



Pearson
Edexcel

Mark Scheme (Results)

Summer 2022

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

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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 (eg 3.5 – 4.2) then this is inclusive of the end points (eg 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 eg $2 \times 6 (=12)$ 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 eg "12" \times 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 eg [area] \times 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: 1MA1/1H | | | | |
|----------------|------------------------|--------------|--|--|
| Question | Answer | Mark | Mark scheme | Additional guidance |
| 1 | $x < 5$ | M1 A1 | for adding 27 to both sides or dividing throughout by 7 (in an inequality or an equation) as a first step or showing 5 as the critical value cao | Can be written as $x = 5$ |
| 2 | $2 \times 2 \times 31$ | M1 A1 | for a complete method to find prime factors; could be shown on a complete factor tree with no more than one error or by division by prime factors with no more than one error or for 2, 2, 31, (1) for $2 \times 2 \times 31$ oe | Condone the inclusion of 1 for this mark Accept $2^2 \times 31$ |

| Paper: 1MA1/1H | | | | |
|----------------|--------------------------|------|---|--|
| Question | Answer | Mark | Mark scheme | Additional guidance |
| 3 | 30 | P1 | for $160 \div (3+7) (= 16)$ or $\frac{3}{3+7} (= \frac{3}{10})$ | |
| | | P1 | for “16” $\times 3 (= 48)$ or “ $\frac{3}{10}$ ” $\times 160 (= 48)$ | |
| | | P1 | for a correct step using 48 eg “48” $\div 8 (= 6)$ or “48” $\times 25 \div 100 (= 12)$ or (indep) for combining $\frac{1}{8}$ and 25%, eg $\frac{1}{8} + \frac{1}{4} (= \frac{3}{8})$ or “0.125” + “0.25” $(= 0.375)$ or “12.5”(%) + 25(%) $(= 37.5(\%))$ | |
| | | P1 | for a complete process to find the number of petrol cars, eg “48” – “6” – “12” oe or $(1 - \frac{3}{8}) \times “48”$ oe or “ $\frac{3}{10}$ ” $\times (1 - \frac{3}{8}) \times 160$ oe | |
| | | A1 | cao SC B2 for an answer of 100 if P0 scored | Award no marks for a correct answer with no supportive working |
| 4 | (a) 0.00163 | B1 | cao | |
| | (b) 4.38×10^5 | B1 | cao | |
| | (c) 2.4×10^{-1} | M1 | for $4 \times 6 \times 10^{3-5}$ or 0.24 oe eg 24×10^{-2} or 2.4×10^n where $n \neq -1$ | |
| | | A1 | cao | |

| Paper: 1MA1/1H | | | | |
|----------------|---------------------------------|------------------------|--|--|
| Question | Answer | Mark | Mark scheme | Additional guidance |
| 5 | 132 | M1 M1 A1 | for finding an exterior angle eg $360 \div 6 (= 60)$ or $360 \div 5 (= 72)$ or an interior angle eg $180 \times 4 \div 6 (= 120)$ or $180 \times 3 \div 5 (= 108)$ for a complete method eg $360 - "120" - "108"$ or $"60" + "72"$ cao | Angles may be shown on the diagram. Only award this mark for an angle that is not contradicted Answer only award no marks |
| 6 (a) | 5,(1),(-1),-1,1,5 | B2 (B1) | for all 4 values correct for 2 or 3 correct values) | Accept a freehand curve drawn that is not made of line segments Ignore anything drawn outside the required range ft their graph for this mark Accept these coordinates reversed |
| (b) | Graph drawn | B2 (B1) | for a fully correct graph ft (dep on B1 in (a)) for plotting at least 5 of the points from their table correctly) | |
| (c) | 0.3 to 0.5 and 2.5 to 2.7 | M1 A1 | for a correct method, eg marking intercepts with x -axis or one correct solution or both solutions given as a coordinates, eg (0.4, 2.6) or (0.4, 0) and (2.6, 0) for answers in the range 0.3 to 0.5 and 2.5 to 2.7 or ft their graph with at least 2 solutions | |
| 7 | 3 : 2 | P1 P1 A1 | for a process to find either volume eg $3^3 (= 27)$ or $4^3 (= 64)$ for showing density A = $81 \div "27" (= 3)$ or density B = $128 \div "64" (= 2)$ for 3 : 2 oe | Ignore units quoted |

| Paper: 1MA1/1H | | | | |
|----------------|-----------------------------|------|--|---|
| Question | Answer | Mark | Mark scheme | Additional guidance |
| 10 | (a) 10, 25, 50, 80, 85, 100 | B1 | cao | |
| | (b) Graph drawn | M1 | for 5 or 6 of their points plotted correctly from a cf table with no more than one error | If histograms drawn, plots must be identified. Accept a smooth curve or line segments. Ignore to the left of the first point and right of the last point. |
| | | A1 | for a fully correct graph | |
| | | | SC B1 for 5 or 6 cf values plotted at correct heights not at end but consistently within each interval and joined provided no gradient is negative | |
| | (c) 35 to 39 | B1 | for answer in the range 35 to 39 or ft their graph (if possible) | |
| | (d) 85 to 93 | M1 | for finding the difference between readings taken from the profit axis at points from a cf of 25 and a cf of 75 ft their graph (if possible) | If answer is in the range award the marks unless from obvious incorrect working |
| | | A1 | for answer in the range 85 to 93 or ft their graph (if possible) | |
| 11 | 8 | P1 | for a start to the process, eg $\frac{9}{9+4+x}$ or $(\frac{3}{7} =) \frac{9}{21}$ | |
| | | | or states that the total number of sweets is 21 | |
| | | P1 | for forming a correct equation without fractions, eg $9 \times 7 = 3(9 + 4 + x)$ or $21 = 9 + 4 + x$ | |
| | | | OR for $21 - 9 - 4$ oe or $1 - \frac{9}{21} - \frac{4}{21} (= \frac{8}{21})$ | |
| | | A1 | cao | |

| Paper: 1MA1/1H | | | | |
|----------------|-------------------|------|---|--|
| Question | Answer | Mark | Mark scheme | Additional guidance |
| 12 | $\frac{116}{990}$ | M1 | for $(x =) 0.11717\dots$ or $(10x =) 1.\dot{1}\dot{7}$ or $1.1717\dots$ or $(100x =) 11.\dot{7}\dot{1}$ or $11.7171\dots$ or $(1000x =) 117.\dot{1}\dot{7}$ or $117.1717\dots$ | |
| | | M1 | (dep M1) for a method using two recurring decimals that leads to a terminating decimal difference, using correct multiples of x eg $(1000x - 10x =) 117.\dot{1}\dot{7} - 1.\dot{1}\dot{7} (= 116)$ or $117.1717\dots - 1.1717\dots (= 116)$ | Accept $(100x - x =) 11.\dot{7}\dot{1} - 0.\dot{1}\dot{7}$ or $11.7171\dots - 0.11717\dots (= 11.6)$ |
| | | A1 | for $\frac{116}{990}$ oe, eg $\frac{58}{495}$ | $\frac{11.6}{99}$ must be written in the form $\frac{a}{b}$ where a and b are integers to gain the accuracy mark |

| Paper: 1MA1/1H | | | | |
|----------------|--------------------|------------------------|--|---|
| Question | Answer | Mark | Mark scheme | Additional guidance |
| 13 | Relationship shown | M1 M1 C1 | <p>for use of Pythagoras' theorem, eg $d_A^2 = d_B^2 + d_C^2$ or $a^2 = b^2 + c^2$ or $(2x)^2 = (2y)^2 + (2z)^2$ or $a = \sqrt{b^2 + c^2}$</p> <p>or uses a 3, 4, 5 triangle</p> <p>for forming correct expressions for the areas of at least 2 of the 3 semicircles, eg at least two of $\frac{1}{2}\pi\left(\frac{a}{2}\right)^2$, $\frac{1}{2}\pi\left(\frac{b}{2}\right)^2$, $\frac{1}{2}\pi\left(\frac{c}{2}\right)^2$ or at least two of $\frac{1}{2}\pi x^2$, $\frac{1}{2}\pi y^2$, $\frac{1}{2}\pi z^2$ or at least two of $\frac{1}{2}\pi\left(\frac{5}{2}\right)^2$, $\frac{1}{2}\pi\left(\frac{3}{2}\right)^2$, $\frac{1}{2}\pi\left(\frac{4}{2}\right)^2$</p> <p>for a fully correct and convincing chain of reasoning, eg showing that eg $\frac{1}{2}\pi\left(\frac{a}{2}\right)^2 = \frac{1}{2}\pi\left(\frac{b}{2}\right)^2 + \frac{1}{2}\pi\left(\frac{c}{2}\right)^2$ can be reduced to $a^2 = b^2 + c^2$ or that $(2x)^2 = (2y)^2 + (2z)^2$ is the same as $\frac{1}{2}\pi x^2 = \frac{1}{2}\pi y^2 + \frac{1}{2}\pi z^2$</p> | <p>May be seen at any stage Where d_A, a, $2x$, etc are their diameters</p> <p>Could be any Pythagorean triple</p> <p>Where a, b, c are their diameters</p> <p>Where $2x$, $2y$, $2z$ are their diameters</p> <p>Where 3, 4, 5 are their diameters</p> |
| 14 (a) | 0.9 | M1 M1 A1 | <p>for drawing a tangent at $t = 2$</p> <p>for a complete method to find the gradient eg tangent at $t = 2$ and “2.7” ÷ “3”</p> <p>for answer in the range 0.7 to 1.1</p> | <p>Use of change in y over change in x Working may be seen on the diagram</p> <p>Accept answers in the form $\frac{a}{b}$ where a and b are integers</p> |
| (b) | Statement | C1 | eg distance (travelled) | If units are given they must be correct |

| Paper: 1MA1/1H | | | | |
|----------------|-----------------------------------|------|--|--|
| Question | Answer | Mark | Mark scheme | Additional guidance |
| 15 (a) | $\vec{AC} = 5\vec{AB}$ and reason | M1 | for $\vec{AC} = 5(3\mathbf{a} + 4\mathbf{b})$ or $\vec{BC} = 4(3\mathbf{a} + 4\mathbf{b})$ or indicates that $15\mathbf{a} + 20\mathbf{b} = 5 \times (3\mathbf{a} + 4\mathbf{b})$ | Do not award this mark if any incorrect working seen Could use AB and BC or AC and BC |
| | | C1 | for $\vec{AC} = 5\vec{AB}$ or $\vec{AC} = 5(3\mathbf{a} + 4\mathbf{b})$ or $15\mathbf{a} + 20\mathbf{b} = 5(3\mathbf{a} + 4\mathbf{b})$ and a correct reason, eg AC is a multiple of AB / multiples of each other / AB is a factor of AC or they have the same gradient / are parallel / go in the same direction or they have a point in common / both start at A or AC is an enlargement of AB | |
| (b) | 5 : 2 | P1 | for $(\vec{DF} =) 3\mathbf{e} + 6\mathbf{f} + (-10.5\mathbf{e} - 21\mathbf{f}) (= -7.5\mathbf{e} - 15\mathbf{f})$ or for a multiplicative relationship for \vec{DE} and \vec{EF} eg $\vec{EF} = -3.5 \vec{DE}$ or for $(DE : EF =) 1 : -3.5$ oe | |
| | | P1 | for a multiplicative relationship for \vec{DF} and \vec{DE} eg $\vec{DF} = -2.5 \vec{DE}$ or for $(DF : DE =) -5 : 2$ oe eg $-2.5 : 1$ or $-7.5 : 3$ or for answer of $2 : 5$ oe | |
| | | A1 | oe eg $2.5 : 1$ | |

