

**Ma**

KEY STAGE

**2**

LEVEL

**6**

Mathematics tests

# **Mathematics mark schemes**

Paper 1 and Paper 2

**2013**

National Curriculum assessments

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# Introduction

The Standards and Testing Agency (STA) is responsible for the development and delivery of statutory tests and assessments in 2013. The STA is an executive agency of the Department for Education. The test papers will be marked by external markers employed by STA.

This booklet contains the mark schemes for level 6 mathematics paper 1 and paper 2. Level threshold tables will be available at [www.education.gov.uk/ks2](http://www.education.gov.uk/ks2) from Tuesday 9 July 2013.

Paper 1 carries a total of 26 marks. Paper 2 carries a total of 24 marks. There is no mental mathematics test in the level 6 test.

The mark schemes were written alongside the questions, with children's responses added as examples to the mark schemes following trials. The mark schemes indicate the criteria on which judgements should be made. In areas of uncertainty, however, markers should use professional judgement based on the training they have received.

A number of questions in both papers contain elements of using and applying mathematics. These are not referenced explicitly in the mark scheme.

The 2013 Key Stage 2 level 6 mathematics tests and mark schemes were produced by the Key Stage 2 mathematics test development team at STA.

## General guidance

The marking information for each question is set out in the form of tables, which start on page 10 of this booklet.

The '**Question**' column on the left-hand side of each table provides a quick reference to the question number and the question part.

The '**Requirement**' column may include two types of information:

- a statement of the requirements for the award of each mark, with an indication of whether credit can be given for correct working; and
- examples of some different types of correct response.

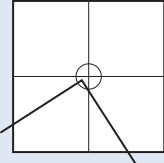
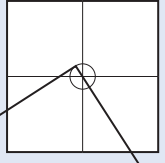
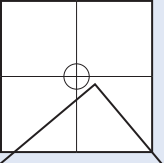
The '**Mark**' column indicates the total number of marks available for each question part.

The '**Additional guidance**' column indicates alternative acceptable responses, and provides details of specific types of response that are unacceptable. Other guidance, such as the range of acceptable answers, is provided as necessary. The '!' is used to indicate responses that are not presented conventionally but are awarded mark(s) in recognition of children's mathematical understanding at this age.

### Applying the mark schemes

To ensure consistency of marking, the most frequent queries about applying the mark scheme are listed on pages 4 and 5 along with the action the marker will take. This is followed by further guidance on pages 6 and 7 relating to the marking of questions that involve money, time and other measures. Specific guidance on marking responses involving coordinates, probability and algebra is given on pages 8 and 9. Unless otherwise specified in the mark scheme, markers will apply these guidelines in all cases.

| What if...   | Marking procedure   |  |
|--|---|--|
| <p>The child's response is numerically or algebraically equivalent to the answer in the mark scheme.</p> | <p>Markers will award the mark unless the mark scheme states otherwise.</p>   |  |
| <p>The child's response does not match closely any of the examples given.</p>                            | <p>Markers will use their judgement in deciding whether the response corresponds with the statement of the requirements given in the 'Requirement' column. Reference will also be made to the 'Additional guidance' column and, if there is still uncertainty, markers will contact the supervising marker.</p>   |  |
| <p>The child has responded in a non-standard way.</p>  | <p>Calculations, formulae and written responses do not have to be set out in any particular format. Children may provide evidence in any form as long as its meaning can be understood. Diagrams, symbols or words are acceptable for explanations or for indicating a response. Any correct method of setting out working, however idiosyncratic, will be accepted.</p>  |  |
| <p>There appears to be a misreading affecting the working.</p>   | <p>This is when the child misreads the information given in the question and uses different information without altering the original intention or difficulty level of the question. For each misread that occurs, one mark only will be deducted.</p>  |  |
| <p>No answer is given in the expected place, but the correct answer is given elsewhere.</p>              | <p>Where a child has shown understanding of the question, the mark(s) will be given. In particular, where a word or number response is expected, a child may meet the requirement by annotating a graph or labelling a diagram elsewhere in the question.</p>   |  |
| <p>The child's answer is correct but the wrong working is shown.</p>                                     | <p>A correct response will always be marked as correct.</p>   |  |
| <p>The response in the answer box is wrong but the correct answer is shown in the working.</p>           | <p>Where appropriate, detailed guidance will be given in the mark scheme, which markers will follow. If no guidance is given, markers will examine each case to decide whether:</p> <ul style="list-style-type: none"> <li>• the incorrect answer is due to a transcription error</li> <li>• the child has continued to give redundant extra working which does not contradict work already done</li> <li>• the child has continued to give redundant extra working which does contradict work already done.</li> </ul> | <p>If so, the mark <b>will</b> be awarded.</p> <p>If so, the mark <b>will</b> be awarded.</p> <p>If so, the mark <b>will not</b> be awarded.</p> |

| What if...   | Marking procedure  |
|--|--|
| <b>The correct response has been crossed out and not replaced.</b>   | Any legible crossed-out work that has not been replaced will be marked according to the mark scheme. If the work is replaced, then crossed-out work will not be considered.  |
| <b>More than one answer is given.</b>  | If all answers are correct (or a range of answers is given, all of which are correct), the mark will be awarded unless prohibited by the mark scheme. If both correct and incorrect responses are given, no mark will be awarded.  |
| <b>The answer is correct but, in a later part of the question, the child has contradicted this response.</b> | A mark given for one part will not be disallowed for working or answers given in a different part, unless the mark scheme specifically states otherwise.   |
| <b>The child has drawn lines which do not meet at the correct point.</b>                                     | <p>Markers will interpret the phrase 'slight inaccuracies in drawing' to mean 'within or on a circle of radius 2mm with its centre at the correct point'.</p> <div style="display: flex; justify-content: space-around; align-items: flex-end;"> <div style="text-align: center;">  <p>within the circle<br/>accepted</p> </div> <div style="text-align: center;">  <p>on the circle<br/>accepted</p> </div> <div style="text-align: center;">  <p>outside the circle<br/><b>not</b> accepted</p> </div> </div> |

### Recording marks awarded

Marking will take place on screen with markers viewing scanned images of children's scripts. Marks should be input on screen in accordance with the guidance given on the use of the on-screen marking software.

