1</b>                                                        |       |          |
|          | 10 × 20 or 200<br>and<br>15 × 12 or 180<br>and<br>25 × 6 or 150                    | M1    |          |
|          | 10 × 20 + 15 × 12 + 25 × 6<br>or<br>their 200 + their 180 + their 150<br>or 530    | M1dep |          |
|          | 580 – their 530 or 50 (eggs)                                                       | M1dep |          |
|          | 54 – (10 + 15 + 25)<br>or 54 – 50 (boxes)<br>or 4 (more boxes)<br>or 1 (+) 2 (+) 1 | M1    |          |
|          | 11 boxes of 20<br>17 boxes of 12<br>26 boxes of 6                                  | A1    |          |

**Alternative method 2 continues on the next page**

| Question  | Answer                                                                                                                                                        | Mark | Comments                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 9<br>cont | <b>Alternative method 2</b>                                                                                                                                   |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|           | 11 boxes of 20<br>17 boxes of 12<br>26 boxes of 6                                                                                                             | B5   | <p>B4 for</p> <p>11 boxes of 20<br/>16 boxes of 12<br/>28 boxes of 6</p> <p>or</p> <p>11 boxes of 20<br/>15 boxes of 12<br/>30 boxes of 6</p> <p>B3 for 580 eggs placed in boxes with two of these conditions satisfied</p> <p>at least 10 boxes of 20 eggs<br/>at least 15 boxes of 12 eggs<br/>at least 25 boxes of 6 eggs</p> <p>B2 for 580 eggs placed in boxes with one of the three conditions satisfied and at least one of each box</p> <p>B1 for all three conditions satisfied with 54 boxes but a total number of eggs not equal to 580</p> |
|           | <b>Additional Guidance</b>                                                                                                                                    |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|           | Fourth M1 mark may be awarded at any stage                                                                                                                    |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|           | 10 + 15 + 25 = 50 is a total of boxes and does not score M1M1M1                                                                                               |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|           | 1 (extra) boxes of 20<br>2 (extra) boxes of 12<br>1 (extra) boxes of 6                                                                                        |      | M1M1M1M1A1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|           | 220, 204 and 156 (eggs) on answer line with 11, 17 and 26 (boxes) seen in working                                                                             |      | B5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|           | Condone number of eggs on answer line if number of boxes seen in working eg 220, 240 and 120 (eggs) on answer line with 11, 20 and 20 (boxes) seen in working |      | B3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

| Question | Answer                                                                                                                                                                                                                                                                         | Mark | Comments                                                                                                                     |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------------------------------------------------------------------------------------------------------------------------------|
| 10       | Correct evaluation of the sum of three multiples of 10 where the sum is not a multiple of three<br>and<br>No<br>eg 10 (+) 20 (+) 40 = 70 and No<br>or<br>Correct evaluation of the sum of three multiples of 10<br>and<br>she is only correct if the total is a multiple of 30 | B2   | B1 for<br>correct evaluation of the sum of three multiples of 10<br>eg<br>10 (+) 20 (+) 40 (=) 70<br>10 (+) 20 (+) 30 (=) 60 |
|          | Additional Guidance                                                                                                                                                                                                                                                            |      |                                                                                                                              |
|          | Ignore incorrect evaluations alongside a correct evaluation                                                                                                                                                                                                                    |      |                                                                                                                              |
|          | The multiples do not have to be different                                                                                                                                                                                                                                      |      |                                                                                                                              |
|          | eg 20 (+) 20 (+) 30 = 70 so she is not correct                                                                                                                                                                                                                                 |      | B2                                                                                                                           |
|          | eg 10 (+) 10 (+) 10 = 30 or $3 \times 10 = 30$                                                                                                                                                                                                                                 |      | B1                                                                                                                           |

| Question   | Answer                                                                                                  | Mark | Comments             |
|------------|---------------------------------------------------------------------------------------------------------|------|----------------------|
| <b>11</b>  | A in two sections                                                                                       | B1   |                      |
|            | B and C have equal number of sections<br>and<br>12 sections labelled using only A, B, C or D            | B1   | $P(B) = P(C) \neq 0$ |
|            | D in twice as many sections as A                                                                        | B1   |                      |
|            | <b>Additional Guidance</b>                                                                              |      |                      |
|            | 2As, 3Bs, 3Cs, 4Ds                                                                                      |      | B1B1B1               |
|            | 2As, 5Bs, 5Cs<br>B and C have equal number of sections and 12 sections labelled using only A, B, C or D |      | B1B1B0               |
|            | 2As, 4Bs, 4Cs, 2Ds                                                                                      |      | B1B1B0               |
|            | 2As, 2Bs, 4Cs, 4Ds                                                                                      |      | B1B0B1               |
|            | 2As, 4Ds                                                                                                |      | B1B0B1               |
|            | 2As, 4Bs, 4Cs only 10 sections labelled                                                                 |      | B1B0B0               |
|            | 2As, 3Bs, 4Cs, 3Ds                                                                                      |      | B1B0B0               |
|            | 1A, 2Bs, 2Cs, 7Ds                                                                                       |      | B0B1B0               |
|            | 1A, 2Bs, 2Cs, 3Ds only 8 sections labelled                                                              |      | B0B0B0               |
| <b>12a</b> | 10                                                                                                      | B1   |                      |
| <b>12b</b> | 35                                                                                                      | B1   |                      |
| <b>12c</b> | –5                                                                                                      | B1   |                      |

