

Mark Scheme (Results)

Summer 2012

GCSE Mathematics (Linear) 1MA0
Foundation (Non-Calculator) Paper 1F

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Summer 2012

Publications Code UG032619

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If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.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


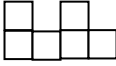
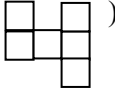
Unless otherwise stated, when an answer is given as a range (e.g 3.5 – 4.2) then this is inclusive of the end points (e.g 3.5, 4.2) and includes all numbers within the range (e.g 4, 4.1)

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)		380	1	B1 cao
	(b)		6.2	1	B1 cao
	(c)		Arrow at 34	1	B1 cao
2	(a)		8	1	B1 for 8 ± 0.2
	(b)		35	1	B1 for $35 \pm 2^\circ$
	(c)		Circle drawn	1	B1 for all parts within $\pm 2\text{mm}$, (use overlay)
3	(a)		4, 7, 4, 3, 2	2	M1 for at least 3 correct tallies or at least 3 correct frequencies A1 for all frequencies correct
	(b)		7	1	B1 for 7 or ft from frequencies in (a) or tallies if no frequencies
	(c)		Diagram drawn	3	M1 for bar chart or other suitable chart with at least 3 correct heights for their scale (can f.t.) A1 for all 5 bars correctly labelled and vertical axis correctly scaled A1 for fully correct or ft frequencies in (a) OR M1 for pictogram with at least 3 correct rows (can f.t.) A1 for correct labels on all 5 rows and correctly key A1 for fully correct or ft frequencies in (a) OR M1 for pie chart with at least 3 correct sectors $\pm 2^\circ$ (can f.t.) A1 for all 5 sectors correctly labelled A1 for fully correct or ft frequencies in (a)

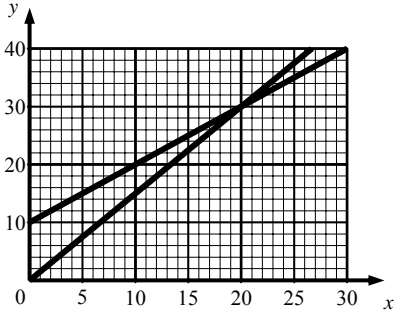
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Question	Working	Answer	Mark	Notes
4	$\pounds 1.18 + 94\text{p} = \pounds 2.12$ $\pounds 5 - \pounds 2.12 - 30\text{p}$ $= \pounds 2.58$ $\pounds 2.58 \div 2 =$	1.29	3	M2 for $(5 - 1.18 - 0.94 - 0.30) \div 2$ oe or digits 129 (M1 for $1.18 + 0.94$ or 2.12 seen or $1.18 + 0.94 + 0.30$ oe or 2.42 seen or $5 - 1.18 - 0.94$ oe or 2.88 seen or $(5 - 1.18 - 0.94) \div 2$ or 1.44 seen or $5 - 1.18 - 0.94 - 0.30$ oe or 2.58 seen) A1 cao NOTE: Accept working in £ or pence
5	(a)(i)	(2, 3)	2	B1 cao
	(ii)	(-3, 1)		B1 cao
	(b)	Point plotted at (3, -4)	1	B1 cao
6	(a)	- 5	1	B1 cao
	(b)	6	1	B1 for 6 or -6
	(c)	3	1	B1 cao
7		(P, B), (P, S), (P, L) (M, B), (M, S), (M, L) (H, B), (H, S), (H, L)	2	M1 for any 3 combinations with no incorrect combinations A1 for all 9 combinations with no duplicates or extras
8	(a)	Walk	1	B1 cao
	(b)	$24 \div 4 =$	2	M1 for $24 \div 4$ oe or $\frac{1}{4}$ oe seen A1 cao

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Question	Working	Answer	Mark	Notes
9	(a)	Isosceles triangle	1	B1 for isosceles triangle
	(b)	Rectangle with area 12 cm^2	2	M1 for rectangle drawn A1 cao
10	(a)	A marked at 0	1	B1 for A marked at 0 (within overlay)
	(b)	B marked at $1/4$	1	B1 for B marked at $1/4$ (within overlay)
11	(a)	9	1	B1 cao
	(b)	33	2	M1 for 5×5 or 25 seen in the working or $2 \times 2 \times 2$ or 8 seen in the working A1 cao
12	(a)	20	2	M1 $3 \times 3 \times 3$ or seen or drawn or 27 seen or use of 3 layers A1 cao
	(b)		2	B2 for correct view (B1 for  or )
13	(a)(i)	07 29	2	B1 for 07 29
	(ii)	36		B1 for 36 or ft difference between (i) and 06 53
	(b)	07 51	1	B1 cao
	(c)	09 55	1	B1 for 09 55 or 9 55 or five to ten

