

Mark Scheme (Results)

Summer 2009

GCSE

GCSE Mathematics (Linear) - 1380

Paper: 1380/3H

GCSE MATHEMATICS 1380 (LINEAR)
RESULTS MARKSCHEME

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If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.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

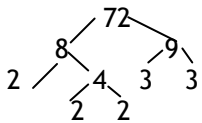


Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded in another.

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1380/3H																						
Question	Working				Answer	Mark	Notes															
1	(a)	<table border="1"> <tr> <td>15</td> <td>25</td> <td>14</td> <td>54</td> </tr> <tr> <td>22</td> <td>8</td> <td>16</td> <td>46</td> </tr> <tr> <td>37</td> <td>33</td> <td>30</td> <td>100</td> </tr> </table>				15	25	14	54	22	8	16	46	37	33	30	100	Table	3	B3 for all 5 correct (B2 for 3 or 4 correct) (B1 for 1 or 2 correct)		
	15	25	14	54																		
22	8	16	46																			
37	33	30	100																			
(b)					$\frac{37}{100}$	1	$\frac{37}{100}$ B1 100 oe															
2	(c)					$2x + 8y$	2	B2 for $2x + 8y$ oe [B1 for $2x$ or $8y$ seen] {Note: $-8y$ seen with no working gets B0 $4x + 2x = 6x$ gets B0}														
	(b)					$2c + 4r$	2	B2 for $2c + 4r$ oe [B1 for $2c$ or $4r$ oe seen] Ignore any Left Hand Side = $2c + 4r$ {Note: ignore units or use of 'p'}														
3	(a)	<table border="1"> <tr> <td>x</td> <td>-2</td> <td>-1</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> </tr> <tr> <td>y</td> <td>-11</td> <td>-7</td> <td>-3</td> <td>1</td> <td>5</td> <td>9</td> </tr> </table>				x	-2	-1	0	1	2	3	y	-11	-7	-3	1	5	9	$-7, 1, 5$	2	B2 all 3 correct (B1 for 1 or 2 correct)
	x	-2	-1	0	1	2	3															
y	-11	-7	-3	1	5	9																
(b)					Graph	2	B2 for correct line between $x = -2$ and $x = 3$ (B1ft for plotting 5 of their points correctly or for a straight line with gradient 4 or for a straight line passing through $(0, -3)$)															

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Question	Working	Answer	Mark	Notes	
4	(a)	$50 = 4k - 10$ $4k = 60$	15	2	M1 for $50 = 4k - 10$ oe A1 cao
	(b)	$y = 4 \times 2 - 3 \times 5$	-7	2	M1 for $4 \times 2 - 3 \times 5$ oe A1 cao
5	(a)		Vertices at (2, -2), (7, -2), (7, -6), (4, -6), (4, -4), (2, -4)	2	B2 for a fully correct rotation [B1 for correct shape with correct orientation OR a 90° anticlockwise rotation about O OR a 180° rotation about O OR for any 3 correct sides in the correct position]
	(b)		Translation by $\begin{pmatrix} 3 \\ -1 \end{pmatrix}$	2	B1 for translation B1 (indep) for $\begin{pmatrix} 3 \\ -1 \end{pmatrix}$ or 3 right and 1 down
6	(a)		opp sides are equal	1	B1 for a correct explanation
	(b)	$4x - 2x = 12 - 1$	5.5	2	M1 for $4x + 1 - 1 - 2x = 2x + 12 - 1 - 2x$ oe A1 for 5.5 or 11/2 or 5½
	(c)	'5.5' $\times 2 + 4 \times '5.5' + 1 + 2 \times '5.5' + 12$	57	2	M1 for correct substitution of $x = '5.5'$ into the four expressions to find the sum of FOUR sides or $8x + 13$ seen A1 ft
7	(a)		15.456	1	B1 cao
	(b)		0.15456	1	B1 cao
	(c)		3220	1	B1 cao