For multiple mark questions, markers will record the award of 3, 2, 1 or 0 as appropriate according to the mark scheme criteria. There will be provision in the software to record questions not attempted (NR: no response).

The software will aggregate mark totals automatically.

Further details on recording of marks and the use of the on-screen system will be given at marker training.



## Responses involving time

|  | Accept  | Do not accept  |
|--|---|--|
| <p><b>A time interval</b></p> <p>for example:<br/>2 hours 30 minutes</p> | <p>2 hours 30 minutes</p> <p>Any unambiguous, correct indication, eg:</p> <p><math>2\frac{1}{2}</math> hours</p> <p>2.5 hours</p> <p>2h 30</p> <p>2h 30 min</p> <p>2 30</p> <p>150 minutes</p> <p>150</p> <p>Digital electronic time, ie:</p> <p>2:30</p>         | <p>Incorrect or ambiguous time interval, eg:</p> <p>2.30</p> <p>2-30</p> <p>2,30</p> <p>230</p> <p>2.3</p> <p>2.3 hours</p> <p>2.3h</p> <p>2h 3</p> <p>2.30 min</p>                              |
| <p><b>A specific time</b></p> <p>for example:<br/>8:40am, 17:20</p>      | <p>8:40am</p> <p>8:40</p> <p>twenty to nine</p> <p>Any unambiguous, correct indication, eg:</p> <p>08.40</p> <p>8.40</p> <p>0840</p> <p>8 40</p> <p>8-40</p> <p>8,40</p> <p>Unambiguous change to 12- or 24-hour clock, eg:</p> <p>17:20 as 5:20pm or 17:20pm</p> | <p>Incorrect time, eg:</p> <p>8.4am</p> <p>8.40pm</p> <p>Incorrect placement of separators, spaces, etc or incorrect use or omission of 0, eg:</p> <p>840</p> <p>8:4:0</p> <p>8.4</p> <p>084</p> |

## Responses involving measures

|   | Accept   | Do not accept   |
|---|--|---|
| <p><b>Where units are given (eg: kg, m, l)</b></p> <p>for example: 8.6kg</p> <div style="border: 1px solid black; display: inline-block; padding: 2px 5px; margin-top: 5px;">kg</div> | <p>8.6kg</p> <p>Any unambiguous indication of the correct measurement, eg:</p> <p>8.60kg</p> <p>8.6000kg</p> <p>8kg 600g</p> | <p>Incorrect or ambiguous use of units, eg:</p> <p>8600kg</p> |

## Responses involving coordinates

|  | Accept  | Do not accept  |
|--|---|--|
| <p><b>Responses involving coordinates</b></p> <p>for example:<br/>(5, 7)</p> | <p>Unconventional notation, eg:</p> <p>(05, 07)</p> <p>(five, seven)</p> <p><math>x \ y</math></p> <p>(5, 7)</p> <p><math>(x = 5, y = 7)</math></p> | <p>Incorrect or ambiguous notation, eg:</p> <p>(7, 5)</p> <p><math>y \ x</math></p> <p>(7, 5)</p> <p><math>(5x, 7y)</math></p> <p><math>(5^x, 7^y)</math></p> <p><math>(x - 5, y - 7)</math></p> |

## Responses involving probability

|   | Accept   | Do not accept   |
|---|--|---|
| <p><b>A numerical probability should be expressed as a decimal, fraction or percentage only</b></p> <p>for example:<br/>0.7   <math>\frac{7}{10}</math>   70%</p> | <p>Equivalent decimals, fractions and percentages, eg:</p> <p>0.700</p> <p><math>\frac{70}{100}</math></p> <p><math>\frac{35}{50}</math></p> <p>70.0%</p> <p>A probability correctly expressed in one acceptable form, which is then incorrectly converted but is still less than 1 and greater than 0, eg:</p> <p><math>\frac{70}{100} = \frac{18}{25}</math></p> | <p>The first <b>four</b> categories of error below should be ignored if accompanied by an acceptable response, but should not be accepted on their own.</p> <p>However, to avoid penalising the first <b>three</b> types of error below more than once within each question, do not award the mark for the <i>first</i> occurrence of each type of error unaccompanied by an acceptable response. Where a question part carries more than one mark, only the final mark should be withheld.</p> <p>! A probability that is incorrectly expressed, eg:<br/>7 in 10<br/>7 over 10<br/>7 out of 10<br/>7 from 10</p> <p>! A fraction with non-integers in the numerator and/or denominator.</p> <p>! A probability expressed as a percentage without a percentage sign.</p> <p>! A probability expressed as a ratio, eg:<br/>7 : 10, 7 : 3, 7 to 10</p> <p>x A probability greater than 1 or less than 0</p> |



