

Mark Scheme (Results) November 2010

GCSE

GCSE Mathematics (5384H)
Paper 13H

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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

ft - follow through

isw - ignore subsequent working

SC: special case

oe - or equivalent (and appropriate)

dep - dependent

indep - independent

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If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.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

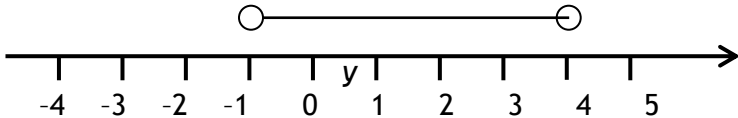
9 Parts of questions

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/13H				
Question	Working	Answer	Mark	Notes
1	$24 \div 2$	36	2	M1 for $24 \div 2$ or $\frac{3}{2} \times 12$ oe or $24 + 12$ or sight of the number 12 A1 cao
2	15×200	30 m or 3000 cm	2	M1 for 15×200 or sight of 3000 or 30 A1 for 3000 cm or 30 m
3		Accurate diagram	2	B2 for fully correct diagram within overlay (B1 for correct angle at $P \pm 2^\circ$ or correct length of $PR \pm 2$ mm)
4	5 pens cost 75p 1 pen costs $75 \div 5$ 3 pens cost 15×3	45	2	M1 for $75 \div 5$ or sight of 15 or $\frac{3}{5} \times 75$ or 75×0.6 or $5p = 75$; $p = 75 \div 5$ A1 for 45
5		B and E	2	B2 for B and E (B1 for one correct)
6 (a)		Correct description	3	B1 for rotation B1 for about (0,0), or point O, or the origin B1 for 180° (accept half turn) NB: if more than one transformation seen then B0.
(b)		triangle with vertices (6, 1) (6, 4) (5, 4)	1	B1 cao

Question	Working	Answer	Mark	Notes
7	$600 + 300 + 150$ $6000 + 1050$ $7050 - 3000$ $4050 \div 10$	405	6	M1 for $600 + 300 + 150$ oe or shows a method to find the VAT eg 6000×0.175 oe M1 for $6000 + "1050"$ A1 for 7050 cao M1 for $"7050" - 3000$ M1 for dividing by 10 A1 for 405 cao
8	$x + 2x + 3x = 180$ $6x = 180$	30	2	M1 for $x + 2x + 3x$ or $6x (= 180)$ Or M1 for all three of 30,60, 90 seen Or M1 for both of 60,90 identified on the diagram. Or M1 for $180 - 2x - 3x$ or any equivalent statement in algebra or words. Or M1 for $180 \div 6$ A1 for 30° or 30° identified on the diagram near x . A1 for 30 N.B. look for answers on drawing
9 (a)			1	B1 for fully correct
(b)		$-2 < x \leq 3$	2	B2 for fully correct answer (B1 for $-2 <$ or ≤ 3 seen)
(c)	$3t + 5 > 17$ $3t > 17 - 5$ $3t > 12$	$t > 4$	2	M1 for $3t \dots 17 - 5$ or dividing throughout by 3 or sight of 4 or an attempt to move the 5. A1 for $t > 4$ oe

Question	Working	Answer	Mark	Notes
10 (a)	Speed = distance \div time	32	2	M1 for 16×2 or attempts to find the speed by distance \div time: $\frac{16}{30}$ or $16 \div \frac{1}{2}$ or $\frac{16}{1/2}$ or 0.53(33..) A1 cao
(b)		Correct line	1	B1 for line drawn from (40, 16) to (65, 0)
11 (a)	$2\frac{17}{20} - 1\frac{8}{20}$	$1\frac{9}{20}$	3	M1 for dealing with the whole numbers M1 for finding a correct common denominator A1 for $1\frac{9}{20}$ oe OR B1 for $\frac{57}{20}$ or $\frac{7}{5}$ oe M1 for finding a correct common denominator A1 for $1\frac{9}{20}$ oe OR M1 for 2.85 M1 for 1.4 A1 for 1.45 oe
(b)	$\frac{8}{3} \times \frac{7}{4} = \frac{8 \times 7}{3 \times 4} = \frac{56}{12}$	$4\frac{2}{3}$	3	B1 for $\frac{8}{3}$ oe or $\frac{7}{4}$ oe M1 for multiplying numerator and denominator of " $\frac{8}{3}$ " and " $\frac{7}{4}$ " A1 for $4\frac{2}{3}$ oe mixed number or $\frac{14}{3}$ oe OR B1 for 2.67 or 2.66(...) and 1.75 M1 (dep B1) for correct method of multiplication A1 for $4\frac{2}{3}$ oe

