Mark Scheme (Results)

Summer 2025

Pearson Edexcel GCSE
In Mathematics (1MA1)
Higher (Non-Calculator) Paper 3H

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General marking guidance

These notes offer general guidance, but the specific notes for examiners appertaining to individual questions take precedence.

1 All candidates must receive the same treatment. Examiners must mark the last candidate in exactly the same way as they mark the first.

Where some judgement is required, mark schemes will provide the principles by which marks will be awarded; exemplification/indicative content will not be exhaustive. When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the response should be sent to review.

2 All the marks on the mark scheme are designed to be awarded; mark schemes should be applied positively. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme. If there is a wrong answer (or no 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.

Questions where working is not required: In general, the correct answer should be given full marks.
Questions that specifically require working: In general, candidates who do not show working on this type of question will get no marks – full details will be given in the mark scheme for each individual question.

3 Crossed out work

This should be marked **unless** the candidate has replaced it with an alternative response.

4 Choice of method

If there is a choice of methods shown, mark the method that leads to the answer given on the answer line.

If no answer appears on the answer line, mark both methods **then award the lower number of marks.**

5 Incorrect method

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 for your Team Leader to check.

6 Follow through marks

Follow through marks which involve a single stage calculation can be awarded without working as you can check the answer, 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.

7 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 or its context. (eg. an incorrectly cancelled fraction when the unsimplified fraction would gain full marks).

It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect (eg. incorrect algebraic simplification).

8 Probability

Probability answers must be given as a fraction, percentage or decimal. 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 fraction is given then cancelled incorrectly, ignore the incorrectly cancelled answer.

9 Linear equations

Unless indicated otherwise in the mark scheme, full marks can be gained if the solution alone is given on the answer line, or otherwise unambiguously identified 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 (embedded answers).

10 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 all numbers within the range.

11 Number in brackets after a calculation

Where there is a number in brackets after a calculation E.g. 2 × 6 (=12) then the mark can be awarded **either** for the correct method, implied by the calculation **or** for the correct answer to the calculation.

12 Use of inverted commas

Some numbers in the mark scheme will appear inside inverted commas E.g. "12" × 50 ; the number in inverted commas cannot be any number – it must come from a correct method or process but the candidate may make an arithmetic error in their working.

13 Word in square brackets

Where a word is used in square brackets E.g. [area] × 1.5 : the value used for [area] does **not** have to come from a correct method or process but is the value that the candidate believes is the area. If there are any constraints on the value that can be used, details will be given in the mark scheme.

14 Misread

If a candidate misreads a number from the question. Eg. uses 252 instead of 255; method or process marks may be awarded provided the question has not been simplified. Examiners should send any instance of a suspected misread to review.

Guidance on the use of abbreviations within this mark scheme	
M	method mark awarded for a correct method or partial method
P	process mark awarded for a correct process as part of a problem solving question
A	accuracy mark (awarded after a correct method or process; if no method or process is seen then full marks for the question are implied but see individual mark schemes for more details)
C	communication mark awarded for a fully correct statement(s) with no contradiction or ambiguity
B	unconditional accuracy mark (no method needed)
oe	or equivalent
cao	correct answer only
ft	follow through (when appropriate as per mark scheme)
sc	special case
dep	dependent (on a previous mark)
indep	independent
awrt	answer which rounds to
isw	ignore subsequent working

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
1	Points plotted at (5, 12) (15, 25) (25, 10) (35, 8) (45, 5) and joined with line segments	B2 (B1	for correct plotting of all 5 points at midpoints **and** joining with line segments for correct plotting of all 5 points at midpoints joined with a curve or missing / no line segments **or** for a frequency polygon with one point incorrect **or** for a frequency polygon with first and last point joined directly **or** for plotting of all 5 points at the correct heights consistent within intervals (including end points) **and** joining with line segments	Ignore any histogram drawn Ignore any part of the frequency polygon outside of the range of the first and last point plotted. for example, at 0, 10, 20, 30, 40 or at 10, 20, 30, 40, 50

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
2 (a)	Mistake identified	C1	for identifying the mistake **Acceptable examples** $p - 5$ should be multiplied by 3 $(-)5$ should be multiplied by 3 All of left side / everything should be multiplied by 3 He failed to multiply the 5 as well He should have / didn't put brackets around the $p - 5$ (The $3p - 5$) should be $3p - 15$ (The $- 5$) should be $- 15$ / (the 5) should be 15 (The answer should be) $m = 3p - 15$ / $m = 3(p - 5)$ He only times the p by 3 **Not acceptable examples** The first line should be $3p = m + 5$ He should have multiplied everything Ben didn't divide $p - 5$ by 3 He failed to multiply the $p - 5$ He failed to multiply the $(-)5$ He only times the p He should have multiplied by 3 first He only multiplied one side by 3 He needs to get rid of the fraction Should have used brackets Just circling the $3 \times p - 5$ and / or the $m = 3p - 5$ Needs to multiply the 5 by -3 He should have done $p - 5 \times 3$	

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
(b)	$2xy(x^2 + 2y)$	B2	for $2xy(x^2 + 2y)$ oe eg $2(x^2 + 2y)xy$	
		(B1	for $2x(x^2y + 2y^2)$ **or** $2y(x^3 + 2xy)$ **or** $xy(2x^2 + 4y)$	
			or for correctly identifying the HCF in the factorisation of the form $2xy(ax^2 \pm ...)$ **or** $2xy(... \pm by)$ where a and b are integers	... can be numerical or algebraic but not equal to 0 or absent
			or $(x^2 + 2y)$ as a factor eg $2x(x^2 + 2y)$	