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Question	Working	Answer	Mark	Notes
14	$2 + 8 + 2 + 8 = 20$ $20 \div 4 =$	5	4	M2 for $2 + 8 + 2 + 8$ oe or 20 seen or $(2 + 8) \div 2$ oe (M1 for the sum of 3 sides of the rectangle) M1 (dep) for the sum of 3 or 4 sides of the rectangle $\div 4$ or an attempt to evaluate $(2 + 8) \div 2$ oe to get the length of one side A1 cao SC: B1 for an answer of 4 coming from $\sqrt{2 \times 8}$ oe
15	(a)	4	1	B1 cao
	(b) $9.5 - 4.75 =$ OR $9.5 \div 2 =$	4.75	2	M1 for $9.5 - 4.75$ or $9.5 \div 2$ or $4.75 - 9.5$ A1 cao
	(c)	6	1	B1 cao
	(d) $12 \times 4 =$	48	2	M1 for $\times 4$ seen or identifying $+ 0.5$ for every 2 inches or $12 + 12 + 12 + 12$ oe or build up method eg 12, 24, 36, 48 allow one error A1 cao
16	(a)	trapezium	1	B1 for trapezium or isosceles trapezium
	(b)		2	B2 for correct tessellation (at least 5 more shapes) (B1 for at least 4 shapes (including initial shape) correctly tessellating)

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Question	Working	Answer	Mark	Notes
17*	<p>S: $35 \div 100 \times 40 = 14$ W: $40 \div 8 \times 3 = 15$</p> <p>OR</p> <p>D: $16 \div 40 \quad (\times 100)$ $= 0.4 \quad (40\%)$ W: $3 \div 8 \quad (\times 100)$ $= 0.375 \quad (37.5\%)$</p> <p>OR</p> <p>D: $\frac{16}{40} = \frac{80}{200}$ S: $\frac{35}{100} = \frac{70}{200}$ W: $\frac{3}{8} = \frac{75}{200}$</p>	Debbie and correct calculations	4	<p>Compares Marks out of 40 or fractions with denominator of 40</p> <p>M1 for $35 \div 100 \times 40$ oe or 14 seen (or 14/40 seen) M1 for $40 \div 8 \times 3$ or 15 seen (or 15/40 seen)</p> <p>A1 for 14 and 15 or $\frac{14}{40}$ and $\frac{15}{40}$</p> <p>C1 (dep on M1) for correct conclusion for their working QWC with 3 comparable marks: Decision and justification should be clear with working clearly presented and attributable.</p> <p>OR Decimals (or Percentages)</p> <p>M1 for $16 \div 40 \quad (\times 100)$ oe or 0.4 (or 40) seen M1 for $3 \div 8 \quad (\times 100)$ oe or 0.375 (or 37.5) seen A1 for 0.4 and 0.375 (or 40 and 37.5)</p> <p>C1 (dep on M1) for correct conclusion for their working QWC: with 3 comparable decimals (or percentages): Decision and justification should be clear with working clearly presented and attributable.</p> <p>OR Compares Fractions with denominator other than 40</p> <p>M1 for attempt to convert all to fractions with a common denominator other than 40 M1 for at least 1 correct</p> <p>A1 for $\frac{80}{200}$ and $\frac{70}{200}$ and $\frac{75}{200}$ oe</p> <p>C1 (dep on M1) for correct conclusion for their working QWC with 3 comparable fractions: Decision and justification should be clear with working clearly presented and attributable.</p>