| Question | Answer                                                                                                                              | Mark             | Comments                                                                       |
|----------|-------------------------------------------------------------------------------------------------------------------------------------|------------------|--------------------------------------------------------------------------------|
| 13       | <b>Alternative method 1</b>                                                                                                         |                  |                                                                                |
|          | $0.9^2$ or 0.81                                                                                                                     | M1               | oe                                                                             |
|          | 4.86                                                                                                                                | A1               |                                                                                |
|          | 48 600                                                                                                                              | B1ft             | ft their $4.86 \times 10\,000$ correctly evaluated<br>their 4.86 cannot be 0.9 |
|          | <b>Alternative method 2</b>                                                                                                         |                  |                                                                                |
|          | 90 (cm)                                                                                                                             | B1               |                                                                                |
|          | (their 90) <sup>2</sup> or 8100                                                                                                     | M1               | oe                                                                             |
|          | 48 600                                                                                                                              | A1ft             | ft (their 90) <sup>2</sup> $\times$ 6 correctly evaluated                      |
|          | <b>Additional Guidance</b>                                                                                                          |                  |                                                                                |
|          | In Alt 1, award the B1ft if their answer clearly comes from multiplying a value by 10 000, but not from $0.9 \times 10\,000 = 9000$ |                  |                                                                                |
|          | 0.9 m = 9 cm<br>$9 \times 9 = 81$ (9 is their 90)<br>$81 \times 6 = 486$                                                            | B0<br>M1<br>A1ft |                                                                                |
|          | No conversion shown<br>$9 \times 9 = 81$ (9 is their 90)<br>$81 \times 6 = 486$                                                     | B0<br>M1<br>A1ft |                                                                                |
|          | $0.9 \times 0.9 = 0.81$ and $0.81 \times 0.9 = 0.729$                                                                               | M0               |                                                                                |
|          | $0.9 \times 0.9 = 0.81$ and $0.81 \times 0.9 = 0.729$<br>$(0.729 \times 10\,000) = 7290$                                            | M0A0<br>B1ft     |                                                                                |

| Question | Answer                                                                                                                                                                                                                                         | Mark  | Comments                        |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|---------------------------------|
| 14       | $1700 \times 0.04$ or 68<br>or<br>$1700 \times 1.04$ or 1768<br>or<br>$4(\%) \times 3$ or 12(%)                                                                                                                                                | M1    | oe                              |
|          | $1700 \times 0.04 \times 3$ or their $68 \times 3$<br>or<br>$(\text{their } 1768 - 1700) \times 3$<br>or<br>$1700 \times (\text{their } 12 \div 100)$<br>or<br>$1700 \times (1 + \text{their } 12 \div 100) (- 1700)$<br>or<br>1904 $(- 1700)$ | M1dep | oe                              |
|          | 204                                                                                                                                                                                                                                            | A1    |                                 |
|          | <b>Additional Guidance</b>                                                                                                                                                                                                                     |       |                                 |
|          | Answer of 1904 with or without 204 seen in working                                                                                                                                                                                             |       | M1M1A0                          |
|          | $1700 \times 3 = 5100$ and their $5100 \times 0.04$                                                                                                                                                                                            |       | M1M1                            |
|          | Condone $1700 \times 1.04^3$ or an answer of 212.26(...) or 212.27 or 1912.26(...) or 1912.27 for the first method mark                                                                                                                        |       | M1M0A0                          |
|          | $680 = 4\%$ and $680 \times 3$ implies $4(\%) \times 3$ for the first M1 mark only<br>680 is not their 68 for the second method mark                                                                                                           |       |                                 |
|          |                                                                                                                                                                                                                                                |       |                                 |
| 15a      | [6.9, 7.1] (cm)                                                                                                                                                                                                                                | B1    |                                 |
|          | [345, 355]                                                                                                                                                                                                                                     | B1ft  | ft their [6.9, 7.1] $\times 50$ |
|          | <b>Additional Guidance</b>                                                                                                                                                                                                                     |       |                                 |
|          | [345, 355] without sight of [6.9, 7.1]                                                                                                                                                                                                         |       | B1B1                            |

