# Mark Scheme

## Specimen Paper

Pearson Edexcel International GCSE
In Mathematics A (4MA1) Paper 1H

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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
  - eeoo – 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  If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.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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**Apart from Questions 4d, 10 (where the mark scheme states otherwise), the correct answer, unless clearly obtained by an incorrect method, should be taken to imply a correct method.**

| Q | Working | Answer | Mark | Notes |
|---|---|---|---|---|
| **1** | $5400 \div (5 + 3 + 4)$ (=450) | | | M1 |
| | "450" $\times$ 5 **or** "450" $\times$ 3 **or** "450" $\times$ 4 | | | M1 |
| | | 2250, 1350, 1800 | 3 | A1 |
| | | | | **Total 3 marks** |

| Q | Working | Answer | Mark | Notes |
|---|---|---|---|---|
| **2** | $120 \div 100^2$ (=0.012) **or** $810 \div 120$ (=6.75) | | | M1 |
| | $810 \div$ "0.012" **or** "6.75" $\times 100^2$ | | | M1 |
| | | 67 500 | 3 | A1 |
| | | | | **Total 3 marks** |

| Q | | Working | Answer | Mark | Notes |
|---|---|---|---|---|---|
| **3** | a | $140 = 2 \times 2 \times 5 \times 7;\quad 245 = 5 \times 7 \times 7$ | | | M1 | or lists at least 3 factors of each number (other than 1 and the number) (1, 2, 4, 10, 14, 35, 70, 140) (1, 5, 7, 35, 49, 245) |
| | | | 35 | 2 | A1 | |
| | b | 50, 100, 150, 200, 250, 300, 350, 400 **and** 80, 160, 240, 320, 400   **OR** $2 \times 5 \times 5$ **and** $2 \times 2 \times 2 \times 2 \times 5$ | | | M1 | |
| | | $2 \times 2 \times 2 \times 2 \times 5 \times 5$ **or** 400 | | | M1 | LCM found |
| | | | 16 40 | 3 | A1 | or 4 40 pm |
| | | | | | | **Total 5 marks** |

| 4 | a | | $3y(2y + 5)$ | 2 | B2 | B1 for $3(2y^2 + 5y)$ **or** $y(6y + 15)$ |
|---|---|---|---|---|---|---|
| | b | $m^2 + 9m - 5m - 45$ | | | M1 | M1 for 3 terms correct **or** 4 terms correct ignoring signs **or** $m^2 + 4m + \ldots$ **or** $\ldots + 4m - 45$ |
| | | | $m^2 + 4m - 45$ | 2 | A1 | |
| | c | $2s = at^2$ **or** $\dfrac{s}{a} = \dfrac{1}{2}t^2$ **or** $\dfrac{2s}{a} = t^2$ | | | M1 | for a correct first step |
| | | | $t = (\pm)\sqrt{\dfrac{2s}{a}}$ | 2 | A1 | |
| | d | $6x - 5 = 2(x + 1)$ **or** $6x - 5 = 2x + 2$ | | | M1 | |
| | | $6x - 2x = 2 + 5$ | | | M1 | |
| | | | 1.75 | 3 | A1 | oe eg. $\dfrac{7}{4}$ dep on at least M1 scored |
| | | | | | | **Total 9 marks** |

| 5 | | $1 - \dfrac{5}{8}\left(= \dfrac{3}{8}\right)$ **or** $100\% - 80\%$ (=20%) **or** $\dfrac{1}{5} + \dfrac{3}{8}\left(= \dfrac{23}{40}\right)$ | | | M1 | may see decimal equivalents |
|---|---|---|---|---|---|---|
| | | $\dfrac{4}{5} - "\dfrac{3}{8}"$ **or** $\dfrac{5}{8} - "\dfrac{1}{5}"$ **or** $1 - "\dfrac{23}{40}"$ | | | M1 | may see decimal or percentage equivalents |
| | | | $\dfrac{17}{40}$ | 3 | A1 | |
| | | | | | | **Total 3 marks** |