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
3	60	P1	for process to find SP of 200 oranges or number of bags, eg 200 ÷ 5 (= 40) oe **or** for process to find the overall profit, eg 200 ÷ 5 – 25 (= 15) oe **or** for process to find CP of 1 orange, eg 25 ÷ 200 (= 0.125) oe **or** SP of 1 orange, eg 1 ÷ 5 (= 0.2) oe **or** for process to find CP of 5 oranges, eg 25 ÷ (200 ÷ 5) (= 0.625) oe **or** for process to find number of oranges bought per £, eg 200 ÷ 25 (= 8)	Working can be in either pounds or pence SP = Selling Price CP = Cost Price 1.6 implies P1
		P1	(dep) for start to a process to find percentage profit, eg $\frac{"40"-25}{25}$ (= 0.6) oe **or** $\frac{"15"}{25}$ (= 0.6) oe **or** $\frac{"40"}{25} \times 100$ (= 160) oe **or** $\frac{"0.2"-"0.125"}{"0.125"}$ (= 0.6) oe **or** $\frac{1}{"0.625"} \times 100$ (= 160) oe **or** $\frac{1-"0.625"}{"0.625"}$ (= 0.6) oe **or** $\frac{"8"-5}{5}$ (= 0.6) oe **or** $\frac{"8"}{5} \times 100$ (= 160) oe **or** $\frac{"8" \times "15"}{200}$ (= 0.6) oe	
		A1	cao	

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
4	New York (supported)	P1	for a conversion between kg and lbs, eg 2 × 2.2 (= 4.4) **or** 5 ÷ 2.2 (= 2.27...)	See page at end of mark scheme
		P1	for a conversion between pounds and US dollars, eg 3.75 × 1.2(0) (= 4.50) **or** 4.9(0) ÷ 1.2(0) (= 4.08...)	
		P1	for a process to find figures to compare, eg 3.75 ÷ "4.4" (= 0.85...) **and** "4.08…" ÷ 5 (= 0.81(6…)) **or** "4.50" ÷ 2 (= 2.25) **and** 4.9(0) ÷ "2.27..." (= 2.15(6...)) **or** "4.4" ÷ 3.75 (= 1.17…) **and** 5 ÷ "4.08" (= 1.22…) **or** 2 ÷ "4.5" (= 0.44…) **and** "2.27" ÷ 4.9(0) (= 0.46 …)	£ per lb US dollars per kg lbs per £ kg per US dollar Condone the incorrect assignment of units for all 3 P marks
		C1	for New York with correct comparable figures, eg 0.85… **and** 0.81(6…) **OR** 2.25 **and** 2.15(6...)	Final comparable values can be rounded or truncated, they just need to be accurate enough to allow a comparison.
5	23.75 and 23.85	B1	for 23.75 in the correct position	
		B1	for 23.85 in the correct position	Accept $23.84\dot{9}$ or 23.8499(9...)

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
6	630	M1	for converting time, eg 24 minutes = $\frac{24}{60}$ (= 0.4 (hours)) oe eg $\frac{2}{5}$ (hours) **or** 2 hours 24 minutes = 2 + $\frac{24}{60}$ (= 2.4 (hours)) oe eg $2\frac{2}{5}$ (hours) **or** 2 hours 24 minutes = 2 × 60 + 24 (= 144 (minutes)) oe **or** 2 hours 24 minutes = 2 × 60 × 60 + 24 × 60 (= 8640 (seconds)) oe **OR** for using distance ÷ time, eg 1512 ÷ [time] oe **or** [distance] ÷ [time] oe	10.5 or 0.175 imply M1 [distance] can be 1512 or the result of an attempt to convert 1512 km to a different unit, it must have the digits 1512 eg 151.2 or 1 512 000 [time] can be any value they believe to be the time the plane takes to fly
		M1	for a complete method using distance ÷ time, eg 1512 ÷ "2.4" **or** 1512 ÷ "$2\frac{2}{5}$" **or** 1512 ÷ "144" × 60 oe **or** 1512 ÷ "8640" × 60 × 60 oe	
		A1	cao	

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
7	(11, 14.5)	P1	for process to work with coordinates, eg 8 – 2 (= 6) **or** 12 – 7 (= 5) **or** eg (2 + 8) ÷ 2 (= 5) **or** (7 + 12) ÷ 2 (= 9.5)	Working may be seen on the diagram Allow alternative notation eg (6, 5) or (5, 6) or (5, 9.5) or (9.5, 5) Implied by $\frac{.....}{8-2}$ or $\frac{12-7}{.....}$ even if using $\frac{\text{diff in } x}{\text{diff in } y}$
		P1	for process to use proportion, eg "6" ÷ 2 (= 3) oe **or** "5" ÷ 2 (= 2.5) oe **or** 2 + "6" × 1.5 (= 11) **or** 2 + 9 (= 11) oe **or** 7 + "5" × 1.5 (= 14.5) **or** 7 + 7.5 (= 14.5) oe **or** "5" + "6" (= 11) **or** 8 + "5" – 2 (= 11) oe **or** "9.5" + "5" (= 14.5) **or** 12 + "9.5" – 7 (= 14.5) oe **or** (11, a) where $a \neq 14.5$ **or** (b, 14.5) where $b \neq 11$	Allow alternative notation eg (3, 2.5) or (2.5, 3) Implied by 8 + "3" (= 11) or 12 + "2.5" (= 14.5) Award P2 for (14.5, 11)
		A1	for (11, 14.5) oe	