| Question   | Answer                                                                                                                  | Mark  | Comments                                                                                                                      |
|------------|-------------------------------------------------------------------------------------------------------------------------|-------|-------------------------------------------------------------------------------------------------------------------------------|
| <b>15b</b> | $R$ marked [3.9, 4.1] cm due South of $P$                                                                               | B2    | B1 for<br>$R$ marked [3.9, 4.1] cm from $P$<br>or<br>$R$ marked due South of $P$<br>or<br>4 (cm) seen                         |
| <b>16</b>  | <b>Alternative method 1 of 6</b>                                                                                        |       |                                                                                                                               |
|            | $64 \times \frac{3}{8}$ or 24<br>or<br>$78 \times \frac{7}{13}$ or 42<br>or<br>$6 \times 78 \times \frac{7}{13}$ or 252 | M1    | oe<br>$64 \times \frac{5}{8}$ or 40<br>or<br>$78 \times \frac{6}{13}$ or 36<br>or<br>$6 \times 78 \times \frac{6}{13}$ or 216 |
|            | $64 \times \frac{3}{8} + 6 \times 78 \times \frac{7}{13}$<br>or their 24 + their 252<br>or 276                          | M1dep | oe<br>$64 \times \frac{5}{8} + 6 \times 78 \times \frac{6}{13}$<br>or their 40 + their 216<br>or 256                          |
|            | $64 + 6 \times 78$ or $64 + 468$ or 532                                                                                 | M1    |                                                                                                                               |
|            | their $532 \div 2$ or 266                                                                                               | M1dep | dep on 3 <sup>rd</sup> method mark only                                                                                       |
|            | 266 and 276 and Yes<br>or<br>266 and 256 and Yes                                                                        | A1    |                                                                                                                               |

Alternative method 2 continues on the next page

| Question           | Answer                                                                                                                  | Mark  | Comments                                                                                                                      |
|--------------------|-------------------------------------------------------------------------------------------------------------------------|-------|-------------------------------------------------------------------------------------------------------------------------------|
| <b>16<br/>cont</b> | <b>Alternative method 2 of 6</b>                                                                                        |       |                                                                                                                               |
|                    | $64 \times \frac{3}{8}$ or 24<br>or<br>$78 \times \frac{7}{13}$ or 42<br>or<br>$6 \times 78 \times \frac{7}{13}$ or 252 | M1    | oe<br>$64 \times \frac{5}{8}$ or 40<br>or<br>$78 \times \frac{6}{13}$ or 36<br>or<br>$6 \times 78 \times \frac{6}{13}$ or 216 |
|                    | $64 \times \frac{3}{8} + 6 \times 78 \times \frac{7}{13}$<br>or their 24 + their 252<br>or 276                          | M1dep | oe<br>$64 \times \frac{5}{8} + 6 \times 78 \times \frac{6}{13}$<br>or their 40 + their 216<br>or 256                          |
|                    | $64 + 6 \times 78$ or $64 + 468$ or 532                                                                                 | M1    |                                                                                                                               |
|                    | their 532 – their 276                                                                                                   | M1dep | dep on M1M1M1<br>their 532 – their 256                                                                                        |
|                    | 256 and 276 and Yes                                                                                                     | A1    |                                                                                                                               |

Alternative method 3 continues on the next page

| Question           | Answer                                                                                                                  | Mark  | Comments                                                                                                                      |
|--------------------|-------------------------------------------------------------------------------------------------------------------------|-------|-------------------------------------------------------------------------------------------------------------------------------|
| <b>16<br/>cont</b> | <b>Alternative method 3 of 6</b>                                                                                        |       |                                                                                                                               |
|                    | $64 \times \frac{3}{8}$ or 24<br>or<br>$78 \times \frac{7}{13}$ or 42<br>or<br>$6 \times 78 \times \frac{7}{13}$ or 252 | M1    | oe<br>$64 \times \frac{5}{8}$ or 40<br>or<br>$78 \times \frac{6}{13}$ or 36<br>or<br>$6 \times 78 \times \frac{6}{13}$ or 216 |
|                    | $64 \times \frac{3}{8} + 6 \times 78 \times \frac{7}{13}$<br>or their 24 + their 252<br>or 276                          | M1dep | oe<br>$64 \times \frac{5}{8} + 6 \times 78 \times \frac{6}{13}$<br>or their 40 + their 216<br>or 256                          |
|                    | $64 \div 2$ or 32<br>and<br>$(6 \times 78) \div 2$ or $468 \div 2$ or 234                                               | M1    |                                                                                                                               |
|                    | their 32 + their 234 or 266                                                                                             | M1dep | dep on 3 <sup>rd</sup> method mark only                                                                                       |
|                    | 266 and 276 and Yes<br>or<br>266 and 256 and Yes                                                                        | A1    |                                                                                                                               |

