

Mark Scheme (Results) Summer 2010

GCSE

GCSE Mathematics (2381)
Calculator Paper 14H

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NOTES ON MARKING PRINCIPLES**1 Types of mark**

M marks: method marks

A marks: accuracy marks

B marks: unconditional accuracy marks (independent of M marks)

2 Abbreviations

cao - correct answer only

isw - ignore subsequent working

oe - or equivalent (and appropriate)

indep - independent

ft - follow through

SC: special case

dep - dependent

3 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.

4 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If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.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.

5 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.

6 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.

7 Probability

Probability answers must be given as 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.

8 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.

9 Parts of questions

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

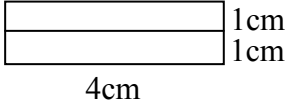
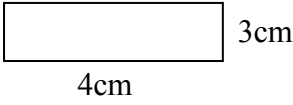
10 Range of answers

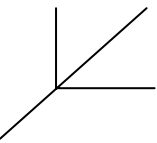
Unless otherwise stated, when an answer is given as a range (e.g. 3.5 - 4.2) then this is inclusive of the end points (e.g. 3.5, 4.2) and includes all numbers within the range (e.g. 4, 4.1)

| 5384H/14H | | | | | |
|-----------|--|----------------------------------|------|---|---|
| Question | Working | Answer | Mark | Notes | |
| 1 | 120×1.5 8×1.5 420×1.5 180×1.5 | 180 12 630 270 | 3 | M1 for $\times 6 \div 4$ or $\frac{6}{4}$ oe or $\div 4 \times 6$ or $(120 + 60)$ or 1.5 seen or sight of any one of the four correct answers A1 for 2 or more correct answers A1 for 4 correct answer | |
| 2 | (a) | 1.25×620 | 775 | 2 | M1 for 1.25×620 oe A1 cao |
| | (b) | $50 \div 1.25 = 40$ $42 - 40$ | 2 | 3 | M1 for $50 \div 1.25 (= 40)$ oe M1 (dep) for $42 - '40'$ or $'40' - 42$ A1 cao OR M1 for $42 \times 1.25 (= 52.5)$ oe M1 (dep) for $'52.5' - 50$ or $50 - '52.5'$ A1 cao (A0 for €2.5(0) or £2.5(0) without any working) (SC award B2 for -2) |

| Question | Working | Answer | Mark | Notes |
|----------|--|--------|------|---|
| 3 (a) | $\pi \times 12$ | 37.7 | 2 | M1 for $\pi \times 12$ (accept π as 22/7 or 3.1 or better) A1 for an answer in the range 37.6 – 37.8 |
| (b) | $\pi \times 6 \times 6$ | 113 | 2 | M1 for $\pi \times 6 \times 6$ (accept π as 22/7 or 3.1 or better) A1 for an answer in the range 113 – 113.2 |
| 4 | $x = 1$ gives 11 $x = 2$ gives 28 $x = 1.5$, gives 18.(3..) $x = 1.6$, gives 20.(09..) $x = 1.7$, gives 21.(9..) $x = 1.8$, gives 23.(8..) $x = 1.9$, gives 25.(8..) $x = 1.85$, gives 24.8(3..) $x = 1.86$ gives 25.(0..) $x = 1.87$ gives 25.2(3..) $x = 1.88$ gives 25.4(4..) $x = 1.89$ gives 25.6(5..) | 1.9 | 4 | B2 for a trial between $1.8 \leq x \leq 1.9$ evaluated (B1 for a trial between $1 \leq x \leq 2$ evaluated) B1 for a different trial between $1.85 \leq x < 1.9$ evaluated B1 (dep on at least one previous B1) for 1.9 NB: no working scores no marks even if answer is correct. Accept trials correct to the nearest whole number (rounded or truncated) if the value of x is to 1dp but correct to 1dp (rounded or truncated) if the value of x is to 2dp |

| Question | Working | Answer | Mark | Notes |
|----------|-----------------------------|--|------|--|
| 5 (a) | $8x = 17 + 3$ | 2.5 | 2 | M1 for $8x = 17 + 3$ or $8x - 3 + 3 = 17 + 3$ or for $8x/8 - 3/8 = 17/8$ or for $(17+3) \div 8$ A1 for 2.5 or $\frac{20}{8}$ oe NB embedded answer of 2.5 must be clearly indicated in the equation and gets SC B1 |
| (b) | $y = 9 \times 3 \div 2$ | 13.5 | 2 | M1 for attempt to multiply both sides by 3 or $3/2$ or divide both sides by 2 or $9 \div (2/3)$ or $9 \times (3/2)$ A1 for 13.5 or $\frac{27}{2}$ oe NB embedded answer of 13.5 must be clearly indicated in the equation and gets SC B1 |
| 6 (a) | | exterior angles of a regular polygon are equal | 1 | B1 for exterior angles of a regular polygon are equal (correct explanations must include each of the features exterior angles, regular polygon oe, and equal oe |
| (b) | $3x = 60$ | 20 | 2 | M1 for an attempt to move x to LHS or -20 to RHS or $+40$ to LHS or $4x$ to LHS, e.g. $-x$ each side or $+20$ each side or -40 each side or $-4x$ each side, or sight of $3x$ on LHS of equation or 60 on RHS of equation A1 cao |
| 7 | $\frac{84}{350} \times 100$ | 24 | 2 | M1 for $\frac{84}{350} \times 100$ oe A1 cao |

