edexcel

Mark Scheme (Results)

November 2012

GCSE Mathematics (Linear) 1MA0
Higher (Non-Calculator) Paper 1H

Edexcel and BTEC Qualifications

Edexcel and BTEC qualifications come from Pearson, the world's leading learning company. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers. For further information visit our qualifications websites at www.edexcel.com or www.btec.co.uk for our BTEC qualifications.
Alternatively, you can get in touch with us using the details on our contact us page at www.edexcel.com/contactus.

If you have any subject specific questions about this specification that require the help of a subject specialist, you can speak directly to the subject team at Pearson.
Their contact details can be found on this link: www.edexcel.com/teachingservices.

You can also use our online Ask the Expert service at www.edexcel.com/ask. You will need an Edexcel username and password to access this service.

Pearson: helping people progress, everywhere
Our aim is to help everyone progress in their lives through education. We believe in every kind of learning, for all kinds of people, wherever they are in the world. We've been involved in education for over 150 years, and by working across 70 countries, in 100 languages, we have built an international reputation for our commitment to high standards and raising achievement through innovation in education. Find out more about how we can help you and your students at: www.pearson.com/uk

November 2012
Publications Code UG033849
All the material in this publication is copyright
© Pearson Education Ltd 2012

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

1MA0_1H					
Question		**Working**	**Answer**	**Mark**	**Notes**
1		180×1.5 40×1.5 110×1.5 30×1.5	Flour = 270 Ginger = 60 Butter = 165 Sugar = 45	3	M1 for ×24÷16 oe or 24/16 or 1.5 seen or 180 + 90 (=270) or 40 + 20 (=60) or 110 + 55 (=165) or 30 + 15 (=45) or sight of any one of the correct answers A2 for all 4 correct answers (A1 for 2 or 3 correct answers)
2	(a)		Positive (correlation)	1	B1 for positive (correlation) [do not accept a relationship]
	(b)		85	2	B2 for an answer in the range 83 to 87 OR M1 for a single straight line segment with positive gradient that could be used as a line of best fit or for an indication on the diagram from 148 on the height axis A1 ft from their line of best fit
3*			9	4	M1 for 7155 – 7095 or 60 seen or 7155×15 (or .15) or 7095×15 (or .15) or 107325 or 106425 or 1073.25 or 1064.25 M1 for '60' ×15 or 7155 ×15 – 7095 × 15 [or .15 instead of 15] A1 for 9 or 9.00 or 900 C1 (ft) for answer with correct units (money notation) identified as the answer.
4			Question Answer	2	B1 for an appropriate question with reference to a time frame with a unit of time or a question with a time frame with a unit of time implied by responses B1 for at least 3 non-overlapping boxes (ignore if not exhaustive) **or** for at least 3 exhaustive boxes (ignore if any overlapping) [Note: labels on response boxes must **not** be inequalities] Do not accept frequency tables or data collection sheets.

1MA0_1H					
Question		**Working**	**Answer**	**Mark**	**Notes**
5			600	3	(M2 for 300 ÷ 0.5 or 60 × 10 or 30 × 20) M1 for at least two of 30, 10 and 0.5 or sight of 300 or 60 or 20 A1 for 600 – 620 but not 601.1(198428…) **OR** (M2 for 310 ÷ 0.5 or 62 × 10 or 31 × 20) M1 for at least two of 31, 10 and 0.5 or sight of 310 or 62 or 20 A1 for 600 – 620 but not 601.1(198428…)
6			Enlargement, scale factor 2.5, centre (0,0)	3	B1 for enlargement B1 for scale factor 2.5 oe B1 for (0,0); accept origin or *O* NB: if two different transformations are stated then 0 marks.
7		$\frac{9}{2}\times(12+18)=135$ 135 ÷ 20 = 6.75 (=7 bags) 7 × 4.99 OR $18\times9-\frac{1}{2}(6\times9)$ = 135 135 ÷ 20 = 6.75 (=7 bags) 7 × 4.99	34.93	4	M1 for $\frac{9}{2}\times(12+18)$ or $18\times9-\frac{1}{2}(6\times9)$ or $9\times12+\frac{1}{2}\times(18-12)\times9$ or 135 seen M1 (dep) for '135'÷ 20 or 6 or 7 seen M1 (dep on previous M1) for '6' × 4.99 or '7' × 4.99 A1 cao [SC: M1 for (12×9 + 6×9) ÷ 20 (= 162÷20) or 8 or 9 seen M1 (dep) for '8' × 4.99 or '9' × 4.99 OR M1 for (18×9 − 6×9) ÷ 20 (= 108÷20) or 5 or 6 seen M1 (dep) for '5' × 4.99 or '6' × 4.99]

