Pearson

Mark Scheme (Results)

November 2025

PEARSON EDEXCEL GCSE in Mathematics
Higher (Calculator)
1MA1/3H

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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

Question	Answer	Mark	Mark scheme	Additional guidance
1 (a)(i)	1.426(8...)	M1	for a partial method, eg 84.9 oe or 41.7 oe or 2.03(5...) or 9.21… or 6.45(7…) **or** 1.4(26…) **or** digits 1426 or digits 1427	Allow values to at least 3 significant figures rounded or truncated. Check first 3 significant figures only. Allow to at least 2 significant figures rounded or truncated. Check first 2 significant figures only.
		A1	for 1.426(8...) or 1.427	Answer must be given to at least 4 significant figures rounded or truncated. Check first 4 significant figures only. Accept consistent use of comma to indicate a decimal point.
(ii)	1.43	B1	for 1.43 or ft (a)(i) provided more than 3 sf in (a)(i)	Do not accept trailing 0, eg 1.430
(b)	0.8	B1	for 0.8 or $\frac{4}{5}$ or an equivalent fraction eg $\frac{100}{125}$	Do not accept $\frac{1}{1.25}$

Question	Answer	Mark	Mark scheme	Additional guidance
2 (a)	45, 27	P1	for a start to the process, eg 2 (shares) = 18 or 18 ÷ 2 (= 9) or $5x - 3x = 18$ oe **or** for a process to use a build up method by giving at least 2 further equivalent ratios, eg 5 × 2 : 3 × 2 (= 10 : 6) **and** 5 × 3 : 3 × 3 (= 15 : 9)	One correct number eg 45 or 27 implies P1
		A1	for 45, 27 (in either order)	Allow –45, –27
(b)	390	P1	for a start to the process, eg 7 (shares) = 210 or 210 ÷ 7 (= 30) or $7x = 210$ oe **or** for start of process to find the sum of the numbers, eg 4 + 7 + 2 (= 13) **or** for a process to use a build up method by giving at least 2 further equivalent ratios, eg 4 × 2 : 7 × 2 : 2 × 2 (= 8 : 14 : 4) **and** 4 × 10 : 7 × 10 : 2 × 10 (= 40 : 70 : 20)	
		P1	for process to find the value of the other two numbers eg 4 × "30" (= 120) **and** 2 × "30" (= 60) **or** for eg 210 ÷ 7 (= 30) **and** 4 + 7 + 2 (= 13)	Maybe written in a ratio eg 120 : (210 :) 60
		A1	cao	

Question	Answer	Mark	Mark scheme	Additional guidance
3 (a)	7, (2), –1, –2 (–1), 2, (7)	B2 (B1	for all values correct for 2 or 3 values correct)	
(b)	Graph drawn	M1	ft (dep on B1 in (a)) for plotting at least 5 of the points from their table correctly	Use overlay
		A1	for correct curve drawn	Accept a freehand curve drawn that is not made of line segments Ignore anything drawn outside the required range
(c)	–1.2, 3.2	M1	for drawing the line $y = 3$ **or** reading off the intersection(s) where $y = 3$ **or** one correct solution **or** both solutions given as coordinates, eg (–1.2, 3.2) **or** (–1.2, 3) and (3.2, 3)	ft their graph for this mark Accept these coordinates reversed
		A1	for one value in each of the ranges –1.3 to –1.2 and 3.2 to 3.3 or ft (dep M1 in (b)) their quadratic graph	Award A0 for coordinate pairs or solutions given as an inequality eg $–1.2 < x < 3.2$ Answers to 3 decimal places can be indicative of an algebraic method and score 0 marks

Question	Answer	Mark	Mark scheme	Additional guidance
4 (a)	2.625×10^{-1}	M1	for $a\times10^{-1}$, $a \neq 2.625$ **or** for 2.625×10^{n}, $n \neq -1$ **or** for a correct value not in standard form, eg 0.2625 or $\frac{21}{80}$ oe eg $\frac{84000}{320000}$ or eg 262.5×10^{-3}	
		A1	cao	
(b)	0.825, 0.835	B1	for 0.825 in the correct position	
		B1	for 0.835 in the correct position	Accept $0.834\dot{9}$ or 0.83499(9…)

