

Mark Scheme Mock Paper

GCSE

Methods in Mathematics (Pilot)
Paper: 2MM01/2H

NOTES ON MARKING PRINCIPLES

- 1 All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- 2 Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- 3 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.
- 4 Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- 5 Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.
- 6 Mark schemes will indicate within the table where, and which strands of QWC, are being assessed. The strands are as follows:
 - i) *ensure that text is legible and that spelling, punctuation and grammar are accurate so that meaning is clear*
Comprehension and meaning is clear by using correct notation and labeling conventions.
 - ii) *select and use a form and style of writing appropriate to purpose and to complex subject matter*
Reasoning, explanation or argument is correct and appropriately structured to convey mathematical reasoning.
 - iii) *organise information clearly and coherently, using specialist vocabulary when appropriate.*
The mathematical methods and processes used are coherently and clearly organised and the appropriate mathematical vocabulary used.

7 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If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.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 it is clear from the working that the “correct” answer has been obtained from incorrect working, award 0 marks. Send the response to review, and discuss each of these situations with your Team Leader.

If there is no answer on the answer line then check the working for an obvious answer.

Any case of suspected misread loses A (and B) marks on that part, but can gain the M marks. Discuss each of these situations with your Team Leader.

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.

8 Follow through marks

Follow through marks which involve a single stage calculation can be awarded without working since you can check the answer yourself, but if ambiguous do not award.

Follow through marks which involve more than one stage of calculation can only be awarded on sight of the relevant working, even if it appears obvious that there is only one way you could get the answer given.

9 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: e.g. incorrect canceling 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 e.g. algebra.

Transcription errors occur when candidates present a correct answer in working, and write it incorrectly on the answer line; mark the correct answer.

10 Probability

Probability answers must be given a fractions, percentages or decimals. If a candidate gives a decimal equivalent to a probability, this should be written to at least 2 decimal places (unless tenths).

Incorrect notation should lose the accuracy marks, but be awarded any implied method marks.

If a probability answer is given on the answer line using both incorrect and correct notation, award the marks.

If a probability fraction is given then cancelled incorrectly, ignore the incorrectly cancelled answer.

11 Linear equations

Full marks can be gained if the solution alone is given on the answer line, or otherwise unambiguously indicated in working (without contradiction elsewhere). Where the correct solution only is shown substituted, but not identified as the solution, the accuracy mark is lost but any method marks can be awarded.

12 Parts of questions

Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded in another.

13 Range of answers

Unless otherwise stated, when an answer is given as a range (e.g 3.5 - 4.2) then this is inclusive of the end points (e.g 3.5, 4.2) and includes all numbers within the range (e.g 4, 4.1)

Guidance on the use of codes within this mark scheme

M1 - method mark
A1 - accuracy mark
B1 - Working mark
C1 - communication mark
QWC - quality of written communication
oe - or equivalent
cao - correct answer only
ft - follow through
sc - special case
dep - dependent (on a previous mark or conclusion)
indep - independent
isw - ignore subsequent working

METHODS IN MATHEMATICS (PILOT)

| PAPER: 2MM01/2H | | | | |
|-----------------|---|-----------------------|------|--|
| Question | Working | Answer | Mark | Notes |
| 1 | $320 \div (1 + 3) (=80)$ "80" $\times 3$ | 80 , 240 | 2 | M1 for $320 \div (1 + 3)$ or 80 seen A1 cao |
| 2 | | 2.9125 | 2 | B1 for 23.3 or 8 or $\frac{233}{80}$ A1 cao |
| 3 | | 52° | 3 | M1 for $180 - 90 - 38$ A1 cao C1 for alternate angles and angles in a triangle add up to 180° or angles on a straight line add up to 180° and alternate angles |
| 4 | (a) | 720 | 2 | M1 for 0.45×1600 oe A1 cao |
| | (b) | £290.40 | 2 | M1 for 1.21×240 or $0.21 \times 240 + 240$ oe A1 cao |
| | (c) | 60% | 2 | M1 for $\frac{120}{200} \times 100$ or $120 \div 2$ oe A1 cao |
| 5 | | 10.68 | 2 | M1 for $6.23 \div 7 \times 12$ oe A1 cao |
| 6 | (a) | 22 | 2 | M1 for $2 \times 5 + 3 \times 4$ A1 cao |
| | (b) | -14 | 2 | M1 for $5 \times -4 - 3 \times -2$ or -20 or 6 seen A1 cao |
| | (c) | 35 | 2 | M1 for sight of $(-5)^2$ or 25 or 50 A1 cao |
| | (d) | $a = \frac{v - u}{6}$ | 2 | M1 for $v - u = 6a$ A1 |

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| 7 | | 32.1 | 4 | M1 for $\pi \times 18$ or $2 \times \pi \times 9$ M1 for " $\pi \times 18$ " $\div 4$ M1 for addition of 2×9 A1 for answer in range 32.1 - 32.14 |
| 8 | | $(t + 5) \div 3$ | 2 | M1 for $t + 5$ A1 for $(t + 5) \div 3$ oe |
| 9 | | 150 cm ² | 4 | M1 for $\sqrt[3]{125}$ or 5 seen M1 for $5 \times 5 (=25)$ M1 for $6 \times "25"$ A1 for 150 |
| 10 | (a) | -1, 0, 1, 2, 3 | 2 | B2 for all correct, ignore repeats, any order (B1 -1 for each omission or additional value to minimum of 0) |
| | (b) | $x > 8$ | 2 | A1 M1 for $2x > 11 + 5$ A1 cao |
| 11 | | 11.7 | 3 | M1 for $6.8^2 + 9.5^2$ M1 for $\sqrt{46.24 + 90.25}$ A1 for ans in range 11.68 - 11.7 |