Alternative method 4 continues on the next page

| Question           | Answer                                                                                                                  | Mark  | Comments            |
|--------------------|-------------------------------------------------------------------------------------------------------------------------|-------|---------------------|
| <b>16<br/>cont</b> | <b>Alternative method 4 of 6</b>                                                                                        |       |                     |
|                    | $64 \times \frac{3}{8}$ or 24<br>or<br>$78 \times \frac{7}{13}$ or 42<br>or<br>$6 \times 78 \times \frac{7}{13}$ or 252 | M1    | oe                  |
|                    | $64 \times \frac{3}{8} + 6 \times 78 \times \frac{7}{13}$<br>or their 24 + their 252<br>or 276                          | M1dep | oe                  |
|                    | $64 + 6 \times 78$ or $64 + 468$ or 532                                                                                 | M1    |                     |
|                    | their $276 \div$ their 532 or 0.51... or 0.52<br>or<br>their $532 \div$ their 276 or 1.9... or 1.93                     | M1dep | oe<br>dep on M1M1M1 |
|                    | 532 and 276 and 0.51... or 0.52 and Yes<br>or<br>532 and 276 and 1.9... or 1.93 and Yes                                 | A1    |                     |

Alternative method 5 continues on the next page

| Question           | Answer                                                                                                                  | Mark  | Comments                                                                                                                      |
|--------------------|-------------------------------------------------------------------------------------------------------------------------|-------|-------------------------------------------------------------------------------------------------------------------------------|
| <b>16<br/>cont</b> | <b>Alternative method 5 of 6</b>                                                                                        |       |                                                                                                                               |
|                    | $64 \times \frac{3}{8}$ or 24<br>or<br>$78 \times \frac{7}{13}$ or 42<br>or<br>$6 \times 78 \times \frac{7}{13}$ or 252 | M1    | oe<br>$64 \times \frac{5}{8}$ or 40<br>or<br>$78 \times \frac{6}{13}$ or 36<br>or<br>$6 \times 78 \times \frac{6}{13}$ or 216 |
|                    | $64 \times \frac{3}{8} + 6 \times 78 \times \frac{7}{13}$<br>or their 24 + their 252<br>or 276                          | M1dep | oe<br>$64 \times \frac{5}{8} + 6 \times 78 \times \frac{6}{13}$<br>or their 40 + their 216<br>or 256                          |
|                    | their 276 $\times$ 2 or 552                                                                                             | M1dep | their 256 $\times$ 2 or 512                                                                                                   |
|                    | $64 + 6 \times 78$ or $64 + 468$ or 532                                                                                 | M1    |                                                                                                                               |
|                    | 532 and 552 and Yes<br>or<br>532 and 512 and Yes                                                                        | A1    |                                                                                                                               |

Alternative method 6 continues on the next page

| Question           | Answer                                                                                                                                                   | Mark  | Comments                |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-------------------------|
| <b>16<br/>cont</b> | <b>Alternative method 6 of 6</b>                                                                                                                         |       |                         |
|                    | $\frac{1}{2} - \frac{3}{8}$ or $\frac{1}{8}$<br>or<br>$\frac{7}{13} - \frac{1}{2}$ or $\frac{1}{26}$                                                     | M1    | oe                      |
|                    | 64 × their $\frac{1}{8}$ or 8 (under)<br>or<br>78 × their $\frac{1}{26}$ or 3 (over)                                                                     | M1dep | oe                      |
|                    | 78 × their $\frac{1}{26} \times 6$ or 18 (over)                                                                                                          | M1dep | oe                      |
|                    | 64 × their $\frac{1}{8}$ or 8 (under)<br>and<br>78 × their $\frac{1}{26} \times 6$ or 18 (over)                                                          | M1dep | oe<br>May be subtracted |
|                    | 8 under (half) and 18 over (half) and Yes<br>or<br>10 over (half) and Yes                                                                                | A1    |                         |
|                    | <b>Additional Guidance</b>                                                                                                                               |       |                         |
|                    | Condone $\frac{24}{64}$ for 24 or $\frac{42}{468}$ for 42 or $\frac{252}{468}$ for 252 for first method mark                                             |       |                         |
|                    | 276 and 10 over (266) and Yes implies 266 and 276 and Yes                                                                                                |       | M1M1M1M1A1              |
|                    | In Alt 2 256 and 276 and Yes                                                                                                                             |       | M1M1M1M1A1              |
|                    | In Alt 4 accept working with unused seats leading to<br>their $256 \div$ their 532 or 0.4... or 0.49<br>or their $532 \div$ their 256 or 2.07... or 2.08 |       |                         |

