

Mark Scheme (Results)

November 2013

Pearson Edexcel GCSE
In Mathematics Linear (1MA0)
Higher (Calculator) Paper 2H

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If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.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

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Question	Working	Answer	Mark	Notes
1 (a)		18.75	2	M1 for 84 or 4.48 or $\frac{112}{25}$ or 18.7 or 18.8 or 19 or 20 or $\frac{75}{4}$ A1 cao
1 (b)		20	1	B1 for 20 or ft from their answer to (a) provided (a) is written to 2 or more significant figures
2 (a)		12	2	M1 for $32 \div 8 (=4)$ or $\frac{3}{8} \times 32$ oe A1 for 12
2 (b)		36	2	M1 for correct method to find 45% of 80 A1 cao
3		4	2	M1 for 14 or $\frac{3+7}{n} = \frac{5}{7}$ or any fraction equivalent to $\frac{2}{7}$ or $\frac{5}{7}$ A1 cao
4			2	M1 for a 5cm by 5 cm square or a 5cm by 3 cm rectangle or a 5 cm by 2 cm rectangle A1 for correct elevation with dividing line NB: diagrams which appear to have a 3D element get 0 marks

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Question	Working	Answer	Mark	Notes
5		£26.50 or HK\$325.95	3	M1 for $3179.55 \div 12.3 (=258.5)$ M1 (dep) for 285 - '258.5' A1 for £26.50 (correctly stated with currency) OR M1 for $285 \times 12.3 (=3505.5)$ M1 (dep) for '3505.5' - 3179.55 (=325.95) A1 for HK\$325.95 (correctly stated with currency)
6		19	4	M1 for $130 - 96 (=34)$ M1 for $73 - 55 (=18)$ M1 for '34' - 9 - '18' + 12 A1 cao OR M1 for $96 - 55 - 12 (=29)$ M1 for $9 + '29' (=38)$ M1 for $130 - 73 - '38'$ A1 cao

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Question	Working	Answer	Mark	Notes
*7		Small with correct figures for comparison	4	<p>M1 for one calculation eg $6.5 \div 30 (=0.216\dots)$ or $8.95 \div 40 (=0.22375)$ or $10.99 \div 50 (=0.2198)$ M1 for all three calculations eg $6.5 \div 30 (=0.216\dots)$ and $8.95 \div 40 (=0.22375)$ and $10.99 \div 50 (=0.2198)$ A1 for 0.216(6...) and 0.223(75) and 0.219(8...); can be rounded or truncated as long as they remain different C1 (dep on M1) for conclusion ft from three comparable figures [could use different figures relating to 30, 40, 50]</p> <p>OR</p> <p>M1 for one calculation eg $6.5 \times 20 (=130)$ or $8.95 \times 15 (=134.25)$ or $10.99 \times 12 (=131.88)$ M1 for three calculations eg $6.5 \times 20 (=130)$ and $8.95 \times 15 (=134.25)$ and $10.99 \times 12 (=131.88)$ A1 for 130 and 134(.25) and 131(.88); can be rounded or truncated as long as they remain different C1 (dep on M1) for conclusion ft from three comparable figures eg cost of 600 plants or comparing small and medium and small and large e.g. 120 plants and 150 plants separately]</p> <p>OR</p> <p>M1 for one calculation e.g. $30 \div 6.5 (= 4.615\dots)$ or $40 \div 8.95 (= 4.469\dots)$ or $50 \div 10.99 (= 4.549\dots)$ M1 for three calculations e.g. $30 \div 6.5 (= 4.615\dots)$ and $40 \div 8.95 (= 4.469\dots)$ and $50 \div 10.99 (= 4.549\dots)$ A1 for 4.6(15...) and 4.4(69...) and 4.5(49...) can be rounded or truncated as long as they remain different C1 (dep on M1) for conclusion ft from three comparable figures</p> <p>[or any other calculations leading to comparable figures]</p>