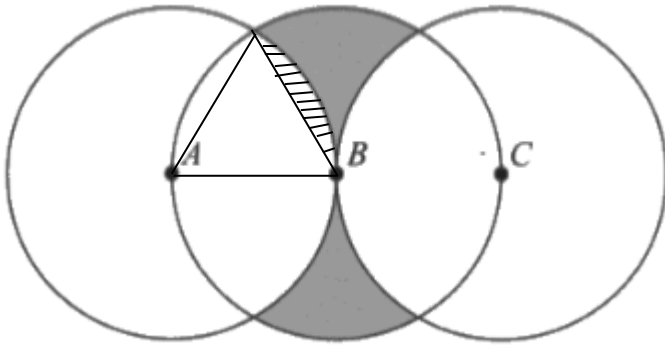
| Paper: 1MA1/1H | | | | |
|----------------|-----------------------------|----------------------------------|---|---|
| Question | Answer | Mark | Mark scheme | Additional guidance |
| 16 | 0.78 | P1 P1 P1 A1 | <p>for using 0.75 or 0.25 in a relevant product, eg $0.75 \times x$ or $0.25 \times y$</p> <p>for using two products to form an equation, eg $0.75x + 0.25y = 0.36$</p> <p>for a correct equation in one variable, eg $0.75(1 - p) + 0.25p = 0.36$ or $0.75f + 0.25(1 - f) = 0.36$</p> <p>oe</p> | <p>Allow different letters Could work with fractions</p> <p>Could set up an equation for pass \times pass + fail \times fail = 0.64</p> <p>Accept 78% or any equivalent fraction, eg $\frac{39}{50}$, $\frac{156}{200}$</p> |
| 17 | $y = \frac{40}{\sqrt{x^3}}$ | P1 P1 P1 A1 | <p>for setting up an equation with a constant term, eg $y = k\sqrt{t}$ or $t = \frac{K}{x^3}$</p> <p>for a process to substitute values in one equation, eg $15 = k\sqrt{9}$ or $k = 5$ or $8 = \frac{K}{2^3}$ or $K = 64$</p> <p>(dep P2) for combining the two equations fit their values of k and K, eg $y = 5\sqrt{\frac{64}{x^3}}$</p> <p>OR for $y = 5\sqrt{t}$ and $t = \frac{64}{x^3}$</p> <p>oe</p> | <p>Condone the use of 'α' instead of '=' for the first two P marks Equation can be implied by correct substitution</p> <p>Formula must include 40 Accept other forms for the power of x but must be a single term in x</p> |

| Paper: 1MA1/1H | | | | |
|----------------|--------|------|--|---|
| Question | Answer | Mark | Mark scheme | Additional guidance |
| 18 | 16 | M1 | for working with square root or with reciprocal in $\left(5\frac{4}{9}\right)^{-\frac{1}{2}}$ eg $\left(\frac{9}{49}\right)^{\frac{1}{2}}$ or $\frac{1}{\sqrt{\frac{49}{9}}}$ or $\frac{1}{\left(\frac{49}{9}\right)^{\frac{1}{2}}}$ or $\left(\frac{7}{3}\right)^{-1}$ or $\frac{3}{7}$ | |
| | | M1 | for a full method to simplify the numerator eg $\frac{3}{7} \times \frac{14}{3} (= 2)$ | |
| | | M1 | for showing $\div 2^{-3}$ as $\times 8$, eg $\frac{3}{7} \times \frac{14}{3} \times 8$ or for $2^1 \div 2^{-3} (= 2^4)$ or for correctly reducing the expression to a single calculation, eg $\frac{336}{21}$ or $\frac{112}{7}$ or $2 \div \frac{1}{8}$ | May be seen at any time during the calculation |
| | | A1 | cao | Award 0 marks for a correct answer with no supportive working |

| Paper: 1MA1/1H | | | | |
|----------------|-----------------------------|------|---|--|
| Question | Answer | Mark | Mark scheme | Additional guidance |
| 19 | $\frac{5 \pm \sqrt{15}}{2}$ | M1 | for using a common denominator eg $\frac{x-1}{(2x-1)(x-1)} + \frac{3(2x-1)}{(2x-1)(x-1)} (= 1)$ or $(x-1) + 3(2x-1) = (2x-1)(x-1)$ | Note we don't need to see "= 0"; just the LHS is sufficient Accept other forms of the 3 term quadratic, eg $2x^2 - 10x = -5$ Correct use of formula or completing the square |
| | | M1 | for expanding and rearranging to get $2x^2 - 10x + 5 (= 0)$ | |
| | | M1 | (dep M1) ft for a method to solve their 3 term quadratic equation eg $\frac{10 \pm \sqrt{(-10)^2 - 4 \times 2 \times 5}}{2 \times 2}$ or $\frac{10 \pm \sqrt{60}}{4}$ or $2 \left[\left(x - \frac{5}{2} \right)^2 - \left(\frac{5}{2} \right)^2 \right] + 5 = 0$ oe | |
| | | A1 | cao | |

| Paper: 1MA1/1H | | | | |
|----------------|--------------------|------|--|--|
| Question | Answer | Mark | Mark scheme | Additional guidance |
| 20 | $7x + 5y - 82 = 0$ | P1 | for process to work out the gradient of the line from the centre of the circle to the point (6,8) eg $\frac{8-3}{6--1} (= \frac{5}{7})$ | |
| | | P1 | (dep P1) for using $mn = -1$ eg $-1 \div \frac{5}{7} (= -\frac{7}{5})$ | |
| | | P1 | for substituting (6, 8) into $y = -\frac{7}{5}x + c$ or for $(y - 8) = -\frac{7}{5}(x - 6)$ or for $y = -\frac{7}{5}x + \frac{82}{5}$ oe | |
| | | A1 | $7x + 5y - 82 = 0$ oe SC B2 for answer of $5x + 7y - 86 = 0$ oe in any form | Must be in form $ax + by + c = 0$ with integer coefficients, eg $82 - 7x - 5y = 0$ |

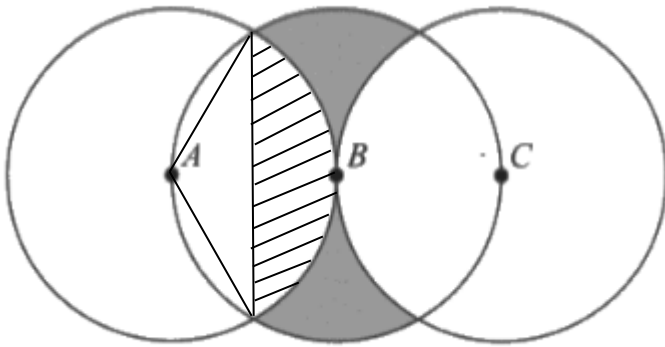
| Paper: 1MA1/1H | | | | |
|----------------|--------------------------------|------|--|--------------------------------------|
| Question | Answer | Mark | Mark scheme | Additional guidance |
| 21 | $16\sqrt{3} - \frac{16\pi}{3}$ | P1 | for identifying an angle of 60 or 120 | |
| | | P1 | for process to find the area of a sector of angle 60 or 120 eg $\pi 4^2 \times \frac{60}{360} (= \frac{8\pi}{3})$ or $\pi 4^2 \times \frac{120}{360} (= \frac{16\pi}{3})$ | |
| | | P1 | for process to find the area of an equilateral triangle eg $\frac{1}{2} \times 4 \times 4 \times \sin 60 (= 4\sqrt{3})$ or $\frac{4 \times \sqrt{4^2 - 2^2}}{2} (= 2\sqrt{12} \text{ or } 4\sqrt{3})$ or the area of an isosceles triangle or area of a right-angled triangle eg $\frac{1}{2} \times 4 \times 4 \times \sin 120 (= 4\sqrt{3})$ or $\frac{2 \times \sqrt{4^2 - 2^2}}{2} (= \sqrt{12} \text{ or } 2\sqrt{3})$ | |
| | | P1 | for using area of sector – area of triangle to find area of a segment eg $\pi 4^2 \times \frac{60}{360} - \frac{1}{2} \times 4 \times 4 \times \sin 60 (= \frac{8\pi}{3} - 4\sqrt{3})$ or $\pi 4^2 \times \frac{120}{360} - \frac{1}{2} \times 4 \times 4 \times \sin 120 (= \frac{16\pi}{3} - 4\sqrt{3})$ | |
| | | A1 | for $16\pi - 4(\frac{16\pi}{6} - 4\sqrt{3} + \frac{16\pi}{6})$ or $16\sqrt{3} - \frac{16\pi}{3}$ oe | Does not need to be in simplest form |



area of segment = area of sector centre A – area of equilateral triangle

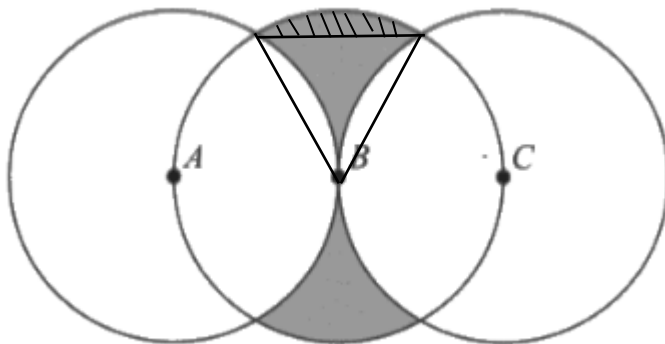
Total shaded area = area of circle – $4 \times$ area of sector – $4 \times$ area of segment

or area of circle – $4 \times$ area of triangle – $8 \times$ area of segment



area of segment = area of sector centre A – area of isosceles triangle

Total shaded area = area of circle – $4 \times$ area of segment



area of segment = area of sector centre B – area of equilateral triangle

Total shaded area = $2 \times$ (area of sector – $2 \times$ area of segment)

or $2 \times$ (area of triangle – area of segment)