| Question | Answer                                                | Mark | Comments                                        |
|----------|-------------------------------------------------------|------|-------------------------------------------------|
| 17       | $x - 3 = \frac{x}{2}$                                 | B1   |                                                 |
| 18       | $5 < x \leq 9$                                        | B1   |                                                 |
| 19       | Valid statement about proportion                      | B1   | eg there were more females than males           |
|          | Valid statement about average                         | B1   | eg the average age of the females was higher    |
|          | Valid statement about spread                          | B1   | eg the ages of the females were more spread out |
|          | <b>Additional Guidance</b>                            |      |                                                 |
|          | Condone incorrect values supporting statements        |      |                                                 |
|          | Condone irrelevant statements with correct statements |      |                                                 |
|          | Proportion of the audience statements                 |      |                                                 |
|          | There were more women                                 | B1   |                                                 |
|          | Are mostly female                                     | B1   |                                                 |
|          | There were 66% more females than males                | B1   |                                                 |
|          | The proportion of women is high                       | B1   |                                                 |
|          | Females are a higher proportion than males            | B1   |                                                 |
|          | Less men than women                                   | B1   |                                                 |
|          | The men were 17%, the women were 83%                  | B1   |                                                 |
|          | The males were 17% which is less than half            | B1   |                                                 |
|          | The males were 17%                                    | B0   |                                                 |
|          | The difference is 66%                                 | B0   |                                                 |

Additional Guidance continues on the next page

|                    |                                                                                                         |    |
|--------------------|---------------------------------------------------------------------------------------------------------|----|
| <b>19<br/>cont</b> | Average age statements                                                                                  |    |
|                    | The women had a higher mean                                                                             | B1 |
|                    | Women were 5 years older                                                                                | B1 |
|                    | Females were older than the males                                                                       | B1 |
|                    | There were more females that were older than the males, this is why the mean age of the females is more | B1 |
|                    | Most males were younger than the females                                                                | B1 |
|                    | More older women than men                                                                               | B1 |
|                    | There are more younger males than females                                                               | B1 |
|                    | There are younger males than females                                                                    | B0 |
|                    | Females have a high mean                                                                                | B0 |
|                    | Average age 5.4 years difference                                                                        | B0 |
|                    | The women's mean age range was higher                                                                   | B0 |
|                    | Spread of ages statements                                                                               |    |
|                    | The women had a higher range                                                                            | B1 |
|                    | More of an age gap in the females than the males                                                        | B1 |
|                    | Females have a higher spread                                                                            | B1 |
|                    | Males ages are closer together than females                                                             | B1 |
|                    | Females have a wider age range                                                                          | B1 |
|                    | The female age gap was high, the male age gap was low                                                   | B1 |
|                    | Ages were quite close together                                                                          | B0 |
|                    | The female age gap was high                                                                             | B0 |
|                    | Age range of males is younger than females                                                              | B0 |

| Question | Answer                                                                                                              | Mark  | Comments                          |
|----------|---------------------------------------------------------------------------------------------------------------------|-------|-----------------------------------|
| 20       | <b>Alternative method 1 of 3</b>                                                                                    |       |                                   |
|          | 98 in the singles non-intersecting part and 34 in the doubles non-intersecting part<br>or $98 + x$<br>or $34 + x$   | M1    |                                   |
|          | $98 + x = 2(34 + x)$                                                                                                | M1dep | oe $\frac{1}{2}(98 + x) = 34 + x$ |
|          | $98 + x = 68 + 2x$                                                                                                  | M1dep | oe $49 + \frac{1}{2}x = 34 + x$   |
|          | 30                                                                                                                  | A1    |                                   |
|          | <b>Alternative method 2 of 3</b>                                                                                    |       |                                   |
|          | 98 in the singles non-intersecting part and 34 in the doubles non-intersecting part                                 | M1    |                                   |
|          | $34 \times 2$ or 68<br>or $98 \div 2$ or 49<br>or $98 - 34$ or 64                                                   | M1    | second M1 implies M1M1            |
|          | 98 – their 68<br>or $2 \times (\text{their } 49 - 34)$<br>or their $64 - 34$<br>or $2 \times \text{their } 64 - 98$ | M1    | third M1 implies M1M1M1           |
|          | 30                                                                                                                  | A1    |                                   |

Alternative method 3 continues on the next page

| Question           | Answer                                                                                                                                            | Mark | Comments                                                                                    |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|------|---------------------------------------------------------------------------------------------|
| <b>20<br/>cont</b> | <b>Alternative method 3 of 3</b>                                                                                                                  |      |                                                                                             |
|                    | One complete trial correctly evaluated<br>eg $98 + 10 = 108$ and $34 + 10 = 44$<br>and<br>$108 \div 2 = 54$ or $44 \times 2 = 88$<br>(and No)     | M1   | oe<br><br>$108 \div 2 = 54$ or $44 \times 2 = 88$ is not required if a second trial is done |
|                    | Second complete trial correctly evaluated<br>eg $98 + 20 = 118$ and $34 + 20 = 54$<br>and<br>$118 \div 2 = 59$ or $54 \times 2 = 108$<br>(and No) | M1   | oe<br><br>$118 \div 2 = 59$ or $54 \times 2 = 108$ is not required if a third trial is done |
|                    | Correct trial with both numbers and correctly evaluated<br>$98 + 30 = 128$ and $34 + 30 = 64$                                                     | M1   |                                                                                             |
|                    | 30                                                                                                                                                | A1   |                                                                                             |
|                    | <b>Additional Guidance</b>                                                                                                                        |      |                                                                                             |
|                    | Working may be shown on Venn diagram                                                                                                              |      |                                                                                             |
|                    | 30 shown in intersection in Venn diagram unless contradicted by final answer                                                                      |      | M1M1M1A1                                                                                    |
|                    | $2 \times 98 - 2 \times 34 - 98$ oe                                                                                                               |      | M1M1M1                                                                                      |
|                    | 98 and 34 correctly positioned in Venn diagram may be replaced by working or have additional working                                              |      |                                                                                             |
|                    | eg 34 in Venn diagram replaced by or with 68                                                                                                      |      | M1M1                                                                                        |
|                    | eg 98 in Venn diagram replaced by or with 49                                                                                                      |      | M1M1                                                                                        |
|                    | 98 and 34 incorrectly positioned in Venn diagram may be recovered by working                                                                      |      |                                                                                             |