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Question	Working	Answer	Mark	Notes
8 (a)		$7n - 4$	2	B2 for $7n - 4$ (B1 for $7n + d$ where d is an integer)
8 (b)		explanation	2	M1 for ' $7n - 4$ ' = 150 or any other valid method, eg. counting on 7s (to get 150) A1 for a complete explanation eg. the 22nd term is 150 or $n = 22$ from solution of equation or a clear demonstration based on 22 or complete sequence
9		115	4	M1 for $360 - 4 \times 25$ (=260) M1 (dep) for ' $260 \div 4$ ' (=65) M1 for $180 - '65'$ or $(360 - 2 \times '65') \div 2$ A1 for 115 with working OR M1 for $360 \div 4$ (=90) M1 (dep) for ' $90 - 25$ ' (=65) M1 for $180 - '65'$ or $(360 - 2 \times '65') \div 2$ A1 for 115 with working
10		Merit	3	M1 for $\frac{62}{80} \times 100$ (=77.5) A1 for 77.5% or 78% B1 ft (dep on M1) for 'Merit' OR M1 for calculating a percentage between 70 and 85% of 80 eg 0.7×80 (=56) or 0.84×80 (=67.2) or 0.85×80 (=68) A1 for 56 and 67(.2) or 68 or for two appropriate values which can be compared with 62 B1 ft (dep on M1) for 'Merit'

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Question	Working	Answer	Mark	Notes
11 (a)		x^{10}	1	B1 cao
(b)		m^{12}	1	B1 cao
(c)		$3a^{-4}f^6$	2	B2 for $3a^{-4}f^6$ or $\frac{3f^6}{a^4}$ (B1 for any two from 3, a^{-4} or $\frac{1}{a^4}$, f^6 in a product)
12		440	2	M1 for $140 \times \pi$ oe or 439 A1 for 439.6 – 440
*13	Distance \div speed: $30 \div 70$ (= 0.42-0.43); Distance \div time: $30 \div 26$ (=1.15...); Speed \times time: = 70×26 (=1820 mins); mph to miles/min = $70 \div 60$ (=1.16-1.17); Minutes to hours is $26 \div 60$ (=0.43...)	No with correct figure	3	M1 for a calculation which uses the Time \times Speed = Distance relationship OR a conversion of units eg between hours & minutes or between mph & miles per min M1 for a calculation involving both of the above C1 for “no” with a correct calculation, with units, from working: 25.2-25.8 minutes, 30.1-30.8 miles, 69-69.3 mph NB: $70 \div 26 \times 30$ as a single stage calculation gets 0 marks

PAPER: 1MA0_2H

Question	Working	Answer	Mark	Notes
14 (a)		$20 < T \leq 24$	1	B1 for $20 < T \leq 24$
14 (b)	$6 \times 10 + 8 \times 14 + 13 \times 18 + 21 \times 22 + 2 \times 26 = 920$ $920 \div 50$	18.4	4	M1 for finding fx with x consistent within intervals (including the end points) allow 1 error; implied by 820, 1020 M1 (dep) for use of all correct mid-interval values eg 920 M1 (dep on 1st M1) for $\sum fx \div \sum f$ A1 for 18.4 oe
14 (c)		correct frequency polygon	2	B2 for fully correct frequency polygon - points plotted at the midpoint (B1 for all points plotted accurately but not joined with straight line segments) or all points plotted accurately and joined with last joined to first to make a polygon or all points at the correct heights and consistently within or at the ends of the intervals and joined (can include joining last to first to make a polygon) NB: ignore parts of graph drawn to the left of the 1 st point or the right of the last point
15		80.1	3	M1 for $39^2 + 70^2$ M1 for $\sqrt{"1521"+"4900"}$ or $\sqrt{"6421"}$ A1 for 80.1 - 80.2