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
8	44.9	P1	for process to find an expression for the area of the trapezium, eg ½(12 + *CD*) 8 or 8 × 12 + ½ × 8 × *x* **or** for process to find the area of the triangle, eg 112 – 8 × 12 (= 16)	*x* is the length of the line from *C* to where perpendicular from *B* meets *CD* Allow use of other letters in place of *CD* and *x* (do not have to be defined unless otherwise stated) Award P1 for 112 – 8 × 12 (= 16) even if not used
		P1	for forming an equation and isolating terms in the unknown length, eg 4*CD* = 112 – 48 **or** ½ × 8 × *x* = 112 – 8 × 12 **or** ½ × 8 × *x* = "16" **or** *CD* = 16 **or** *x* = 4	Award P2 for *CD* = 16 or *x* = 4 even if not used unless clearly from incorrect working eg 12 – 8 (= 4) Only award P2 for 16 if it is clearly identified as *CD*
		P1	for start of process to find length of *BC*, eg 8^2 + "4"^{2} (= 80) **or** 8^2 + [their *x*]^2 **or** $\tan^{-1}\left(\frac{"4"}{8}\right)$ (= 26.5…) oe **or** $\tan^{-1}\left(\frac{8}{"4"}\right)$ (= 63.4…) where "4" can be [their *x*]	[their *x*] can be any value less than 12 or clearly identified as the length of the line from *C* to where perpendicular from *B* meets *CD* (may be seen on the diagram)
		P1	for $\sqrt{8^2+"4"^2}$ or $\sqrt{64+"16"}$ or $\sqrt{80}$ or $4\sqrt{5}$ (= 8.9…) oe or $\sqrt{8^2+[\text{their } x]^2}$ **or** $\frac{"4"}{\sin"26.5..."}$ or $\frac{8}{\cos"26.5..."}$ or $\frac{8}{\sin"63.4..."}$ or $\frac{"4"}{\cos"63.4..."}$ where "4" can be [their *x*]	Award P4 for (*BC* =) $\sqrt{80}$ or $4\sqrt{5}$ or 8.9... unless *x* = 4 is clearly from incorrect working
		A1	for answer in the range 44.9 to 44.95	If an answer is shown in the range in working and then incorrectly rounded award full marks

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
9 (a)	5 730 000	B1	cao	
(b)	3.5×10^{-2}	B1	cao	
10	12.6	M1	for partial evaluation, eg $(4.777(294722))^2$ **or** $\sqrt[3]{5.969(47697)}$ **or** 22.822(54486) **or** 1.814(081699)	
		A1	for answer in the range 12.58 to 12.6	12.58077014 If an answer is shown in the range in working and then incorrectly rounded award full marks

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
11 (a)	2	M1	for a correct start, using one rule of indices, eg $3^n \times 3^{12} = 3^{14}$ or $3^n \times 3^{20} = 3^{22}$ or $3^{20} \div 3^8 = 3^{12}$ or $3^{14} \times 3^8 = 3^{22}$ or $\frac{3^{n+20}}{3^8} = 3^{14}$ or $3^{n-8} \times 3^{20} = 3^{14}$ **or** for forming an equation in n, eg $n + 20 - 8 = 14$ oe or (n =) $14 + 8 - 20$	
		A1	cao	Allow an answer of $3^n = 3^2$
			SCB1 for an answer of 3^2 if M0 scored	An answer of 9 or $3^n = 9$, $n \neq 2$ on its own is to be awarded 0 marks
(b)	$16m^8$	M1	for an intention to find the cube root and square, eg $\sqrt[3]{64m^{12}}^2$ or $\sqrt[3]{\left(64m^{12}\right)^2}$ or $\left(4m^4\right)^2$ or $\sqrt[3]{4096m^{24}}$ or for am^8 with $a \neq 16$ or $16m^b$ with $b \neq 8$	Do not condone missing brackets 16 or m^8 imply M1 Allow multiplication sign for M1
		A1	cao	Accept $a = 16$, $b = 8$

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
12 (a)	No with reason	C1	No with reason **Acceptable examples** It's 10% of the original price, not 10% of 440 He found the percentage of the new amount not the original amount He found 10% of the increased value The original price is £400 100% is £400 / 100% is not £440 / 110% is £440 10% is £40 / 10% is not £44 / 11% is £44 99% is 396 10% of 396 is 39.6(0) 110% of 396 is 435.6(0) He should have divided by 1.1 **Not acceptable examples** No, 440 minus 10% is not 396 100% is not £396 £440 is the price after the increase / The original price is not £440 He has to find 90% of 440 He has to find 110% of 440 It should be £484 Jim is correct / Yes ……..	

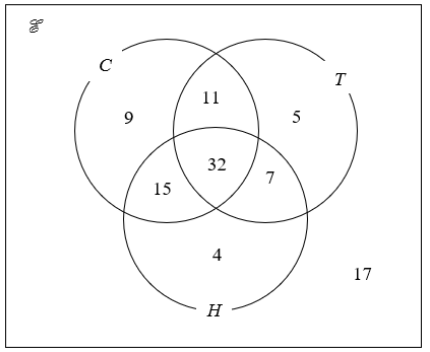
Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
(b)	160	P1	for process to find the number sold in November, eg 180 ÷ 150 × 100 or 180 ÷ 1.5 (= 120) oe or for 0.75 × 1.5 (= 1.125) oe or for 75 × 1.5 (= 112.5) oe	
		P1	for a process to find the number sold in October, eg "120" ÷ 75 × 100 oe eg "120" ÷ 0.75 or 180 ÷ "1.125" oe eg 180 ÷ "112.5" × 100 or [value] ÷ 0.75 oe	[value] can be any value they believe to be the number of bikes sold in November or 180
		A1	cao	
13	E C B H	B3	for a fully correct table	
		(B2	for 3 correct)	
		(B1	for 2 correct)	
14	23.3	M1	for a complete method eg $\frac{1}{2}\times 8.3\times 9.8\times \sin 35$	
		A1	for answer in range 23.3 to 23.33	If an answer is shown in the range in working and then incorrectly rounded award full marks