1MA0_1H					
Question		**Working**	**Answer**	**Mark**	**Notes**
8	(a)		0.15	2	M1 for $1 - (0.2 + 0.5)$ oe or sight of 0.3 A1 oe
	(b)		48	2	M1 for 240×0.2 oe or $48 + 120 + 36 + 36$ A1 cao
9			380	3	M1 for $4\times7 + 5\times2$ (=38) or $9\times2 + 5\times4$ (=38) or $4\times7\times10$ or $(7\times9 - 5\times5)$ or $5\times2\times10$ (=100) or $9\times2\times10$ (=180) or $5\times4\times10$ (=200) or $9\times7\times10$ (=630) or $5\times5\times10$ (=250) M1 (dep) for '38'×10 or 380 or $4\times7\times10 + 5\times2\times10$ or $9\times2\times10 + 5\times4\times10$ or ×10 A1 cao
10			Region shaded	3	B1 for circle arc of radius 3cm (± 2mm) centre Burford B1 for circle arc of radius 5 cm (± 2mm) centre Hightown B1 for overlapping regions of circle arcs shaded
11	(a)		$12x + 20$	1	B1 cao
	(b)		$5x + 7$	2	M1 for $2\times x - 2\times4$ or $3\times x + 3\times5$ A1 cao
	(c)		$x^2 + 10x + 24$	2	B2 cao (B1 for 4 correct terms with or without signs, or 3 out of no more than 4 terms, with correct signs. The terms may be in an expression or in a table)

1MA0_1H					
Question		**Working**	**Answer**	**Mark**	**Notes**
12			36 – 9π	3	M1 for π×6×6 or 36π seen value 113.03-113.2 M1 for (12×12 –'π×6×6')÷4 or value 7.7-7.8 A1 for 36 – 9π oe **OR** M1 for π×6×6÷4 or 9π seen or value 28.2-28.3 M1 for 6×6 – 'π×6×6÷4' or value 7.7-7.8 A1 for 36 – 9π oe NB: for M marks π may be given numerically.
13*		180÷9×1:180÷9×3:180÷9×5 =20:60:100 Not enough cement (but enough sand and enough gravel) OR 1×15:3×15:5×15 =15:45:75 15+45+75=135 (<180) Not enough cement (to make 180kg of concrete)	No + reason	4	M1 for 180 ÷ (1+3+5) (= 20) or 3 multiples of 1: 3: 5 M1 for 1×"20" or 3×"20" or 5×"20" or 20 seen or 60 seen or 100 seen A1 for (Cement =) 20, (Sand =) 60, (Gravel) = 100 C1 ft (provided both Ms awarded) for not enough cement oe **OR** M1 for (1×15 and) 3×15 and 5×15 or 9×15 or sight of the numbers 15, 45, 75 together. M1 for '15' + '45' + '75' A1 for 135 (<180) C1 ft (provided both Ms awarded) for not enough cement oe

1MA0_1H					
Question		**Working**	**Answer**	**Mark**	**Notes**
14			230	2	M1 for 180 + 50 A1 cao **OR** M1 for 360 – (180 – 50) or 360 – 130 A1 cao **OR** M1 for 50 + (90 – 50) + 90 + 50 or 50 + 40 + 90 + 50 A1 cao **OR** M1 for a suitable diagram (sketch) with bearing of lighthouse from ship indicated and 50° marked at lighthouse; diagram only intended to indicate position of 50°; ignore other labels and markings unless they create ambiguity. A1 cao
15	(a)		m^2	1	B1 for m^2 or m^{5-3}
	(b)		$5x^6y^4$	2	M1 for $x^{4+2}y^a$ or x^by^{3+1} A1 cao