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Question	Working	Answer	Mark	Notes
8	(a) $x^2 = 72 \div 2$	6	2	M1 for $72 \div 2$ or 36 seen A1 6 or -6 or ± 6
	(b) $72 = 2 \times 36 = 2 \times 2 \times 18$ $= 2 \times 2 \times 2 \times 9$ 	$2 \times 2 \times 2 \times 3 \times 3$	2	M1 for a systematic method of at least 2 correct divisions by a prime number or factor tree or a full process with one calculation error; can be implied by digits 2, 2, 2, 3, 3 on answer line A1 for $2 \times 2 \times 2 \times 3 \times 3$ or $2^3 \times 3^2$ oe [Note $1 \times 2 \times 2 \times 2 \times 3 \times 3$ gets M1 A0]
9	(a)		2	M1 rectangle with either correct width or height or any square A1 cao
	(b)		2	B2 for a correct sketch (B1 any 3-D sketch of no more than 4 faces seen, with a trapezoidal face)
10	$\frac{40000}{125} = \frac{8000}{25} = 320$ seconds	320	3	M1 for 40×1000 or $125 \div 1000$ or 40000 or 0.125 M1 for $\frac{40000}{125}$ or $\frac{40}{0.125}$ A1 cao OR M1 for $1000 \div 125$ M1 for $'8' \times 40$ A1 cao

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Question	Working	Answer	Mark	Notes
11	(a)	62.5	1	B1 cao
	(b)	63.5	1	B1 for 63.5 (accept 63.49 or 63.49.. or any evidence that the 9 is recurring or 63.499 or better)
12		Diagram	4	M1 arc radius 4 cm centre <i>B</i> within the guidelines M1 angle bisector from <i>A</i> to <i>BC</i> within the guidelines A1 for clear indication that inside of arc is being identified as correct region for the first condition, or that side of straight line nearer to <i>C</i> is identified as correct region for the second condition. (Note that only 1 of the Ms need be awarded for this A mark to be awarded) A1 fully correct region Ignore any drawing outside the given triangle
13	(a)		2	B1 'What type of magazine do you read?'
	(b)	How many magazines have you read in the last week 0 <input type="checkbox"/> 1 <input type="checkbox"/> 2-3 <input type="checkbox"/> >3 <input type="checkbox"/>	2	B1 for at least 2 magazines identified in response boxes [Note: B0 for any data collection sheet/chart] B1 Relevant question that refers to a time period. B1 for at least 3 mutually exclusive response boxes (need not be exhaustive)
14		$\frac{7 \times 200}{0.05} = \frac{1400}{0.05}$	3	B1 for any two of 7, 200 or 0.05 M1 for correct processing of at least two of 7, 200 or 190 and 0.05 or 0.1 A1 26600 - 28000

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Question	Working	Answer	Mark	Notes
15	(a)		1	B1 cao
	(b)		1	B1 cao
16	(a)		2	B2 (B1 for $x(4x - 6y)$ or $2(2x^2 - 3xy)$ or $2x(\text{two terms})$ or $4x(x - 1.5y)$)
	(b)	$x^2 - x + 6x - 6 =$ $x(x - 1) + 6(x - 1)$	2	B2 cao (B1 $(x - 6)(x + 1)$ or $(x - 6)(x - 1)$ or $x(x - 1) + 6(x - 1)$ or $x(x + 6) - (x + 6)$)
17	(a)		2	B1 6 or 7 points plotted correctly ± 1 full (2mm) square B1 (dep) for points joined by curve or line segments provided no gradient is negative - ignore any part of graph outside range of their points (SC: B1 if 6 or 7 points plotted not at end but consistent within each interval and joined)
	(b)		2	B2 if answer is in the range 235 - 245 OR M1 (dep on graph being cf) for using cf = 60 or 60.5 A1 ft (± 1 square)
	(c)		1	B1ft correct comment comparing money spent by men with money spent by women