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Question	Working	Answer	Mark	Notes																					
18*	<p>(a)</p> <p>(b)</p>  <table border="1" data-bbox="436 774 846 858"> <thead> <tr> <th>Miles</th> <th>0</th> <th>10</th> <th>20</th> <th>30</th> <th>40</th> <th>50</th> </tr> </thead> <tbody> <tr> <td>Ed</td> <td>0</td> <td>15</td> <td>30</td> <td>45</td> <td>60</td> <td>75</td> </tr> <tr> <td>Bill</td> <td>10</td> <td>20</td> <td>30</td> <td>40</td> <td>50</td> <td>60</td> </tr> </tbody> </table>	Miles	0	10	20	30	40	50	Ed	0	15	30	45	60	75	Bill	10	20	30	40	50	60	<p>10</p> <p>Ed is cheaper up to 20 miles,</p> <p>Bill is cheaper for more than 20 miles</p>	<p>1</p> <p>3</p>	<p>B1 cao</p> <p>M1 for correct line for Ed intersecting at (20,30) ±1 sq tolerance or $10 + x = 1.5x$ oe</p> <p>C2 (dep on M1) for a correct full statement ft from graph eg. Ed cheaper up to 20 miles and Bill cheaper for more than 20 miles</p> <p>(C1 (dep on M1) for a correct conclusion ft from graph eg. cheaper at 10 miles with Ed ; eg. cheaper at 50 miles with Bill eg. same cost at 20 miles; eg. for £5 go further with Bill or A general statement covering short and long distances eg. Ed is cheaper for shorter distances and Bill is cheaper for long distances)</p> <p>OR (continued on next page)</p>
Miles	0	10	20	30	40	50																			
Ed	0	15	30	45	60	75																			
Bill	10	20	30	40	50	60																			

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Question	Working	Answer	Mark	Notes
18 (contd)				<p>OR</p> <p>M1 for correct method to work out Ed's delivery cost for at least 2 values of n miles where $0 < n \leq 50$ or for correct method to work out Ed and Bill's delivery cost for n miles where $0 < n \leq 50$</p> <p>C2 (dep on M1) for 20 miles linked with £30 for Ed and Bill with correct full statement eg. Ed cheaper up to 20 miles and Bill cheaper for more than 20 miles</p> <p>(C1 (dep on M1) for a correct conclusion eg. cheaper at 10 miles with Ed; eg. cheaper at 50 miles with Bill eg. same cost at 20 miles; eg. for £5 go further with Bill or A general statement covering short and long distances eg. Ed is cheaper for shorter distances and Bill is cheaper for long distances)</p> <p>SC: B1 for correct full statement seen with no working eg. Ed cheaper up to 20 miles and Bill cheaper for more than 20 miles</p> <p>QWC Decision and justification should be clear with working clearly presented and attributable</p>

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Question	Working	Answer	Mark	Notes
19	$1.96 \times 2.25 = 4.41$ OR $4.23 \div 9 = 0.47$ $1.96 \div 4 = 0.49$ OR $4.23 \times 4 = 16.92$ $1.96 \times 9 = 17.64$ OR $4.23 \div 9 = 0.47$ $0.47 \times 4 = 1.88$ OR $1.96 \div 4 = 0.49$ $0.49 \times 9 = 4.41$ OR $9 \div 4.23 = 2.12$ $4 \div 1.96 = 2.04$	Pack of 9	3	M2 for a fully correct method to enable a conclusion eg $1.96 \times 2\frac{1}{4}$ OR M1 for $4.23 \div 9$ or $423 \div 9$ or 0.47 seen or 47 seen M1 for $1.96 \div 4$ or $196 \div 4$ or 0.49 seen or 49 seen OR M1 for 4.23×4 or 423×4 or 16.92 seen or 1692 seen M1 for 1.96×9 or 196×9 or 17.64 seen or 1764 seen OR M1 for $4.23 \div 9$ or $423 \div 9$ or 0.47 seen or 47 seen M1 for 0.47×4 or 47×4 or 1.88 seen or 188 seen OR M1 for $1.96 \div 4$ or $196 \div 4$ or 0.49 seen or 49 seen M1 for 0.49×9 or 49×9 or 4.41 seen or 441 seen OR M1 for $9 \div 4.23$ or 2.12(...) seen or 2.13 seen M1 for $4 \div 1.96$ or 2.04(...) seen A1 for Pack of 9 and fully correct calculations NOTE: B0 for an answer of 9 not supported by working.
20	(a)	6	1	B1 cao
	(b)	44	1	B1 cao
	(c)	31	2	M1 for 60 – 29 or 29 – 60 or any correct method that is attempting to find the difference between 29 and 60 (allow 1 arithmetic error) A1 cao