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

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: $\pm 5^\circ$

Measurements of length: ± 5 mm

| PAPER: 1MA1_1H | | |
|----------------|---|----------------------|
| Question | Modification | Mark scheme notes |
| 5 | <p>Wording added 'Look at the diagram for Question 5 in the Diagram Booklet. It shows a regular hexagon and a regular pentagon which share a common side.'</p> <p>Diagram enlarged. The angle moved outside of the angle arc and the angle arc made smaller.</p> <p>For Braille the diagram has hexagon ABCDEF and pentagon GHICB with x outside the angle arc.</p> <p>Wording now "The diagram is a regular hexagon, ABCDEF, and a regular pentagon, GHICB, joined at the common side, BC." "In the diagram, angle DCI is marked x."</p> | Standard mark scheme |
| 6 | (a) <p>Wording added 'Complete the table below...'. The table turned vertical.</p> <p>Wording added 'There are four spaces to fill.'</p> <p>For Braille Add (i), (ii), (iii) & (iv) in the blank spaces and "Ans: (i) __ (ii) __ (iii) __ (iv) __"</p> | Standard mark scheme |
| 6 | (b) <p>Wording added 'Look at the diagram for Question 6(b) in the Diagram Booklet. It shows a grid.'</p> <p>Diagram enlarged. Open headed arrows. Small squares removed.</p> <p>The axes labels moved to the top of the vertical axis and to the right of the horizontal axis.</p> | Standard mark scheme |
| 7 | <p>Wording added 'Look at the diagram for Question 7 in the Diagram Booklet. It shows cube A and cube B.'</p> <p>Wording added 'Cube A has sides of length 3 cm'; 'Cube B has sides of length 4 cm.'</p> <p>Diagram enlarged. The diagrams relabelled as 'cube A' and 'cube B'.</p> <p>Braille: have a model with the words "The models represent two cubes, A and B."</p> | Standard mark scheme |
| 8 | <p>Wording added 'Look at the table for Question 8 in the Diagram Booklet. It shows...'. The frequency column widened.</p> | Standard mark scheme |

| PAPER: 1MA1_1H | | | |
|----------------|---|---|---|
| Question | Modification | Mark scheme notes | |
| 9 | <p>Wording added 'Look at the diagram for Question 9 in the Diagram Booklet. You may be provided with a model.'</p> <p>Wording added 'A cube is placed on top of a cuboid, to form a solid, as shown by the diagram and the model.'</p> <p>Diagram enlarged.</p> <p>The dashed lines made longer and thicker.</p> | Standard mark scheme | |
| 10 | (a) | <p>Wording added 'Look at the table for Question 10 in the Diagram Booklet. It shows...'. The values changed so that the answers can be read on a grid line. 25 changed to 30. 30 changed to 15. 5 changed to 10. 15 changed to 20. Wording added 'Complete the cumulative frequency table below.' 'There are six spaces to fill.'</p> | B1 for 10, 25, 55, 70, 80, 100 |
| 10 | (b) (c) (d) | <p>Wording added 'Look at the diagram for Question 10(b) in the Diagram Booklet. It shows a grid.'</p> <p>Diagram enlarged. Small squares removed. Open headed arrows. Right axis labelled. The axes labels moved to the top of the vertical axis and to the left of the horizontal axis. Intermediates added at intervals of 5 on the y axis. The grid cut at 300 on the x axis.</p> | <p>(b) Standard mark scheme (c) B1 for answer of 40 or ft their graph (if possible) (d) M1 for finding the difference between readings taken from the profit axis at points from a cf of 25 and a cf of 75 ft their graph (if possible) A1 for answer in the range 120 to 130 or ft their graph (if possible)</p> |
| 11 | | Wording added 'Look at the information for Question 11 in the Diagram Booklet.' | Standard mark scheme |

| PAPER: 1MA1_1H | | |
|-----------------------|---|--|
| Question | Modification | Mark scheme notes |
| 13 | <p>Wording added 'Look at the diagram for Question 13 in the Diagram Booklet.'</p> <p>Wording added 'three semicircular shaded'.</p> <p>Diagram enlarged. The right angle made more obvious. Shading changed.</p> <p>The regions labelled as 'region A', 'region B' and 'region C'.</p> | Standard mark scheme |
| 14 | <p>Wording added 'Look at the diagram for Question 14 in the Diagram Booklet. It shows...'. Diagram enlarged. Small squares removed. Open headed arrows. Right axis labelled. The axes labels moved to the top of the vertical axis and to the left of the horizontal axis.</p> | Standard mark scheme with leeway in part (a) |
| 21 | <p>Wording added 'Look at the diagram for Question 21 in the Diagram Booklet. It shows...'. Diagram enlarged. Shading changed. Labels A, B and C moved to the left.</p> | Standard mark scheme |



Pearson
Edexcel

Mark Scheme (Results)

Summer 2022

Pearson Edexcel GCSE
In Mathematics (1MA1)
Higher (Calculator) Paper 2H

| Paper: 1MA1/2H | | | | | | |
|----------------|--|------|----------------|---------------------|--|--|
| Question | Answer | Mark | Mark scheme | Additional guidance | | |
| 1 | (a) | | x^{15} | B1 | cao | |
| | (b) | | $40 - 10x$ | M1 | for method to expand one bracket, or collect like terms eg $4 \times x + 4 \times 3 (= 4x + 12)$ or $7 \times 4 - 7 \times 2x (= 28 - 14x)$ or $4 \times x - 7 \times 2x (= 4x - 14x)$ and $4 \times 3 + 7 \times 4 (= 12 + 28)$ | |
| | | | | A1 | oe | |
| | (c) | | $3x^2(5x + y)$ | M1 | for $3(5x^3 + x^2y)$ or $x(15x^2 + 3xy)$ or $3x(5x^2 + xy)$ or $x^2(15x + 3y)$ or $3x^2(ax + by)$ | |
| | | | | A1 | cao | |
| 2 | translation $\begin{pmatrix} -5 \\ 6 \end{pmatrix}$ | | | B1 | for translation | Award no marks if more than one transformation is given Do not accept as a coordinate $(-5, 6)$ |
| | | | | B1 | for vector $\begin{pmatrix} -5 \\ 6 \end{pmatrix}$ | |
| 3 | 89.5 and 90.5 | | | B1 | for 89.5 in the correct position | Accept 90.49 or 90.499(...) |
| | | | | B1 | for 90.5 in the correct position | |

| Paper: 1MA1/2H | | | | |
|----------------|--------|------|---|--|
| Question | Answer | Mark | Mark scheme | Additional guidance |
| 4 (a) | 19 | P1 | for process to find area available at festival B, eg $700 \times 2000 (=1\ 400\ 000)$ | Accept either number rounded eg 207 or 188 Accept either number rounded eg 207 or 188 |
| | | P1 | for process to find the area available per person at one festival, eg $80\ 000 \div 425 (= 188.23\dots)$ or [area] $\div 6750 (= 207.40\dots)$ | |
| | | P1 | for process to find the area available per person at both festivals, eg $80\ 000 \div 425 (= 188.23\dots)$ and [area] $\div 6750 (= 207.40\dots)$ | |
| | | A1 | for an answer in the range 18.7 to 19.5 | |
| | | (b) | explanation | |

| Paper: 1MA1/2H | | | | |
|----------------|----------|------|---|--|
| Question | Answer | Mark | Mark scheme | Additional guidance |
| 5 | 14.5, 21 | P1 | for process to work with coordinates, eg $4 - (-3) (= 7)$ or $9 - 1 (= 8)$ | Accept in reverse order eg $-3 - 4 (= -7)$ and negative distances throughout This mark is implied by 10.5 or 12 or 17.5 or 20 |
| | | P1 | for process to use ratio, eg $"7" \div 2 (= 3.5)$ or $"8" \div 2 (= 4)$ or $"7" \times 3 (= 21)$ or $"8" \times 3 (= 24)$ | |
| | | P1 | for complete process to find x or y coordinate of N , eg $"3.5" \times 3 + 4$ or $"4" \times 3 + 9$ or $"3.5" \times 5 - 3$ or $"4" \times 5 + 1$ OR to find both the required distances eg $"3.5" \times 3 (= 10.5)$ and $"4" \times 3 (= 12)$ or $"21" \div 2 (= 10.5)$ and $"24" \div 2 (= 12)$ or $"3.5" \times 5 (= 17.5)$ and $"4" \times 5 (= 20)$ | |
| | | A1 | oe | |

| Paper: 1MA1/2H | | | | |
|----------------|-------------------|----------------------------------|---|---|
| Question | Answer | Mark | Mark scheme | Additional guidance |
| 6 | 600.74 | M1 M1 A1 | works out decrease for one year eg $679 \times 4 \div 100$ (= 27.16) oe or $679 \times (100 - 4) \div 100$ (= 651.84) oe for compound method, eg $679 \times "0.96"^{t}$, $t \geq 2$ or $"651.84" \times "0.96"$ (= 625.76..) or $"651.84" \times 0.04$ (= 26.07) or for answers in the range 600.71 to 600.74 for 600.71 or 600.72 or 600.73 or 600.74 | Implied by 679×0.12 (= 81.48) or 679×0.88 (= 597.52) Values may be rounded or truncated If correct answer seen, and then difference found award M1M1A0 |
| 7 | No (supported) | P1 P1 P1 C1 | for a conversion with litres and gallons, eg $18 \div 4.5$ (= 4) or 8×4.5 (= 36) for a conversion with £ and euros, eg 27×0.85 (= 22.95) or $40.8 \div 0.85$ (= 48) for finding the unit price, eg $27 \div 18$ (= 1.5) OR finding proportionality for fuel eg $("36" \div 18)$ (= 2) for No with comparative figures, eg No with 20.4 and 22.95 OR No with 1.275 and 1.133... | See page at end of mark scheme May compare cost per gallon or cost in euros May be seen in a calculation or given in a description Accept comparative figures rounded or truncated No is implied by eg Wales is cheaper |

| Paper: 1MA1/2H | | | | |
|----------------|--------|------------------------|--|--|
| Question | Answer | Mark | Mark scheme | Additional guidance |
| 8 | 0.739 | M1 A1 | for partial evaluation, eg 6.07(5732...) or $\sqrt{7.2}$ (= 2.68(328...)) or 7.80(778...) or $\sqrt[3]{7.80(7782818...)}$ (= 1.98(3851871...)) for an answer in the range 0.739 to 0.747 | If an answer is given in the range in working and then rounded incorrectly award full marks. |
| 9 | 0.8 | P1 P1 A1 | for process to find the area, eg $187.5 = \frac{180}{A}$ or $180 \div 187.5 (= 0.96)$ or $\frac{180}{1.2x} = 187.5$ or $1.2x = \frac{180}{187.5}$ for complete process to find width, eg “0.96” $\div 1.2$ or $180 \div 225$ cao | Ignore units for P marks only |

