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Mark Scheme (Results)

Summer 2012

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

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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.

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If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.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

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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)		Type of film Tally Frequency	2	B2 for a **table** with all 3 aspects: Column/row heading 'type of film' **or** list of at least 3 film types Column/row heading 'tally' or tally marks (or key) Column/row heading 'frequency' or totals oe (B1 for a table with 2 of the 3 aspects)
	(b)			1	B1 for acceptable reason eg. all same age, sample too small, biased, same school

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

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Question		**Working**	**Answer**	**Mark**	**Notes**
	(b)	1726 25890 27616 **8 6 3** **2** 2 4 | 1 8 | 9 **3** **7** 1 6 | 1 2 | 6 **2** 6 1 6 | | 800 | 60 | 3 | | 30 | 24000 | 1800 | 90 | | 2 | 1600 | 120 | 6 | 24000+1800+90+1600+120+6 = 27616	276.16	3	M1 for complete correct method with relative place value correct. Condone 1 multiplication error, addition not necessary. **OR** M1 for a complete grid. Condone 1 multiplication error, addition not necessary. **OR** M1 for sight of a complete partitioning method, condone 1 multiplication error. Final addition not necessary. A1 for digits 27616 A1 ft (dep on M1) for correct placement of decimal point after addition (of appropriate values) (SC: B1 for attempting to add 32 lots of 8.63)

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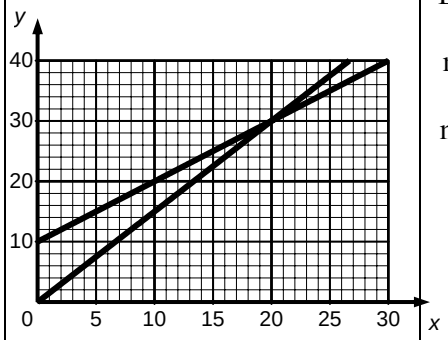
Question		**Working**	**Answer**	**Mark**	**Notes**
3	(a)		10	1	B1 cao
	(b)		Ed is cheaper up to 20 miles, Bill is cheaper for more than 20 miles	3	M1 for correct line for Ed intersecting at (20,30) ±1 sq tolerance **or** $10 + x = 1.5x$ oe C2 (dep on M1) for a correct full statement ft from graph eg. Ed cheaper up to 20 miles **and** Bill cheaper for more than 20 miles (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) **OR** 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 $0 < n \leq 50$ 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 (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) 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 QWC: Decision and justification should be clear with working clearly presented and attributable

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**
4		2| 9 3| 1 3 5 6 9 4| 2 3 3 4 6 8 9 5| 2 4 5 **OR** 20 | 9 30 | 1 3 5 6 9 40 | 2 3 3 4 6 8 9 50 | 2 4 5	2| 9 3| 1 3 5 6 9 4| 2 3 3 4 6 8 9 5| 2 4 5 Key: 2| 9 = 29	3	B3 for fully correct diagram with appropriate key (B2 for ordered leaves, with at most two errors or omissions **and** a key **OR** correct unordered leaves **and** a key **OR** correct ordered leaves) (B1 for unordered or ordered leaves, with at most two errors or omissions **OR** key) NB : Order of stem may be reversed; condone commas between leaves
5		$c = \frac{30 \times 40}{150}$	8	2	M1 for $\frac{30 \times 40}{150}$ **or** 1200 seen A1 cao
6	(a)		30	2	M1 for 25 ÷ 10 or 2.5 seen or 10 ÷ 25 or 0.4 seen or 12 + 12 + 6 oe or a complete method eg. 25 × 12 ÷ 10 oe A1 cao
	(b)	*1000 ÷ 200 × 12*	60	2	M1 for 500÷50 or 1000÷200 or 500÷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 answer of 120 or 600 A1 cao

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Question		**Working**	**Answer**	**Mark**	**Notes**
7		Acton after 24, 48, 72, 96, 120 Barton after 20, 40, 60, 80, 100, 120 LCM of 20 and 24 is 120 9:00 am + 120 minutes **OR** Acton after 24, 48, 1h 12 m, 1h 36m, 2h Barton after 20, 40, 1 h, 1h 20m, 1h 40m, 2h LCM is 2 hours 9:00 am + 2 hours **OR** Times from 9:00 am when each bus leaves the bus station Acton at 9:24, 9:48, 10:12, 10:36, 11:00 Barton at 9:20, 9:40, 10:00, 10:20, 10:40, 11:00 **OR** $20 = 2 \times 2 \times 5$ $24 = 2 \times 2 \times 2 \times 3$ $2 \times 2 \times 2 \times 3 \times 5 = 120$	11:00 am	3	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 **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 **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