| Question   | Answer                                                                 | Mark     | Comments                                                 |
|------------|------------------------------------------------------------------------|----------|----------------------------------------------------------|
| <b>21a</b> | 140 ÷ 50 or 2.8<br>or 140 ÷ 50 × 60 or 168                             | M1       | oe                                                       |
|            | 2 (hours) 48 (minutes)                                                 | A1       | 258 (minutes) (after midday) implies M1A1                |
|            | 4.18 (pm)                                                              | A1ft     | oe<br>ft their time in hours and minutes with M1 awarded |
|            | <b>Additional Guidance</b>                                             |          |                                                          |
|            | 140 ÷ 50 or 2.8 = 2 hours 80 minutes = 3 hours 20 minutes, Answer 4.50 | M1A0A1ft |                                                          |
|            | 140 ÷ 50 or 2.8 = 2 hours 8 minutes, Answer 3.38                       | M1A0A1ft |                                                          |
|            | 140 ÷ 50 or 2.8 = 2 hours 80 minutes = 3 hours 20 minutes, Answer 4.5  | M1A0A0ft |                                                          |
|            | 140 ÷ 50 or 2.8, Answer 4.10                                           | M1A0A0ft |                                                          |
|            | 2 hours 8 minutes implies attempt at 140 ÷ 50                          | M1       |                                                          |
|            |                                                                        |          |                                                          |

| Question   | Answer                                                             | Mark | Comments                                                                                                                      |
|------------|--------------------------------------------------------------------|------|-------------------------------------------------------------------------------------------------------------------------------|
| <b>21b</b> | Valid statement                                                    | B1ft | eg the arrival time will be later<br>it will be later<br>time will be more<br>ft their time in (a) eg it will be after 4.18pm |
|            | <b>Additional Guidance</b>                                         |      |                                                                                                                               |
|            | It will be delayed                                                 |      | B1                                                                                                                            |
|            | The arrival time will be increased                                 |      | B1                                                                                                                            |
|            | He will reach there late                                           |      | B1                                                                                                                            |
|            | The time will go up                                                |      | B1                                                                                                                            |
|            | It will go up                                                      |      | B1                                                                                                                            |
|            | The journey will take longer so the arrival time is later          |      | B1                                                                                                                            |
|            | Take longer                                                        |      | B0                                                                                                                            |
|            | Longer                                                             |      | B0                                                                                                                            |
|            | Slower (restating question)                                        |      | B0                                                                                                                            |
|            | You won't get there as quick                                       |      | B0                                                                                                                            |
|            | Time will be longer                                                |      | B0                                                                                                                            |
|            | Journey will be longer                                             |      | B0                                                                                                                            |
|            | 'Longer' is referring to a time period rather than an arrival time |      |                                                                                                                               |

| Question | Answer                                                                                                                                                                                                                                                                                                                                 | Mark  | Comments                                                                                                            |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|---------------------------------------------------------------------------------------------------------------------|
| 22       | <b>Alternative method 1 of 2</b>                                                                                                                                                                                                                                                                                                       |       |                                                                                                                     |
|          | $PAB = 51$<br>or $PAD = 51$<br>or $APC = 180 - 51$<br>or $APC = 129$                                                                                                                                                                                                                                                                   | M1    |                                                                                                                     |
|          | $ABP = 180 - 51 - \text{their } 51$<br>or $ABP = 180 - 102$<br>or $ABP = 78$<br><br>or $ADC = 180 - \text{their } 51 - \text{their } 51$<br>$ADC = 180 - 102$<br>$ADC = 78$                                                                                                                                                            | M1dep | $PAB = 51$ and $PAD = 51$<br>or $BAD = 102$                                                                         |
|          | $BCD = 180 - \text{their } 78$<br>or $BCD = 360 - \text{their } 129 - \text{their } 51 - \text{their } 78$<br>or $BCD = 360 - 258$<br>or $BCD = 102$<br><br>or $4x = 180 - \text{their } 78$<br>or $4x = 360 - \text{their } 129 - \text{their } 51 - \text{their } 78$<br>or $4x = 360 - 258$<br>or $4x = 102$<br><br>or $102 \div 4$ | M1dep | oe<br>eg $BCD = (360 - 2 \times \text{their } 78) \div 2$<br><br>or $4x = (360 - 2 \times \text{their } 78) \div 2$ |
|          | 25.5                                                                                                                                                                                                                                                                                                                                   | A1    |                                                                                                                     |