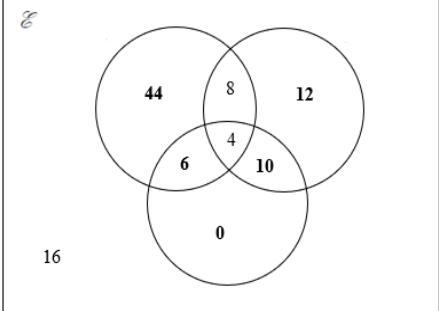
| Paper: 1MA1/2H | | | | | | | | | | | | | | | | |
|----------------|--------------------------|----------------|--|---|--|--------|-------|-----|--------|-----|-----|-----|------|-----|-----|-----|
| Question | Answer | Mark | Mark scheme | Additional guidance | | | | | | | | | | | | |
| 10 (a) | Explanation | C1 | <p>for explanation, eg</p> <p>Acceptable examples</p> <p>The IQR is half the data</p> <p>This is half the data</p> <p>$\frac{3}{4}$ of the data is less than 350(000)</p> <p>$\frac{3}{4}$ of the data is more than 160(000)</p> <p>$\frac{3}{4}$ of the data is lies between 60(000) and 350(000)</p> <p>$\frac{1}{2}$ of the data lies between 160(000) and 350(000)</p> <p>Not acceptable examples</p> <p>The data lies between 160 and 350</p> <p>The IQR is 190 (000)</p> <p>IQR = UQ – LQ</p> <p>The upper and lower quartiles represent half the data</p> | Zeros can be present or missing, but must be consistent. | | | | | | | | | | | | |
| (b) | box plot drawn | B2 (B1) | <p>for fully correct box plot</p> <p>for showing a box and at least 3 correctly plotted values)</p> | Box can be of any height. Accept ends that are marked (eg line, cross, dot) or defined by the end of the whiskers if clear | | | | | | | | | | | | |
| (c) | decision and comparisons | C1 C1 | <p>(ft) for correct comparison of medians eg the median for online is greater than the median for the shop, the shop takes less money from sales in general as the median is lower</p> <p>(ft) for a correct comparison of a measure of spread, eg the interquartile (range) of sales for the online store is greater than the IQR for the sales of the shop</p> <p>Comparisons for this mark can relate to the range or the IQR.</p> <p>For the award of both marks at least one comparison must be in the context of the question.</p> | <p>Simply quoting values for median, range and IQR is insufficient, they must be compared</p> <table style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td>Median</td> <td>Range</td> <td>IQR</td> </tr> <tr> <td>Online</td> <td>200</td> <td>360</td> <td>190</td> </tr> <tr> <td>Shop</td> <td>170</td> <td>320</td> <td>180</td> </tr> </table> <p>Also accept figures as 000s as long as consistent.</p> <p>Figures need not be seen but if given they must be correct.</p> | | Median | Range | IQR | Online | 200 | 360 | 190 | Shop | 170 | 320 | 180 |
| | Median | Range | IQR | | | | | | | | | | | | | |
| Online | 200 | 360 | 190 | | | | | | | | | | | | | |
| Shop | 170 | 320 | 180 | | | | | | | | | | | | | |

| Paper: 1MA1/2H | | | | |
|----------------|------------------|------------------------|---|---|
| Question | Answer | Mark | Mark scheme | Additional guidance |
| 11 | Shown | M1 M1 C1 | for $6 \times 14.5 (= 87)$ or $13 \times 7 (= 91)$ or $13 \div 6 (= 2.16(666\dots))$ for “87” $\div 7 (= 12.428\dots)$ or “87” $\div 13 (= 6.692\dots)$ or $6 \times 14.5 (= 87)$ and $13 \times 7 (= 91)$ or $14.5 \div “2.16” (= 6.692\dots)$ (dep M2) for 12.(428...) (workers) or 6.69(2...) (days) or 87 and 91 | May work in hours or other units of time Accept figure rounded or truncated to 1dp Figures must be correct and supported by working. Accept value in range 6.69 to 6.72 for number of days |
| 12 | comparison shown | M1 A1 | for starting to manipulate equation, eg $5y = 10x + 15$ or $5y = 10x - 4$ or $y - 2x + \frac{4}{5} = 0$ or $y - 2x = 3$ for statement and equation(s) which can be used to show that the gradients of the two lines are the same, eg $5y = 10x + 15$ and $5y = 10x - 4$ and both have the same x coefficient OR $y = 2x - \frac{4}{5}$ and both have a gradient of 2 | Ignore constant terms for both marks |
| 13 | enlargement | B2 (B1) | for correct enlargement at (4, 8) (6, 4) (10, 4) (12, 8) for correct size and orientation in the wrong position OR 3 of 4 vertices correct) | |

| Paper: 1MA1/2H | | | | |
|----------------|--------|------------------------|---|---|
| Question | Answer | Mark | Mark scheme | Additional guidance |
| 14 | 1220 | P1 P1 A1 | for $\frac{45}{305}$ (= 0.147...) or $\frac{180}{45}$ (= 4) or $\frac{305}{45}$ (= 6.77...) or $\frac{45}{180}$ (= 0.25) for $\frac{45}{305} = \frac{180}{n}$ or $\frac{45}{180} = \frac{305}{n}$ or $\frac{180 \times 305}{45}$ cao | Decimal values truncated or rounded to 2 dp or more |

| Paper: 1MA1/2H | | | | |
|----------------|----------------|------|--|---------------------|
| Question | Answer | Mark | Mark scheme | Additional guidance |
| 15 | (M) 18, (K) 15 | P1 | <p>for start of process, eg $(6x + 1.5)$ and $(5x + 1.5)$ or $(6x + 1.5)$ and $(11x + 3)$ or $a + 1.5$ and $b + 1.5$</p> <p>OR starts to work with ratio, eg $6 : 5 = 12 : 10$</p> | |
| | | P1 | <p>for setting up an equation, eg $\frac{6x+1.5}{5x+1.5} = \frac{13}{11}$ or $66x + 16.5 = 65x + 19.5$ or $\frac{6x+1.5}{11x+3} = \frac{13}{24}$ or $144x + 36 = 143x + 39$ or $\frac{a}{b} = \frac{6}{5}$ and $\frac{a+1.5}{b+1.5} = \frac{13}{11}$</p> <p>or $5a = 6b$ and $11a + 16.5 = 13b + 19.5$ oe</p> <p>OR for comparing $12 : 10$ to $13 : 11$ and deducing 1 part = 1.5</p> | |
| | | P1 | <p>for isolating in terms of x, eg $66x - 65x = 19.5 - 16.5$ or $144x - 143x = 39 - 36$ or $x = 3$</p> <p>or for eliminating a or b, eg $55a = 66b$ and so $66b = 65b + 15$</p> <p>OR for process to find values for M and K, eg 12×1.5 and 10×1.5</p> | |
| | | A1 | cao | |

Paper: 1MA1/2H

| Question | Answer | Mark | Mark scheme | Additional guidance |
|----------|-----------------|-------------------------------------|---|---|
| 16 (a) | Venn diagram | C4 (C3 (C2 (C1 | fully correct Venn diagram 6 or 7 of the 8 regions correct) 4 or 5 of the 8 regions correct) 2 or 3 of the 8 regions correct) |  <p>If all other regions correct, accept blank region for 0 Additional digits in the diagram should be counted as 2 elements</p> |
| (b) | $\frac{12}{62}$ | M1 A1 | (ft their Venn diagram) for $\frac{"8+4"}{b}$ where $b > "8+4"$ or $\frac{a}{"44+8+4+6"}$ where $a < "44+8+4+6"$ oe ft oe | Need not be written in correct form at this stage eg could be a ratio 12 : 62 Accept any equivalent fraction, decimal form 0.19(35...) or percentage form 19(.35...)% |

| Paper: 1MA1/2H | | | | |
|----------------|--------|------|--|---|
| Question | Answer | Mark | Mark scheme | Additional guidance |
| 17 (a) | 25.9 | P1 | <p>for process to find volume of hemisphere, eg $\frac{1}{2} \times \frac{4}{3} \times \pi \times 3.5^3$ (=89.797...) $\left(\frac{343\pi}{12}\right)$</p> <p>or for a correct expression for the volume of the cone, eg $\frac{1}{3} \times \pi \times 3.5^2 (y - 3.5)$ or $\frac{1}{3} \times \pi \times 3.5^2 \times h$</p> | <p>'y - 3.5' may be seen as a new variable, but cannot be just y Condone missing brackets Accept decimals rounded or truncated to 1dp</p> <p>$120\pi - "89.797..." = 287.193...$ or $\frac{1097\pi}{12}$</p> <p>π may be missing throughout Award of this mark implies award of the previous May be seen in multiple steps</p> |
| | | P1 | <p>for setting up an equation linking all three aspects, eg $\frac{1}{2} \times \frac{4}{3} \times \pi \times 3.5^3 + \frac{1}{3} \times \pi \times 3.5^2 (y - 3.5) = 120\pi$</p> <p>or "89.797..." + "12.828..."(y - 3.5) = "376.99 ..." or "28.5833..." π + "4.0833..." $\pi(y - 3.5) = 120\pi$</p> | |
| | | P1 | <p>for process to isolate y or (y - 3.5) or h in their equation, $120\pi - \frac{1}{2} \times \frac{4}{3} \pi 3.5^3 + \frac{1}{3} \pi 3.5^3$ eg $\frac{\frac{1}{3} \pi 3.5^2}{\frac{1}{3} \pi 3.5^2}$</p> <p>or $\frac{"376.99..." - "89.797..." + "44.898..."}{"12.828..."}$</p> <p>or $\frac{120\pi - "28.583..." \pi + "14.291..." \pi}{"4.083..." \pi}$ oe</p> | |
| | | A1 | <p>for answer in range 25.8 to 26.3</p> <p>SCB3 for an answer in the range 22.3 to 22.8 or $\frac{1097}{49}$</p> | <p>If an answer is given in the range in working and then rounded incorrectly award full marks.</p> |