Question	Answer	Mark	Mark scheme	Additional guidance
5 (a)	Explanation	C1	for explanation, **Acceptable examples** the 5% is off a different value each year it decreases by 5% of the new value doesn't decrease by same amount each year it is compound depreciation (not simple depreciation) used simple depreciation (not compound depreciation) should have used $P\left(1+\frac{r}{100}\right)^n$ / $19\,950\left(1-\frac{5}{100}\right)^4$ the answer should be 16 249(…) he should multiply (19 950) by 0.95^4 it decreases by 18.5% (not 20%) the value of the 5% decreases each year value decreases by less each year need to work it out for each year separately as the number changes it loses 5% of its value at the end of the year **Not acceptable examples** his answer is correct his answer is wrong should have used $19\,950\left(1+\frac{5}{100}\right)^4$ he should multiply by 1.05^4 he should divide by 1.05^4 it does not decrease by 20% 4 × 5% is incorrect didn't find the multiplier / incorrect multiplier $x \times 0.95^4 = 19\,950$ he should multiply (19 950) by 0.95^5 need to work it out for each year separately	Condone use of word 'interest' for 'depreciation' Accept 'normal' for 'simple' Accept 'composite' for 'compound' Accept 'change' for 'decrease'

Question	Answer	Mark	Mark scheme	Additional guidance
5 (b)	288 to 290	P1	for use of a correct multiplier, eg 0.95 oe or for a correct process to find the value after one year, eg 19 950 – 0.05×19 950 (=19 950 – 997(.50) = 18 952(.50)) oe	
		P1	for evidence of a compound depreciation process, eg "18 952(.50)" – 0.05 × "18 952(.50)" (= 18 004(.8…)) oe **or** $19\,950 \times 0.95^4$ (= 16 249...) oe eg $19950\left(1-\frac{5}{100}\right)^4$ $(=16249...)$ **or** $19\,950 \times 0.95^t$ where $t \geq 2$	May be seen in more than one calculation Accept rounding at intermediate stages Award of this mark implies the first P1
		P1	for a complete process, eg "16 249…" – 15 960 or 15 960 – "16 249…"	
		A1	for answer in the range 288 to 290 or –290 to –288	If correct answer is seen and then incorrectly rounded award full marks
6	Inequality shown	B1	for line with arrow drawn to left of 1 with solid circle at 1	

Question	Answer	Mark	Mark scheme	Additional guidance
7	81.1	P1	for process to use πd or $2\pi r$, eg $\pi \times 16 \left(= 16\pi = 50.2(6...)\right)$ oe or $\frac{1}{2} \times \pi \times 16 \left(= 8\pi = 25.1(3...)\right)$ oe or $\frac{1}{4} \times \pi \times 16 \left(= 4\pi = 12.5(6...)\right)$ oe	Must use correct value for radius / diameter Do not award this mark if candidate has used area formula
		P1	for a complete process, eg "8π" + 20 + 20 + 8 + 8 oe	Condone addition of the lengths of the dashed lines "8π" + 72 oe
		A1	for answer in the range 81 to 81.2	If correct answer is seen and then incorrectly rounded award full marks

Question	Answer	Mark	Mark scheme	Additional guidance
8	35.8	P1	for start of process to find *QS*, eg $QS^2 + 15^2 = 39^2$ oe or $(QS^2 =) 39^2 - 15^2 (= 1296)$ oe or for starting to use 5, 12, 13 triangle, eg 15 ÷ 5 or 39 ÷ 13	Trigonometry may be used but must lead to a relationship involving *QS*
		P1	for complete process to find *QS*, eg $(QS =) \sqrt{39^2 - 15^2} (= 36)$ or 15 ÷ 5 × 12 (= 36)	
		P1	for relationship involving angle *QRS*, eg $\tan QRS = \frac{"36"}{50}$ oe or $\tan QRS = \frac{[QS]}{50}$ oe eg $\sqrt{36^2 + 50^2} \left(= \sqrt{3796}\right)$ **and** $36^2 = 50^2 + \sqrt{"3796"}^2 - 2 \times 50 \times \sqrt{"3796"} \cos QRS$ oe	May use *QRS* = 90 − *QSR* Pythagoras may be used but must lead to a relationship involving *QS* [*QS*] must be numerical and clearly identified by labelling or on the diagram with no contradiction ([*QS*] > 39 is not a contradiction)
		A1	for angle 35.7 – 35.8	If correct answer is seen and then incorrectly rounded award full marks