## Responses involving algebra

|  | Accept   | Do not accept   |
|--|--|---|
| <p><b>Responses involving algebra</b></p> <p>for example:</p> <p><math>2 + n</math></p> <p><math>n + 2</math></p> <p><math>2n</math></p> <p><math>\frac{n}{2}</math></p> <p><math>n^2</math></p> | <p>Unambiguous use of a different case or variable, eg:</p> <p><math>N</math> used for <math>n</math></p> <p><math>x</math> used for <math>n</math></p> <p>Words used to precede or follow equations or expressions, eg:</p> <p><math>t = n + 2</math> tiles, or tiles = <math>t = n + 2</math> for <math>t = n + 2</math></p> <p>Unambiguous letters used to indicate expressions, eg:</p> <p><math>t = n + 2</math> for <math>n + 2</math></p> | <p>! Unconventional notation, eg:</p> <p><math>n \times 2</math>, or <math>2 \times n</math>, or <math>n2</math>, or <math>n + n</math> for <math>2n</math></p> <p><math>n \times n</math> for <math>n^2</math></p> <p><math>n \div 2</math>, for <math>\frac{n}{2}</math> or <math>\frac{1}{2}n</math></p> <p><math>2 + 1n</math> for <math>2 + n</math></p> <p><math>2 + 0n</math> for <math>2</math></p> <p>Within a question that demands simplification, do not accept as part of a final answer involving algebra. Accept within a method when awarding partial credit, or within an explanation or general working.</p> <p>x Embedded values given when solving equations (since this provides insufficient indication that the child recognises the answer within the equation), eg:</p> <p>in solving <math>3x + 2 = 32</math>,</p> <p><math>3 \times 10 + 2 = 32</math> for <math>x = 10</math></p> <p>To avoid penalising the two types of error below more than once within each question, do not award the mark for the <i>first</i> occurrence of each type within each question. Where a question carries more than one mark, only the final mark should be withheld.</p> <p>! Words or units used within equations or expressions, eg:</p> <p><math>n</math> tiles + 2</p> <p><math>n</math> cm + 2</p> <p>Do not accept the above on its own. Ignore if accompanying an acceptable response.</p> <p>x Ambiguous letters used to indicate expressions, eg:</p> <p><math>n = n + 2</math> for <math>n + 2</math></p> |

**Note**

If a child leaves the answer box empty but writes the answer elsewhere on the page, then that answer must be consistent with the units given in the answer box and the conditions listed above.

If a child changes the unit given in the answer box, then their answer must be equivalent to the correct answer using the unit they have chosen, unless otherwise indicated in the mark scheme.

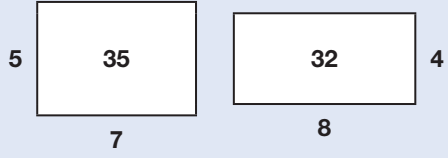
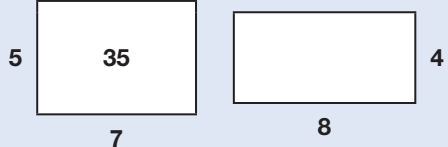
**Paper 1: Calculator not allowed**

| Question          | Requirement  | Mark                          | Additional guidance   |                   |                               |   |         |     |     |     |     |      |      |      |     |     |                               |   |
|-------------------|--|-------------------------------|---|-------------------|-------------------------------|---|---------|-----|-----|-----|-----|------|------|------|-----|-----|-------------------------------|---|
| 1                 | <p>Gives a correct probability, eg:</p> <ul style="list-style-type: none"> <li>45%</li> <li>0.45</li> <li><math>\frac{45}{100}</math></li> <li><math>\frac{9}{20}</math></li> </ul> <p>Shows or implies a complete correct method, with not more than one computational error, eg:</p> <ul style="list-style-type: none"> <li><math>\frac{1}{4} = 100 \div 4 = 40\%</math> (error)<br/>40% + 30% = 70%<br/>100% - 70% = 30%</li> <li><math>\frac{1}{4} = \frac{4}{20}</math> (error)<br/>30% = <math>\frac{6}{20}</math><br/><math>\frac{4}{20} + \frac{6}{20} = \frac{10}{20}</math><br/><math>1 - \frac{10}{20} = \frac{10}{20}</math></li> <li><math>1 - \frac{1}{4} - 30\%</math><br/><math>1 - 0.25 - 0.30 = 0.55</math> (error)</li> <li><math>P(\text{Salt \&amp; Vin}) = 1 - P(\text{Prawn}) - P(\text{Cheese})</math><br/>100% - 25% - 30%</li> </ul> | <p>2m</p> <p>or</p> <p>1m</p> | <p>! <b>Probability</b></p> <p>See guidance (page 8)</p> <p>! <b>Probability expressed as a percentage without a percentage sign</b></p> <p>Condone for 1m, ie:</p> <ul style="list-style-type: none"> <li>45</li> </ul> <p>! <b>Conversion between fractions, decimals and percentages</b></p> <p>Within a complete correct method, conversions must be correct and/or show the method of conversion</p> <p>x <b>Incomplete methods which do not convert the probabilities to a common format, eg:</b></p> <ul style="list-style-type: none"> <li><math>1 - \frac{1}{4} - 30\%</math></li> </ul> |                   |                               |   |         |     |     |     |     |      |      |      |     |     |                               |   |
| 2                 | <p>Gives the three correct numbers in their correct positions, ie:</p> <ul style="list-style-type: none"> <li> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;">75</td> </tr> <tr> <td style="text-align: center;">10      7.5</td> </tr> <tr> <td style="text-align: center;">4      2.5      3</td> </tr> </table> </li> </ul> <p>Gives two correct numbers in their correct positions</p>   | 75                            | 10      7.5   | 4      2.5      3 | <p>2m</p> <p>or</p> <p>1m</p> | <p>✓ <b>Unambiguous indication</b></p> <p>✓ <b>Equivalent fractions, eg:</b></p> <ul style="list-style-type: none"> <li><math>7\frac{5}{10}</math> for 7.5</li> </ul> |         |     |     |     |     |      |      |      |     |     |                               |   |
| 75                |  |                               |   |                   |                               |   |         |     |     |     |     |      |      |      |     |     |                               |   |
| 10      7.5       |  |                               |   |                   |                               |   |         |     |     |     |     |      |      |      |     |     |                               |   |
| 4      2.5      3 |  |                               |   |                   |                               |   |         |     |     |     |     |      |      |      |     |     |                               |   |
| 3                 | <p>Completes all three rows correctly, eg:</p> <ul style="list-style-type: none"> <li> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>rectangle</td> <td>3cm</td> <td>3cm</td> <td>15cm</td> <td>15cm</td> </tr> <tr> <td>rhombus</td> <td>9cm</td> <td>9cm</td> <td>9cm</td> <td>9cm</td> </tr> <tr> <td>kite</td> <td>10cm</td> <td>10cm</td> <td>8cm</td> <td>8cm</td> </tr> </table> </li> </ul> <p>Completes two rows correctly</p>   | rectangle                     | 3cm   | 3cm               | 15cm                          | 15cm  | rhombus | 9cm | 9cm | 9cm | 9cm | kite | 10cm | 10cm | 8cm | 8cm | <p>2m</p> <p>or</p> <p>1m</p> | <p>! <b>Measures</b></p> <p>See guidance (page 7)</p> <p>✓ <b>Side lengths in each row may be given in any order</b></p> <p>✓ <b>Accept correct values with cm omitted eg,</b> for the rectangle:</p> <ul style="list-style-type: none"> <li>15   3   15</li> </ul> |
| rectangle         | 3cm  | 3cm                           | 15cm  | 15cm              |                               |   |         |     |     |     |     |      |      |      |     |     |                               |   |
| rhombus           | 9cm  | 9cm                           | 9cm   | 9cm               |                               |   |         |     |     |     |     |      |      |      |     |     |                               |   |
| kite              | 10cm   | 10cm                          | 8cm   | 8cm               |                               |   |         |     |     |     |     |      |      |      |     |     |                               |   |