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
15	Shown	M1	for one correct product **eg** $\frac{7}{10}\times\frac{7}{10}\times\frac{7}{10}(=\frac{343}{1000})$ oe **or** $\frac{7}{10}\times\frac{7}{10}\times\frac{3}{10}(=\frac{147}{1000})$ oe **or** $\frac{3}{10}\times\frac{3}{10}\times\frac{3}{10}(=\frac{27}{1000})$ oe **or** $\frac{3}{10}\times\frac{3}{10}\times\frac{7}{10}(=\frac{63}{1000})$ oe **or** $\frac{7}{10}\times\frac{7}{10}(=\frac{49}{100})$ oe **or** $\frac{3}{10}\times\frac{3}{10}(=\frac{9}{100})$ oe	Throughout accept probabilities given as decimals or percentages Condone sampling without replacement for the first method mark only provided it is in the form $\frac{a}{10}\times\frac{b}{9}\times\frac{c}{8}$ where a, b, c are integers and $a < 10$ and $b < 9$ and $c < 8$ Condone any labelling, even if incorrect for the method marks ÷
		M1	for $\frac{7}{10}\times\frac{7}{10}\times\frac{7}{10}(=\frac{343}{1000})$ oe **and** $\frac{7}{10}\times\frac{7}{10}\times\frac{3}{10}(=\frac{147}{1000})$ oe or $\frac{3}{10}\times\frac{3}{10}\times\frac{3}{10}(=\frac{27}{1000})$ oe **and** $\frac{3}{10}\times\frac{3}{10}\times\frac{7}{10}(=\frac{63}{1000})$ oe or $\frac{7}{10}\times\frac{7}{10}(=\frac{49}{100})$ oe **and** $\frac{7}{10}\times\frac{7}{10}\times\frac{3}{10}(=\frac{147}{1000})$ oe or $\frac{3}{10}\times\frac{3}{10}(=\frac{9}{100})$ oe **and** $\frac{3}{10}\times\frac{3}{10}\times\frac{7}{10}(=\frac{63}{1000})$ oe	
		M1	for $\frac{7}{10}\times\frac{7}{10}\times\frac{7}{10}$ oe **and** $3\times\frac{7}{10}\times\frac{7}{10}\times\frac{3}{10}$ oe **or** $\frac{3}{10}\times\frac{3}{10}\times\frac{3}{10}$ oe **and** $3\times\frac{3}{10}\times\frac{3}{10}\times\frac{7}{10}$ oe **or** $\frac{7}{10}\times\frac{7}{10}$ oe **and** $2\times\frac{7}{10}\times\frac{7}{10}\times\frac{3}{10}$ oe **or** $\frac{3}{10}\times\frac{3}{10}$ oe **and** $2\times\frac{3}{10}\times\frac{3}{10}\times\frac{7}{10}$ oe	

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
		C1	for a complete method and chain of reasoning leading to $\frac{98}{125}$ eg $\frac{7}{10}\times\frac{7}{10}\times\frac{7}{10}+3\times\frac{7}{10}\times\frac{7}{10}\times\frac{3}{10}=\frac{98}{125}$ **or** $1-\frac{3}{10}\times\frac{3}{10}\times\frac{3}{10}-3\times\frac{3}{10}\times\frac{3}{10}\times\frac{7}{10}=\frac{98}{125}$ **or** $\frac{7}{10}\times\frac{7}{10}+2\times\frac{7}{10}\times\frac{7}{10}\times\frac{3}{10}=\frac{98}{125}$ **or** $1-\frac{3}{10}\times\frac{3}{10}-2\times\frac{3}{10}\times\frac{3}{10}\times\frac{7}{10}=\frac{98}{125}$	

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
16	15	P1	for process to find volume of cylinder or volume of cone, eg $\pi \times 8^2 \times \frac{h}{3}$ oe **or** $\frac{1}{3} \times \pi \times 8^2 \times h$ oe **or** $\pi \times 8^2 \times H$ oe **or** $\frac{1}{3} \times \pi \times 8^2 \times 3H$ oe **or** $\pi \times 8^2 \times \frac{x}{4}$ oe **or** $\frac{1}{3} \times \pi \times 8^2 \times \frac{3x}{4}$ oe	h = height of the cone H = height of the cylinder x = total height of the shape Allow any letter for h, H and x, does not have to be defined for the award of the marks The award of all marks requires the substitution of $r = 8$, allow this to be done at a later stage in the question
		P1	(dep P1) for setting up an equation in terms of one variable, eg $"\pi \times 8^2 \times \frac{h}{3}" + "\frac{1}{3} \times \pi \times 8^2 \times h" = 640\pi$ oe or $"\pi \times 8^2 \times H" + "\frac{1}{3} \times \pi \times 8^2 \times 3H" = 640\pi$ oe or $"\pi \times 8^2 \times \frac{x}{4}" + "\frac{1}{3} \times \pi \times 8^2 \times \frac{3x}{4}" = 640\pi$ oe or $"\pi \times 8^2 \times \frac{h}{3}" = 320\pi$ oe or $"\frac{1}{3} \times \pi \times 8^2 \times h" = 320\pi$ oe or $"\pi \times 8^2 \times H" = 320\pi$ oe or $"\frac{1}{3} \times \pi \times 8^2 \times 3H" = 320\pi$ oe or $"\pi \times 8^2 \times \frac{x}{4}" = 320\pi$ oe or $"\frac{1}{3} \times \pi \times 8^2 \times \frac{3x}{4}" = 320\pi$ oe	A correct equation implies the first P1 Allow inconsistent use of π within their equation provided the correct volumes are seen previously

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
		P1	(dep P2) for process to solve for h or H or x eg $(h=)\dfrac{640\pi}{"\frac{1}{3}\times\pi\times8^2"+"\frac{1}{3}\times\pi\times8^2"}$ oe eg $(h=)\dfrac{3\times640\pi}{"64\pi"+"64\pi"}$ or $(H=)\dfrac{640\pi}{"\pi\times8^2"+"\frac{1}{3}\times\pi\times8^2\times3"}(=5)$ oe eg $(h=)\dfrac{640\pi}{"64\pi"+"64\pi"}(=5)$ or $(x=)\dfrac{640\pi}{"\pi\times8^2\times\frac{1}{4}"+"\frac{1}{3}\times\pi\times8^2\times\frac{3}{4}"}(=20)$ oe eg $(x=)\dfrac{640\pi}{"32\pi"}(=20)$	Can be an equation in the form $ah = p$ or $bH = q$ or $cx = r$ where a or b or c is an integer
		A1	cao	Award 0 marks for a correct answer with no (or incorrect) supportive working
17	$-\frac{1}{7}$	M1	for using a common denominator eg $\dfrac{5x(3x+1)-2x(3x-1)}{(3x-1)(3x+1)}(=1)$ **or** for removing the fraction eg $5x(3x+1)-2x(3x-1)=(3x-1)(3x+1)$	Allow one error in total in all the expansions (may be a sign error)
		M1	for correct methods to remove all fraction(s) **and** expand the brackets, eg $15x^2+5x-6x^2+2x=9x^2+3x-3x-1$	
		A1	for $-\frac{1}{7}$ oe	Allow –0.14(2…) for $-\frac{1}{7}$