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Question	Working	Answer	Mark	Notes
21*	<p>Angle $DBC = (180 - 50) \div 2$ Base <u>angles</u> of <u>isosceles</u> triangle are <u>equal</u> Angle $ABD = 180 - 65$ <u>Angles</u> on a straight <u>line</u> add up to <u>180</u> $x = 180 - 20 - 115$ <u>Angles</u> in a <u>triangle</u> add up to <u>180</u></p> <p>OR Angle $DBC = (180 - 50) \div 2$ Base <u>angles</u> of <u>isosceles</u> triangle are <u>equal</u> $x = 65 - 20$ <u>Exterior</u> angle of triangle is <u>equal</u> to sum of <u>interior opposite</u> angles</p> <p>OR Angle $DCB = (180 - 50) \div 2$ Base <u>angles</u> of <u>isosceles</u> triangle are <u>equal</u> $x = 180 - 50 - 20 - 65$ <u>Angles</u> in a <u>triangle</u> add up to <u>180</u></p>	45 with reasons	4	<p>M1 for $(180 - 50) \div 2$ oe or 65 seen</p> <p>M1 for $180 - 20 - (180 - "65")$ or $"65" - 20$ or $180 - 50 - 20 - '65'$ oe</p> <p>C2 for x identified as 45 with full reasons</p> <p>QWC: Reasons clearly laid out with correct geometrical language used</p> <p>(C1 (dep on M1) for one reason QWC: Reasons clearly laid out with correct geometrical language used)</p> <p>NOTE: $x = 45$ with no working or without any correct angles marked on the diagram cannot score.</p>

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Question	Working	Answer	Mark	Notes	
22	(a)	$360 \div 60 = 6$ $300 \div 60 = 5$ $6 \times 5 =$	Yes and 30	3	<p>M1 for dividing side of patio by side of paving slab eg $360 \div 60$ or $300 \div 60$ or $3.6 \div 0.6$ or $3 \div 0.6$ or 6 and 5 seen or 6 divisions seen on length of diagram or 5 divisions seen on width of diagram</p> <p>M1 for correct method to find number of paving slabs eg $(360 \div 60) \times (300 \div 60)$ oe or 6×5 or 30 squares seen on diagram (units may not be consistent)</p> <p>A1 for Yes and 30 (or 2 extra) with correct calculations</p> <p>OR</p> <p>M1 for correct method to find area of patio or paving slab eg 360×300 or 108000 seen or 60×60 or 3600 seen or 3.6×3 or 10.8 seen or 0.6×0.6 or 0.36 seen</p> <p>M1 for dividing area of patio by area of a paving slab eg. $(3.6 \times 3) \div (0.6 \times 0.6)$ oe (units may not be consistent)</p> <p>A1 for Yes and 30 (or 2 extra) with correct calculations</p> <p>OR</p> <p>M1 for method to find area of patio and area of 32 slabs eg. $60 \times 60 \times 32$ or 360×300</p> <p>M1 for method to find both areas eg. $60 \times 60 \times 32$ and 360×300 (units may not be consistent)</p> <p>A1 for Yes and 115200 and 108000 OR Yes and 11.52 and 10.8</p> <p>NB : Throughout the question, candidates could be working in metres or centimetres</p>

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Question	Working	Answer	Mark	Notes													
22	(b)	$\begin{array}{r} 1726 \\ 25890 \\ \hline 27616 \end{array}$ <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td>800</td> <td>60</td> <td>3</td> </tr> <tr> <td>30</td> <td>24000</td> <td>1800</td> <td>90</td> </tr> <tr> <td>2</td> <td>1600</td> <td>120</td> <td>6</td> </tr> </table> $\begin{aligned} &24000 + 1800 + 90 \\ &+ 1600 + 120 + 6 \\ &= 27616 \end{aligned}$		800	60	3	30	24000	1800	90	2	1600	120	6	276.16	3	<p>M1 for complete correct method with relative place value correct. Condone 1 multiplication error, addition not necessary.</p> <p>OR</p> <p>M1 for a complete grid. Condone 1 multiplication error, addition not necessary.</p> <p>OR</p> <p>M1 for sight of a complete partitioning method, condone 1 multiplication error. Final addition not necessary.</p> <p>A1 for digits 27616</p> <p>A1 ft (dep on M1) for correct placement of decimal point after addition (of appropriate values)</p> <p>(SC: B1 for attempting to add 32 lots of 8.63)</p>
	800	60	3														
30	24000	1800	90														
2	1600	120	6														
23	(a)		30	2	<p>M1 for $25 \div 10$ or 2.5 seen or $10 \div 25$ or 0.4 seen or $12+12+6$ oe or a complete method eg. $25 \times 12 \div 10$ oe</p> <p>A1 cao</p>												
	(b)	$1000 \div 200 \times 12$	60	2	<p>M1 for $500 \div 50$ or $1000 \div 200$ or $500 \div 10$ or correct scale factor clearly linked with one ingredient eg 10 with sugar or 5 with butter or flour or 50 with milk or an answer of 120 or 600</p> <p>A1 cao</p>												