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Question		**Working**	**Answer**	**Mark**	**Notes**
8	(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** $4x(2x - y)$)
	(c)	$10t = gh$ $h = \frac{10t}{g}$	$\frac{10t}{g}$	2	M1 for clear intention to multiply both sides of the equation by 10 (eg. ×10 seen on both sides of equation) **or** clear intention to divide both sides of the equation by g (eg. ÷g seen on both sides of equation) **or** $10t = gh$ **or** $\frac{t}{g} = \frac{h}{10}$ **or** fully correct reverse flow diagram eg. ← ×10 ← ÷g ← A1 for $\frac{10t}{g}$ oe

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Question		**Working**	**Answer**	**Mark**	**Notes**
9			Rotation 180° Centre (3, 3) **or** Enlargement Scale factor -1 Centre (3, 3)	3	B1 for rotation B1 for 180° B1 for (3, 3) **OR** B1 for enlargement B1 for scale factor -1 B1 for (3, 3) B0 for a combination of transformations

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Question		**Working**	**Answer**	**Mark**	**Notes**
10		2.25 × 60 ÷ 100 = 1.35 1.35 + 0.80 = 2.15 1.5 × 60 ÷ 100 = 0.90 0.90 + 1.90 = 2.80 **OR**	Railtickets with correct calculations	4	NB. All work may be done in pence throughout M1 for correct method to find credit card charge for one company eg. 0.0225 × 60(=1.35) oe **or** 0.015 × 60 (=0.9) oe M1 (dep) for correct method to find total additional charge or total price for one company eg. 0.0225×60 + 0.80 **or** 0.015×60 + 1.90 **or** 2.15 **or** 2.8(0) **or** 62.15 **or** 62.8(0) A1 for 2.15 **and** 2.8(0) **or** 62.15 **and** 62.8(0) C1 (dep on M1) for a statement deducing the cheapest company, but figures used for the comparison must also be stated somewhere, and a clear association with the name of each company **OR** M1 for correct method to find percentage of (60+booking fee) eg. 0.0225 × 60.8(=1.368) oe **or** 0.015 × 61.9(=0.9285) M1 (dep) for correct method to find total cost or total additional cost eg. '1.368' + 60.8(=62.168) **or** '1.368' + 0.8 (=2.168) **or** '0.9285' + 61.9 (=62.8285) **or** '0.9285' +1.9 (=2.8285) A1 for 62.168 **or** 62.17 **AND** 62.8285 **or** 62.83 **OR** 2.168 **or** 2.17 **AND** 2.8285 **or** 2.83 C1 (dep on M1) for a statement deducing the cheapest company, but figures used for the comparison must also be stated somewhere, and a clear association with the name of each company **OR**

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1MA0_1H					
Question		**Working**	**Answer**	**Mark**	**Notes**
		2.25 – 1.5 = 0.75 0.075 × 60 ÷ 100 = 0.45 0.80 + 0.45 = 1.25 1.25 < 1.90			M1 for correct method to find difference in cost of credit card charge eg. (2.25 – 1.5) × 60 ÷ 100 oe **or** 0.45 seen M1 (dep) for using difference with booking fee or finding difference between booking fees eg. 0.80 + "0.45"(=1.25) **or** 1.90 – "0.45" (=1.45) **or** 1.90 – 0.8 (=1.1(0)) A1 1.25 **and** 1.9(0) **or** 0.45 **and** 1.1(0) C1 (dep on M1) for a statement deducing the cheapest company, but figures used for the comparison must also be stated somewhere, and a clear association with the name of each company QWC: Decision and justification should be clear with working clearly presented and attributable