| 6 | a | $0.03 \times 180\,000\ (=5400)$ | | | M1 | | M2 for $1.03 \times 180\,000$ |
|---|---|---|---|---|---|---|---|
| | | "5400" + 180 000 | | | M1 | dep | |
| | | | 185 400 | 3 | A1 | | |
| | b | $6630 = 85\%$ oe **or** $\dfrac{6630}{85}(=78)$ | | | M1 | | M2 for $6630 \div 0.85$ |
| | | $6630 \div 85 \times 100$ **or** "78" $\times 100$ | | | M1 | dep | |
| | | | 7800 | 3 | A1 | | |
| | | | | | | | **Total 6 marks** |

| 7 | | $42 \times 7\ (=294)$ **or** $8 \times 50\ (=400)$ | | | M1 |
|---|---|---|---|---|---|
| | | $8 \times 50 - 42 \times 7$ | | | M1 |
| | | | 106 | 3 | A1 |
| | | | | | **Total 3 marks** |

| 8 | a | | 93 000 000 | 1 | B1 | |
|---|---|---|---|---|---|---|
| | b | | Singapore | 1 | B1 | |
| | c | $1.382 \times 10^9 - 1.327 \times 10^9$ oe **or** 55 000 000 | | | M1 | or for $5.5 \times 10^n$  $n \neq 7$ |
| | | | $5.5 \times 10^7$ | 2 | A1 | |
| | | | | | | **Total 4 marks** |

| 9 | e.g. $(h^2 =)$ $14.5^2 - 10^2$ **or** $\cos x = \dfrac{10}{14.5}$ | | | M1 | start to find height or angle |
|---|---|---|---|---|---|
| | e.g. $(h =)$ $\sqrt{14.5^2 - 10^2}$ $(=10.5)$ **or** $(x =)$ $\cos^{-1}\left(\dfrac{10}{14.5}\right)$ $(=46.3\ldots)$ | | | M1 | complete method to find height or angle |
| | e.g. $\dfrac{1}{2} \times 20 \times "10.5"$ **or** $\dfrac{1}{2} \times 20 \times 14.5 \times \sin("46.3...")$ | | | M1 | (dep on M1) method to find area |
| | | 105 | 4 | A1 | cao |
| | | | | | **Total 4 marks** |

| 10 | $21x + 9y = 60$        $35x + 15y = 100$ <br> $21x + 35y = 21$  **or**  $9x + 15y = 9$ <br><br> $-26y = 39$         $26x = 91$ | | | M1 | for method to eliminate one variable (condone one arithmetic error) |
|---|---|---|---|---|---|
| | $y = -1.5$   **or**   $x = 3.5$ | | | A1 | one variable correct dep on M1 |
| | | | | M1 | (dep on M1) for method to find second variable |
| | | $x = 3.5, y = -1.5$ | 4 | A1 | both variables dep on at least M1 |
| | | | | | **Total 4 marks** |

| 11 | median = 26 **or** LQ = 20 **or** UQ = 29 | | | M1 | |
|---|---|---|---|---|---|
| | iqr = 9 **and** median = 26 | | | A1 | |
| | | | | B1 | ft comparison of IQR<br>eg. English results were more spread out |
| | | median = 26; iqr = 9<br>and two comparisons | 4 | B1 | ft comparison of median<br>eg. Maths results were higher<br>**NB. In order to award both marks, at least one of the comparisons must be in context** |
| | | | | | **Total 4 marks** |

| 12 | $(1 + 4)^2$ (= 25) | | | M1 | |
|---|---|---|---|---|---|
| | "5"$^2$ × 8 − 8  oe | | | M1 | complete method |
| | | 192 | 3 | A1 | |
| | | | | | **Total 3 marks** |