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
18 (a)	Venn diagram	C4	fully correct Venn diagram	Ignore all entries except the region you are marking for each C mark Repeated digits in the diagram should be counted as 2 elements 
		(C3	6 or 7 of the 8 regions correct)	
		(C2	4 or 5 of the 8 regions correct)	
		(C1	2 or 3 of the 8 regions correct)	
(b)	$\frac{47}{67}$	M1	for $\frac{47}{b}$ where $b > 47$ or ft $\frac{"47"}{b}$ where $b >$ "47" or $\frac{a}{67}$ where $0 < a < 67$ or ft $\frac{a}{"67"}$ where $0 < a <$ "67"	Need not be written in correct form at this stage eg could be a ratio 47 : 67 "47" = "15" + "32" "67" = "9" + "11" + "32" +"15"
		A1	for $\frac{47}{67}$ oe or ft $\frac{"47"}{"67"}$ oe	Accept any equivalent fraction, decimal form 0.70(14..) or percentage form 70(.14…)%

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
19	633	B1	for stating any correct bound, eg 10.35 or 10.45 or 103.5 or 104.5 or 0.165 or 0.175 or 0.0165 or 0.0175	Accept $10.44\dot{9}$ or 10.4499(9…) for 10.45 Accept $0.174\dot{9}$ or 0.17499(9…) for 0.175
		P1	for process to find the upper bound, eg [UB of height] ÷ [LB of thickness] or 104.5 ÷ 0.165 or 10.45 ÷ 0.0165 **or** eg [UB of height] ÷ [LB of thickness] × 10 or 10.45 ÷ 0.165 × 10	104 < [UB of height] ≤ 104.5 and 0.165 ≤ [LB of thickness] < 0.17 **or** 10.4 < [UB of height] ≤ 10.45 and 0.0165 ≤ [LB of thickness] < 0.017 **or** 10.4 < [UB of height] ≤ 10.45 and 0.165 ≤ [LB of thickness] < 0.17
		A1	(dep on all previous marks) for an answer of 633 or 633(.33…) clearly coming from working with correct values eg 104.5 ÷ 0.165 = 633	Condone 630 from a correct calculation If correct answer is seen and then incorrectly rounded award full marks Award 0 marks for a correct answer with no (or incorrect) supportive working

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
20	57	M1	for method to find angle *BCD* eg *BCD* = 180 – 80 (= 100)	Angles may be seen on diagram Method marks can be awarded in either order
		M1	for method to find angle *DOB* eg *DOB* = 80 × 2 (= 160)	Correct method can be implied from angles on the diagram if no ambiguity or contradiction. eg Angle *O* = 160 is too ambiguous accept angle *C* = 100
		A1	for *OBC* = 57	
		C1	(dep on M1) for one correct circle theorem appropriate to their method eg The angle at the centre of a circle is twice the angle at the circumference **or** The angle at the circumference of a circle is half the angle at the centre **or** Opposite angles of a cyclic quadrilateral add up to 180	Underlined words need to be shown; reasons need to be linked to their method. Accept "∠" for "angle" and "∠*s*" for "angles" Accept "4-sided shape" for "quadrilateral"

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
21	$x = -\frac{6}{7}, y = \frac{32}{7}$ $x = 2, y = -4$	M1	for substitution of a rearranged equation into a correct equation to form an equation in one variable. eg $3x^2 + 2(2 - 3x)^2 = 44$ **or** $3\left(\frac{2-y}{3}\right)^2 + 2y^2 = 44$	Allow $(\pm 2 \pm 3x)$ for $(2 - 3x)$ (or $\left(\frac{\pm 2 \pm y}{3}\right)$ for $\left(\frac{2-y}{3}\right)$) Implied by a correct equation (simplified or unsimplified) in terms of x or y eg $3x^2 + 2(4 - 12x + 9x^2) = 44$ or $3x^2 + 8 - 24x + 18x^2 = 44$ or $21x^2 - 24x = 36$
		M1	(dep on first M1) for multiplying out all brackets and collecting terms to form a simplified three term quadratic in any form of $ax^2 + bx + c$ (= 0) where at least 2 coefficients (a, b, c) are correct eg $21x^2 - 24x - 36$ (= 0) **or** $7x^2 - 8x - 12$ (= 0) **or** $7y^2 - 4y - 128$ (= 0)	Look out for signs reversed The quadratic does not have to equal 0, ie accept $21x^2 - 24x = 36$
		M1	(dep on first M1) for a suitable method to solve **their** 3 term quadratic using any correct method, for factorising, eg $(7x + 6)(x - 2)$ or $(7x + 6)(3x - 6)$ or $(21x + 18)(x - 2)$ or $(7y - 32)(y + 4)$ or correct use of formula, eg $\frac{8 \pm \sqrt{(-8)^2 - 4 \times 7 \times -12}}{2 \times 7}$ or $\frac{4 \pm \sqrt{(-4)^2 - 4 \times 7 \times -128}}{2 \times 7}$ or completing the square	Can be implied by both x values **or** both y values correct (condone incorrect labelling) if the quadratic is correct If using the quadratic formula (condone one sign error, omission of brackets around the b in the $b^2 - 4ac$ and the fraction line not being under the – in the $-b$. Allow some simplification – as far as eg $\frac{8 \pm \sqrt{64 + 336}}{14}$ **or** if factorising allow brackets which expand to give 2 out of 3 terms correct for their quadratic