Alternative method 2 continues on the next page

| Question           | Answer                                                                               | Mark  | Comments |
|--------------------|--------------------------------------------------------------------------------------|-------|----------|
| <b>22<br/>cont</b> | <b>Alternative method 2 of 2</b>                                                     |       |          |
|                    | $ABC = 180 - 3x - x$<br>or $ABC = 180 - 4x$<br>or $APC = 180 - 51$<br>or $APC = 129$ | M1    |          |
|                    | $PAB = 2x$<br>or $APB = 2x$<br>or $2x = 51$                                          | M1dep |          |
|                    | $51 \div 2$                                                                          | M1dep |          |
|                    | 25.5                                                                                 | A1    |          |
|                    | <b>Additional Guidance</b>                                                           |       |          |
|                    | Angles must be labelled or shown on the diagram                                      |       |          |

| Question | Answer                                                                                                                                                                                                                                                                 | Mark | Comments                                                                                    |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|---------------------------------------------------------------------------------------------|
| 23       | Lists three from<br>3, 9, 27, 81, 243, 729<br>or lists three from<br>1, 4, 9, 16, ..., 225, 256, 289<br>or correctly evaluating<br>a power of 3 + a square number<br>or correctly evaluating<br>268 – a power of 3<br>or correctly evaluating<br>268 – a square number | M1   | eg $27 + 25 = 52$ or $3^3 + 5^2 = 52$<br><br>eg $268 - 27 = 241$<br><br>eg $268 - 49 = 219$ |
|          | $243 + 25$ or $3^5 + 5^2$                                                                                                                                                                                                                                              | A1   | oe<br>Addition sign must be seen in working or<br>on answer line                            |
|          | <b>Additional Guidance</b>                                                                                                                                                                                                                                             |      |                                                                                             |
|          | $3^5$ , $5^2$ or $3^5$ and $5^2$ on answer line                                                                                                                                                                                                                        |      | M1A0                                                                                        |
|          | $268 - 243 = 25$                                                                                                                                                                                                                                                       |      | M1A0                                                                                        |
|          | 243, 25 or 243 and 25 on answer line                                                                                                                                                                                                                                   |      | M1A0                                                                                        |
|          | Beware of $5^3 + 5^2$                                                                                                                                                                                                                                                  |      |                                                                                             |
| 24       | $y = \frac{k}{x}$                                                                                                                                                                                                                                                      | B1   |                                                                                             |
| 25       | 72 N                                                                                                                                                                                                                                                                   | B1   |                                                                                             |

| Question | Answer                                                                                                                                                                                                                                                                                                             | Mark | Comments                                                                              |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|---------------------------------------------------------------------------------------|
| 26a      | 80                                                                                                                                                                                                                                                                                                                 | B1   |                                                                                       |
|          | 44 and 36                                                                                                                                                                                                                                                                                                          | B1ft | ft their $80 - 44$                                                                    |
|          | 27 and 9                                                                                                                                                                                                                                                                                                           | B1ft | ft their $36 \div 4 \times 3$<br>and ft their $36 \div 4$                             |
|          | 15 and 29                                                                                                                                                                                                                                                                                                          | B1ft | ft $42 - \text{their } 27$<br>and ft $38 - \text{their } 9$<br>Total on ft must be 44 |
|          | <b>Additional Guidance</b>                                                                                                                                                                                                                                                                                         |      |                                                                                       |
|          | <p style="text-align: center;"><b>Voucher                      Gender</b></p> <pre> graph LR     80((80)) -- Yes --&gt; 44((44))     80 -- No --&gt; 36((36))     44 -- Men --&gt; 15((15))     44 -- Women --&gt; 29((29))     36 -- Men --&gt; 27((27))     36 -- Women --&gt; 9((9))                     </pre> |      | B1B1B1B1                                                                              |
|          | Mark diagram only, do not allow misread                                                                                                                                                                                                                                                                            |      |                                                                                       |
|          | Values may be rounded up or down to whole numbers provided the total is correct                                                                                                                                                                                                                                    |      |                                                                                       |
|          | Penalise the use of relative frequencies on the first occurrence only                                                                                                                                                                                                                                              |      |                                                                                       |
|          | If relative frequencies are shown the denominator must be 80 and not simplified eg $\frac{3}{4}$ and $\frac{1}{4}$ is B0                                                                                                                                                                                           |      |                                                                                       |