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Question		**Working**	**Answer**	**Mark**	**Notes**
11		$3x–15 = 2x+24$ $x = 39$ **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** $2x + 3x – 15 + 2x + 2x + 24 = 360$ **OR** $2x + 2x + 24 = 180$ **OR** $2x + 3x –15 = 180$ **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 to $ax = b$ A1 cao **OR** M2 for $\frac{351}{9}$ oe **or** $\frac{195}{5}$ oe **or** $\frac{156}{4}$ oe A1 cao

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Question		**Working**	**Answer**	**Mark**	**Notes**
12		$6 \times 10 \times 8 = 480$ $480 \div (6 \times 20) =$	4	3	M1 for $6 \times 10 \times 8$ **or** 480 seen M1 (dep) for '480' $\div (6 \times 20)$ oe A1 cao **OR** M1 for $20 \div 10$ (=2) **or** $10 \div 20$ $(=\frac{1}{2})$ **or** $\frac{8}{20}$ oe **or** $\frac{20}{8}$ oe M1 (dep) for $8 \div$ '2' **or** $8 \times \frac{1}{2}$ **or** $\frac{8}{20} \times 10$ oe **or** $10 \div \frac{20}{8}$ A1 cao SC : B2 for answer of 16 coming from $\frac{20 \times 8 \times 6}{10 \times 6}$ oe

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Question		**Working**	**Answer**	**Mark**	**Notes**
13		180 – (360 ÷ 6) = 120 180 – (360 ÷ 8) = 135 360 – 120 – 135 = **OR** 360 ÷ 6 = 60 360 ÷ 8 = 45 60 + 45 =	105	4	NB. Do remember to look at the diagram when marking this question. Looking at the complete method should confirm if interior or exterior angles are being calculated M1 for a correct method to work out the **interior** angle of a regular hexagon eg. 180 – (360 ÷ 6) oe **or** (6 - 2)×180 ÷ 6 oe **or** 120 as **interior** angle of the hexagon M1 for a correct method to work out the **interior** angle of a regular octagon 180 – (360 ÷ 8) oe **or** (8 - 2)×180 ÷ 8 oe **or** 135 as **interior** angle of the octagon M1 (dep on at least M1) for a complete method eg. 360 – "120" – "135" A1 cao **OR** M1 for a correct method to work out an **exterior** angle of a regular hexagon eg. 360 ÷ 6 **or** 60 as **exterior** angle of the hexagon M1 for a correct method to work out an **exterior** angle of a regular hexagon 360 ÷ 8 **or** 45 as **exterior** angle of the octagon M1 (dep on at least M1) for a complete method eg. "60" + "45" A1 cao SC : B1 for answer of 255

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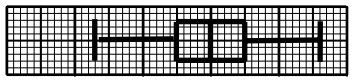
Question		**Working**	**Answer**	**Mark**	**Notes**
14	(a)		35	1	B1 for 34 – 36
	(b)		110	1	B1 for 108 – 112
	(c)		Position of *B* marked	2	B1 for a point marked on a bearing of 40° (±2°) from *H* **or** for a line on a bearing of 40° (±2°) (use straight line guidelines on overlay) B1 for a point 4 cm (± 0.2cm) from *H* **or** for a line of length 4 cm (± 0.2cm) from *H* (use circular guidelines on overlay) NB. No label needed for point
15	(a)		170	1	B1 accept answers in range 170 - 170.5 inclusive
	(b)			3	B3 for box plot with all 3 aspects correct (overlay) aspect 1 : ends of whiskers at 153 and 186 aspect 2 : ends of box at 165 and 175 aspect 3 : median marked at 170 **or** ft (a) provided 165<(*a*)<175 (B2 for box plot with two aspects correct) (B1 for one aspect **or** correct quartiles and median identified) SC : B2 for all 5 values (153, 165, '170', 175, 186) plotted
	(c)		Two correct comparisons	2	B1 ft from (b) for a correct **comparison** of range **or** inter-quartile range eg. the range / iqr is smaller for group B than group A B1 ft from (b) for a correct **comparison** of median **or** upper quartile **or** lower quartile **or** minimum **or** maximum eg. the median in group A is greater than the median in group B