| Question | Working | Answer | Mark | Notes |
|----------|----------------------------------|--|------|---|
| 8 | $\sqrt{6^2 + 14^2} = \sqrt{232}$ | 15.23 | 3 | M1 for $6^2 + 14^2$ or $36+196$ or 232 M1 for $\sqrt{36+196}$ or $\sqrt{232}$ A1 for answer in the range 15.2 – 15.3 |
| 9 (a) | |  | 2 | B2 cao (B1 for a rectangle 4cm×1cm or a rectangle 4cm×2cm. Could be attached to other rectangles) Do not accept rectangles with additional external lines. |
| (b) | |  | 2 | B2 cao [B1 for a rectangle with one correct dimension] NB any orientation possible, ignore internal lines |
| 10 (a) | | -3, -2, -1, 0, 1 | 2 | B2 for all 5 correct values, ignore repeats, any order (-1 for each omission or additional value) |
| (b) | $3x - x > 7 + 2$ $2x > 9$ | $x > 4.5$ | 2 | M1 for an attempt to move x to LHS or -2 to RHS, e.g. $-x$ each side or $+2$ each side or sight of $2x$ or 9 or $2x > 9$, or sight of $2x$ on LHS of (in)equality or 9 on RHS of (in)equality e.g.. $3x - x > 7 + 2$ A1 oe allow $x > \frac{9}{2}$ and $x > 4\frac{1}{2}$ [SC: B1 for $x = 4.5, x < 4.5$ if M0 scored] |

| Question | Working | Answer | Mark | Notes |
|----------|---|--|------|--|
| 11 | |  | 2 | B2 for correct locus within guidelines (overlay) (B1 for a line drawn parallel to either given line OR a line passing through the angle outside of the guidelines OR for a line drawn within guidelines but not passing through angle) |
| 12 | $r^2 = \frac{A}{3}$ | $A = 3r^2$ | 2 | M1 for $r^2 = \frac{A}{3}$ or an attempt to square both sides or an attempt to multiply both sides by $\sqrt{3}$ A1 cao |
| 13 | $24500 \div 0.000125 = 196000000$ | 1.96×10^8 | 2 | B2 cao [B1 for 196000000 or $1.96 \times 10^4 \times 10^4$ oe or 1.96×10^n or digits 196×10^n , where n is a number other than 8 or absent] |
| 14 | $\cos 58^\circ = \frac{AB}{16}$ $AB = 16 \times \cos 58^\circ$ | 8.48 | 3 | M1 for $\cos 58^\circ = \frac{AB}{16}$ M1 (dep) for $16 \times \cos 58^\circ$ A1 for answer in range 8.47 – 8.48 [SC M2 A0 for 1.9-1.91 (rad) or 9.8 – 9.81 (grad)] |

| Question | Working | Answer | Mark | Notes |
|----------|--|------------------------------------|------|---|
| 15 (a) | | 28.5 | 1 | B1 for 28.5 or 2850 cm or 28.499 or 28.49... |
| (b) | $2 \times (147.5 + 28.5)$ | 352 | 3 | B1 for upper bound of length = 147.5 or 14750 cm or 147.49 recurring oe M1 for $2 \times$ (“upper bound width” + “upper bound length”), where these are not the given values A1 for answer in the range 351.999 – 352 |
| 16 (a) | p^{5+4} | p^9 | 1 | B1 (accept p^{5+4}) |
| (b) | | $x^{-2} x^0 x^{\frac{1}{2}} x x^2$ | 2 | B2 cao (B1 for any 4 in relative correct order or all correct but in reverse order) |
| 17 | $\frac{40}{360} \times \pi \times 8^2 - \frac{1}{2} \times 8^2 \times \sin 40^\circ$ $= 22.34\dots - 20.569\dots$ OR $\frac{40}{360} \times \pi \times 8^2 - 8 \times \sin 20^\circ \times 8 \times \cos 20^\circ$ $= 22.34\dots - 20.569\dots$ | 1.77 | 5 | M1 for $\frac{40}{360}$ oe seen or 0.11 seen or $\div 9$ M1 for $\frac{40}{360} \times \pi \times 8^2$ oe or sight of 22 – 22.35 M1 for $\frac{1}{2} \times 8^2 \times \sin 40^\circ$ or $8 \times \sin 20^\circ \times 8 \times \cos 20^\circ$ or sight of answer in range 20.56 – 20.57 M1 (dep on at least one M1 scored) for the difference between the area of triangle <i>OPS</i> and the area of sector <i>OPRS</i> A1 for answer in range 1.74 – 1.78 [B3 for $\pm 1.50(3\dots)$ (rad) or 3.53(1\dots) (grad)] |

| Question | Working | Answer | Mark | Notes |
|----------|---------|----------------|------|--|
| 18 (a) | | $y = f(x - 5)$ | 1 | B1 cao |
| (b) | | (4, 3) | 2 | B2 cao (B1 for one correct (in correct position) or for (3, 4)) |

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