1380/3H					
Question	Working	Answer	Mark	Notes	
18	(a)	$AOD = 90 - 36$ or $180 - (90 + 36)$	54	2	M1 $AOD = 90 - 36$ or $180 - (90 + 36)$ A1 cao
	(b)(i)	$ABC = AOD \div 2$	27	2	M1 $ABC = AOD \div 2$ A1 ft from '54'
	(ii)		Reason	1	B1 Angle at centre = twice angle at circumference
19	(a)		$x = 2, y = 3$	1	B1 cao
	(b)		$y = \frac{1}{2}x + 4$	2	M1 for $y = mx + 4$ or $y = \frac{1}{2}x + c, c \neq 2$, or $\frac{1}{2}x + 4$ A1 for $y = \frac{1}{2}x + 4$ oe
20	(a)	$3t + 1 < t + 12$ $3t - t < 12 - 1$ $2t < 11$	$t < 5.5$	2	M1 $3t - t < 12 - 1$ A1 $t < 5.5$ oe (B1 for $t = 5.5$ or $t > 5.5$ or 5.5 or $t \leq 5.5$ or $t \geq 5.5$ on the answer line)
	(b)		5	1	B1 for 5 or ft (a)
21		$M = kL^3$ $k = \frac{M}{L^3} = \frac{160}{8} = 20$ When $L = 3, M = 20 \times 3^3$	540	4	M1 for $M \propto L^3$ or $M = kL^3$ A1 $k = 20$ M1 for '20' $\times 3^3$ A1 for 540 cao

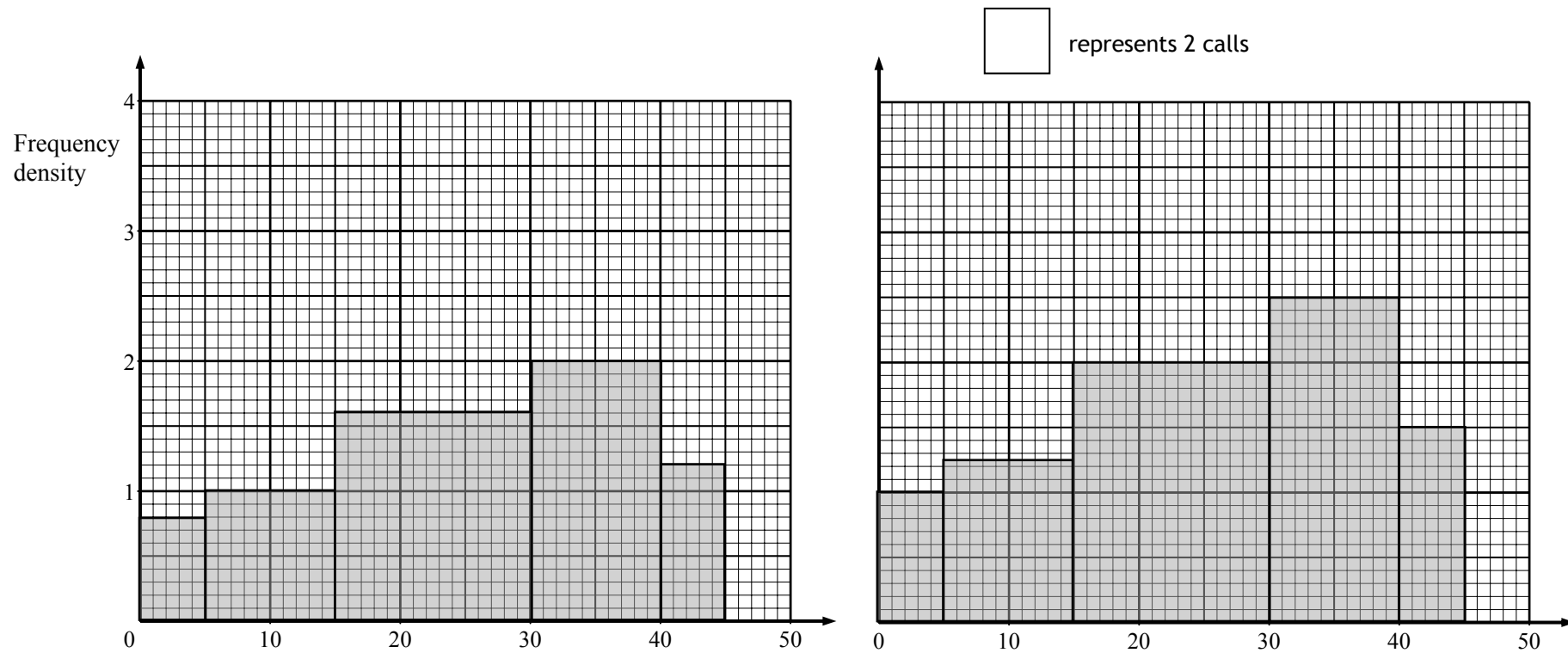
1380/3H									
Question	Working					Answer	Mark	Notes	
22		F	4	10	24	20	6	<p>Correct histogram</p> <p>4</p> <p>M1 use of frequency density as frequency \div width (can be implied by two correct frequency densities or two correct bars with different widths) or area (can be implied by one correct bar) to represent frequency</p> <p>A2 for all 5 histogram bars correct $\pm\frac{1}{2}$ square (A1 at least 3 correct histogram bars $\pm\frac{1}{2}$ square)</p> <p>A1 for correct label and scale numbered appropriately or for key and consistent scaling</p>	
		Fd	0.8	1	1.6	2	1.2		
		or							
		F	4	10	24	20	6		
		Fd	4	5	8	10	6		
23	(a)						Correct diagram	2	B1 for 0.2 oe seen on bottom left branch B1 for correct probabilities on other branches
	(b)	prob(WW) = 0.5×0.5					0.25	2	M1for $0.5 \times '0.5'$ A1ft for 0.25 oe