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Question	Working	Answer	Mark	Notes
16 (a)		6.25	3	M1 for clear intention to expand bracket or divide both sides of the equation by 5 as first step M1 for correct method to isolate terms in f A1 for 6.25 oe
(b)		-0.75	4	M1 for correct method to clear fractions eg. multiply all terms by 6 M1 for expansion of brackets oe M1 (dep on M1) for isolating the terms in h and the constant terms A1 for -0.75 oe
17 (a)		-15, 0, 3, 0, -3, 0, 15	2	B2 for all correct (B1 for any 2 or 3 correct)
(b)		Correct graph	2	M1 for at least 5 points plotted correctly (ft from table if at least B1 awarded in (a)) A1 for a fully correct curve

PAPER: 1MA0_2H

Question	Working	Answer	Mark	Notes
18		49.5	4	<p>M1 for $\tan 54 = \frac{\text{height}}{6}$</p> <p>M1 for (height =) $6 \times \tan 54$ (=8.2-8.3)</p> <p>M1 for $\frac{1}{2} \times '8.258..' \times 12$</p> <p>A1 for 49.2 - 50</p> <p>OR</p> <p>M1 for $\cos 54 = \frac{6}{AC}$</p> <p>M1 for (AC =) $\frac{6}{\cos 54}$ (=10.2(07...))</p> <p>M1 for $\frac{1}{2} \times 12 \times '10.207' \times \sin 54$</p> <p>A1 for 49.2 - 50</p> <p>OR</p> <p>M1 for $\frac{AC}{\sin 54} = \frac{12}{\sin 72}$</p> <p>M1 for (AC =) $\frac{12}{\sin 72} \times \sin 54$ (=10.2(07...))</p> <p>M1 for $\frac{1}{2} \times 12 \times '10.207' \times \sin 54$</p> <p>A1 for 49.2 - 50</p>
19 (a)		0.00078	1	B1 cao

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Question	Working	Answer	Mark	Notes
(b)		9.56×10^7	1	B1 cao
20		116	3	M1 for 80% or 0.8 seen oe or $\frac{464}{0.8}$ (=580) M1 for $\frac{464}{0.8} - 464$ A1 cao OR M1 for 80% or 0.8 seen oe M1 for $464 \div 4$ or $464 \div (80 \div 20)$ A1 cao
21 (a) (b)		$(2x + 3)(2x - 3)$ $m = \frac{g - 5}{a + 3}$	1 3	B1 cao M1 for correct processes to isolate terms in m from other terms M1 for taking m out as a common factor A1 for $m = \frac{g - 5}{a + 3}$ or $m = \frac{5 - g}{-a - 3}$

PAPER: 1MA0_2H

Question	Working	Answer	Mark	Notes
22 (a)		'show'	2	M1 for $\frac{1}{2} \times (x - 4 + x + 5) \times 2x$ or $2x \times (x - 4) + \frac{1}{2} \times 2x \times 9$ A1 for completion with correct processes seen
22 (b)		13	3	M1 for $\frac{-1 \pm \sqrt{1^2 - 4 \times 2 \times -351}}{2 \times 2}$ condone incorrect sign for 351 M1 for $\frac{-1 \pm \sqrt{2809}}{4}$ A1 for 13 NB for either M mark accept + only in place of ± OR M2 for $(2x + 27)(x - 13)$ (M1 for $(2x \pm 27)(x \pm 13)$) A1 for 13
23		15	2	M1 for $\frac{134}{1065} \times 120$ or 15.098... oe A1 cao