Paper 1: Calculator **not** allowed

| Question | Requirement   | Mark                   | Additional guidance   |
|----------|---|------------------------|---|
| 4a       | 50  | 1m                     |   |
| 4b       | 5   | 1m                     |   |
| 5a       | $\frac{1}{20}$ or equivalent  | 1m                     | <p>✓ <b>Equivalent fractions, decimals or percentages</b>, eg:</p> <ul style="list-style-type: none"> <li>• 5%</li> <li>• 0.05</li> <li>• <math>\frac{5}{100}</math></li> </ul> <p>✗ <b>5 without a percentage sign</b></p>   |
| 5b       | 95  | 1m                     | ✗ <b>Equivalent fractions or decimals</b>   |
| 6a       | 302   | 1m                     |   |
| 6b       | 49  | 2m<br><br>or<br><br>1m | <p>! <b>Correct embedded solutions</b></p> <p>Award 1m for a response which shows 49 as the embedded solution to their working</p>  |
|          | Shows or implies a correct first step of algebraic manipulation that either reduces the number of terms <b>or</b> collects variables on one side of the equation and numbers on the other, eg:  |                        |   |
|          | <ul style="list-style-type: none"> <li>• <math>2s = 100 - 2</math></li> <li>• <math>s = 98 \div 2</math></li> </ul> <p><b>OR</b></p> <p>Shows or implies a complete correct method, eg:</p> <ul style="list-style-type: none"> <li>• <math>(100 - 2) \div 2</math></li> </ul>   |                        |   |
| 7        | $\frac{3}{10}$ or equivalent  | 2m<br><br>or<br><br>1m | <p>✓ <b>Equivalent fractions, decimals or percentages</b></p> <p>or</p> <p>! <b>30 with no % sign</b></p> <p>Accept for 1m as evidence of a correct method</p> <p>! <math>\frac{1.5}{5}</math> or <math>\frac{1\frac{1}{2}}{5}</math></p> <p>Accept for 1m as evidence of a correct method (<i>incorrect notation for <math>\frac{3}{5} \div 2</math></i>)</p> <p>✗ <b>Conceptual errors seen</b>, eg:</p> <ul style="list-style-type: none"> <li>• <math>\frac{1}{5} + \frac{1}{5} = \frac{2}{10}</math></li> <li>• <math>\frac{1}{5} + \frac{1}{5} = 5\% + 5\% = 10\%</math></li> <li>• <math>\frac{6}{10} \div 2 = \frac{3}{5}</math></li> </ul> |
|          | Shows or implies a complete correct method and no conceptual errors, eg:  |                        |   |
|          | <ul style="list-style-type: none"> <li>• Shaded fraction is <math>\frac{1}{5} + \frac{1}{5} = \frac{2}{5}</math></li> </ul> <p>Fraction of total white area = <math>1 - \frac{2}{5} = \frac{3}{5}</math></p> <p><math>\frac{3}{5} \div 2</math></p> <ul style="list-style-type: none"> <li>• <math>\frac{1}{5} + \frac{1}{5} = 20\% + 20\% = 30\%</math> (<i>error</i>)</li> </ul> <p>White area = 70%</p> <p>Each white area = 35%</p> |                        |   |