| Paper: 1MA1/2H | | | | |
|----------------|-------------|----------------------------------|--|--|
| Question | Answer | Mark | Mark scheme | Additional guidance |
| (b) | explanation | C1 | for explanation, eg Acceptable examples the height would decrease the height would be 0 at 14.227 y would be smaller it would decrease Not acceptable examples the height would increase | |
| 18 | 7.63 | M1 M1 M1 A1 | for process to use the cosine rule to find QR , eg $(QR^2 =) 11^2 + 9.4^2 - 2 \times 11 \times 9.4 \cos(27)$ for correct order of operations, eg $QR = \sqrt{209.36 - 206.8 \times \cos 27}$ (= 5(.009...)) or $QR = \sqrt{25(.09...)} \text{ or } \sqrt{25.1}$ (dep on M1) for process to use the sine rule, eg $\frac{QS}{\sin 88} = \frac{[QR]}{\sin 41}$ oe or $QS = \frac{[QR] \times \sin 88}{\sin 41}$ (= 7.631...) oe for answer in range 7.61 to 7.632 | [QR] could be written as “5.009...” or could be a different figure, as long as this is clearly associated with the side QR If an answer is given in the range in working and then rounded incorrectly award full marks. Award 0 marks for a correct answer with no (or incorrect) supportive working |

| Paper: 1MA1/2H | | | | | |
|----------------|-------------------|------|---|---|---|
| Question | Answer | Mark | Mark scheme | | Additional guidance |
| 19 (a) | 3 | B1 | cao | | [g ⁻¹ (x)] must be their inverse function and cannot be $\sqrt[3]{2x-5}$ |
| (b) | $\frac{2}{x^3+5}$ | M1 | for finding $(g^{-1}(x) = \frac{x^3+5}{2})$ oe | | |
| | | M1 | for $(hg^{-1}(x) = \frac{1}{g^{-1}(x)})$ oe | | |
| | | A1 | Accept $\left(\frac{x^3+5}{2}\right)^{-1}$ | | |
| 20 | 98 | M1 | for $BAD = 132 \div 2 (= 66)$ | | Angles may be seen on diagram |
| | | M1 | eg $BCD = 180 - "66" (= 114)$ or $ABE = 180 - "66" - 16 (= 98)$ | M2 for reflex $BOD = 360 - 132 (= 228)$ and $BCD = "228" \div 2 (= 114)$ | |
| | | A1 | for finding $CDE = 98$ | | |
| | | C1 | (dep on at least M2) for one circle theorem relevant to their method eg The <u>angle</u> at the <u>centre</u> of a circle is <u>twice</u> the <u>angle</u> at the <u>circumference</u> or <u>Opposite angles</u> of a <u>cyclic quadrilateral</u> add up to 180 | | |
| | | | | | Underlined words need to be shown; reasons need to be linked to their method. |

| Paper: 1MA1/2H | | | | |
|----------------|---------------------------|------|--|--|
| Question | Answer | Mark | Mark scheme | Additional guidance |
| 21 (a) | Sketch | B1 | for an appropriate sketch, ie reflection in y axis | Must go through (-2, -4) (0, 0) (1, 1) (3, 0) (5, 4) |
| (b) | $\tan(x + 270)^\circ - 5$ | M1 | for describing one part of the translation, eg $360 - 90 (= 270)$ or $\tan(x + 270)$ or $(y =) \tan(kx + a) - 5$ where k and a are numbers and $k \neq 0$ | |
| | | A1 | cao | Condone missing degree symbol |
| 22 | $x < -7, x > 8$ | M1 | for method to solve $x^2 - 49 > 0$ eg $(x + 7)(x - 7)$ or 7 and -7 | accept use of = or incorrect inequality symbol for both the M marks This may be implied by a suitable diagram |
| | | A1 | for $x < -7$ and $x > 7$ | |
| | | M1 | for method to solve $5x^2 - 31x - 72 > 0$ eg $(5x \pm 9)(x \pm 8)$ or $\frac{- -31 \pm \sqrt{(-31)^2 - 4 \times 5 \times (-72)}}{2 \times 5}$ | This may be implied by a suitable diagram |
| | | | or 8 and -1.8 oe | |
| | | A1 | for $x < -1.8$ and $x > 8$ | |
| | | A1 | cao | |

QUESTION 7 – Additional information NOT Exhaustive

| | |
|---|---|
| <p><u>Cost per litre in £:</u> $27 \times 0.85 (=22.95)$ $"22.95" \div 18 (=1.275)$ $8 \times 4.5 (=36)$ No and $40.8 \div "36" = 1.133..$ (cost per litre in £ in Wales) compared to 1.275 (cost per litre in £ in Spain).</p> | <p><u>Cost per litre in euros:</u> $27 \div 18 (=1.5)$ $8 \times 4.5 (=36)$ $40.8 \div 0.85 (= 48)$ No and $"48" \div "36" = 1.333..$ (cost per litre in euros in Wales) compared to 1.5 (cost per litre in euros in Spain).</p> |
| <p><u>Cost per gallon in £:</u> $40.8 \div 8 (=5.1)$ $27 \times 0.85 (=22.95)$ $18 \div 4.5 (= 4)$ No and $"22.95" \div "4" = 5.7375$ (cost per gallon in £ in Spain) compared to 5.1(0) (cost per gallon in £ in Wales).</p> | <p><u>Cost per gallon in euros:</u> $40.8 \div 0.85 (=48)$ $"48" \div 8 (= 6)$ $18 \div 4.5 (=4)$ No and $27 \div "4" = 6.75$ (cost per gallon in euros in Spain) compared to 6 (cost per gallon in euros in Wales).</p> <p><u>Note:</u> $"2"$ comes from $8 \div "4"$ or $"36" \div 18$</p> |
| <p><u>Cost of 8 gallons in £:</u> $18 \div 4.5 (= 4)$ $27 \times 0.85 (=22.95)$ $"22.95" \times "2" (=45.90)$ No and 45.90 (total cost in £ in Spain) compared to 40.80 (total cost in £ in Wales given).</p> | <p><u>Cost of 8 gallons in euros:</u> $18 \div 4.5 (=4)$ $40.8 \div 0.85 (=48)$ $27 \times "2" (= 54)$ No and 54 (cost for 8 gallons in euros in Spain) compared to 48 (cost of 8 gallons in euros in Wales).</p> |
| <p><u>Cost of 18 litres in £:</u> $8 \times 4.5 (= 36)$ $40.8 \div "2" (= 20.4)$ $27 \times 0.85 (= 22.95)$ No and 22.95 (cost for 18 litres in £ in Spain) compared to 20.40 (cost of 18 litres in £ in Wales). OR $18 \div 4.5 (= 4)$ $27 \times 0.85 (= 22.95)$ $40.8 \div "2" (= 20.4)$ No and 22.95 (cost for 18 litres in £ in Spain) compared to 20.40 (cost of 18 litres in £ in Wales).</p> | <p><u>Cost of 18 litres in euros:</u> $18 \div 4.5 (=4)$ $40.8 \div 0.85 (=48)$ $"48" \div "2" (= 24)$ No and 24 (cost for 18 litres in euros in Wales) compared to 27 (cost of 18 litres in euros in Spain given). OR $8 \times 4.5 (= 36)$ $40.8 \div "2" (= 20.4)$ $"20.4" \div 0.85 (= 24)$ No and 24 (cost for 18 litres in euros in Wales) compared to 27 (cost of 18 litres in euros in Spain given).</p> |

Modifications to the mark scheme for Modified Large Print (MLP) papers: 1MA1 2H

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: $\pm 5^\circ$

Measurements of length: ± 5 mm

| PAPER: 1MA1_2H | | |
|----------------|--|---|
| Question | Modification | Mark scheme notes |
| 1 | (b) The letter x changed to y . | Standard mark scheme but note change of letter. |
| 2 | Wording added 'Look at the diagram for Question 2 in the Diagram Booklet. It shows shape S and shape T on a grid. A cut out shape may be available if you wish to use it.' Cut out shape provided. Diagram enlarged. Shading changed. The axes labels moved to the top of the vertical axis and to the right of the horizontal axis. Open headed arrows. The shapes labelled as 'shape T' and 'shape S'. | Standard mark scheme |
| 9 | The frame removed from the formula. | Standard mark scheme |
| 10 | (a) Wording added 'Look at the diagram for Question 10(a) in the Diagram Booklet. It is a box plot which shows...'. The values changed so that they can be on grid lines. The least value changed to 50; lower quartile changed to 150; greatest value changed to 450. Diagram enlarged. Small squares removed. The horizontal axis label moved to the left of the horizontal axis. The grid cut at 500. The wording '...lies between 160 000 and 350 000' removed and replaced by '...lies between 150 000 and 350 000'. | Standard mark scheme but explanation should reference the adjusted figures. 160 now 150 350 still 350 IQR now 200 (000) |
| 10 | (c) Wording added 'The table below shows...'. Wording added 'Look at the diagram for Question 10(b) in the Diagram Booklet.' The wording 'On the grid below,' removed and replaced by 'On the grid in the Diagram Booklet,'. The values changed so that they can be plotted on grid lines. The least value changed to 50; LQ changed to 100; median changed to 150; UQ changed to 250. Diagram enlarged. Small squares removed. The horizontal axis label moved to the left of the horizontal axis. The grid cut at 500. | Standard mark scheme but explanation should reference the adjusted figures. Median Range IQR Online 190 400 200 Shop 150 300 150 |