1MA0_1H					
Question		**Working**	**Answer**	**Mark**	**Notes**
16			84	4	M1 for $x - 1 + 3x + 1 + 3x$ (= 56) or $7x = 56+1-1$ or $\frac{3x(x-1)}{2}$ oe M1 for $7x = 56$ or 8 seen M1 for $0.5\times(\text{'8'} - 1)\times(3\times\text{'8'})$ A1 cao Ignore any statement of units. SC B2 for 8 as the answer or 7 identified as the height and 24 identified as the base of the triangle.
17			(4,3), (4,4), (4,5), (5.4) marked	3	M2 for identifying the correct region or at least 3 correct points with no more than 3 incorrect points (M1 for drawing $x = 3$ (solid or dashed line) or at least 1 correct point with no more than 3 incorrect points) A1 cao

1MA0_1H					
Question		**Working**	**Answer**	**Mark**	**Notes**
18			12	4	B1 for 60 seen M1 for (360 – 60) ÷ 2 (=150) M1 for 360 ÷ (180 – 150) or 150×n=180(n-2) oe A1 cao **OR** B1 for 60 seen M1 for 60 ÷ 2 (=30) M1 for 360 ÷ (60÷2) A1 cao **OR** M2 for 30 seen M1 for 360 ÷ 30 A1 cao
19	(a)		Box plot	2	B2 cao (B1 for ends of whiskers at 18 and 44 (as part of a box plot diagram) **OR** for ends of box at 25 and 33 with median at 29)
	(b)		2 comparisons	2	B2 ft for two comparisons with at least one referring to IQR or median values (B1 ft for one comparison of IQRs, medians, or other values) As well as median or interquartile range accept other valid references to spread if explained correctly within a statistical context. Statements need to be true.

1MA0_1H					
Question		**Working**	**Answer**	**Mark**	**Notes**
20		0.38×10^{-1}, 3800×10^{-4}, 0.038×10^{2}, 380	Correct order	2	M1 changing any one correctly or at least 3 in the correct order (ignoring one) or reverse order A1 for correct order (accept any form)
21	(a)		11, 34, 65, 92, 100	1	B1 cao
	(b)		cf graph	2	B1 for 5 or 6 points plotted correctly ±1 full 2 mm square at the upper end of the interval dep on sensible table (condone one error in addition) B1 (dep) for points joined by curve or line segments provided no gradient is negative. Ignore any point or graph outside range of their points. SC B1 for 5 or 6 points plotted not at end but consistently within each interval and joined.
	(c)		18 – 24	2	M1 for indication of taking a reading from 90 or ft from their cf graph A1 for 18 – 24

1MA0_1H					
Question		**Working**	**Answer**	**Mark**	**Notes**
22		$12x+8y=16$ $12x+15y=51$ $7y=35$ $3x+2\times5=6$ Alternative method $x=\frac{4-2y}{3}$ $4\left(\frac{4-2y}{3}\right)+5y=17$ $16-8y+15y=51$ $7y=35$ $x=\frac{4-2\times5}{3}$	$x=-2$ $y=5$	4	M1 for a correct process to eliminate either x or y or leading to substitution (condone one arithmetic error) A1 for either $x=-2$ or $y=5$ M1 (dep) for correct substitution of their found value A1 cao SC If M0 scored B1 for $y=-2$ and $x=5$

1MA0_1H					
Question		**Working**	**Answer**	**Mark**	**Notes**
23			7.5	4	B1 for identifying A at 3 or D at 6 or A(3, 0) or D(0, 6) oe eg may be seen as labels on the diagram M1 for $0 = \frac{-1}{-2} \times 3 + c$ M1 (dep on previous M1) for 6 + '1.5' A1 cao **OR** B1 for identifying A at 3 or D at 6 or A(3, 0) or D(0, 6) oe eg may be seen as labels on the diagram M1 for 3/6 = *OP*/3 or 1.5 oe seen (from similar triangles) M1 for 6 + '1.5' A1 cao **OR** B1 for identifying A at 3 or D at 6 or A(3, 0) or D(0, 6) oe eg may be seen as labels on the diagram M1 for $(6+OP)^2 = (6^2+3^2) + (3^2+OP^2)$ oe (from Pythagoras) M1 for 6 + '1.5' A1 cao
24			$t = \frac{3-4p}{p+2}$	4	M1 for intention to multiply both sides by 4+*t* eg $p \times 4 + t = 3 - 2t$ M1 for intention to correctly move their *t* terms to one side, and correctly move their other terms to the other side eg $p \times 4 + t - 4p + 2t = 3 - 2t + 2t - 4p$ M1 for intention to factorise eg $t(p \pm 2)$ A1 for $t = \frac{3-4p}{p+2}$ oe