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
		M1	(dep on first M1) for substituting their 2 found values of x or y in a suitable equation or (dep on first M1) for one correct pair of values following from a correct quadratic	Condone substitution into their $(\pm 2 \pm 3x)$ or $\left(\frac{\pm 2 \pm y}{3}\right)$ Allow – 0.85(7…) or – 0.86 for $-\frac{6}{7}$ Allow 4.57(1…) for $\frac{32}{7}$ If values of x or y are incorrect then working must be shown
		A1	for $x = -\frac{6}{7}$ oe, $y = \frac{32}{7}$ oe **and** $x = 2, y = -4$	Accept as coordinates Assume correct pairing unless clearly incorrect eg $\left(-\frac{6}{7}, -4\right)$, $\left(2, \frac{32}{7}\right)$ Allow – 0.85(7…) or – 0.86 for $-\frac{6}{7}$ Allow 4.57(1…) for $\frac{32}{7}$ If an answer is shown in the range in working and then incorrectly rounded award full marks A correct answer with no supportive working gets 0 marks

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
22	(12, –8)	P1	for process to rearrange the equation to give y in terms of x, eg $y = \frac{3x-52}{2}$ **or** $y = \frac{3}{2}x - 26$ **or** $m = \frac{3}{2}$	Condone an incorrect value for the y intercept (= c)
		P1	for process to find gradient of OP, eg $-1 \div$ "$\frac{3}{2}$" $(= -\frac{2}{3})$ **or** $-1 \div [m]$	Where $[m]$ is clearly identified as the gradient of the straight line $3x - 2y = 52$ Allow 0.66(6…) or 0.67 for $\frac{2}{3}$ throughout
		P1	(dep on equation of the form $y = \frac{-1}{[m]}x$ for the radius may be implied in subsequent working) for starting to solve $3x - 2y = 52$ with $y = \frac{-1}{[m]}x$ simultaneously to find the value of x or y eg substituting $y = \frac{-2}{3}x$ or $y = \frac{-1}{[m]}x$ into $y = \frac{3}{2}x - 26$ or $3x - 2y = 52$ or an equation of the form $y = \frac{3}{2}x + c$ eg $-\frac{2}{3}x = \frac{3}{2}x - 26$ **or** $3x - 2\left(-\frac{2}{3}x\right) = 52$ **or** $-\frac{2}{3}x = \frac{3}{2}x + c$ **or** $-\frac{1}{[m]}x = \frac{3}{2}x - 26$ **or** $3x - 2\left(-\frac{1}{[m]}x\right) = 52$ **or** $-\frac{1}{[m]}x = \frac{3}{2}x + c$	Where $[m]$ is clearly identified as the gradient of the straight line $3x - 2y = 52$ Can be done by elimination Award P1 for a correct method to eliminate x or y: coefficient of x or y the same and correct operator to eliminate selected variable eg $9x - 6y = 156$ $\quad$ $6x - 4y = 104$ $+ 4x + 6y = 0$ $\quad$ $- 6x + 9y = 0$ $(13x = 156)$ $\quad$ $(-13y = 104)$
		A1	cao	

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
23	$\frac{15}{4}$	P1	for process to find $\overrightarrow{BC}$ or $\overrightarrow{CB}$, eg $\overrightarrow{BC} = -3\mathbf{b} + \mathbf{a} + 2\mathbf{b}$ oe (= $\mathbf{a} - \mathbf{b}$) **or** $\overrightarrow{CB} = -2\mathbf{b} - \mathbf{a} + 3\mathbf{b}$ oe (= $-\mathbf{a} + \mathbf{b}$)	Vectors must be unambiguously identified Accept BC for $\overrightarrow{BC}$ etc throughout Allow a for **a** and b for **b** throughout Vectors could be written on the diagram and may be in either direction.
		P1	for process that uses the ratio 5 : 3, eg $\overrightarrow{BN} = \frac{5}{8}(-3\mathbf{b} + \mathbf{a} + 2\mathbf{b})$ $(= \frac{5}{8}\mathbf{a} - \frac{5}{8}\mathbf{b})$ or $\overrightarrow{NB} = -\frac{5}{8}\mathbf{a} + \frac{5}{8}\mathbf{b}$ oe **or** $\overrightarrow{CN} = \frac{3}{8}(-2\mathbf{b} - \mathbf{a} + 3\mathbf{b})$ $(= -\frac{3}{8}\mathbf{a} + \frac{3}{8}\mathbf{b})$ or $\overrightarrow{NC} = \frac{3}{8}\mathbf{a} - \frac{3}{8}\mathbf{b}$ oe	Throughout, do not condone missing brackets unless recovered Follow through candidates $\overrightarrow{BC}$ or $\overrightarrow{CB}$ provided full method to find subsequent vectors is clearly shown A correct expression for $\overrightarrow{BN}$ or $\overrightarrow{NB}$ or $\overrightarrow{CN}$ or $\overrightarrow{NC}$ implies the previous P mark
		P1	for a process to find an expression, in terms of **a** and **b**, for $\overrightarrow{MN}$ **or** $\overrightarrow{MP}$ **or** $\overrightarrow{NP}$ eg $\overrightarrow{MN} = -\frac{1}{2}\mathbf{a} + 3\mathbf{b} + \frac{5}{8}(\mathbf{a} - \mathbf{b})$ oe $(= \frac{1}{8}\mathbf{a} + \frac{19}{8}\mathbf{b})$ **or** $\overrightarrow{MN} = \frac{1}{2}\mathbf{a} + 2\mathbf{b} + \frac{3}{8}(-\mathbf{a} + \mathbf{b})$ oe $(= \frac{1}{8}\mathbf{a} + \frac{19}{8}\mathbf{b})$ **or** $\overrightarrow{MP} = \frac{1}{2}\mathbf{a} + 2\mathbf{b} + k(2\mathbf{b})$ oe **or** $\overrightarrow{NP} = \frac{3}{8}\mathbf{a} - \frac{3}{8}\mathbf{b} + k(2\mathbf{b})$ oe	Follow through candidates $\overrightarrow{BN}$ or $\overrightarrow{NB}$ or $\overrightarrow{CN}$ or $\overrightarrow{NC}$ provided full method to find subsequent vectors is clearly shown May use $\overrightarrow{NM}$ or $\overrightarrow{PM}$ or $\overrightarrow{PN}$ Allow equivalent vectors throughout eg $\overrightarrow{MP} = \frac{1}{2}\mathbf{a} + 2\mathbf{b} + \mu(\mathbf{b})$ This mark may be awarded without the previous mark being awarded