PAPER: 1MA1_2H

| Question | Modification | Mark scheme notes |
|-----------------|--|---|
| 13 | <p>The question reversed and the candidate asked to describe the transformation instead of drawing.</p> <p>The shape drawn on the grid at the points (4, 8), (6, 4), (10, 4) and (12, 8) and labelled 'shape B'.</p> <p>The original shape labelled 'shape A'.</p> <p>Wording added 'Look at the diagram for Question 13 in the Diagram Booklet. It shows shape A and shape B on a grid. Shape A has been mapped onto shape B. Describe fully the single transformation that maps shape A onto shape B'.</p> <p>The grid cut at $x = -7$ and $x = 13$. The grid cut at $y = -6$ and $y = 9$.</p> <p>Diagram enlarged. Open headed arrows. Shading changed.</p> <p>The axes labels moved to the top of the vertical axis and to the right of the horizontal axis.</p> <p>3 answer lines provided.</p> | <p>B2 for a complete answer containing all three aspects: enlargement, (scale factor) -2, (centre of enlargement) origin or (0,0)</p> <p>(B1 for a partial answer containing two of the three aspects listed above).</p> <p>Award no marks if more than one transformation is given.</p> |
| 16 | <p>Wording added 'Look at the diagram for Question 16 in the Diagram Booklet. It shows an incomplete Venn diagram.'</p> <p>In part (a) wording added 'Complete the Venn diagram in the Diagram Booklet for this information.' Diagram enlarged. The circles relabelled as 'type A', 'type B' and 'type C'.</p> <p>Braille: In the Venn diagram, add (i), (ii), (iii), (iv), (v), (vi), (vii) & (viii) in the blank spaces.</p> <p>Also add "Ans: (i) __ (ii) __ (iii) __ (iv) __ (v) __ (vi) __ (vii) __ (viii) __"</p> | Standard mark scheme |

PAPER: 1MA1_2H

| Question | Modification | Mark scheme notes |
|-----------------|--|--------------------------|
| 17 | <p>Wording added ‘Look at Diagram 1, Diagram 2 and the formulas for Question 17 in the Diagram Booklet. You may be provided with a model for the question and additional formula models.’</p> <p>The wording ‘...to make the solid T shown below’ removed and replaced by ‘...to make the solid T as shown by Diagram 1 and the model’.</p> <p>Model provided. Formula models provided. Diagram 2 to show a 2D diagram of solid T.</p> <p>Diagrams enlarged. Open headed arrows. The dashed lines made longer and thicker.</p> <p>The frame removed from the formulas.</p> <p>Wording added ‘You may be provided with a model.’ below the formulas.</p> <p>Wording added ‘Diagram 2 is a simplified 2D diagram of solid T. ‘The total vertical height...’</p> <p>Braille: Add the sentence “Separate models are provided to accompany these formulae.”</p> | Standard mark scheme |
| 18 | <p>Wording added ‘Look at the diagram for Question 18 in the Diagram Booklet. It shows triangles PQR and QRS which have a common side QR.’</p> <p>Wording added: ‘PQ = 11 cm PR = 9.4 cm angle QPR = 27° angle QRS = 88° angle RSQ = 41°’.</p> <p>Diagram enlarged. The angles moved outside of the angle arcs and the angle arcs made smaller.</p> | Standard mark scheme |
| 20 | <p>Wording added ‘Look at the diagram for Question 20 in the Diagram Booklet.’</p> <p>Wording added: ‘Angle BOD = 132° Angle CED = 16°’ Diagram enlarged.</p> <p>The angles moved outside of the angle arcs and the angle arcs made smaller.</p> | Standard mark scheme |

PAPER: 1MA1_2H

| Question | | Modification | Mark scheme notes |
|-----------------|-----|--|--------------------------|
| 21 | (a) | Wording added 'Look at the diagram for Question 21(a) in the Diagram Booklet. It shows the graph of $y = f(x)$ on a grid.' Wording removed 'The graph of $y = f(x)$ is shown on the grid below.' Diagram enlarged. The axes labels moved to the top of the vertical axis and to the right of the horizontal axis. Wording added 'On the grid in the Diagram Booklet,'. | Standard mark scheme |
| 21 | (b) | Wording added 'Look at the diagram for Question 21(b) in the Diagram Booklet. It shows a sketch...'. Diagram enlarged. The axes labels moved to the top of the vertical axis and to the right of the horizontal axis. The dashed lines made longer and thicker. The wording 'shown on the graph above' removed and replaced by 'shown on the graph in the Diagram Booklet'. | Standard mark scheme |



Pearson
Edexcel

Mark Scheme (Results)

Summer 2022

Pearson Edexcel GCSE (9 – 1)
In Mathematics (1MA1)
Higher (Calculator) Paper 3H

Paper: 1MA1/3H

| Question | Answer | Mark | Mark scheme | Additional guidance |
|----------|------------------------|--|--|--|
| 1 | 7.5 | M1 A1 | for correct use of Pythagoras, eg $8.5^2 - 4^2 (= 56.25)$ or $4^2 + x^2 = 8.5^2$ for 7.5 or $7\frac{1}{2}$ or $\frac{15}{2}$ | Must have values substituted Trigonometry may be used but M1 only awarded when complete method shown. |
| 2 (a) | 25 | M1 A1 | for $(T =) 4 \times (-3)^2 - 11$ or $4 \times (-3)^2 = 36$ cao | Can accept missing brackets. |
| (b) | $p = \frac{d-4}{3}$ oe | M1 A1 | for a correct first step, eg. $d - 4 = 3p$ or $\frac{d}{3} = p + \frac{4}{3}$ or for $\frac{d-4}{3}$ as answer for $p = \frac{d-4}{3}$ oe | May be in unsimplified form, eg $d - 4 = 3p + 4 - 4$ |
| 3 | 1.5 | P1 P1 P1 P1 A1 | for process to develop 3 algebraic expressions, eg. $(R =) n$, $(S =) 2n$, $(T =) 2n - 6$, oe, at least two must be correct. or for selecting 3 values satisfying the given criteria, eg. $(R =) 10$, $(S =) 20$, $(T =) 14$ for process to sum 3 algebraic expressions and equating to 54, eg. $n + "2n" + "2n - 6" = 54$ or for finding the correct sum of their values eg. $"10" + "20" + "14" = 44$ for start of process to solve the correct linear equation, eg. $5n = 54 + 6$ ($n = 12$) or for 12, 24, 18 for $"12" : 2 \times "12" - 6$ oe eg $12 : 18$ oe or $18 : 12$ linked to T, R for 1.5 or $\frac{3}{2}$ or $1\frac{1}{2}$ | Accept 1 : 1.5 etc as answer |

Paper: 1MA1/3H

| Question | Answer | Mark | Mark scheme | Additional guidance |
|----------|---|---|--|--|
| 4 | Chic Decor with correct supporting evidence | <p>P1</p> <p>P1</p> <p>P1</p> <p>C1</p> | <p>for process to find cost of 15 rolls from Chic Decor, eg $\frac{15}{3} \times 36 (= 180)$ or for process to find cost of 15 rolls from Style Papers at normal price, eg $\frac{15}{5} \times 70 (= 210)$ or for process to find cost of 1 roll from Chic Decor, eg $36 \div 3 (= 12)$ or for process to find cost of 1 roll from Style Papers, eg $70 \div 5 (= 14)$ or for process to find the cost of 5 rolls from Chic Decor, eg $\frac{36}{3} \times 5 (= 60)$</p> <p>P1 for any first step in using the discount at Style Papers, eg $0.12 \times "210" (= 25.2(0))$ or $0.12 \times "14" (= 1.68)$ or $0.12 \times 70 (= 8.4(0))$ or $1 - 0.12 (= 0.88)$</p> <p>P1 for full process to find cost from Style Papers, eg. $"210" - "25.2" \text{ oe } (=184.8(0))$ or $"0.88" \times "210"$ or for $"14" - "1.68" \text{ oe } (= 12.32)$ or $"0.88" \times "14"$ or for $70 - "8.4(0)" \text{ oe } (= 61.6(0))$ or $"0.88" \times 70$</p> <p>C1 for Chic Decor with fully correct figures eg 180 and 184.8(0) or 12 and 12.32 or 60 and 61.6(0)</p> | <p>Could compare the costs for any number of rolls</p> |

Paper: 1MA1/3H

| Question | Answer | Mark | Mark scheme | Additional guidance |
|----------|-----------------------------|------|--|--|
| 7 | Complete chain of reasoning | M1 | for (area of trapezium $TQRS = 0.5 \times 4x \times (2x + 3x)$ or for (area of rectangle $TUVS = 4x \times (3x + 5) (= 12x^2 + 20x)$ M1 for (area of trapezium $QUVR = 4x(3x + 5) - 0.5 \times 4x \times (2x + 3x)$ C1 for correct algebraic processing and simplification to the given form M1 Alternative 1 for ($QU = 3x + 5 - 2x (= x + 5)$) M1 for (area of trapezium $QUVR = 0.5 \times 4x \times ((x + 5) + 5)$ or $0.5 \times 4x \times (x + 10)$) C1 for correct algebraic processing and simplification to the given form M1 Alternative 2 for (area of triangle $= 0.5 \times (3x - 2x) \times 4x$ or for (area of rectangle $= 4x \times 5$) M1 for (area of trapezium $QUVR = "0.5 \times (3x - 2x) \times 4x" + "4x \times 5"$) C1 for correct algebraic processing and simplification to the given form | Evidence for the award of marks may be seen on the diagram Alternative methods may be seen. Accept x for $(3x - 2x)$ |

Paper: 1MA1/3H

| Question | Answer | Mark | Mark scheme | Additional guidance |
|----------|------------------------------|------|---|----------------------------------|
| 8 (a) | 0.14 | M1 | for a method to find the gradient, eg. $14 \div 100$ using readings from the graph, at least one correct or for an answer of $0.14x$ | Must use the scales on the graph |
| (b) | Cost per unit of electricity | A1 | for answer in the range 0.135 to 0.145 or ft correct readings from the graph | May be expressed as a fraction |
| | | C1 | for a correct explanation Acceptable examples eg cost of each unit (of electricity) rate of change of cost with units of electricity used cost per unit of electricity each unit costs 14p average cost charged for each unit of electricity used Not acceptable examples cost of how many units used costs in pounds per number of units used how much the cost of electricity goes up the relationship of cost and number of units used how steep it is | |