Paper 1: Calculator **not** allowed

| Question | Requirement   | Mark | Additional guidance  |
|----------|---|------|--|
| 8        | <p>Indicates No <b>and</b> gives a correct explanation that includes indicating two different areas, eg:</p> <ul style="list-style-type: none"> <li>A rectangle with sides 6cm by 2cm has a perimeter of 16cm and an area of <math>12\text{cm}^2</math> but a rectangle with sides 5cm and 3cm has the same perimeter of 16cm but it has an area of <math>15\text{cm}^2</math> which is different so she is not correct</li> <li>A square with sides 3cm by 3cm and a rectangle with sides 4cm by 2cm have the same perimeter of 12cm but they have different areas of <math>9\text{cm}^2</math> and <math>8\text{cm}^2</math></li> </ul> | 1m   | <p>✓ <b>Minimally acceptable explanation</b>, eg:</p> <ul style="list-style-type: none"> <li><math>6 \times 2 = 12, 5 \times 3 = 15</math></li> </ul> <p>• </p> <p>! <b>Ignore any incorrect units given in an otherwise correct explanation</b>, eg:</p> <ul style="list-style-type: none"> <li><math>6^2</math> for <math>6\text{cm}^2</math></li> </ul> <p>! <b>Indicates Yes, or no decision made, but explanation clearly correct</b></p> <p>Condone, provided the explanation is more than minimal</p> <p>✗ <b>Incomplete or incorrect explanation</b>, eg:</p> <ul style="list-style-type: none"> <li><math>6 \times 2, 5 \times 3</math></li> <li>Two rectangles, one with sides 6cm by 5cm and one with sides 8cm by 3cm have the same perimeter of 22cm but they don't have the same area</li> </ul> <p>• </p> |

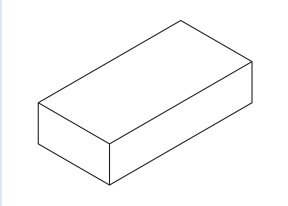
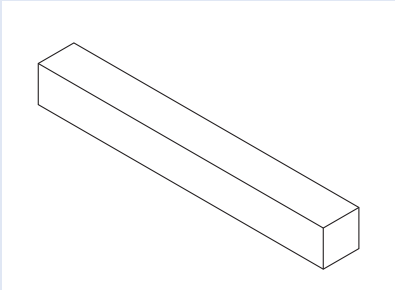
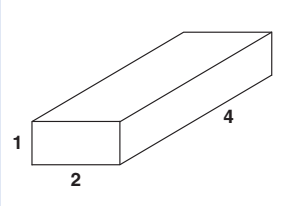
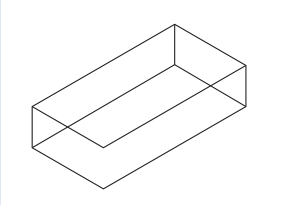
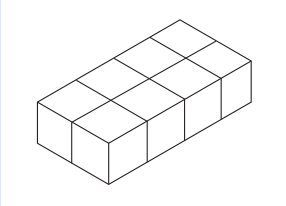
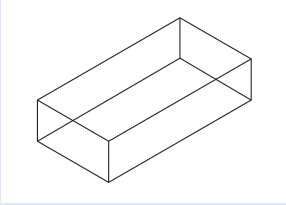
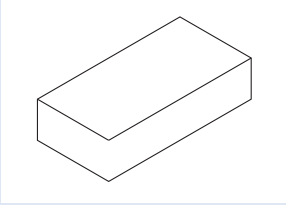
Paper 1: Calculator **not** allowed

| Question                | Requirement  | Mark         | Additional guidance   |                         |  |  |   |              |  |      |    |    |  |  |    |    |     |  |  |
|-------------------------|--|--------------|-----------------------|-------------------------|--|--|---|--------------|--|------|----|----|--|--|----|----|-----|--|--|
| 9                       | <p>10</p> <p>Shows or implies a complete correct method, eg:</p> <ul style="list-style-type: none"> <li>• <math>100 - (15 + 75)</math></li> <li>• No salad, <math>100 - 75 = 35</math> (<i>error</i>)<br/>Cheese without salad, <math>35 - 15</math></li> <li>• Tuna with salad, <math>75 - 30 = 45</math><br/>Tuna, <math>45 + 15 = 55</math> (<i>error</i>)<br/>Cheese, <math>100 - 55 = 45</math><br/>Cheese without salad, <math>45 - 30 = 5</math> (<i>error</i>)</li> <li>• <table border="1" style="margin-left: 20px;"> <tr> <td></td> <td>salad</td> <td>no salad</td> <td></td> </tr> <tr> <td>cheese</td> <td>30</td> <td><i>error</i></td> <td></td> </tr> <tr> <td>tuna</td> <td>45</td> <td>15</td> <td></td> </tr> <tr> <td></td> <td>75</td> <td>25</td> <td>100</td> </tr> </table> </li> </ul> |              | salad                 | no salad                |  | cheese   | 30  | <i>error</i> |  | tuna | 45 | 15 |  |  | 75 | 25 | 100 | <p><b>2m</b></p> <p><i>or</i></p> <p><b>1m</b></p> |  |
|                         | salad  | no salad     |                       |                         |  |  |   |              |  |      |    |    |  |  |    |    |     |  |  |
| cheese                  | 30   | <i>error</i> |                       |                         |  |  |   |              |  |      |    |    |  |  |    |    |     |  |  |
| tuna                    | 45   | 15           |                       |                         |  |  |   |              |  |      |    |    |  |  |    |    |     |  |  |
|                         | 75   | 25           | 100                   |                         |  |  |   |              |  |      |    |    |  |  |    |    |     |  |  |
| 10                      | <p>9.6 or equivalent, eg:</p> <ul style="list-style-type: none"> <li>• 9.60</li> </ul> <p>Shows or implies the correct scale factor, eg:</p> <ul style="list-style-type: none"> <li>• <math>\times 3</math> seen</li> <li>• <math>13.5 \div 4.5 = 3</math></li> <li>• <math>3.2 + 3.2 + 3.2</math></li> <li>• 1 : 3</li> </ul> <p><b>OR</b></p> <p>Shows the digits 96</p> <p><b>OR</b></p> <p>Shows or implies a complete correct method, eg:</p> <ul style="list-style-type: none"> <li>• <math>13.5 \div 4.5 \times 3.2</math></li> <li>• <table style="margin-left: 20px;"> <tr> <td></td> <td>2.10 (<i>error</i>)</td> </tr> <tr> <td>4.5 <math>\overline{) 13.5}</math></td> <td></td> </tr> </table> </li> <li>• <math>3.2 \times 2.10 = 6.4</math> (<i>error</i>)</li> </ul>                             |              | 2.10 ( <i>error</i> ) | 4.5 $\overline{) 13.5}$ |  | <p><b>2m</b></p> <p><i>or</i></p> <p><b>1m</b></p> | <p><b>! Measures</b></p> <p>See guidance (page 7)</p> |              |  |      |    |    |  |  |    |    |     |  |  |
|                         | 2.10 ( <i>error</i> )  |              |                       |                         |  |  |   |              |  |      |    |    |  |  |    |    |     |  |  |
| 4.5 $\overline{) 13.5}$ |  |              |                       |                         |  |  |   |              |  |      |    |    |  |  |    |    |     |  |  |