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Question	Working	Answer	Mark	Notes
24	<p>Acton after 24, 48, 72, 96, .. Barton after 20, 40, 60, 80, .. LCM of 20 and 24 is 120 9:00 am + 120 minutes</p> <p>OR Acton after 24, 48, 1h 12 min... Barton after 20, 40, 1 h LCM is 2 hours 9:00 am + 2 hours</p> <p>OR Times from 9:00 am when each service leaves the bus station Acton at 9:24, 9:48, 10:12.. Barton at 9:20, 9:40, 10:00..</p> <p>OR $20 = 2 \times 2 \times 5$ $24 = 2 \times 2 \times 2 \times 3$ $2 \times 2 \times 2 \times 3 \times 5 = 120$</p>	11:00 am	3	<p>M1 for listing multiples of 20 and 24 with at least 3 numbers in each list ; multiples could be given in minutes or in hours and minutes (condone one addition error in total in first 3 numbers in lists) A1 identify 120 (mins) or 2 (hours) as LCM A1 for 11:00 (am) or 11(am) or 11 o'clock</p> <p>OR M1 for listing times after 9am when each bus leaves the bus station, with at least 3 times in each list (condone one addition error in total in first 3 times after 9am in lists) A1 for correct times in each list up to and including 11:00 A1 for 11:00 (am) or 11(am) or 11 o'clock</p> <p>OR M1 for correct method to write 20 and 24 in terms of their prime factors 2, 2, 5 and 2, 2, 2, 3 (condone one error) A1 identify 120 as LCM A1 for 11:00 (am) or 11(am) or 11 o'clock</p>

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Question	Working	Answer	Mark	Notes
25	(a)	$6y - 15$	1	B1 cao
	(b)	$4x(2x + y)$	2	B2 cao (B1 for $x(8x + 4y)$ or $2x(4x + 2y)$ or $4(2x^2 + xy)$ or $4x(ax + by)$ where a, b are positive integers or $ax(2x + y)$ where a is a positive integer or $4x(2x \square y)$)
	(c)	$10t = gh$ $h = \frac{10t}{g}$	2	M1 for clear intention to multiply both sides of the equation by 10 (eg. $\times 10$ seen on both sides of equation) or clear intention to divide both sides of the equation by g (eg. $\div g$ seen on both sides of equation) or $10t = gh$ or $\frac{t}{g} = \frac{h}{10}$ or fully correct reverse flow diagram eg. $\leftarrow \times 10 \leftarrow \div g \leftarrow$ A1 for $\frac{10t}{g}$ oe

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Question	Working	Answer	Mark	Notes
26	(a) $2 \times 5 \times 2 = 20$ $300 \div 20 =$	15	3	M2 for $300 \div (2 \times 5 \times 2)$ oe (M1 for $2 \times 5 \times 2$ or 20 seen or $300 \div (2 \times 5)$ or 30 seen A1 cao
	(b) $c = \frac{30 \times 40}{150} =$	8	2	M1 for $\frac{30 \times 40}{150}$ or 1200 seen A1 cao
27	$3x - 15 = 2x + 24$ $x = 39$ OR $2x + 3x - 15 + 2x + 2x + 24 = 360$ $9x + 9 = 360$ $9x = 351$ $x = 39$ OR $2x + 2x + 24 = 180$ $4x + 24 = 180$ $4x = 156$ $x = 39$ OR $2x + 3x - 15 = 180$ $5x - 15 = 180$ $5x = 195$ $x = 39$	39	3	M1 for forming an appropriate equation eg $3x - 15 = 2x + 24$ or $2x + 3x - 15 + 2x + 2x + 24 = 360$ oe or $2x + 2x + 24 = 180$ oe or $2x + 3x - 15 = 180$ oe or $2x + 3x - 15 = 2x + 2x + 24$ M1 (dep) for correct operation(s) to isolate x and non- x terms in an equation to get $ax = b$ A1 cao OR M2 for $\frac{351}{9}$ or $\frac{195}{5}$ or $\frac{156}{4}$ oe A1 cao

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