Question	Answer	Mark	Mark scheme	Additional guidance
9 (a)	39, 14	B1	for Range = 39	
		M1	for IQR = 56 – 42	
		A1	for 14	
(b)	Yes, supported	C1	for Yes, with reason, eg the median for class X is greater oe	Yes may be implied by eg the word 'correct' Must use the word 'median' Ignore any reference to range / IQR
(c)	No, supported	C1	ft (a) for No, with reason, eg the range/IQR for class Y is greater oe	No may be implied by eg the word 'incorrect' Must use the word 'range' or phrase 'IQR' C0 if also compare median in part (c)
10	C, E, B, A, D	B3	for all five correct	
		(B2	for 3 or 4 correct)	
		(B1	for 2 correct)	
11	$-\frac{1}{2}, 2, 1$	M1	scale factor $-\frac{1}{2}$ correct **or** for centre 2, 1	May be shown on diagram provided no contradiction with answer lines.
		A1	cao	

Question	Answer	Mark	Mark scheme	Additional guidance
12 (a)	Proof	P1	for process to expand at least one square, to obtain 4 terms will all 4 terms correct without considering signs or for 3 terms out of 4 correct with correct signs eg $(5m + 2)^2 = 25m^2 + 10m + 10m + 4$ oe or $(5m – 2)^2 = 25m^2 – 10m – 10m + 4$ oe **or** for $\{(5m+2)+(5m-2)\}\{(5m+2)-(5m-2)\}$	NB: $(5m + 2)^2 = 25m^2 + 20m$ or $20m + 4$ can be considered 3 terms out of 4 correct with correct signs $(5m – 2)^2 = 25m^2 – 20m$ or $–20m + 4$ can be considered 3 terms out of 4 correct with correct signs
		P1	for complete process to expand brackets correctly eg $25m^2 + 10m + 10m + 4 – 25m^2 + 10m + 10m – 4$ (= $40m$) **or** for $(5m+2+5m-2)(5m+2-5m+2)$ $(=(10m)(4)=40m)$	Does not have to be simplified at this stage. Must have no errors Condone recovered brackets eg $25m^2 + 20m + 4 – 25m^2 – 20m + 4$ provided this is simplified to $40m$
		C1	for showing statement is correct (with supportive evidence) eg $40m = 20(2m)$ or $40m \div 20 = 2m$ or $40m$ **and** 40 is a multiple of 20 oe eg 20 is a factor of 40 or $40m$ **and** ‘is a multiple of 20’	Condone recovered brackets on $25m^2 + 20m + 4 – 25m^2 – 20m + 4 = 40m$

Question	Answer	Mark	Mark scheme	Additional guidance
12 (b)	No, supported	C1	No with reason **Acceptable examples** eg when $m = 1$, $40m = 40$ **and** 80 is not a factor (of 40) oe 80 is not always a factor of $40m$ It only works for even numbers (of m) It does not work for odd numbers (of m) It does not work if $m = 1$ oe **Not acceptable examples** 80 is not a factor of $(5m + 2)^2 – (5m – 2)^2$ 80 is not a factor of 40 / 80 is not a factor of $40m$ 80 is a multiple of 40 not a factor oe $40m = 80(0.5m)$ or $40m \div 80 = 0.5m$ $40m$ divided by 80 is a fraction $40m \div 80 = 0.5$ It works for even numbers (of m) It works for odd numbers (of m) It works when $m = 2$ oe eg 80 is a factor when $m = 2$ Yes, …	