1MA0_1H					
Question		**Working**	**Answer**	**Mark**	**Notes**
25	(a)		640	2	M1 for $80\times\left(\frac{8}{4}\right)^3$ or $80\div\left(\frac{4}{8}\right)^3$ A1 cao
	(b)		40	2	M1 for $160\div\left(\frac{8}{4}\right)^2$ or $160\times\left(\frac{4}{8}\right)^2$ or ft their scale factor from (a) A1 cao

1MA0_1H					
Question		**Working**	**Answer**	**Mark**	**Notes**
26	(a)		$\frac{5\sqrt{2}}{2}$	2	M1 for $\frac{5}{\sqrt{2}}\times\frac{\sqrt{2}}{\sqrt{2}}$ oe A1 for $\frac{5\sqrt{2}}{2}$ oe
	(b)		$8\sqrt{3}$	2	M1 for $2\times2+2\sqrt{3}+2\sqrt{3}+\sqrt{3}\times\sqrt{3}$ or $\left(4+4\sqrt{3}+3\right)-\left(4-4\sqrt{3}+3\right)$ or $2\times2-2\sqrt{3}-2\sqrt{3}+\sqrt{3}\times\sqrt{3}$ at least three terms in either correct; could be in a grid. A1 cao **OR** Difference of two squares M1 for $\left(\left(2+\sqrt{3}\right)-\left(2-\sqrt{3}\right)\right)\left(\left(2+\sqrt{3}\right)+\left(2-\sqrt{3}\right)\right)$ A1 cao
27	(a)		Circle, centre *O*, radius 2	2	B2 cao (B1 for a circle radius 2 any centre or for a circle or part of a circle centre (0, 0) any radius)
	(b)		Cosine curve crossing at (0, 1), (90, 0), (270, 0) and (360, 1)	2	B2 cao (ignore if sketch outside region) (B1 for a curve with correct intercepts but incorrect amplitude OR for a curve starting at (0,1) with correct amplitude but incorrect intercepts; curves must have a shape that approximates to a cosine curve)

1MA0_1H					
Question		**Working**	**Answer**	**Mark**	**Notes**
28	(a)		$\mathbf{a} - 3\mathbf{b}$	1	B1 for $\mathbf{a} - 3\mathbf{b}$ oe
	(b)			4	M1 for (**NC** =) $2\mathbf{a} - 2\mathbf{b}$ oe M1 for (**NM** =) $\mathbf{b} + \frac{1}{2}"(\mathbf{a} - 3\mathbf{b})"$ A1 for $\frac{1}{2}(\mathbf{a} - \mathbf{b})$ oe and $2\mathbf{a} - 2\mathbf{b}$ oe C1 for **NC** is a multiple of **NM** (+ common point) **OR** M1 for (**NC** =) $2\mathbf{a} - 2\mathbf{b}$ oe M1 for (**MC** =) $\frac{1}{2}"(\mathbf{a} - 3\mathbf{b})" + \mathbf{a}$ A1 for $\frac{3}{2}(\mathbf{a} - \mathbf{b})$ oe and $2\mathbf{a} - 2\mathbf{b}$ oe C1 for **NC** is a multiple of **MC** (+ common point) **OR** M1 for (**NM** =) $\mathbf{b} + \frac{1}{2}"(\mathbf{a} - 3\mathbf{b})"$ M1 for (**MC** =) $\frac{1}{2}"(\mathbf{a} - 3\mathbf{b})" + \mathbf{a}$ A1 for $\frac{1}{2}(\mathbf{a} - \mathbf{b})$ oe and $\frac{3}{2}(\mathbf{a} - \mathbf{b})$ oe C1 for **NM** is a multiple to **MC** (+ common point)

Further copies of this publication are available from
Edexcel Publications, Adamsway, Mansfield, Notts, NG18 4FN

Telephone 01623 467467
Fax 01623 450481
Email publication.orders@edexcel.com

Order Code UG033849 November 2012

For more information on Edexcel qualifications, please visit our website www.edexcel.com

Pearson Education Limited. Registered company number 872828
with its registered office at Edinburgh Gate, Harlow, Essex CM20 2JE

Ofqual

Llywodraeth Cynulliad Cymru
Welsh Assembly Government

Rewarding Learning