| 13 | $\dfrac{7--1}{4-1}\left(=\dfrac{8}{3}\right)$ | | | M1 | for a method to find gradient |
|---|---|---|---|---|---|
| | e.g. $7 = \text{``}\dfrac{8}{3}\text{''} \times 4 + c$ **or** $y - 7 = \text{``}\dfrac{8}{3}\text{''}(x-4)$ <br><br> $c = -\dfrac{11}{3}$ | | | M1 | for a method to find $c$ |
| | $y = \text{''}\dfrac{8}{3}\text{''}x - \text{``}\dfrac{11}{3}\text{''}$ | | | M1 | dep on M2 |
| | | $8x - 3y = 11$oe | 4 | A1 | |
| | | | | | **Total 4 marks** |


| 14 | Angle $DBA = 43^\circ$ **or** Angle $DAB = 90^\circ$ | | | M1 | |
|---|---|---|---|---|---|
| | $180 - 90 - 43\ (=47)$ | | | M1 | |
| | | | | A1 | |
| | | 47 with reasons | 5 | B2 | for full reasons <br> Angles in the same segment are equal; <br> Angle in a semi-circle is a right angle <br> Angles in a triangle add up to $180^\circ$ <br> (B1 for a correct and relevant reason using a circle theorem) |
| | | | | | **Total 5 marks** |

| 15 | a | $P = \dfrac{k}{\sqrt{q}}$ | | | M1 | |
|----|---|----------------------------|---|---|----|---|
| | | $10 = \dfrac{k}{\sqrt{0.0064}}$ **or** $k = 0.8$ | | | M1 | implies first M1 |
| | | | $P = \dfrac{0.8}{\sqrt{q}}$ | 3 | A1 | oe with $P$ as the subject |
| | b | $\left(\dfrac{0.8}{20}\right)^2$ | | | M1 | |
| | | | 0.0016oe | 2 | A1 | |
| | | | | | | **Total 5 marks** |

| 16 | $3 \times (3 + 8.5) = 5 \times PR$ **or** $3 \times (3 + 8.5) = 5 \times (5 + PQ)$ | | | M1 | |
|----|----------------------------------------------------------------------------------|---|---|----|---|
| | $(3 \times (3 + 8.5)) \div 5 - 5$ | | | M1 | for a complete method for $PQ$ |
| | | 1.9 | 3 | A1 | |
| | | | | | **Total 3 marks** |

| 17 | a | $x^2 + 2x - 6x - 5 > 0$ **or** $x^2 - 4x - 5 > 0$ | | | | M1 | |
|---|---|---|---|---|---|---|---|
| | | $(x - 5)(x + 1)$ | | | | M1 | |
| | | | $x < -1, \ x > 5$ | | 3 | A1 | |
| | b | | | | 1 | B1 | ft from (a) |



| | | | | Total 4 marks |
|---|---|---|---|---|

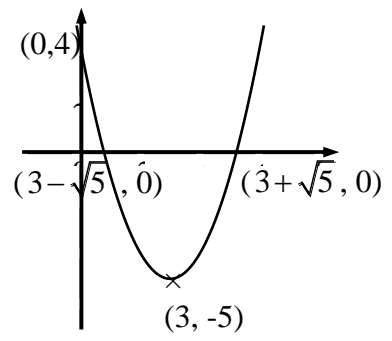| 18 | $\dfrac{1}{2} \times \dfrac{4}{3} \times \pi \times 6^3$ **or** $\pi \times 6^2 \times t$ **or** $\pi \times 6^2 \times 10$ | | | M1 | for one expression for an appropriate volume |
|---|---|---|---|---|---|
| | $\dfrac{1}{2} \times \dfrac{4}{3} \times \pi \times 6^3 + \pi \times 6^2 \times 10$ | | | M1 | for total volume |
| | $\pi \times 6^2 \times t \ = \ \dfrac{1}{2} \times \dfrac{4}{3} \times \pi \times 6^3 + \pi \times 6^2 \times 10$ | | | M1 | for forming a correct equation |
| | | 7 | 4 | A1 | |
| | | | | | **Total 4 marks** |