Question	Answer	Mark	Mark scheme	Additional guidance
13	70 with reasons	M1	for method to find the size of angle *ACD* or angle *CAD* eg $ACD = \frac{180-40}{2}(=70)$ oe or $CAD = \frac{180-40}{2}(=70)$ oe **or** for method to find the size of angle *AOC* where *O* is the centre of the circle eg $AOC = 360-90-90-40(=140)$	Correct method can be implied from angles on the diagram if no ambiguity or contradiction Angles must be unambiguously identified. Angle *C* = 70 and Angle *A* = 70 are too ambiguous
		A1	for angle *ABC* = 70	
		C1	(dep on M1) for one reason from Base angles of an isosceles triangle are equal Tangents from an external point are equal in length Angles in a quadrilateral add up to 360 Alternate segment theorem The tangent to a circle is perpendicular to the radius (diameter) The angle at the centre of a circle is twice the angle at the circumference	Underlined words need to be shown Reasons must be clearly linked to the method. Accept "∠" for "angle" and "∠*s*" for "angles" and "△" for "triangle" Accept "4-sided shape" for "quadrilateral"
		C1	(dep on M1) for a second reason from Alternate segment theorem The tangent to a circle is perpendicular to the radius (diameter) The angle at the centre of a circle is twice the angle at the circumference	

Question	Answer	Mark	Mark scheme	Additional guidance
14	1.765	B1	for stating a bound, eg 8.705 or 8.715 or 24.25 or 24.35	Accept $8.714\dot{9}$ or 8.71499(9..) for 8.715 Accept $24.34\dot{9}$ or 24.3499(9…) for 24.35
		M1	for correct use of LB and UB, eg 3 × [LB of x] – [UB of y]	$8.705 \leq$ LB of $x < 8.71$ $24.3 <$ UB of $y \leq 24.35$
		A1	(dep on all previous marks) for an answer of 1.765 clearly coming from working with correct values eg $3\times8.705-24.35=1.765$	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

Question	Answer	Mark	Mark scheme	Additional guidance
15 (a)	$\frac{126}{216}$	P1	for process to use the ratio to find a correct probability, eg $\left(\text{P(blue)} =\right)\frac{5}{6}$ oe or $\left(\text{P(red)} =\right)\frac{1}{6}$ oe	Accept any equivalent fraction, decimal form, 0.16(6…) or 0.83(3…), or percentage form 16(.6…)% or 83(.3…)% rounded or truncated to at least 2 significant figures for P marks
		P1	for process to find the probability of three counters of the same colour, eg $\frac{5}{6}\times\frac{5}{6}\times\frac{5}{6}\left(=\frac{125}{216}\right)$ oe or $\frac{1}{6}\times\frac{1}{6}\times\frac{1}{6}\left(=\frac{1}{216}\right)$ oe or $[p]\times[p]\times[p]$	Where $[p]$ is clearly identified as P(blue) or P(red) and $0 < [p] < 1$
		A1	for $\frac{126}{216}$ oe, eg $\frac{7}{12}$	Accept any equivalent fraction inc $\frac{126x^3}{216x^3}$, decimal form, 0.583(3…) or percentage form 58.3(3…)% rounded or truncated to at least 3 significant figures. But allow 0.58(3…) or 58(.3…)% oe rounded or truncated to at least 2 significant figures from correct working.

Question	Answer	Mark	Mark scheme	Additional guidance
15 (b)	Yes, supported	C1	Yes with reason **Acceptable examples** the ratio of blue to red counters stays the same 10 : 2 is the same as 5: 1 there are still 5 times as many blue as red the probability / fraction of getting a blue or red counter stays the same $\frac{10}{12}\times\frac{10}{12}\times\frac{10}{12}+\frac{2}{12}\times\frac{2}{12}\times\frac{2}{12}$ = their answer to part (a) $\frac{10}{12}\times\frac{10}{12}\times\frac{10}{12}=\frac{125}{216}$ or $\frac{2}{12}\times\frac{2}{12}\times\frac{2}{12}=\frac{1}{216}$ **Not acceptable examples** the probability / probabilities stay the same the total will double and the probability stays the same the fraction(s) are equivalent we do the same multiplication there are still the same number and still more blue counters than red counters No, …	