PAPER: 1MA0_2H

Question	Working	Answer	Mark	Notes
24		14.4	3	<p>M1 for $\pi \times 6.5^2 \times 11.5$ (=1526.42...) M1 (dep) for $\frac{1526.42...}{\pi \times 5.8^2}$ A1 for 14.4 - 14.5</p> <p>OR</p> <p>M1 for $\frac{5.8}{6.5}$ or $\frac{6.5}{5.8}$ or 0.89(23...) or 1.12(06896...) M1 for $11.5 \div \left(\frac{5.8}{6.5}\right)^2$ or $11.5 \times \left(\frac{6.5}{5.8}\right)^2$ A1 for 14.4 - 14.5</p>
*25		Yes with explanation	3	<p>M1 For Line A: writes equation as $y = 1.5x + 4$ or gives the gradient as 1.5 or constant term of 4 OR for Line B: shows a method which could lead to finding the gradient or gives the gradient as 2 or constant term of 4 or calculates a sequence of points including (0,4) or writes equation of line as $y = 2x + 4$</p> <p>M1 Shows correct aspects relating to an aspect of Line A and an aspect of Line B that enables some comparison to be made eg gradients, equations or points.</p> <p>C1 for gradients 1.5 and 2 and Yes with explanation that the gradients are different or states the lines intersect at (0,4) or explanation that interprets common constant term (4) from equations</p> <p>OR</p> <p>M1 for a diagram that shows both lines drawn and intersecting at (0,4) M1 for a diagram that shows both lines and their intersection point identified as (0,4) C1 for Yes and states the intersection point as (0,4)</p>

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Question	Working	Answer	Mark	Notes
26	180-136-“34.4” =9.504	3.73	5	M1 for $\frac{\sin L}{12.8} = \frac{\sin 136}{15.7}$ M1 for $L = \sin^{-1}\left(\frac{\sin 136}{15.7} \times 12.8\right)$ or $\sin^{-1}0.566\dots$ A1 for 34.4 - 34.5 M1 for $\frac{LN}{\sin(180-136-'34.4')} = \frac{15.7}{\sin 136}$ or $\frac{LN}{\sin(180-136-'34.4')} = \frac{12.8}{\sin '34.4'}$ or $(LN^2 =) 15.7^2 + 12.8^2 - 2 \times 15.7 \times 12.8 \times \cos(180 - 136 - '34.4')$ A1 for 3.73 - 3.74
27	$12 \times 20 + 10.8 \times 10 +$ $7 \times 15 + 5 \times 15 + 1.8 \times 30$ $+ 0.6 \times 30$ $= 240 + 108 + 105 + 75$ $+ 54 + 18$ $= 528 + 72 = 600$	12%	3	M1 for attempt to work out total area (eg =600) or area greater than 60 (eg =72) by using fd or counting squares M1 (dep) for $\frac{'72'}{'600'} \times 100$ oe (=12) A1 cao (must have % otherwise 2 marks)

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Question	Working	Answer	Mark	Notes
*28		Proof	3	<p>M1 for one pair of equal angles or sides with reason M1 for second pair of equal angles or sides with reason C1 for proof completed correctly with full reasons and reason for congruence</p> <p>Acceptable reasons: <i>AD</i> common (oe eg both same) Angle <i>BAD</i> = angle <i>CDA</i> (<u>angles</u> in a <u>semicircle</u> are <u>90°</u>) Angle <i>ABO</i> = angle <i>DCA</i> (<u>angles</u> in the <u>same segment</u> are <u>equal</u>) Triangle <i>ABD</i> and triangle <i>DCA</i> are congruent - ASA</p> <p>OR <i>BD</i> = <i>CA</i> (diameters of the circle) Angle <i>BAD</i> = angle <i>CDA</i> (<u>angles</u> in a <u>semicircle</u> are <u>90°</u>) <i>AD</i> common Triangle <i>ABD</i> and triangle <i>DCA</i> are congruent - RHS</p> <p>OR <i>BD</i> = <i>CA</i> (diameters of the circle) <i>AD</i> is common Angle <i>ADB</i> = angle <i>CAD</i> (base <u>angles</u> of an <u>isosceles</u> triangle are <u>equal</u>.) Triangle <i>ABD</i> and triangle <i>DCA</i> are congruent - SAS</p>

Question 6:

	F	S	G	
W	12	55		96
M	7	18	9	34
	19	73		130

	F	S	G	
W	12	55	29	96
M			9	
	19	73	38	130

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