Paper: 1MA1/3H

| Question | Answer | Mark | Mark scheme | Additional guidance |
|----------|-----------|------|--|---------------------|
| 9 (a) | 10^{60} | M1 | for a correct first step using one of the rules of indices, eg. $10^{150} \times 10^{90} = 10^{240}$ or $10^{360} \div 10^{150} = 10^{210}$ or $10^{360} \div 10^{90} = 10^{270}$ or $\sqrt{10^{360}} = 10^{180}$ or $\sqrt{10^{150}} = 10^{75}$ or $\sqrt{10^{90}} = 10^{45}$ | |
| | | M1 | for correct use of rules of indices leading as far as $\sqrt{10^{120}}$ or $\frac{10^{180}}{10^{120}}$ | |
| | | A1 | cao | |
| (b) | reason | C1 | for correct reasoning Acceptable examples eg should do 50×2 (not 50^2) because $(12^{50})^2 = 12^{100}$ because when you have a power inside and outside the bracket you times them because $(a^b)^c = a^{bc}$ (not a^{b^c}) Not acceptable examples because you need to multiply everything in the brackets by 2 because he should have squared 12 as well you add the powers instead of timesing | |

| Paper: 1MA1/3H | | | | |
|----------------|--------|--|---|---|
| Question | Answer | Mark | Mark scheme | Additional guidance |
| 10 | 24000 | P1 P1 A1 | for use of either 0.9 or 0.875 or for 18900 (after 2 years) for using $0.9^2 \times 0.875 (= 0.70875)$ oe or for 21000 (after 1 year) cao | |
| 11 | 240 | M1 A1 | for $16 \times 5 \times 3$ cao | |
| 12 | 23.4 | M1 M1 A1 M1 M1 A1 | for stating that $AC = 8$ or for a relationship that may be used to find AC eg $(AC =) 8 \times \tan 45$ or $\tan 45 = \frac{AC}{8}$ for relationship that may be used to find AB , eg $\sin(20) = "8" \div AB$ or $(AB =) \frac{"8"}{\sin 20}$ for answer in the range 23.3 to 23.4 Alternative for a relationship that may be used to find AD eg $\cos(45) = 8 \div AD$ oe or $(AD =) 11.3(13\dots)$ for a relationship that may be used to find AB , eg $\frac{AB}{\sin 45} = \frac{"11.3"}{\sin 20}$ for answer in the range 23.3 to 23.4 | May be seen on diagram May use the sine rule If an answer is given in the range in working and then rounded incorrectly award full marks. May be seen on diagram If an answer is given in the range in working and then rounded incorrectly award full marks. |

Paper: 1MA1/3H

| Question | Answer | Mark | Mark scheme | Additional guidance |
|----------|---|------------------------|--|---|
| 13 | $\begin{pmatrix} -1 \\ 4 \end{pmatrix}$ | M1 M1 A1 | for $3\begin{pmatrix} 2 \\ -3 \end{pmatrix} - 2\mathbf{b} = \begin{pmatrix} 8 \\ -17 \end{pmatrix}$ oe or for $\begin{pmatrix} 6 \\ -9 \end{pmatrix}$ for $2\mathbf{b} = \begin{pmatrix} 3 \times 2 - 8 \\ 3 \times -3 - -17 \end{pmatrix} (= \begin{pmatrix} -2 \\ 8 \end{pmatrix})$ oe or $-2\mathbf{b} = \begin{pmatrix} 8 - 3 \times 2 \\ -17 - 3 \times -3 \end{pmatrix} (= \begin{pmatrix} 2 \\ -8 \end{pmatrix})$ oe or for one element correct, -1 or 4 cao (if M0 scored, SC B1 for $\begin{pmatrix} 1 \\ -4 \end{pmatrix}$) | Must see “ $2\mathbf{b} = \dots$ ” or “ $-2\mathbf{b} = \dots$ ” to award 2 marks One correct element scores 2 marks |
| 14 (a) | $4(p-3)(p+3)$ | M1 A1 | for $4(p^2 - 9)$ or partial factorisation which includes the product of 2 linear factors eg. $(4p - 12)(p + 3)$ or $(p - 3)(4p + 12)$ or $(2p - 6)(2p + 6)$ or $2(2p - 6)(p + 3)$ or $2(2p + 6)(p - 3)$ or $2(p - 3)2(p + 3)$ for $4(p - 3)(p + 3)$ | |
| (b) | $6m^3 + 11m^2 - 57m - 20$ | M1 M1 A1 | for a method to find the product of two linear expressions, 3 correct terms out of 4 terms, eg. $6m^2 + 2m - 15m - 5 = 6m^2 - 13m - 5$ or $2m^2 + 8m - 5m - 20 = 2m^2 + 3m - 20$ or $3m^2 + 12m + m + 4 = 3m^2 + 13m + 4$ for a complete method to obtain all terms, at least half of which are correct (ft their first product), eg. $6m^3 + 2m^2 - 15m^2 + 24m^2 + 8m - 60m - 5m - 20$ for $6m^3 + 11m^2 - 57m - 20$ | Note that, for example, $3m - 20$ is regarded as three terms in the expansion of $(m + 4)(2m - 5)$ First product must be a 3 or 4 term quadratic but need not be simplified or may be incorrect. Accept $a = 6, b = 11, c = -57, d = -20$ |

| Paper: 1MA1/3H | | | | |
|----------------|--------|------|--|--|
| Question | Answer | Mark | Mark scheme | Additional guidance |
| 15 | Proof | C1 | for angle $PQX = \text{angle } SRX$ as <u>angles</u> in the <u>same segment</u> are equal (or <u>angles</u> at the circumference <u>subtended</u> from the same <u>arc/chord</u> of a circle are equal) | Underlined words need to be shown; reasons need to be linked to their method. |
| | | | or angle $QPX = \text{angle } RSX$ as <u>angles</u> in the <u>same segment</u> are equal (or <u>angles</u> at the circumference <u>subtended</u> from the same <u>arc/chord</u> of a circle are equal) | |
| | | | or angle $PXQ = \text{angle } SXR$ as vertically <u>opposite angles</u> / <u>vertically opposite angles</u> are equal | |
| | | | or for identifying two pairs of corresponding equal angles with no reason given | Could be shown on the diagram |
| | | C1 | for identifying two pairs of corresponding equal angles with correct reasons given | |
| | | C1 | for stating that the triangles are similar because all three pairs of corresponding angles are equal with complete reasons given. | Note that the students third/final reason may be: <u>Angles in a triangle</u> add up to 180 |
| 16 | 17.4 | B1 | for stating any correct bound, eg. 6.75 or 6.85 or 0.045 or 0.055 | Accept 6.849 or 6.8499... for 6.85 and 0.0549 or 0.05499.. for 0.055 |
| | | M1 | using both UB of e and LB of f to work out value of $2e \div f$, eg $2[\text{UB of } e] \div [\text{LB of } f]$ or $\frac{2 \times 6.85}{0.045}$ | $6.8 < \text{UB}(e) \leq 6.85$ $0.045 \leq \text{LB}(f) < 0.05$ |
| | | A1 | for answer in the range 17.4 to 17.5 from correct working | If an answer is given in the range in working and then rounded incorrectly 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 |
| 17 (a) | histogram drawn | B3 | for fully correct histogram, eg. relative heights 90, 96, 44, 8, 6 | |
| | | (B2) | for 4 correct bars or for frequency \div class interval for all 5 frequencies and 2 correct bars of different widths) | |
| | | (B1) | for 2 correct bars of different widths or for frequency \div class interval for at least 3 frequencies) | |
| (b) | $0.4n$ | M1 | for finding ratio of heights or widths of bars, eg $5 : 1$ or $\frac{1}{5}$, $1 : 2$ or $\frac{n}{5}$ oe or $2n$ oe as answer or compares areas of bars, eg 6 and 2.4 or 3 and 1.2 or 150 and 60 | |
| | | A1 | for $0.4n$ oe | Evidence for this mark may be seen on the diagram Any 2 numbers in the ratio 2.5 : 1 score M1 |
| 18 | 30.6 | P1 | for process to find TC , eg. ($TC =$) $14 \times \frac{3}{3+4}$ ($= 6$) | Lengths of TC , TD , SD may be seen on the diagram A complete set of processes to find the angle is needed where an alternative route is involved with more than one stage in the working If an answer is given in the range in working and then rounded incorrectly award full marks. |
| | | P1 | for process to find TD , eg. ($TD =$) $\sqrt{14^2 + "6"'^2}$ or $\sqrt{232}$ or $2\sqrt{58}$ ($= 15.2\dots$) | |
| | | P1 | for process to find SD , using area of a trapezium, $147 = 0.5 \times (SD + 12) \times 14$, or $SD = 9$ | |
| | | P1 | for $\tan^{-1}\left(\frac{"9"}{"15.2\dots"}\right)$ | |
| | | A1 | for answer in the range 30.4 to 30.7 | |

Paper: 1MA1/3H

| Question | Answer | Mark | Mark scheme | Additional guidance |
|----------|------------------------|---|--|---|
| 19 | $\frac{-11x+2}{x^2-4}$ | <p>M1</p> <p>M1</p> <p>M1</p> <p>A1</p> | <p>for writing at least one of the 3 terms with a denominator of $(x^2 - 4)$ or $(x - 2)(x + 2)$</p> <p>eg. $\frac{3x(x-2)}{x^2-4}$ oe or $\frac{(x+2)(2x+1)}{x^2-4}$ oe or $\frac{x^2-4}{x^2-4}$</p> <p>for $\frac{3x(x-2)}{x^2-4} - \frac{(x+2)(2x+1)}{x^2-4} - \frac{x^2-4}{x^2-4}$ oe</p> <p>or for $\frac{x^2-11x-2}{x^2-4} (-1)$</p> <p>or for $\frac{[x^2-11x-2]}{x^2-4} - \frac{x^2-4}{x^2-4}$</p> <p>for a numerator of $3x^2 - 6x - 2x^2 - 5x - 2 - x^2 + 4$</p> <p>for $\frac{-11x+2}{x^2-4}$</p> | <p>Students may work with a denominator of $(x - 2)(x + 2)$ for the first 3 marks</p> <p>$[x^2 - 11x - 2]$ denotes their expansion of $3x(x - 2) - (x + 2)(2x + 1)$</p> <p>May be simplified</p> <p>Accept $a = -11$ and $b = 2$</p> |
| 20 | 44 384 | <p>P1</p> <p>P1</p> <p>P1</p> <p>A1</p> | <p>for process to find a, eg. $29\,600 = 24\,000a + 800$ or $(a =) 1.2$ oe</p> <p>for $(P_{2020} =) "1.2" \times 29\,600 + 800 (= 36\,320)$</p> <p>for $(P_{2021} =) "1.2" \times "36\,320" + 800$</p> <p>cao</p> | |