Question	Answer	Mark	Mark scheme	Additional guidance
16 (a)	Shown	C1	for showing values of –5 and 10 leading to the conclusion	
(b)	Shows re-arrangement	C1	for showing re-arrangement must see $2x^3 = 8 - x$ or $x^3 = \frac{8-x}{2}$ leading to $x = \sqrt[3]{\frac{8-x}{2}}$	Can work backwards No incorrect steps allowed
(c)	1.483	M1	for substitution to find x_1 eg $\sqrt[3]{\frac{8-1.5}{2}} \left(=1.48(1248034)\right)$	Accept an accuracy of 2dp or more rounded or truncated for x_1
		M1	for substitution to find x_2 eg $\sqrt[3]{\frac{8-"1.48(1248034)"}{2}}$ (=1.482(671093))	Accept an accuracy of 3dp or more rounded or truncated for x_2
		A1	for awrt 1.483	For reference x_3 = 1.482563195 If correct answer is seen and then incorrectly rounded award full marks

Question	Answer	Mark	Mark scheme	Additional guidance
17	$x = \frac{1}{3}, y = \frac{2}{3}$ $x = -\frac{1}{2}, y = \frac{3}{2}$	P1 P1 P1 P1	for start to process, eg $\frac{y}{x^2} = 6$ oe or $y = 1 - x$ or $x = 1 - y$ for process to substitute a rearranged equation into a correct equation to form an equation in one variable eg $\frac{1-x}{x^2} = 6$ oe or $\frac{y}{(1-y)^2} = 6$ oe for process to remove all fractions and expand all brackets to form a correct standard simplified three term quadratic in any form of $ax^2 + bx + c$ (= 0) or $ay^2 + by + c$ (= 0) eg $6x^2 + x - 1$ (= 0) or $6y^2 - 13y + 6$ (= 0) **(indep)** for process to solve equation **their** 3 term quadratic using any correct method eg $(3x - 1)(2x + 1)$ (= 0) or $x = \frac{-1 \pm \sqrt{1^2 - 4 \times 6 \times -1}}{2 \times 6}$ or eg $(2y - 3)(3y - 2)$ (= 0) or $y = \frac{--13 \pm \sqrt{(-13)^2 - 4 \times 6 \times 6}}{2 \times 6}$	Allow $x = y - 1$ for $x = 1 - y$ Look out for signs reversed The quadratic does not have to equal 0, ie accept $6x^2 + x = 1$ Can be implied by both correct x values **or** both correct y values (condone incorrect labelling) if the quadratic is correct If quadratic is incorrect then working must be shown. 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 $\frac{-1 \pm \sqrt{1+24}}{12}$ or $\frac{13 \pm \sqrt{169-144}}{12}$ **or** if factorising allow brackets which expand to give 2 out of 3 terms correct for their quadratic

Question	Answer	Mark	Mark scheme	Additional guidance
17 cont.		A1	for $x=\frac{1}{3}$ $y=\frac{2}{3}$ and $x=-\frac{1}{2}$ $y=\frac{3}{2}$	May be expressed in exact decimal form or as equivalent fractions Accept as coordinates Assume correct pairing unless clearly incorrect eg $\left(\frac{1}{3},\frac{3}{2}\right)\left(-\frac{1}{2},\frac{2}{3}\right)$

Question	Answer	Mark	Mark scheme	Additional guidance
18 (a)	Explanation	C1	for explanation, eg needs to make sure the total is 100 **Acceptable examples** Total in diagram is 98 Total in diagram is not 100 Diagram is missing 2 people eg 100 – 42 – 10 – 8 – 5 – 1 – 2 – 13 = 19 not 17 **Not acceptable examples** Imran hasn't written all the values The total is 81 (not 100) The total (for the Venn diagram) is more than 100 The 17 shouldn't be there The numbers don't add up correctly Total doesn't add to the correct amount The diagram is correct	
(b)	$\frac{64}{89}$	M1	for $\frac{8+56}{8+56+7+18}$ or for $\frac{64}{n}$, $n > 64$ or $\frac{"8+56"}{n}$, $n >$ "8 + 56" or for $\frac{m}{89}$, $m < 89$ or $\frac{m}{"8+56+7+18"}$, $m <$ "8 + 56 + 7 + 18" or for 64 : 89	
		A1	for $\frac{64}{89}$ oe	Accept any equivalent fraction, decimal form, 0.71(9…) or percentage form 71(.9…)% rounded or truncated to at least 2 significant figures

