Mark Scheme

Specimen Paper

Pearson Edexcel International GCSE In Mathematics A (4MA1) Paper 2H
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Specimen Paper
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**General Marking Guidance**

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate’s response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate’s response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

**Types of mark**
- M marks: method marks
- A marks: accuracy marks
- B marks: unconditional accuracy marks (independent of M marks)

**Abbreviations**
- cao – correct answer only
- ft – follow through
- isw – ignore subsequent working
- SC - special case
- oe – or equivalent (and appropriate)
- dep – dependent
- indep – independent
- eooo – each error or omission
• **No working**
  If no working is shown then correct answers normally score full marks
  If no working is shown then incorrect (even though nearly correct) answers score no marks.

• **With working**
  If there is a wrong answer indicated on the answer line always check the working in the body of the script (and on any diagrams), and award any marks appropriate from the mark scheme.
  If it is clear from the working that the “correct” answer has been obtained from incorrect working, award 0 marks.
  Any case of suspected misread loses A (and B) marks on that part, but can gain the M marks.
  If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.
  If there is a choice of methods shown, then no marks should be awarded, unless the answer on the answer line makes clear the method that has been used.
  If there is no answer on the answer line then check the working for an obvious answer.

• **Ignoring subsequent work**
  It is appropriate to ignore subsequent work when the additional work does not change the answer in a way that is inappropriate for the question: eg. Incorrect cancelling of a fraction that would otherwise be correct.
  It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect eg algebra.
  Transcription errors occur when candidates present a correct answer in working, and write it incorrectly on the answer line; mark the correct answer.

• **Parts of questions**
  Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded in another.
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Our website subject pages hold useful resources, support material and live feeds from our subject advisors giving you access to a portal of information. If you have any subject specific questions about this specification that require the help of a subject specialist, you may find our Ask The Expert email service helpful.

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• **Parts of questions**  
  Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded in another.
International GCSE Maths

Apart from questions 10, 11, 14, 17 and 21 (where the mark scheme states otherwise) the correct answer, unless clearly obtained from an incorrect method, should be taken to imply a correct method.

<table>
<thead>
<tr>
<th>Q</th>
<th>Working</th>
<th>Answer</th>
<th>Mark</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (a)</td>
<td></td>
<td>$12e^9 f^2$</td>
<td>2</td>
<td>B2 B1 for 2 correct parts</td>
</tr>
<tr>
<td>(b)</td>
<td></td>
<td>$9a^8$</td>
<td>2</td>
<td>B2 B1 for $9a^8$</td>
</tr>
<tr>
<td>(c)</td>
<td>$5q \geq 31$ or $2q + 3q \geq 31$</td>
<td>$q \geq 6.2$</td>
<td>2</td>
<td>M1 For $5q \geq 31$ or $2q + 3q \geq 31$ or $5q = 31$ or $q = 6.2$ for $q \leq 6.2$ or an answer of 6.2 following $q \geq 6.2$ in working oe, $(q &gt; 6.2$ is M1 only)</td>
</tr>
<tr>
<td>(d)</td>
<td></td>
<td>$-2, -1, 0, 1, 2$</td>
<td>2</td>
<td>B2 B1 for 4 correct and none incorrect or all correct with one addition</td>
</tr>
</tbody>
</table>

**Total 8 marks**

| 2 | | $\pi \times 8.5^2 (=226.98...)$ | 4 | M1 A correct method to find the area of the circle |
| | | $(\text{area of trapezium } =) (20 + 25) \div 2 \times h$ oe | | M1 Use of correct formula for trapezium |
| | | $(=22.5h)$ | | M1 A correct method to find $h$ |
| | | $\pi \times 8.5^2 \div 22.5$ | 10.1 | A1 |

**Total 4 marks**
### Question 3

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</thead>
<tbody>
<tr>
<td><strong>3</strong></td>
<td>(a)</td>
<td>$1 - (0.26 + 0.3) (=0.44)$</td>
<td>“0.44” $\div 2$</td>
<td></td>
<td></td>
<td>0.22</td>
<td></td>
<td>3</td>
<td>M1</td>
<td>M1</td>
<td>A1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(b)</td>
<td>$91 \div 0.26 (=350)$ or $(0.3 \div 0.26) \times 91 (=105))$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td>M1</td>
<td>A correct method to find total number of bricks or number of blue bricks</td>
<td>M1</td>
<td>A correct method to find number of layers</td>
<td>A1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>$(91 + 0.3 \times “350”) \div 4 \ [ (91 + “105”) \div 4] \ oe$</td>
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<td>Total 6 marks</td>
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### Question 4