**Additional Guidance continues on the next page**

|             |                                                                                                                                                                                                                                                                                                         |            |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| 26a<br>cont | <p style="text-align: center;"><b>Voucher</b>                      <b>Gender</b></p> <pre> graph LR     A((80)) -- Yes --&gt; B((44))     A -- No --&gt; C((36))     B -- Men --&gt; D((33))     B -- Women --&gt; E((11))     C -- Men --&gt; F((9))     C -- Women --&gt; G((27))             </pre>  | B1B1B0B1ft |
|             | <p style="text-align: center;"><b>Voucher</b>                      <b>Gender</b></p> <pre> graph LR     A((80)) -- Yes --&gt; B((44))     A -- No --&gt; C((36))     B -- Men --&gt; D((30))     B -- Women --&gt; E((14))     C -- Men --&gt; F((12))     C -- Women --&gt; G((24))             </pre> | B1B1B0B1ft |

| Question | Answer                                                             | Mark                 | Comments                                |
|----------|--------------------------------------------------------------------|----------------------|-----------------------------------------|
| 26b      | 85%<br>or 0.85                                                     | M1                   |                                         |
|          | $27.2 \div 0.85$<br>or $27.2 \div 85 (\times 100)$ or 0.32         | M1dep                |                                         |
|          | 32(.00)                                                            | A1                   | Correct money notation<br>Allow £32.00p |
|          | <b>Additional Guidance</b>                                         |                      |                                         |
|          | 32.0                                                               |                      | M1M1A0                                  |
| 27a      | <b>Alternative method 1</b>                                        |                      |                                         |
|          | $v - u = at$                                                       | $-at = u - v$        | M1                                      |
|          | $t = \frac{v-u}{a}$                                                | $t = \frac{u-v}{-a}$ | A1<br>oe                                |
|          | <b>Alternative method 2</b>                                        |                      |                                         |
|          | $\frac{v}{a} = \frac{u}{a} + t$                                    | M1                   |                                         |
|          | $t = \frac{v}{a} - \frac{u}{a}$                                    | A1                   | oe                                      |
|          | <b>Additional Guidance</b>                                         |                      |                                         |
|          | $t = (v - u) \div a$                                               |                      | M1A1                                    |
|          | $v - u = at$ and $t = v - u \div a$                                |                      | M1A0                                    |
|          | $\frac{v-u}{a}$ or $\frac{u-v}{-a}$ or $\frac{v}{a} - \frac{u}{a}$ |                      | M1A0                                    |
|          | $a = \frac{v-u}{t}$ with or without working                        |                      | M1A0                                    |
|          | $t = v - u \div a$                                                 |                      | M0A0                                    |
|          | $t = \frac{v+u}{a}$                                                |                      | M0A0                                    |

| Question | Answer                                                                                                          | Mark | Comments                                                                                                                                             |
|----------|-----------------------------------------------------------------------------------------------------------------|------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| 27b      | (Speed) m/s or ms <sup>-1</sup><br>(Acceleration) m/s <sup>2</sup> or ms <sup>-2</sup> or m/s/s                 | B2   | B1 for one correct<br>or two mutually consistent units eg km/h and km/h <sup>2</sup><br>Accept mps for m/s and mps <sup>2</sup> for m/s <sup>2</sup> |
|          | <b>Additional Guidance</b>                                                                                      |      |                                                                                                                                                      |
|          | Allow units given in words<br>eg metres per second<br>metres per second squared or metres per second per second |      |                                                                                                                                                      |
|          | m/s <sup>-1</sup> (speed)                                                                                       |      | B0                                                                                                                                                   |
|          | m/s <sup>-2</sup> (acceleration)                                                                                |      | B0                                                                                                                                                   |
| 28       | $x^2 - 8x - 8x + 64$                                                                                            | M1   | allow one error or omission<br>terms may be seen in a grid                                                                                           |
|          | $x^2 - 16x + 64$                                                                                                | A1   | Ignore fw eg if attempting to solve<br>Do not ignore fw if attempting to simplify                                                                    |
|          | <b>Additional Guidance</b>                                                                                      |      |                                                                                                                                                      |
|          | $x^2 - 16x (+ k) \quad k \neq 64$                                                                               |      | M1A0                                                                                                                                                 |
|          | $x^2 - 8x + 64$                                                                                                 |      | M1A0                                                                                                                                                 |
|          | $x^2 - 16x + 64 = -15x^3 + 64$                                                                                  |      | M1A0                                                                                                                                                 |
|          | $x^2 - 8x + 8x + 64$ (one error)                                                                                |      | M1A0                                                                                                                                                 |
|          | $x^2 + 8x + 8x + 64$ (one error)                                                                                |      | M1A0                                                                                                                                                 |
|          | $x^2 - 6x + 8x + 64$ (two errors)                                                                               |      | M0A0                                                                                                                                                 |
|          | $x^2 + 64$ (two errors)                                                                                         |      | M0A0                                                                                                                                                 |