Paper 1: Calculator **not** allowed

| Question | Requirement  | Mark  | Additional guidance   |
|----------|--|---|---|
| 11       | $\frac{1}{2}$ or equivalent<br><br>Shows or implies a correct first step of algebraic manipulation that either reduces the number of terms <b>or</b> collects variables on one side of the equation and numbers on the other <b>or</b> correctly removes the brackets, eg: <ul style="list-style-type: none"> <li>• <math>8y + 96 = 100</math></li> <li>• <math>y + 12 = 100 \div 8</math></li> <li>• <math>8y = 4</math></li> </ul> <b>OR</b><br>Shows or implies a complete correct method, eg: <ul style="list-style-type: none"> <li>• <math>100 \div 8 = 12</math> (<i>error</i>)<br/><math>12 - 12 = 0</math></li> <li>• <math>25 \times 4 = 100</math><br/><math>12.5 \times 8 = 100</math><br/><math>12.5 - 12</math></li> </ul> | <b>2m</b><br><br><b>or</b><br><br><b>1m</b> | <b>!</b> <b>Algebra</b><br>See guidance (page 9)<br><br><b>✓</b> <b>Equivalent fractions or decimals</b><br><br><b>or</b><br><br><b>x</b> <b>A first step of algebraic manipulation which has a conceptual error, eg:</b> <ul style="list-style-type: none"> <li>• <math>y + 12 = 100</math></li> <li>• <math>y + 96 = 100</math></li> <li>• <math>8y + 12 = 100</math></li> </ul> <b>!</b> <b>Correct embedded solutions</b><br>Award 1m for a response which shows $\frac{1}{2}$ , or equivalent, as the embedded solution to their working |
| 12a      | (19, 25)   | 1m  | <b>!</b> <b>Coordinates</b><br>See guidance (page 8)  |
| 12b      | (-6, 19)   | 1m  | <b>!</b> <b>Gives values for A and B transposed</b><br>Award 1m for part (b) only, ie: <ul style="list-style-type: none"> <li>• A is (-6, 19) and<br/>B is (19, 25)</li> </ul>  |

**Paper 1: Calculator not allowed**

| Question | Requirement  | Mark                          | Additional guidance  |
|----------|--|-------------------------------|--|
| 13       | <p>Draws a cuboid with a height of 1cm and a volume of 8cm<sup>3</sup> in any orientation, using the isometric grid, eg:</p> <ul style="list-style-type: none"> <li></li> <li></li> </ul> <p>Draws a cuboid with unambiguous indication of the correct dimensions, but the only error is not to use the isometric grid correctly <b>or</b> omits an external line and/or includes some hidden lines, eg:</p> <ul style="list-style-type: none"> <li></li> <li></li> </ul> | <p>2m</p> <p>or</p> <p>1m</p> | <p>✓ <b>Lines not ruled or accurate</b><br/>Accept slight inaccuracies in drawing</p> <p>! <b>Extended lines</b><br/>For 2m or 1m, condone</p> <p>! <b>Internal lines drawn</b><br/>Ignore, eg:<br/></p> <p>! <b>Hidden lines drawn</b><br/>Do not accept for 2m, unless hidden lines are dotted or otherwise shown as hidden. Accept hidden lines for 1m, eg:<br/></p> <p>! <b>An external line omitted</b><br/>Do not accept for 2m. Accept for 1m if intended shape is clear, eg:<br/></p> <p>! <b>Ignore incomplete drawings</b></p> <p>! <b>Vertices not at dots</b><br/>Do not accept for 2m, but accept for 1m</p> |