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
		P1	for a process to find a **correct** expression, in terms of **a** and **b** for the same vector eg $\overrightarrow{MP}$ or $\overrightarrow{NP}$ **or** parallel vectors eg $\overrightarrow{MP}$ and $\overrightarrow{MN}$ or $\overrightarrow{NP}$ and $\overrightarrow{MN}$ **eg** $\overrightarrow{MP}=\frac{1}{2}\mathbf{a}+2\mathbf{b}+k(2\mathbf{b})$ oe **and** $\overrightarrow{MP}=\lambda\left(\frac{1}{8}\mathbf{a}+\frac{19}{8}\mathbf{b}\right)$ oe **or** $\overrightarrow{NP}=\frac{3}{8}\mathbf{a}-\frac{3}{8}\mathbf{b}+k(2\mathbf{b})$ oe **and** $\overrightarrow{NP}=\lambda\left(\frac{1}{8}\mathbf{a}+\frac{19}{8}\mathbf{b}\right)$ oe **or** $\overrightarrow{MP}=\frac{1}{2}\mathbf{a}+2\mathbf{b}+k(2\mathbf{b})$ oe **and** $\overrightarrow{MN}=\frac{1}{8}\mathbf{a}+\frac{19}{8}\mathbf{b}$ oe **or** $\overrightarrow{NP}=\frac{3}{8}\mathbf{a}-\frac{3}{8}\mathbf{b}+k(2\mathbf{b})$ oe **and** $\overrightarrow{MN}=\frac{1}{8}\mathbf{a}+\frac{19}{8}\mathbf{b}$ oe	Vectors do not have to be simplified May use $\overrightarrow{NM}$ or $\overrightarrow{PM}$ or $\overrightarrow{PN}$ Condone use of same variable for equivalent vector journeys Condone lack of labelling if vector journeys are correctly equated
			OR for a process to find a **correct** expression in terms of **a** and **b**, for $\overrightarrow{AP}$ or $\overrightarrow{CP}$ using $\overrightarrow{MN}$ $\overrightarrow{AP}=-\frac{1}{2}\mathbf{a}+\mu\left(\frac{1}{8}\mathbf{a}+\frac{19}{8}\mathbf{b}\right)$ oe **or** $\overrightarrow{CP}=-\frac{3}{8}\mathbf{a}+\frac{3}{8}\mathbf{b}+\mu\left(\frac{1}{8}\mathbf{a}+\frac{19}{8}\mathbf{b}\right)$ oe	May use $\overrightarrow{PA}$ or $\overrightarrow{PC}$ NB: $\overrightarrow{CP}=-\frac{1}{2}\mathbf{a}-2\mathbf{b}+\mu\left(\frac{1}{8}\mathbf{a}+\frac{19}{8}\mathbf{b}\right)$
			OR for a process to find a **correct** expression in terms of **a** and **b** for the same vector $\overrightarrow{BP}$ or $\overrightarrow{OP}$ $\overrightarrow{BP}=\mathbf{a}-\mathbf{b}+k(2\mathbf{b})$ oe **and** $\overrightarrow{BP}=\frac{5}{8}\mathbf{a}-\frac{5}{8}\mathbf{b}+\mu\left(\frac{1}{8}\mathbf{a}+\frac{19}{8}\mathbf{b}\right)$ oe $\overrightarrow{OP}=\mathbf{a}+2\mathbf{b}+k(2\mathbf{b})$ oe **and** $\overrightarrow{OP}=\frac{1}{2}\mathbf{a}+\mu\left(\frac{1}{8}\mathbf{a}+\frac{19}{8}\mathbf{b}\right)$ oe	May use $\overrightarrow{PB}$ or $\overrightarrow{PO}$
		A1	for $\frac{15}{4}$ oe	Award 0 marks for a correct answer with no supportive working

QUESTION 4 – Additional information NOT Exhaustive
Final comparable values, can be truncated or rounded, they just need to be accurate enough to allow a comparison