Question	Answer	Mark	Mark scheme	Additional guidance
19	$3:7+4\sqrt{3}$	P1	for first step in process to find the length of a side of triangle *ACF*, eg $BC=\frac{x}{\sin 60}$ or $BC=\frac{2\sqrt{3}}{3}x$ or $DC=\frac{x}{\tan 60}$ oe eg $DC=x\tan 30$ or $DC=\frac{\sqrt{3}}{3}x$ or $AM=x\sin 60$ oe eg $AM=\sqrt{x^2-(0.5x)^2}$ or $AM=\frac{\sqrt{3}}{2}x$	For reference $x = AG = AB$ Must have expression for *BC* (or *FG*) or *DC* (or *FE*) or *AM* or where *M* is where perpendicular from *A* meets *BG* May use cos30 for sin60
		P1	for process to find area of *ABG* or area of *ACF*, eg (Area *ABG* =) $\frac{1}{2}\times x\times x\times \sin 60$ oe eg $"\frac{\sqrt{3}}{2}x"\times x\div 2$ or $\frac{\sqrt{3}}{4}x^2$ or (Area *ACF* =) $\frac{1}{2}\times\left(x+"\frac{2\sqrt{3}}{3}x"\right)\times\left(x+"\frac{2\sqrt{3}}{3}x"\right)\times\sin 60$ oe **or** for process to find ratio of sides, eg $AB:AC=x:x+"\frac{2\sqrt{3}}{3}x"$ oe	For reference may use $\frac{1}{\sqrt{3}}$ for $\frac{\sqrt{3}}{3}$ and $\frac{2}{\sqrt{3}}$ for $\frac{2\sqrt{3}}{3}$ and $\frac{\sqrt{3}}{2}$ for sin60 etc throughout
		P1	for process to find the areas of *ABG* **and** area of *ACF* , eg $\frac{1}{2}\times x\times x\times \sin 60$ **and** $\frac{1}{2}\times\left(x+"\frac{2\sqrt{3}}{3}x"\right)\times\left(x+"\frac{2\sqrt{3}}{3}x"\right)\times\sin 60$ oe or for process to find ratio of areas, eg $x^2:\left(x+"\frac{2\sqrt{3}}{3}x"\right)^2$ or $1:\left(1+"\frac{2\sqrt{3}}{3}"\right)^2$ oe	For reference Area *ABG* = $\frac{\sqrt{3}}{4}x^2$ oe Area *ACF* = $x^2+\frac{7\sqrt{3}}{12}x^2$ oe

Question	Answer	Mark	Mark scheme	Additional guidance
		P1	for process to expand the square, eg $\left(1+"\frac{2\sqrt{3}}{3}"\right)^2 = 1+\frac{4\sqrt{3}}{3}+\frac{4}{3}$ oe or $\left(x+"\frac{2\sqrt{3}}{3}x"\right)^2 = x^2+\frac{4\sqrt{3}}{3}x^2+\frac{4}{3}x^2$ oe **or** for $\left(1(x)+"\frac{2\sqrt{3}}{3}(x)"\right)\left(1(x)+"\frac{\sqrt{3}}{2}(x)"\right) = 2(x^2)+\frac{\sqrt{3}}{2}(x^2)+\frac{2\sqrt{3}}{3}(x^2)$ oe	May be implied by a correct simplified area for *ACF* eg $x^2+\frac{7\sqrt{3}}{12}x^2$
		A1	for $3:7+4\sqrt{3}$ oe in required form	Award 0 marks for a correct answer with no (or incorrect) supportive working