## Paper 2: Calculator allowed

| Question | Requirement  | Mark   | Additional guidance   |   |  |  |   |  |   |   |  |  |   |
|----------|--|--|---|---|--|--|---|--|---|---|--|--|---|
| 1        | <p>Makes all four correct decisions, ie:</p> <ul style="list-style-type: none"> <li>odd    even</li> </ul> <table style="border-collapse: collapse; margin-left: 20px;"> <tr> <td style="border: 1px solid black; padding: 2px; text-align: center;">✓</td> <td style="border: 1px solid black; width: 20px; height: 20px; margin-left: 10px;"></td> </tr> <tr> <td style="border: 1px solid black; padding: 2px; text-align: center;">✓</td> <td style="border: 1px solid black; width: 20px; height: 20px; margin-left: 10px;"></td> </tr> <tr> <td style="border: 1px solid black; width: 20px; height: 20px; margin-left: 20px;"></td> <td style="border: 1px solid black; padding: 2px; text-align: center;">✓</td> </tr> <tr> <td style="border: 1px solid black; width: 20px; height: 20px; margin-left: 20px;"></td> <td style="border: 1px solid black; padding: 2px; text-align: center;">✓</td> </tr> <tr> <td style="border: 1px solid black; padding: 2px; text-align: center;">✓</td> <td style="border: 1px solid black; width: 20px; height: 20px; margin-left: 10px;"></td> </tr> </table> <p>Makes three correct decisions</p> | ✓  |   | ✓ |  |  | ✓ |  | ✓ | ✓ |  | <p>2m</p> <p style="text-align: center;"><i>or</i></p> <p>1m</p> | <p>✓ <b>Accept unambiguous indications</b>, eg:</p> <ul style="list-style-type: none"> <li>'y' or 'x' for ticked in each row</li> </ul> |
| ✓        |  |  |   |   |  |  |   |  |   |   |  |  |   |
| ✓        |  |  |   |   |  |  |   |  |   |   |  |  |   |
|          | ✓  |  |   |   |  |  |   |  |   |   |  |  |   |
|          | ✓  |  |   |   |  |  |   |  |   |   |  |  |   |
| ✓        |  |  |   |   |  |  |   |  |   |   |  |  |   |
| 2        | <p>525</p> <p>175 seen (<i>the weight of the elephant</i>)</p> <p><b>OR</b></p> <p>Shows or implies a complete correct method, eg:</p> <ul style="list-style-type: none"> <li><math>\frac{700}{4} = 170</math> (<i>error</i>)</li> <li><math>170 \times 3</math></li> </ul>  | <p>2m</p> <p style="text-align: center;"><i>or</i></p> <p>1m</p> | <p>! <b>Measures</b></p> <p>See guidance (page 7)</p>   |   |  |  |   |  |   |   |  |  |   |
| 3        | <p>17</p> <p>73° seen (<i>one of the other angles in the isosceles triangle</i>)</p> <p><b>OR</b></p> <p>Shows or implies a complete correct method, eg:</p> <ul style="list-style-type: none"> <li><math>180 - 34 = 144</math> (<i>error</i>)</li> <li><math>144 \div 2 = 72</math></li> <li><math>90 - 72 = 28</math> (<i>error</i>)</li> </ul>  | <p>2m</p> <p style="text-align: center;"><i>or</i></p> <p>1m</p> | <p>! <b>Answer written on diagram</b></p> <p>Accept providing there is no ambiguity</p>   |   |  |  |   |  |   |   |  |  |   |
| 4        | <p>Identifies all three graphs correctly, ie:</p> <ul style="list-style-type: none"> <li>Chen <b>A</b>    Megan <b>C</b>    Alfie <b>B</b></li> </ul>  | <p>1m</p>  | <p>✓ <b>Unambiguous indications of the correct graph for each person</b>, eg:</p> <ul style="list-style-type: none"> <li>Names written on scatter graphs</li> </ul> |   |  |  |   |  |   |   |  |  |   |



## Paper 2: Calculator allowed

| Question | Requirement   | Mark   | Additional guidance   |
|----------|---|--|---|
| 5        | <p>Gives only the three correct prime numbers in any order, ie:</p> <ul style="list-style-type: none"> <li>• 37, 41, 43</li> </ul> <p>Gives at least two correct prime numbers <b>and</b> not more than one incorrect number, eg:</p> <ul style="list-style-type: none"> <li>• 37, 39, 41, 43</li> <li>• 39, 41, 43</li> <li>• 41, 43</li> </ul>  | <p><b>2m</b></p> <p><i>or</i></p> <p><b>1m</b></p> |   |
| 6a       | Gives an answer in the range 25 to 29 inclusive   | <b>1m</b>  |   |
| 6b       | Gives an answer in the range 44 to 52 inclusive   | <b>1m</b>  |   |
| 7a       | <p>Gives a correct explanation, eg:</p> <ul style="list-style-type: none"> <li>• Her average is 15.75</li> <li>• <math>14 + 23 + 13 + 13 = 63</math><br/><math>63 \div 4</math> is more than 15</li> <li>• If the average is 15, Monday Wednesday and Thursday total 5 below and Tuesday is 8 above so the average must be <math>&gt; 15</math></li> <li>• To walk an average of 15km a day you need to have walked 60km. Megan has walked 63km so she is over the average of 15km</li> </ul> | <b>1m</b>  | <p>✓ <b>Minimally acceptable explanation</b>, eg:</p> <ul style="list-style-type: none"> <li>• <math>63 \div 4</math></li> <li>• <math>63 \div 4 = 16</math></li> <li>• <math>63 \div 4 = 15 \text{ r } 3</math></li> </ul> <p>✗ <b>Incomplete or incorrect explanation</b>, eg:</p> <ul style="list-style-type: none"> <li>• If you add up how far she walked in four days and divide by 4, it's more than 15</li> <li>• <math>14 + 23 + 13 + 13 = 63</math></li> <li>• <math>63 \div 4 = 15</math></li> </ul> |
| 7b       | <p>22</p> <p>85 seen (<i>the total for 5 days</i>)</p> <p><b>OR</b></p> <p>Shows or implies a complete correct method, eg:</p> <ul style="list-style-type: none"> <li>• <math>(17 \times 5) - 14 - 23 - 13 - 13</math></li> <li>• <math>17 \times 5 = 80</math> (<i>error</i>)<br/><math>80 - 63</math></li> </ul>  | <p><b>2m</b></p> <p><i>or</i></p> <p><b>1m</b></p> | <p>! <b>Follow-through of incorrect total or average</b></p> <p>For 2m or 1m, accept follow-through from incorrect value for the average <b>or</b> the total calculated for part (a) used correctly in part (b), eg:</p> <ul style="list-style-type: none"> <li>• for 16 as answer in part (a), award 2 marks for <math>85 - 4 \times 16 = 21</math></li> </ul> <p>! <b>Correct embedded solutions</b></p> <p>Award 1m, for a response which shows 22 as the embedded solution to their working</p>             |