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</thead>
<tbody>
<tr>
<td><strong>4</strong></td>
<td>(a)</td>
<td>$4n + 3$</td>
<td></td>
<td>2</td>
<td>B2</td>
<td>B1 for $4n + x$ where $x$ is any integer</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td></td>
<td>(b)</td>
<td></td>
<td></td>
<td>78, 76, 74</td>
<td>2</td>
<td>B2</td>
<td>B1 for one correct term</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>(c)</td>
<td>Correct reason</td>
<td>1</td>
<td>B1</td>
<td>The first sequence is only odd numbers and the second is only even numbers</td>
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<td>Total 5 marks</td>
</tr>
<tr>
<td>5</td>
<td>Eg ( \frac{4}{100} \times 18000 ) oe or 720</td>
<td>OR ( 18000 \times 1.04^3 )</td>
<td>3</td>
<td>M1 for eg ( \frac{4}{100} \times 18000 ) oe or 720</td>
<td>OR M2 for ( 18000 \times 1.04^3 ) (M1 for ( 18000 \times 1.04 ) or 18720 or ( 18000 \times 1.04^2 ) or 19468.8 or ( 18000 \times 1.04^4 ) or 21057.45)</td>
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<tr>
<td>( \frac{4}{100} \times (18000 + '720') ) = 748.80</td>
<td>( \frac{4}{100} \times (18000 + '720' + '748.80') ) = 778.75</td>
<td></td>
<td></td>
<td>M1 for completing method</td>
<td></td>
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<td>Accept 1 + 0.04 as equivalent to 1.04 throughout</td>
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<td>SC: If no other marks gained, award M1 for 18000 ( \times 1.12 ) oe or 20160 OR or 2160</td>
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<td></td>
<td>2248 A1 Answers in range 2247 – 2248</td>
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<td><strong>Total 3 marks</strong></td>
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</table>
### Question 6

\[
\tan x = \frac{8}{12} \quad \text{or} \quad \sin x = \frac{8}{\sqrt{208}} \quad \text{or} \quad \cos x = \frac{12}{\sqrt{208}}
\]

\[
x = \tan^{-1}\left(\frac{8}{12}\right) \quad \text{or} \quad \sin^{-1}\left(\frac{8}{\sqrt{208}}\right) \quad \text{or} \quad \cos^{-1}\left(\frac{12}{\sqrt{208}}\right)
\]

\[
\tan x = \frac{8}{12} \quad \text{or} \quad \sin x = \frac{8}{\sqrt{208}} \quad \text{or} \quad \cos x = \frac{12}{\sqrt{208}}
\]

Correct reasons for finding angle \(x\):

- \(M1\) A correct trig ratio for angle \(x\)
- \(M1\) A complete method to find angle \(x\)
- \(A1\) Accept answers which round to \(33.7\)

**Total 3 marks**

### Question 7

\((x = ) 360 - (90 + 90 + 52)\)

- \(128\) Correct reasons
- \(M1\) A correct trig ratio for angle \(x\)
- \(B1\) The angle between a tangent and a radius is \(90^\circ\) oe
- \(B1\) Angles in a quadrilateral add up to \(360^\circ\) oe

**Total 4 marks**

### Question 8

\((31.50 \div 7) \times 8\ oe (=36)\)

- \(43.2(0)\)
- \(M1\) Correct method to find the amount Behnaz has
- \(M1\) Correct method to find the amount Ahmed has
- \(A1\)

**Total 3 marks**
<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>9 (a)</td>
<td>4, 18, 35, 48, 55, 58, 60</td>
<td>1</td>
<td>M1</td>
</tr>
<tr>
<td>(b)</td>
<td>Points correct Curve or line segments</td>
<td>2</td>
<td>B1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>B1</td>
</tr>
<tr>
<td>(c)</td>
<td>15 and 45 or 15.25 and 45.75 indicated on cumulative frequency axis or stated</td>
<td>2</td>
<td>M1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>A1</td>
</tr>
<tr>
<td>(d)</td>
<td>A vertical line from 48 up to the cf graph</td>
<td>2</td>
<td>M1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>A1</td>
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</table>