Question	Working	Answer	Mark	Notes
12 (a)	$15 \div 10$ 8×1.5	12	2	M1 for $15 \div 10$ or sight of 1.5 or $\frac{3}{2}$ or $\frac{2}{3}$ A1 cao
(b)	$\frac{1}{2} \times (8 + "a") \times 5$	50	2	NB: ft from (a) provided $DC > 8$ M1 for $\frac{(8 + "a") \times 5}{2}$ A1 ft OR M1 for $(8 \times 5) + \frac{1}{2}("DC" - 8) \times 5$ A1 ft OR M1 for $\frac{1}{2} \times "DC" \times 15 - \frac{1}{2} \times 8 \times 10$ A1 ft OR M1 for $\frac{1}{2} \times 8 \times 10 \times "1.5" - \frac{1}{2} \times 8 \times 10$ A1 ft
13	Equation (1) $\times 3$ then add equation (2) $\times 2$ leads to $26x = 13$ $3 + 2y = -3$	$x = \frac{1}{2}$ $y = -3$	4	M1 for coefficients of x or y the same followed by correct operation, condone one arithmetic error A1 for one correct answer M1 (dep) for substituting found value in one equation A1 cao (SC: B2 for one correct answer only if M's not awarded)

Question	Working	Answer	Mark	Notes
14	$(x + 9)(x - 1) = 0$ OR $a = 1, b = 8, c = -9$ $x = \frac{-8 \pm \sqrt{8^2 - 4 \times 1 \times -9}}{2 \times 1}$ $= \frac{-8 \pm \sqrt{100}}{2}$ OR $(x + 4)^2 = 16 + 9$ $(x + 4)^2 = 25$ $x = -4 \pm \sqrt{25}$	$x = 1$ or $x = -9$	3	M2 for $(x + 9)(x - 1)$ (M1 for $(x \pm 9)(x \pm 1)$) A1 cao OR M1 for correct substitution in formula of 1, 8, ± 9 M1 for reduction to $\frac{-8 \pm \sqrt{100}}{2}$ A1 cao OR M1 for $(x + 4)^2$ M1 for $-4 \pm \sqrt{25}$ A1 cao SC: trial and improvement: B1 for 1 correct root, B3 for both correct roots.
15 (a)	$P = \frac{k}{V} : 5 = \frac{k}{8} ; k = 40$	$P = \frac{40}{V}$	3	M1 for $P \propto \frac{k}{V}$ or $P = \frac{k}{V}$, k algebraic M1 for subs $P = 5$ and $V = 8$ into $P = \frac{k}{V}$ A1 for $P = \frac{40}{V}$
(b)	$P = \frac{40}{2}$	20	1	B1 ft on k only in an equation of the form $P = \frac{k}{V}$

Question	Working	Answer	Mark	Notes
16 (a)	$\overrightarrow{OP} = \mathbf{a} + \mathbf{b}$ $\overrightarrow{OM} = \frac{1}{2} \overrightarrow{OP}$	$\frac{1}{2} (\mathbf{a} + \mathbf{b})$	2	M1 for $\overrightarrow{OP} = \mathbf{a} + \mathbf{b}$ or $\overrightarrow{OM} = \frac{1}{2} \overrightarrow{OT} + \frac{1}{2} \overrightarrow{TP}$ or $\overrightarrow{OP} = \overrightarrow{OT} + \overrightarrow{TP}$ A1 for $\overrightarrow{OM} = \frac{1}{2} (\mathbf{a} + \mathbf{b})$ oe SC B1 for $\mathbf{a} + \mathbf{b} \div 2$
(b)	$\overrightarrow{TO} + \overrightarrow{OM}$ $-\mathbf{a} + \frac{1}{2} (\mathbf{a} + \mathbf{b})$	$-\frac{1}{2} \mathbf{a} + \frac{1}{2} \mathbf{b}$	2	M1 for $-\mathbf{a} + \frac{1}{2} (\mathbf{a} + \mathbf{b})$ oe or $\overrightarrow{TM} = \overrightarrow{TO} + \overrightarrow{OM}$ or $\overrightarrow{TM} = \overrightarrow{TP} + \overrightarrow{PM}$ oe A1 ft but simplified
17 (a)		Circle, centre O , radius 3	2	M1 for complete circle centre (0, 0) A1 correct circle (within overlay)
(b)		$x = 2.6, y = -1.6$ or $x = -1.6, y = 2.6$	3	M1 for $x + y = 1$ drawn M1 (dep) ft from (a) for an attempt to find coordinates of point(s) of intersection (with any curve) A1 for $x = 2.6, y = -1.6$ or $x = -1.6, y = 2.6$ given to a tolerance of ± 0.1

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