Question	Answer	Mark	Mark scheme	Additional guidance
20 (a)	5	M1	for method to find $f^{-1}(x)$, eg $\frac{x+6}{3}$ oe **or** for $3x - 6 = 9$ oe **or** for $f(5) = 3 \times 5 - 6 = 9$	For reference $f(x) = 3x - 6$ and $g(x) = \frac{2x^2}{x^2+1}$ Allow f^{-1} and f to be in terms of y ie accept $\frac{y+6}{3}$ and $3y - 6 = 9$
		A1	cao	
(b)	$\frac{-6}{x^2+1}$	M1	for method to find fg(x), eg $f\left(\frac{2x^2}{x^2+1}\right)$ or $3 \times \frac{2x^2}{x^2+1} - 6$	
		M1	for complete method to write a correct expression for fg(x), as a single fraction or as two fractions with a common denominator eg $3 \times \frac{2x^2}{x^2+1} - \frac{6(x^2+1)}{x^2+1}$	Condone sign errors
		A1	for $\frac{-6}{x^2+1}$	

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.

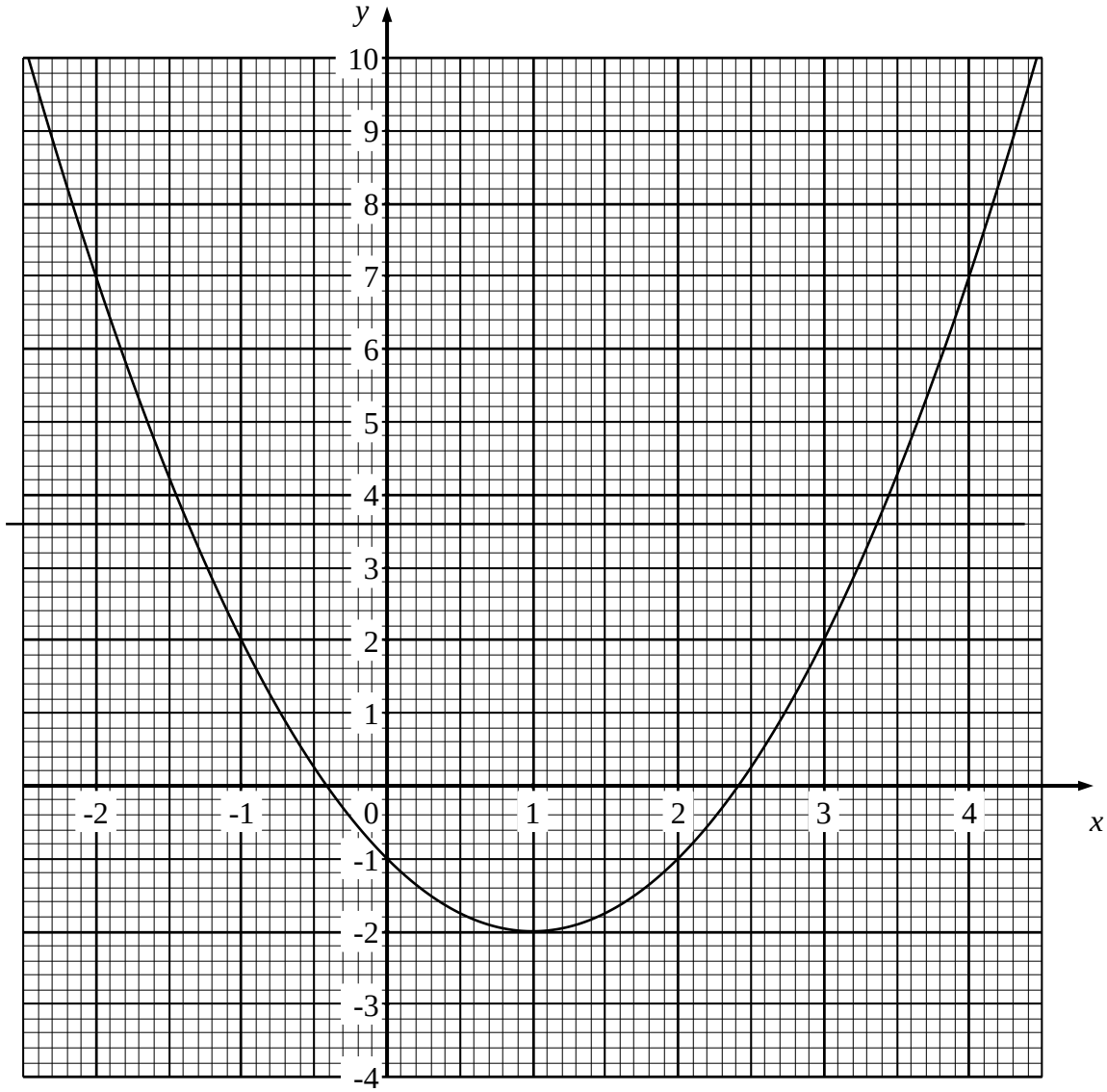
The following tolerances should be accepted on marking MLP papers, unless otherwise stated below:
Angles: ±5º
Measurements of length: ±5 mm