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Question	Working	Answer	Mark	Notes
24	<p>(a) $AB = AC$ (equilateral triangle) AD is common $ADC = ADB$ ($= 90^\circ$ given) $\triangle ADC \equiv \triangle ADB$ (RHS)</p> <p>OR</p> <p>$DAC = DAB$ (since $ACD = ABD$ and $ADC = ADB$) $AB = AC$ (equilateral triangle) AD is common $\triangle ADC \equiv \triangle ADB$ (SAS)</p> <p>OR</p> <p>$DAC = DAB$ (since $ACD = ABD$ and $ADC = ADB$) AD is common $ACD = ABD$ (equilateral triangle) $\triangle ADC \equiv \triangle ADB$ (AAS)</p>	Proof	3	<p>M1 for any three correct statements (which do not have to be justified) that together lead to a congruence proof (ignore irrelevant statements) A1 for a full justification of these statements A1 for RHS, SAS, AAS, ASA or SSS as appropriate</p> <p>NB The two A marks are independent</p>
	<p>(b) $BD = DC$ (congruent \triangles) $BC = AB$ (equilateral \triangles) Hence $BD = \frac{1}{2} AB$</p>	Proof	2	<p>B1 for $BD = DC$ and $BC = AB$ B1 for justification of these statements and completion of proof</p>

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Question	Working	Answer	Mark	Notes
25	(a)		3	
				$\frac{1}{2\frac{1}{2}} + \frac{1}{3\frac{1}{3}} = \frac{1}{f}$ $\frac{2}{5} + \frac{3}{10} = \frac{1}{f}$ $\frac{7}{10} = \frac{1}{f}$
	(b)		2	
				$\frac{1}{u} = \frac{1}{f} - \frac{1}{v}$ $\frac{1}{u} = \frac{v-f}{fv}$
		$u = \frac{fv}{v-f}$		<p>M1 $\frac{1}{2\frac{1}{2}} + \frac{1}{3\frac{1}{3}} = \frac{1}{f}$</p> <p>M1 correct addition of the fractions to get $\frac{7}{10}$ oe</p> <p>A1 for $\frac{10}{7}$ oe</p> <p>M1 $\frac{1}{u} = \frac{v-f}{fv}$ oe or $vf + uf = uv$ oe or $\frac{1}{u} = \frac{f-v}{fv}$ or</p> <p>$u = \frac{1}{\frac{v-f}{fv}}$ or $u = \frac{1}{\frac{1}{f} - \frac{1}{v}}$</p> <p>A1 $u = \frac{fv}{v-f}$ or $u = \frac{-fv}{f-v}$</p>
26	(a)		2	
		$y = f(x-4)$		B2 cao (B1 for $f(x-4)$ or $y = f(x+a)$, $a \neq -4$, $a \neq 0$)
	(b)		2	
				B2 cao (B1 cosine curve with either correct amplitude or correct period, but not both)

22

Examples:



26.