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Question		**Working**	**Answer**	**Mark**	**Notes**
16	(a)		m^{-10}	1	B1 for m^{-10} or $\frac{1}{m^{10}}$
	(b)		$(x + 5)(x – 2)$	2	M1 for $(x \pm 5)(x \pm 2)$ **or** $x(x – 2) + 5(x – 2)$ **or** $x(x + 5) – 2(x + 5)$ A1
17	(a)		1	1	B1 cao
	(b)		0.000067	1	B1 cao
	(c)		2.7×10^{14}	2	M1 for $27 \times 10^{7+6}$ **or** 27×10^{13} oe **or** an answer of 2.7×10^{n} where n is an integer **or** an answer of $a \times 10^{14}$ where $1 \leq a < 10$ A1 cao

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Question		**Working**	**Answer**	**Mark**	**Notes**
18		$\frac{1}{2} \times 4 \times 3 = 6$ $\left(\frac{1}{2}\right)^2 \times 6 =$	1.5	3	M1 for $\frac{1}{2} \times 4 \times 3$ oe M1 for $\left(\frac{1}{2}\right)^2 \times$ "6" A1 cao **OR** M2 for $\frac{1}{2} \times 2 \times 1.5$ oe (M1 for triangle with all lengths $\frac{1}{2}$ corresponding lengths of triangle *ABC* seen in any position **or** vertices seen at (1, 1) (3,1) and (2.5, 2.5) or stated) A1 cao
19	(a)		0.6 0.7, 0.3, 0.7	2	B1 for 0.6 in correct position on tree diagram B1 for 0.7, 0.3, 0.7 in correct positions on tree diagram
	(b)	$0.4 \times 0.3 =$	0.12	2	M1 for 0.4×0.3 oe **or** a complete alternative method ft from tree diagram A1 for 0.12 oe

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Question		**Working**	**Answer**	**Mark**	**Notes**
20		$15x + 6y = 33$ $8x - 6y = 36$ $23x = 69$ $5\times 3 + 2y = 11$ **OR** $x = \frac{11-2y}{5}$ $4\times\left(\frac{11-2y}{5}\right) - 3y = 18$ $44 - 8y - 15y = 90$ $-46 = 23y$ $y = -2$	$x = 3$ $y = -2$	4	M1 for coefficients of x or y the same followed by correct operation (condone one arithmetic error) A1 cao for first solution M1 (dep on M1) for correct substitution of found value into one of the equations or appropriate method after starting again (condone one arithmetic error) A1 cao for second solution **OR** M1 for full method to rearrange and substitute to eliminate x or y, (condone one arithmetical error) A1 cao for first solution M1 (dep on M1) for correct substitution of found value into one of the equations or appropriate method after starting again (condone one arithmetic error) A1 cao for second solution Trial and improvement 0 marks unless both x and y correct values found

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1MA0_1H					
Question		**Working**	**Answer**	**Mark**	**Notes**
21*		*ABO* = *ADO* = 90° (Angle between tangent and radius is 90°) *DOB* = 360 – 90 – 90 – 50 (Angles in a quadrilateral add up to 360°) *BCD* = 130 ÷ 2 (Angle at centre is twice angle at circumference) **OR** *ABD* = (180 – 50) ÷ 2 (Base angles of an isosceles triangle) *BCD* = 65 (Alternate segment theorem)	65°	4	B1 for *ABO* = 90 **or** *ADO* = 90 (may be on diagram) B1 for *BCD* = 65 (may be on diagram) C2 for *BCD* = 65° stated **or** *DCB* = 65° stated **or** angle C = 65° stated **with** all reasons: angle between tangent and radius is 90°; angles in a quadrilateral sum to 360°; angle at centre is twice angle at circumference (accept angle at circumference is half (or $\frac{1}{2}$) the angle at the centre) (C1 for one correct and appropriate circle theorem reason) QWC: Working clearly laid out and reasons given using correct language **OR** B1 for *ABD* = 65 or *ADB* = 65 (may be on diagram) B1 for *BCD* = 65 (may be on diagram) C2 for *BCD* = 65° stated **or** *DCB* = 65° stated **or** angle C = 65° stated **with** all reasons: base angles of an isosceles triangle are equal; angles in a triangle sum to 180°; tangents from an external point are equal; alternate segment theorem (C1 for one correct and appropriate circle theorem reason) QWC: Working clearly laid out and reasons given using correct language