Question		Modification	Mark scheme notes
3	(a)	Wording added: 'below'. Wording added: 'There are four spaces to fill.' Braille: Wording added 'by writing the missing values labelled (i) to (iv).' Table turned vertically.	Standard mark scheme
	(b)	Wording added: 'Look at the diagram for Question 3(b) in the Diagram Booklet. It shows a grid.' Diagram enlarged (2 cm grid). Open headed arrows. Braille: Wording added 'Drawing film and bumpons are provided if you wish to use them.'	Standard mark scheme
6		Wording added: 'Look at the diagram for Question 4 in the Diagram Booklet. It shows a number line.' Wording removed: 'below' Diagram enlarged. Open headed arrows.	Standard mark scheme
7		Wording added: 'Look at the diagram for Question 7 in the Diagram Booklet.' Diagram enlarged. Dashed lines made longer and thicker.	Standard mark scheme
8		Wording added: 'Look at the diagram for Question 8 in the Diagram Booklet. QR = 50cm PS = 15cm PQ = 39cm Angle PSQ is a right angle' Diagram enlarged.	Standard mark scheme
9		Wording added: 'Look at the table for Question 9 in the Diagram Booklet. Wording changed: 'Here' to 'Below'	
	(a)	Wording changed: 'below' to 'in the Diagram Booklet' Wording added: 'There are two spaces to fill.'	Standard mark scheme
	(b)	Wording changed: 'Here' to 'Below'	Standard mark scheme

Question		Modification	Mark scheme notes
10		Wording added: ‘Look at the diagrams for Question 10 in the Diagram Booklet.’ Wording changed: ‘They show five graphs.’ Graphs enlarged. Open headed arrows. Graphs labelled ‘graph A’, ‘graph B’, etc. Wording added: ‘below’ Wording added: ‘There are five spaces to fill.’	Standard mark scheme
11		Wording added: ‘Look at the diagram for Question 11 in the Diagram Booklet. It shows shape P and shape Q on a grid.’ Wording added: ‘Two accurate cutout shapes may be available if you wish to use them.’ Diagram enlarged (1.5 cm grid). Open headed arrows. Shapes labelled ‘shape P’ and ‘shape Q’ Cutout shapes provided.	Standard mark scheme
13		Wording added: ‘Look at the diagram for Question 13 in the Diagram Booklet.’ Diagram enlarged. Angle moved outside of angle arc and angle arc made smaller. Wording added: ‘Angle CDA = 40^{o}’	Standard mark scheme
16		Letter ‘x’ changed to ‘y’	Standard mark scheme but note change of letter
17		Letters changed: ‘x’ changed to ‘p’, ‘y’ changed to 'q’	Standard mark scheme but note change of letter
18	(a)	Wording added: ‘Look at the diagram for Question 18(a) in the Diagram Booklet. It shows a Venn diagram.’ Wording changed: ‘He draws the Venn Diagram in the Diagram Booklet to give information about his results.’ Diagram enlarged. Labels moved above/below circles.	Standard mark scheme
	(b)	Wording added: ‘Look at the diagram for Question 18(b) in the Diagram Booklet. It shows a Venn diagram.’ Diagram enlarged. Labels moved above/below circles.	Standard mark scheme

Question		Modification	Mark scheme notes
19		Wording added: ‘Look at the diagram for Question 19 in the Diagram Booklet. Diagram enlarged. GB labelled as x cm.	Standard mark scheme

Question 3(b)



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