## Paper 2: Calculator allowed

| Question | Requirement   | Mark                                    | Additional guidance  |
|----------|---|---|--|
| 8        | 64<br><br>Shows the value 19 200 ( <i>volume of the tank</i> )<br><b>OR</b><br>Shows or implies a complete correct method, eg:<br>• $(40 \times 40 \times 12) \div 300 = 58$ ( <i>error</i> )   | <b>2m</b><br><br><i>or</i><br><b>1m</b> | <b>!</b> <b>For 2m, condone 63.99(...)</b> ( <i>some calculator displays will show this as their final answer</i> )<br><br><b>!</b> <b>For 1m, condone 63.9 as evidence of an appropriate method</b> ( <i>calculator display incorrectly rounded</i> )   |
| 9        | 2.2<br><br>10.648 or 10.65 or 10.6 seen<br>( <i>the answer to <math>2.2 \times 2.2 \times 2.2</math></i> )<br><b>OR</b><br>2.15(...) seen<br><b>OR</b><br>Shows a correct method using trial and improvement, eg:<br>• $2 \times 2 \times 2 = 8$<br>$2.5 \times 2.5 \times 2.5 = 15.625$<br>$2.1 \times 2.1 \times 2.1 = 9.261$<br>• 2.4 because it's bigger than 2.1 which was too small, but smaller than 2.5 which was too big | <b>2m</b><br><br><i>or</i><br><b>1m</b> | <b>!</b> <b>For 1m, accept 2.1</b> ( <i>correct value but not correctly rounded</i> )<br><br><b>!</b> <b>Trial and improvement methods</b><br>There must be at least three trials. At least three of these trials must reduce the interval in which the solution is known to lie<br><b>and</b><br>at least two trials must use values to 1 decimal place<br><br><b>!</b> <b>Numbers not evaluated within trial and improvement methods</b><br>Condone methods that do not show evidence of evaluating the final number, eg:<br>• 2.3 because I know it's between 2 and 2.5 |

## Paper 2: Calculator allowed

| Question | Requirement   | Mark                                 | Additional guidance  |
|----------|---|--------------------------------------|--|
| 10       | <p>2</p> <p>Shows the digits 15(...) or 16 as evidence of a correct method (<i>correct value but not correctly rounded to the nearest penny</i>), eg:</p> <ul style="list-style-type: none"> <li>1.5(...)</li> </ul> <p><b>OR</b></p> <p>Shows or implies a complete correct method, eg:</p> <ul style="list-style-type: none"> <li><math>\pounds 33.50 \div 150 = 0.22</math><br/><math>0.22 \div 14</math></li> <li><math>150 \times 14 = 2100</math><br/><math>\pounds 33.50 \div 2100</math></li> </ul> <p><b>OR</b></p> <p>Shows a method for evaluating the cost of the labels at 1p and 2p each, eg:</p> <ul style="list-style-type: none"> <li><math>14 \times 150 = 2100</math><br/><math>2 \times 2100 = \pounds 42</math><br/><math>1 \times 2100 = \pounds 21</math></li> </ul> | <p>2m</p> <p><i>or</i></p> <p>1m</p> | <p>! <b>Money</b></p> <p>See guidance (page 6)</p> <p><math>\times</math> <b>Do not accept 150 as showing digits 15(...)</b><br/>(restates value from question)</p> <p>! <b>Inconsistent conversions</b></p> <p>Within an otherwise correct method condone inconsistent conversions between pence and pounds</p> |
| 11       | <p>15</p> <p>50 seen (<i>total counters in bag</i>)</p> <p><b>OR</b></p> <p>Shows or implies a complete correct method, eg:</p> <ul style="list-style-type: none"> <li>If 30% are green, 70% are red<br/><math>70\% = 35</math><br/><math>10\% = 5</math><br/><math>30\% = 5 \times 3</math></li> <li><math>P(\text{Green}) = G \div (35 + G)</math><br/><math>3 \div 10 = G \div (35 + G)</math><br/><math>3(35 + G) = 10G</math><br/><math>7G = 105</math><br/><math>G = 105 \div 7</math></li> </ul>   | <p>2m</p> <p><i>or</i></p> <p>1m</p> |  |
| 12       | <p>80</p> <p>Shows or implies a complete correct method, eg:</p> <ul style="list-style-type: none"> <li><math>(10 \times 10.5) - \left(\frac{1}{2} \times 10 \times 5\right)</math></li> <li><math>\frac{1}{2} (5.5 + 10.5) \times 10</math></li> <li><math>(10 \times 5.5) + \left(\frac{1}{2} \times 10 \times 5\right)</math><br/><math>= 55 + 22.5</math> (<i>error</i>)</li> </ul>   | <p>2m</p> <p><i>or</i></p> <p>1m</p> | <p>! <b>Measures</b></p> <p>See guidance (page 7)</p>  |



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