Paper: 1MA1/3H

| Question | Answer | Mark | Mark scheme | Additional guidance |
|----------|-----------------|----------------------------------|--|--|
| 21 | $\frac{11}{21}$ | P1 P1 P1 A1 | <p>for any product of 3 probabilities of the form $\frac{a}{9} \times \frac{b}{8} \times \frac{c}{7}$ where $a < 9, b < 8, c < 7$</p> <p>for a product of 3 probabilities giving an even sum, eg. E,E,E = $\frac{4}{9} \times \frac{3}{8} \times \frac{2}{7}$ or E,O,O = $\frac{4}{9} \times \frac{5}{8} \times \frac{4}{7}$</p> <p>for summing the product of at least three correct triples, eg (E,E,E + E,O,O + O,O,E =) $\frac{4}{9} \times \frac{3}{8} \times \frac{2}{7} + \frac{4}{9} \times \frac{5}{8} \times \frac{4}{7} + \frac{5}{9} \times \frac{4}{8} \times \frac{4}{7}$ OR $3(\frac{4}{9} \times \frac{5}{8} \times \frac{4}{7})$</p> <p>for $\frac{11}{21}$ oe</p> <p>SCB1 for answer of $\frac{364}{729}$ (replacement)</p> | <p>May see fraction with denominator 504</p> <p>Students who indicate they are using the approach $P(\text{even}) = 1 - P(\text{odd})$ should be given credit as appropriate</p> <p>Accept any equivalent fraction, decimal form 0.52(38...) or percentage form 52(.38...)%</p> |

Paper: 1MA1/3H

| Question | Answer | Mark | Mark scheme | Additional guidance |
|----------|------------------------|--|--|---------------------|
| 22 | (-3, -11) and (5.5, 6) | M1 M1 M1 A1 A1 | for method to eliminate one variable, eg $(2x - 5)^2 = 6x^2 - 25x - 8$ or $y^2 = 6\left(\frac{y+5}{2}\right)^2 - 25\left(\frac{y+5}{2}\right) - 8$ for expanding the square to give, eg. $4x^2 - 20x + 25 = 6x^2 - 25x - 8$ or $y^2 = 6\left(\frac{y^2+10y+25}{4}\right) - 25\left(\frac{y+5}{2}\right) - 8$ for method to solve equation $2x^2 - 5x - 33 (= 0)$, eg $(2x - 11)(x + 3) (= 0)$ or $x = \frac{-(-5) \pm \sqrt{(-5)^2 - 4 \times 2 \times -33}}{2 \times 2}$ or -3, 5.5 oe or for method to solve equation $2y^2 + 10y - 132 (= 0)$, eg. $(2y + 22)(y - 6) (= 0)$ or $y = \frac{-10 \pm \sqrt{10^2 - 4 \times 2 \times -132}}{2 \times 2}$ or -11, 6 for (-3, -11) for (5.5, 6) oe | |

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: $\pm 5^\circ$

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 right-angled triangle, ABC.' Diagram enlarged. The diagram labelled ABC. Wording added: 'AB = 4 cm AC = 8.5 cm BC = x cm'. Wording added 'Angle ABC is a right angle.' The right angle made more obvious. | Standard mark scheme |
| 2 | (b) | The letter ' d ' changed to ' n ' | Standard mark scheme but note the change of letter |
| 3 | | Wording added 'Look at the information for Question 3 in the Diagram Booklet.' Wording added 'as shown in the ratio.' | Standard mark scheme |
| 4 | | Wording added 'Look at the information for Question 4 in the Diagram Booklet.' Wording added 'The information in the Diagram Booklet shows the cost...'. Diagram enlarged. The information stacked vertically. | Standard mark scheme |
| 5 | | Wording added 'Look at the diagram for Question 5 in the Diagram Booklet. It shows a frequency polygon.' Wording added 'The table below...'. Wording added 'Amos draws the frequency polygon in the Diagram Booklet...'. Diagram enlarged. Open headed arrows. Change the crosses to dots. The axes labels moved to the top of the vertical axis and to the left of the horizontal axis. | Standard mark scheme |
| 7 | | The letter x changed to y . Wording added 'Look at the diagram for Question 7 in the Diagram Booklet. It shows...'. Wording added: 'TQ = $2y$ cm, TS = $4y$ cm, SR = $3y$ cm, RV = 5 cm' Wording added 'The trapezium QUVR is shaded.' Diagram enlarged. Open headed arrows. The text moved out of the arrows. Shading changed. | Standard mark scheme |
| 8 | | Wording added 'Look at the diagram for Question 8 in the Diagram Booklet. It shows a graph.' Wording added 'David uses the graph in the Diagram Booklet...'. Diagram enlarged. Right axes labelled. Open headed arrows. Remove the small squares. The axes labels moved to the top of the vertical axis and to the left of the horizontal axis. | Standard mark scheme |

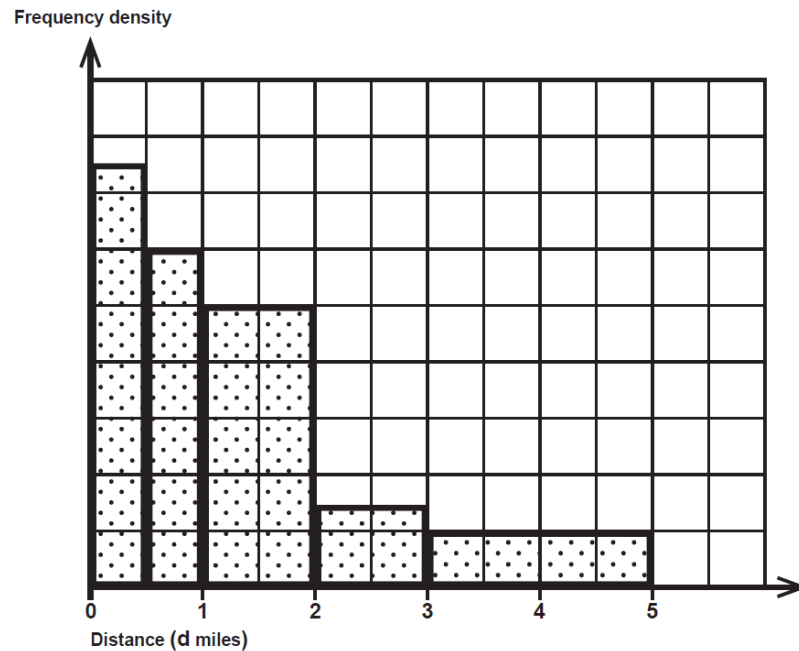
| | | | |
|----|-----|---|--|
| 12 | | <p>Wording added ‘Look at the diagram for Question 12 in the Diagram Booklet.’</p> <p>Wording added ‘...are right-angled triangles with a common side AC.’</p> <p>Wording added ‘Angle ACD and angle ACB are right-angles.’</p> <p>Diagram enlarged. The angles moved outside of the angle arcs and the angle arcs made smaller.</p> | Standard mark scheme |
| 15 | | <p>Wording added ‘Look at the diagram for Question 15 in the Diagram Booklet.’</p> <p>Diagram enlarged.</p> | Standard mark scheme |
| 16 | | <p>Letter ‘<i>e</i>’ changed to ‘<i>t</i>’. Letter ‘<i>f</i>’ changed to ‘<i>u</i>’.</p> | Standard mark scheme but note change of letters. |
| 17 | (a) | <p>The values changed: 48 changed to 50. 22 changed to 30. 8 changed to 20. 12 changed to 20.</p> <p>Wording added ‘Look at the diagram for Question 17(a) in the Diagram Booklet. It shows a grid.’</p> <p>Wording added ‘The table below...’. ‘On the grid in the Diagram Booklet...’.</p> <p>Diagram enlarged. Small squares removed. Open headed arrows. Grid reduced in size.</p> <p>Axes labels moved to the top of the vertical axis and to the left of the horizontal axis.</p> | <p>Standard mark scheme but note change in values: relative heights: 90, 100, 60, 20, 10</p> |

17

(b)

Wording added 'Look at the diagram for Question 17(b) in the Diagram Booklet. It is a histogram which shows...'.
 The values changed: 0.5 – 1 moved up to 30 small squares (6 squares high);
 1– 2 moved up to 25 small squares (5 squares high); 3 – 5 moved up to 5 small squares (1 square high)
 Diagram enlarged. Small squares removed. Open headed arrows. Shading changed.
 The axes labels moved to the top of the vertical axis and to the left of the horizontal axis.

Question 17(b)



M1 for comparing the heights of the bars of the two intervals, showing them in the ratio 5 : 2, eg. height of 1 - 2 = 5 units and height of 3 - 5 = 1 unit
 or compares areas of bars, eg 10 and 4
A1 for 0.4n oe

| | | |
|----|--|----------------------|
| 18 | <p>Open-fronted model provided with a dowel from S to T and D to T. A wedge placed at DTS. DC is labelled with 14 cm.</p> <p>Wording added ‘Look at Diagram 1 and Diagram 2 for Question 18 in the Diagram Booklet. You may be provided with a model.’</p> <p>Wording added ‘Diagram 1 and the model show a prism ABCDSPQR.’ ‘...a trapezium of area 147 cm^2 as shown in Diagram 2’; ‘CD = 14cm.’</p> <p>Diagram 1 to show the original diagram. The line ‘DT’ joined with a dotted line and an angle arc added.</p> <p>Diagram 2 to show SRC D with 12 cm, 14 cm and two right angles marked. Diagrams enlarged.</p> <p>The dashed lines made longer and thicker.</p> <p>Braille: For ALL candidates, provide a simplified 2D diagram of the cross section SRC D.</p> <p>Wording added: “Look at the diagram for Question 18 in the separate Diagram Booklet. The diagram is NOT accurately drawn. The diagram is a simplified 2D diagram of the cross section of the prism.”</p> | Standard mark scheme |
| 20 | <p>Wording added ‘Look at the table for Question 20 in the Diagram Booklet.’</p> <p>Wording added ‘The table in the Diagram Booklet...’. Table turned vertical.</p> | Standard mark scheme |
| 21 | <p>Wording added ‘Look at the diagram for Question 21 in the Diagram Booklet. It shows Ray’s nine cards numbered 1 to 9.’ Diagram enlarged.</p> <p>Braille: Text frames removed and the numbers listed.</p> <p>Words changed to “Ray has nine cards numbered 1 to 9, as listed below.”</p> | Standard mark scheme |