| 19 | e.g. $8.8 \times 5$ (=44) | | | M1 | for finding area of $50 - 55$ bar |
|---|---|---|---|---|---|
| | e.g. $3.4 \times 10$ (=34) + $7.2 \times 20$ (=144) + $8.8 \times 5$ (=44) + $4 \times 15$ (=60) + $1.8 \times 10$ (=18)  (=300) | | | M1 | for method to find total area (condone two errors) |
| | $\dfrac{"44"}{"300"} \times 150$ | | | M1 | (dep on M2) for complete method |
| | | 22 | 4 | A1 | |
| | | | | | **Total 4 marks** |

| 20 | eg. $2n + 1, 2n + 3$ | | | M1 | for algebraic representation of two consecutive odd numbers |
|---|---|---|---|---|---|
| | $(2n + 3)^2 - (2n + 1)^2 =$ $(4n^2 + 6n + 6n + 9) - (4n^2 + 2n + 2n + 1)$ | | | M1 | for correct expansion of at least one bracket |
| | $8n + 8$ | | | M1 | for simplified answer, may be factorised |
| | | proof | 4 | A1 | for completion of proof |
| | | | | | **Total 4 marks** |

| 21 | e.g. $\dfrac{dy}{dx} = 2x - 6$ **or** $(x-3)^2 - 3^2 + 4$ **or** $\dfrac{'3+\sqrt{5}'+'3-\sqrt{5}'}{2}$ | | | M1 | |
|---|---|---|---|---|---|
| | $(x-3)^2 - 5$ **or** $x = 3$ | | | A1 | (ft providing previous M1 scored) for $(3, -5)$ |
| | eg. $x = \dfrac{--6 \pm \sqrt{(-6)^2 - 4 \times 1 \times 4}}{2 \times 1}$ **or** $x = 3 \pm \sqrt{3^2 - 4}$ **or** $(x-3)^2 = 5$ | | | M1 | for correct method to find roots |
| | $x = 3 \pm \sqrt{5}$ | | | A1 | or exact equivalents |
| | | Correct graph | 6 | B2 | for fully correct labelled graph (see end of mark scheme) (B1 for parabola intercepting $y$-axis at $(0, 4)$) |
| | | | | | **Total 6 marks** |

| 22 | $\dfrac{7}{x}$ **or** $\dfrac{x-7}{x-1}$ | | | M1 | for a correct expression for one probability |
|---|---|---|---|---|---|
| | $2\times\dfrac{7}{x}\times\dfrac{x-7}{x-1}=\dfrac{7}{15}$ | | | M1 | for equation formed |
| | e.g. $x^2-31x+210=0$ **or** $7x^2-217x+1470=0$ | | | M1 | correct quadratic ready to solve |
| | e.g. $(x-21)(x-10)=0$ **or** $\dfrac{--31\pm\sqrt{(-31)^2-4\times210}}{2}$ | | | M1 | method to solve quadratic equation |
| | | 21 | 5 | A1 | 21 must be selected as final answer |
| | | | | | **Total 5 marks** |

| 23 | eg. diagram drawn showing relative positions of $A$, $B$ and $C$ <br> can be implied by angle $ABC=55^\circ$ | | | M1 | interprets information |
|---|---|---|---|---|---|
| | $\dfrac{\sin CAB}{95}=\dfrac{\sin 55}{180}$ | | | M1 | |
| | $CAB=\sin^{-1}\left(\dfrac{95\sin 55}{180}\right)$ **or** <br><br> $CAB=25.6(1\ldots)$ | | | M1 dep | |
| | $AB=\dfrac{180}{\sin 55}\times\sin(180-55-"25.6")$ | | | M1 | dep or for <br> $\sqrt{180^2+95^2-2\times180\times95\times\cos(180-55-"25.6"}$ |
| | | 217 | 5 | A1 | |
| | | | | | **Total 5 marks** |

$(0,4)$

$(3-\sqrt{5}, 0)$      $(3+\sqrt{5}, 0)$

$(3, -5)$