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| Question | Working | Answer | Mark | Notes |
| 12 | | 384 cm^3 | 5 | M2 for correct full method to work out area of cross-section or sight of 64 (M1 for correct calculation for part of area of cross-section) M1 for "64" \times 6 A1 cao B1 for cm^3 or (Method of splitting into separate cuboids) M1 for volume of any one cuboid M1 for volume of all remaining cuboids M1 (dep) for addition of volumes A1 cao B1 cm^3 |
| 13 | (a) | 4, -4, -1 | 2 | B2 all correct (B1 for 1 or 2 correct) |
| | (b) | | 2 | M1(ft) for plotting points from table A1 for smooth curve |
| | (c) | | 2 | B1 ft for -1.2 B1 ft for 3.2 |
| 14 | | show | 3 | M1 for $180 - 30$ or $((360 \div 30) - 2) \times 180 \div (360 \div 30)$ A1 for 150 C1 for 150 is not a factor of 360 oe |
| 15 | | 2.05×10^3 | 3 | B3 for ans in range $2.045 \times 10^3 - 2.05 \times 10^3$ (B2 for 4185000 oe or 2045.7... or 2050 oe (not in standard form)) (B1 for 8.37×10^9 oe) |

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| Question | Working | Answer | Mark | Notes |
| 16 (a) | | $x = 4, y = 3$ | 1 | B1 cao |
| (b) | | $(3,1)(4,2)(4,3)$ | 3 | M1 for $x = 5$ drawn M1 for correct region identified A1 for $(3,1)(4,1)(4,2)$ identified |
| 17 | | 8.19 | 3 | M1 for $\tan 38 = \frac{6.4}{AB}$ M1 for $AB = \frac{6.4}{\tan 38}$ A1 for ans in range 8.19 - 8.195 or M1 for angle $C = 180 - 90 - 38 (=52)$ M1 for $6.4 \times \tan 52$ A1 for ans in range 8.19 - 8.195 |
| 18 | | 350 | 3 | M1 for sight of 0.88 M1 for $308 \div 0.88$ oe A1 cao |
| 19 | | 45π | 2 | M1 for $\pi \times 3^2 \times 5$ A1 cao |
| 20 | | $\frac{5-2b}{b+3}$ | 4 | M1 for $b(c+2)$ or $bc+2b$ M1 for isolating bc and $3c$ on one side to get $bc+3c$ oe M1 for correctly factorising from " $bc+3c$ " (term in bc must be present) A1 for $\frac{5-2b}{b+3}$ or $\frac{-5+2b}{-b-3}$ |

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|-----------------|---------|----------------|------|--|
| Question | Working | Answer | Mark | Notes |
| 21 (a) | | $d = 15m^2$ | 3 | M1 for $d = km^2$ M1 for $60 = k \times 2^2$ A1 cao B1 cao |
| (b) | | 540 | 1 | |
| 22 | | 3.35, 0.15 | 3 | M1 for $\frac{7 \pm \sqrt{(-7)^2 - 4 \times 2 \times 1}}{2 \times 2}$ ignore incorrect signs M1 for $\frac{7 \pm \sqrt{41}}{4}$ A1 |
| 23 | | $y = -x/3 + 9$ | 2 | B2 for $y = -x/3 + 9$ oe (B1 for gradient = 3 or gradient = -1/3 or $y = ax + 9$) |
| 24 | | 93.4 | 5 | M1 for $\frac{\sin 47}{12.8} = \frac{\sin x}{15.4}$ oe M1 for $x = \sin^{-1}\left(\frac{\sin 47}{12.8} \times 15.4\right)$ A1 for $B = 61.6\dots$ M1 for $\frac{1}{2} \times 12.8 \times 15.4 \times \sin(180 - 47 - 61.6)$ A1 |
| 25 | | 19.8 | 5 | M1 for $\sqrt{20^2 + 12^2} (= 23.32\dots)$ M1 for $\tan 35 = \frac{EB}{12}$ M1 for $EB = 12 \times \tan 35 (8.402\dots)$ M1 for $\tan EDB = \frac{8.402\dots}{23.32\dots}$ |

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| Question | Working | Answer | Mark | Notes |
| 26 | | $(-4.2, -0.6) (3,3)$ | 6 | M1 for $4y^2 - 12y + 9$ M1 for substitution into quadratic A1 for $5y^2 - 12y - 9 = 0$ M1 for correct method to solve quadratic A1 for $y = 3$ and -0.6 oe A1 for $x = 3$ and -4.2 oe |
| 27 | | $f(x + 2)$ drawn | 2 | M1 for translation of $\begin{pmatrix} 2 \\ 0 \end{pmatrix}$ or $\begin{pmatrix} -2 \\ 0 \end{pmatrix}$ A1 for correct shape of graph through $(-4,0)$, $(-2,0)$ and $(1,0)$ |