**Total 7 marks**
<table>
<thead>
<tr>
<th>Question</th>
<th>Marks</th>
<th>M1</th>
<th>A1</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>5</td>
<td>Method to find exterior angle of octagon or pentagon</td>
<td>Method to find exterior angle of both octagon and pentagon</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Method to find CAB or CBA</td>
<td>Fully correct method to find angle $\gamma$</td>
</tr>
<tr>
<td><strong>Alternative</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>5</td>
<td>Method to find interior angle of octagon or pentagon</td>
<td>Method to find interior angle of both octagon and pentagon</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Method to find CAB or CBA</td>
<td>Fully correct method to find angle $\gamma$</td>
</tr>
</tbody>
</table>

**Total 5 marks**
\[
\begin{align*}
\text{Eg} & \quad \frac{2(3x-2)}{10} - \frac{5(3-4x)}{10} = 2 \quad \text{or} \\
& \quad \frac{2(3x-2) - 5(3-4x)}{10} = 2 \quad \text{or} \\
& \quad 2(3x-2) - 5(3-4x) = 2 \times 10 \\
& \quad 6x - 4 - 15 + 20x = 2 \times 10 \quad \text{oe} \\
& \quad \frac{6x - 4 - 15 + 20x}{10} = 2 \\
& \quad 26x = 39 \quad \text{or} \\
& \quad 6x + 20x = 20 + 4 + 15 \\
& \quad 6x + 20x = 39 \quad \text{oe} \\
\end{align*}
\]

| 11 | \[
\begin{align*}
\text{Eg} & \quad \frac{2(3x-2)}{10} - \frac{5(3-4x)}{10} = 2 \quad \text{or} \\
& \quad \frac{2(3x-2) - 5(3-4x)}{10} = 2 \quad \text{or} \\
& \quad 2(3x-2) - 5(3-4x) = 2 \times 10 \\
& \quad 6x - 4 - 15 + 20x = 2 \times 10 \quad \text{oe} \\
& \quad \frac{6x - 4 - 15 + 20x}{10} = 2 \\
& \quad 26x = 39 \quad \text{or} \\
& \quad 6x + 20x = 20 + 4 + 15 \\
& \quad 6x + 20x = 39 \quad \text{oe} \\
\end{align*}
\] | 4 | M1 \quad \text{for clear intention to multiply all terms by 10 or a multiple of 10} \quad \text{or to express LHS as a single fraction with a denominator of 10 or a multiple of 10} \\
& \quad \text{M1} \quad \text{Expanding brackets} \\
& \quad \text{M1} \quad \text{For correct rearrangement of a correct equation with terms in } x \text{ isolated} \\
& \quad \text{A1} \quad \text{Award full marks for a correct answer if at least M1 scored} \\

\text{Total 4 marks}
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<tbody>
<tr>
<td><strong>12</strong></td>
<td>(a)</td>
<td>$3x^2 - 12x - 15 = 0$</td>
<td>2</td>
<td>B2</td>
<td>B1 for 2 correct terms</td>
</tr>
<tr>
<td>(b)</td>
<td>$(3x + 3)(x - 5) = 0$</td>
<td>$x = -1$ or $x = 5$</td>
<td>4</td>
<td>M1ft</td>
<td></td>
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<tr>
<td></td>
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<td></td>
<td></td>
<td>M1</td>
<td>Correct factorisation or correct use of quadratic formula</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>A1</td>
<td>One correct pair</td>
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<td></td>
<td>A1</td>
<td>Both correct pairs</td>
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<tr>
<td></td>
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<td>$(-1, 8)$ $(5, -100)$</td>
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<td><strong>Total 6 marks</strong></td>
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<p>| <strong>13</strong> |   |   | 3 | M1 |   |
|   |   |   |   | M1 | For at least 3 correct entries into Venn diagram |
|   |   |   |   | M1 | $30 - (3 + 3 + 5 + 7 + 2 + 2)$ |
|   |   |   |   | A1 |   |
|   |   | 20 |   |   |   |
|   |   |   |   | <strong>Total 3 marks</strong> |   |</p>
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<tbody>
<tr>
<td><strong>14</strong></td>
<td>(a)</td>
<td></td>
<td>show</td>
<td>2</td>
<td>M1  For selecting $10x = 3.2424...$ and $1000x = 324.2424...$ oe</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>A1  $\frac{321}{990}$</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(b)</td>
<td></td>
<td></td>
<td>3</td>
<td>M1  For multiplying the numerator and denominator by $(7 + \sqrt{5})$</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>M1  For a correct single fraction with brackets expanded in denominator</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td>A1  dep on correct working seen</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>Total 5 marks</td>
</tr>
</tbody>
</table>