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1MA0_1H					
Question		**Working**	**Answer**	**Mark**	**Notes**
22	(a)	<table><tr><td>F</td><td>15</td><td>25</td><td>36</td><td>24</td></tr><tr><td>Fd</td><td>3</td><td>5</td><td>3.6</td><td>1.2</td></tr></table>	Correct histogram	3	B3 for fully correct histogram (overlay) (B2 for 3 correct blocks) (B1 for 2 correct blocks of different widths) SC : B1 for correct key, eg. 1 cm^2 = 5 (cars) **or** correct values for (freq ÷ class interval) for at least 3 frequencies (3, 5, 3.6, 1.2) NB: The overlay shows one possible histogram, there are other correct solutions.
	(b)	$\frac{3}{4} \times 24$	18	2	M1 for $\frac{3}{4} \times 24$ (=18) oe **or** $\frac{1}{4} \times 24$ (=6) oe A1 cao **OR** M1 ft histogram for 15 × “1.2” **or** 5 × "1.2" A1 ft

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1MA0_1H					
Question		**Working**	**Answer**	**Mark**	**Notes**
23	(a)	$\frac{(x+4)(x-1)}{(2x-3)(x-1)}$	$\frac{x+4}{2x-3}$	3	M1 for $(x + 4)(x - 1)$ M1 for $(2x - 3)(x - 1)$ A1 cao
	(b)	$\frac{4(x-2)}{(x+2)(x-2)}+\frac{3(x+2)}{(x+2)(x-2)}$	$\frac{7x-2}{(x+2)(x-2)}$	3	M1 for denominator $(x + 2)(x - 2)$ oe **or** $x^2 - 4$ M1 for $\frac{4(x-2)}{(x+2)(x-2)}$ oe **or** $\frac{3(x+2)}{(x+2)(x-2)}$ oe (NB. The denominator must be $(x + 2)(x - 2)$ **or** $x^2 - 4$ **or** another suitable common denominator) A1 for $\frac{7x-2}{(x+2)(x-2)}$ **or** $\frac{7x-2}{x^2-4}$ SC: If no marks awarded then award B1 for $\frac{4(x-2)}{x^2-2}+\frac{3(x+2)}{x^2-2}$ oe

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1MA0_1H					
Question		**Working**	**Answer**	**Mark**	**Notes**
24		eg. $x = 0.28181...$ $100x = 28.181...$ $99x = 27.9$	$\frac{31}{110}$	3	M1 for 0.28181(...) **or** 0.2 + 0.08181(...) **or** evidence of correct recurring decimal eg. 281.81(...) M1 for two correct recurring decimals that, when subtracted, would result in a terminating decimal, and attempting the subtraction eg. $100x = 28.1818\ldots$, $x = 0.28181\ldots$ and subtracting eg. $1000x = 281.8181\ldots$, $10x = 2.8181\ldots$ and subtracting **OR** $\frac{27.9}{99}$ **or** $\frac{279}{990}$ oe A1 cao
25		Vol cylinder $= \pi \times (2x)^2 \times 9x$ $= 36\pi x^3$ $36\pi x^3 = \frac{4}{3}\pi r^3$ $r^3 = 27x^3$	$3x$	3	M1 for sub. into $\pi r^2 h$ eg. $\pi \times (2x)^2 \times 9x$ oe M1 for $\pi \times (2x)^2 \times 9x = \frac{4}{3}\pi r^3$ oe A1 oe eg. $\sqrt[3]{\frac{36x^3}{\frac{4}{3}}}$ NB : For both method marks condone missing brackets around the $2x$

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Question		**Working**	**Answer**	**Mark**	**Notes**
26	(a)		Parabola through (4, –1), (2, 3), (6, 3) (3, 0) (5, 0)	2	B2 for a parabola with min (4, –1), through (2, 3), (6, 3),(3, 0), (5, 0) (B1 for a parabola with min (4, –1) **or** a parabola through (2, 3) and (6, 3) **or** a parabola through (3, 0) and (5, 0) **or** a translation of the given parabola along the *x*-axis by any value other than +3 **with** the points (–1, 3) (0, 0) (1, –1) (2, 0) (3, 3) all translated by the same amount)
	(b)		Parabola through (1, –2), (0, 0), (2, 0)	2	B2 parabola with min (1, –2), through (0, 0) and (2, 0) (B1 parabola with min (1, –2) **or** parabola through (0, 0), (2, 0) (-1, 6) and (3, 6))

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