Cost per lb in $: 2 × 2.2 (= 4.4) 3.75 × 1.2(0) (= 4.5) "4.5" ÷ "4.4" (= 1.02…) and 4.9(0) ÷ 5 (= 0.98) New York **and** 1.02… **and** 0.98	**Cost per lb in £:** 2 × 2.2 (= 4.4) 4.9(0) ÷ 1.2(0) (= 4.08…) 3.75 ÷ "4.4" (= 0.85…) and "4.08…" ÷ 5 (= 0.81(6…)) New York **and** 0.85… **and** 0.81(6…)
Cost per kg in $: 5 ÷ 2.2 (= 2.27…) 3.75 × 1.2(0) (= 4.5) "4.5" ÷ 2 (= 2.25) and 4.9(0) ÷ "2.27…" (= 2.15(6)) New York **and** 2.25 **and** 2.15(6)	**Cost per kg in £:** 5 ÷ 2.2 (= 2.27…) 4.9(0) ÷ 1.2(0) (= 4.08…) 3.75 ÷ 2 (= 1.87(5)) and "4.08…" ÷ "2.27…" (= 1.79(6…)) New York **and** 1.87(5) **and** 1.79(6…)
Number of lbs per $: 2 × 2.2 (= 4.4) 3.75 × 1.2(0) (= 4.5) "4.4" ÷ "4.5" (= 0.97(7…)) and 5 ÷ 4.9(0) (= 1.02…) New York **and** 0.97(7…) **and** 1.02…	**Number of lbs per £:** 2 × 2.2 (= 4.4) 4.9(0) ÷ 1.2(0) (= 4.08…) "4.4" ÷ 3.75 (= 1.17…) and 5 ÷ "4.08…" (= 1.22…) New York **and** 1.17… **and** 1.22…
Number of kg per $: 5 ÷ 2.2 (= 2.27…) 3.75 × 1.2(0) (= 4.5) 2 ÷ "4.5" (= 0.44…) and "2.27…" ÷ 4.9(0) (= 0.46…) New York **and** 0.44… **and** 0.46…	**Number of kg per £:** 5 ÷ 2.2 (= 2.27…) 4.9(0) ÷ 1.2(0) (= 4.08…) 2 ÷ 3.75 (= 0.53…) and "2.27…" ÷ "4.08…" (= 0.55(6…)) New York **and** 0.53… **and** 0.55(6…)
Cost of 5 lb in $: 2 × 2.2 (= 4.4) 3.75 × 1.2(0) (= 4.5) "4.5" ÷ "4.4" × 5 (= 5.11…) New York **and** 5.11…	**Cost of 5 lb in £:** 2 × 2.2 (= 4.4) 4.9(0) ÷ 1.2(0) (= 4.08…) 3.75 ÷ "4.4" × 5 (= 4.26…) New York **and** 4.08… **and** 4.26…
Cost of 2 kg in $: 5 ÷ 2.2 (= 2.27…) 3.75 × 1.2(0) (= 4.5) 4.9(0) ÷ "2.27…" × 2 (= 4.31…) New York **and** 4.5 **and** 4.31…	**Cost of 2 kg in £:** 5 ÷ 2.2 (= 2.27…) 4.9(0) ÷ 1.2(0) (= 4.08…) "4.08…" ÷ "2.27…" × 2 (= 3.59…) New York **and** 3.59…

Modifications to the mark scheme for Modified Large Print (MLP) papers: 1MA1 3H

Only mark scheme amendments are shown where the enlargement or modification of the paper requires a change in the mark scheme. Notes apply to both MLP papers and Braille papers unless otherwise stated.

The following tolerances should be accepted on marking MLP papers, unless otherwise stated below:
Angles: ±5º
Measurements of length: ±5 mm

PAPER: 1MA1_3H			
Question		**Modification**	**Mark scheme notes**
1		Wording added: 'Look at the diagram for Question 1 in the Diagram Booklet. It shows a grid.' Wording added 'below'. Wording added: 'on the grid in the Diagram Booklet' Values in the table changed: 12 changed to 15, 8 changed to 5 Braille: 12 changed to 15, 8 changed to 5 and final value removed. Diagram enlarged. Open headed arrows. Braille: Horizontal axis cropped at 40.	Standard mark scheme but note change of values (heights at 15, 25, 10, 5, 5) Braille: heights at 15, 25, 10, 5
7		Wording changed: 'Look at the diagram for Question 7 in the Diagram Booklet. It shows straight line ABC on a set of axes.' Diagram enlarged. Open headed arrows. Crosses changed to dots.	Standard mark scheme
8		Wording changed: 'Look at the diagram for Question 8 in the Diagram Booklet. It shows…' Wording added: 'Angle DAB and angle ADC are right angles.' Diagram enlarged.	Standard mark scheme
11	(b)	Letter 'a' changed to 'p'. Letter 'b' changed to 'r'.	Standard mark scheme but note the change of letters
13		Wording changed: 'Look at the diagram for Question 13 in the Diagram Booklet. It shows eight graphs.' Wording added: 'There are four spaces to fill.' Braille: Wording added 'By writing the missing values labelled (i) to (iv).' Diagram enlarged. Graphs relabelled 'graph A', 'graph B' etc.	Standard mark scheme
14		Wording changed: 'Look at the diagram for Question 14 in the Diagram Booklet. It shows triangle ABC.' Wording added: 'AB = 8.3 cm AC = 9.8 cm Angle BAC = 35°' Diagram enlarged. Angles moved outside of angle arcs and angle arcs made smaller.	Standard mark scheme

16		Wording changed: ‘Look at Diagram 1, Diagram 2, and the formula for Question 16 in the Diagram Booklet. You may be provided with three models. They are NOT accurate. The models show a cylinder, a cone and the cone joined to the cylinder. Diagram 1 shows a solid shape made from a cylinder and a cone. Diagram 2 shows a cross section of the solid shape.’ Braille: Wording changed ‘Look at the diagram and the formula diagram for Question 16 in the diagram booklet. You are also provided with three models. They are NOT accurate. The models show a cylinder, a cone and the cone joined to the cylinder. The diagram shows a cross section of the solid shape. The formula diagrams show the base of a cone with r labelled and a side view of a cone with r and h labelled.’ Diagrams enlarged. Open headed arrows. 2D view added. Models provided. Braille: 3D diagram removed.	Standard mark scheme
17		Letter ‘x’ changed to ‘y’.	Standard mark scheme but note the change of letter
18		Wording added: ‘Look at the diagram for Question 18 in the Diagram Booklet. It shows an incomplete Venn diagram.’ Wording removed: ‘(C)’, ‘(T)’ and ‘(H)’. Wording added: ‘in the Diagram Booklet’ Diagram enlarged. Single letter labels replaced with the words, ‘Coffee’, ‘Tea’ and ‘Hot chocolate’.	Standard mark scheme
20		Wording changed: ‘Look at the diagram for Question 20 in the Diagram Booklet. It shows A, B, C and D, points on a …’ Diagram enlarged. Angles moved outside of angle arcs and angle arcs made smaller.	Standard mark scheme
23		Wording added: ‘Look at the diagram for Question 23 in the Diagram Booklet.’ Diagram enlarged.	Standard mark scheme

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