| **15** |   |   |   |   |   |
| 0.3 \times 0.9 \approx 0.27 | 0.7 + '0.27' |   |   | 3 | M1  The correct product for fail, pass |
|     |     |   | M1  A fully correct method to find the probability that Sophie passes 1st or 2nd time |
|     |     |   | A1  oe |   |   |
|     |     |   |   |   | Total 3 marks |
### Question 16

(a)(i) (ii) 
(b) 

<table>
<thead>
<tr>
<th>16</th>
<th>Total 4 marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a)(i)</td>
<td>(180, 0)</td>
</tr>
<tr>
<td>(ii)</td>
<td>(270, −1)</td>
</tr>
<tr>
<td>(b)</td>
<td></td>
</tr>
</tbody>
</table>

- **Correct shape curve**
- **Correct intersections of 0°, 180° and 360° with x axis**

### Question 17

1. 12.45, 12.55, 135 or 145
2. Largest volume of cube = 12.55³
3. Greatest number of spheres = 12.55³ ÷ 135 (≈14.641899...)

<table>
<thead>
<tr>
<th>17</th>
<th>Total 4 marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.45, 12.55, 135 or 145</td>
<td>4</td>
</tr>
<tr>
<td>Largest volume of cube = 12.55³</td>
<td></td>
</tr>
<tr>
<td>Greatest number of spheres = 12.55³ ÷ 135 (≈14.641899...)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>14</td>
</tr>
</tbody>
</table>
18  
(a) (i) \((7, -4)\) 1 B1 
(ii) \((3, -12)\) 1 B1 
(iii) \((6, -4)\) 1 B1 
(b) \(9\) 1 B1 

Total 4 marks

19  
(a)(i) \(2q - p\) 1 B1 
(a)(ii) \[\overrightarrow{MB} = \frac{1}{4}p \text{ or } \overrightarrow{BM} = -\frac{1}{4}p\] \[\overrightarrow{BN} = \frac{1}{2}(p - q) \text{ or } \overrightarrow{NB} = \frac{1}{2}(p - q)\] \(\frac{1}{2}q - \frac{1}{4}p\) 2 M1 For correctly giving \(\overrightarrow{MB} \text{ or } \overrightarrow{BM} \text{ or } \overrightarrow{BN} \text{ or } \overrightarrow{NB}\) 
(b) \(MN \text{ is parallel to } BD\) \(BD = 4 \times MN\) 2 A1 With suitable reasons 

Total 5 marks
\[ \frac{1}{3} \pi (2h)^2 h = 562.5\pi \] or
\[ \frac{1}{3} \pi \times r^2 \times \frac{1}{2} r = 562.5\pi \]

\[ \frac{1}{3} \pi \times 4h^2 \times h = 562.5\pi \] or
\[ \frac{1}{3} \pi \times r^2 \times \frac{1}{2} r = 562.5\pi \]

\[ h = \sqrt{\frac{3 \times 562.5}{4}} = 7.5 \text{ or } r = \sqrt{3375} \]

\[ \sqrt{15^2 + 7.5^2} = \frac{15 \sqrt{5}}{2} = 16.7705... \]

\[ \text{CSA} = \pi \times 15 \times 16.77... \]

\[ \text{Total 5 marks} \]
(2x + 3) \times \frac{7}{(2x + 3)(2x + 5)}

\frac{5}{4x^2 - 25} \times \frac{7}{2x + 5}

\frac{5 - 7(2x - 5)}{4x^2 - 25} \text{ or } \frac{5 - 14x + 35}{4x^2 - 25}

\frac{40 - 14x}{4x^2 - 25}

\text{Total 4 marks}

a + 2d = 19

\frac{10}{2} (2a + 9d) = 290 \text{ oe}

Eg 10a + 45d = 290
10a + 20d = 190
Or 5(19 - 2d + 9d) = 290, a = 11, d = 4

10^{th} \text{ term } = 11 + 9 \times 4
\text{ or } 290 - 4.5(2 \times 11 + 8 \times 4)

\text{Total 5 marks}