



Mark Scheme (Results)

Predicted Paper 2 - Set 1

Edexcel-style GCSE

In Mathematics (PA-1MA1/2H)

Higher (Calculator) Paper 2H

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: PA-1MA1/2H				
Question	Answer	Mark	Mark Scheme	Additional guidance
1 (a)	0.4 or 0.48	M1 A1	for rounding at least two numbers to 1 significant figure . e.g., 10, 2, or 50 or for a correct process to estimate, e.g., $v = (10 \times 2) / 50$ for 0.4 oe	If the exact calculation is attempted without prior rounding, award 0 marks. Accept $\frac{3}{5}$ for the final accuracy mark. awrt 0.4 or better accepted Dividing instead of multiplying: M0
1 (b)	Smaller	C1	for stating 'Smaller' with a valid mathematical reason. e.g., "Smaller because the numerator values were rounded down and the denominator was rounded up."	"smaller" with no reason: C0
2	correct line	B3 B2 B1	B3 for a fully correct straight line from $x = -1$ to $x = 4$ for at least 3 correct points plotted or implied for at least 2 correct points plotted or implied	Correct points: (-1, 5), (0, 3), (1, 1), (2, -1), (3, -3), (4, -5). Plotting $y - 2x = 3$: B0 throughout Curve drawn: max B1
3	No (with reason)	C1 C1	for "No" oe for a valid reason, eg similar triangles have equal angles but may differ in size; congruent triangles must be identical (or a 1:2 counter-example)	"Yes": C0 "No" without reasoning: C1 max
4	Yes (James correct)	P1	for a first pressure, eg $80 \div 26 (= 3.07\dots)$	ft own P1, P2 into comparison
		P1 C1	for a second pressure, eg $68 \div 14 (= 4.85\dots)$ for a fully correct percentage increase $(4.86 - 3.08) \div 3.08 \times 100 (= 57.7)$ with comparison to 60% and conclusion "Yes"	Using new value as denominator: C0

Paper: PA-1MA1/2H				
Question	Answer	Mark	Mark Scheme	Additional guidance
5 (a)	Yes, both = 11	M1	for $g(-4) = (-4)^2 - 5 = 11$ (substitution shown)	Sign slip $(-4)^2 = -16$: M0
		A1	for $f(0.5) = 11$ and a statement that the values are equal	
5 (b)	$16x^2 + 72x + 76$	M1	for substituting $f(x)$ into $g(x)$, e.g., $(4x + 9)^2 - 5$	$(4x+9)^2 = 16x^2+36x+81$: M1A0
		A1	for correct expansion and simplification	Omitting -5 : M1A0
6 (a)	$2 < w \leq 3$	B1	for the class with the highest frequency	oe, eg "2 to 3"
6 (b)	correct polygon	B1	for at least 5 points plotted at correct class midpoints	Midpoints are 0.5, 1.5, 2.5, 3.5, 4.5, 5.5.
		B1	for points plotted correctly at midpoints but not joined, OR points joined correctly but plotted at class boundaries	Plotting at boundaries: B0 Bar chart: B0
7	Orange 0.19, Blue 0.19	M1	for using $\Sigma P = 1$ with $P(\text{Blue}) = P(\text{Orange})$, eg $1 - (0.4 + 0.22) = 0.38$ then $\div 2$	
		A1	for Orange = 0.19 and Blue = 0.19	
8	9900	P1	for a complete process, eg $221 \div 11$ and $330\,000 \div 11$	Forgetting to $\div 11$: P0
		A1	for 9900 cao	Slip in division: P1A0
9	$a = 2, b = 4, c = -32$	M1	for a correct common denominator $x^2 - 4$ and combining over it	No common denominator: M0
		M1	for correctly expanding all numerator terms	Sign error in expansion: M1A0
		A1	for $2x^2 + 4x - 32$ leading to correct values of a, b, and c	
10	1.27 (cm)	M1	for correct trigonometry in the first triangle (correct ratio)	$AB = BC \tan 45^\circ$
		M1	for correct trigonometry in the second triangle	Using sin for tan: M0
		A1	for $AD = 1.22$ (2 d.p.)	$DB = BC \tan 30^\circ$
				awrt 1.27 cm
				Not to 2 d.p.: A0

Paper: PA-1MA1/2H				
Question	Answer	Mark	Mark Scheme	Additional guidance
11 (a)	$y = f(x + 12)$	B1	for $y = f(x + 12)$ cao	$f(x) + 12$ (vertical): B0
11 (b)	correct sketch	B1	for an inverted parabola (maximum turning point) shifted up by 4 units	One transformation only: B0
12	$x_1 = -8.82, x_2 = -8.08$	B1	for $x_1 = -8.82$ (2 d.p.)	awrt -8.82 Not squaring x_n : B0
		B1	for $x_2 = -8.08$ (2 d.p.)	awrt -8.08
13	5/11	P1	for finding the total number of females (= 44)	fraction can be unsimplified due to isw (ignore subsequent working) if left as 20/44 ft consistent values Using 20/80: P3A0
		P1	for finding the number of females for Brazil (Brazil total 26, – 12 males = 14)	
		P1	for finding the number of females for France (= 20)	
		A1	for $20/44 = 5/11$ oe in simplest form	
14	mean = 11 (shown)	M1	for identifying class midpoints 2, 7, 12, 17, 22	Upper boundaries used: M0
		M1	for finding $\Sigma fx = (5 \times 2) + (9 \times 7) + (6 \times 12) + (7 \times 17) + (3 \times 22)$	
		M1	for $330 \div 30$	
		A1	for a fully shown mean of 11	
15	£180	P1	for establishing ratio Jack: Jim:Jill:Jones = 2:9:4:4	Jill/Jones as 1 part each: P1 max
		P1	for finding total parts = $2 + 9 + 4 + 4 = 19$	
		P1	$(380 \div 19) \times 9$	
		A1	for £180 cao	
16 (a)	shown	M1	for multiplying numerator and denominator by the conjugate $(\sqrt{2} - 3)$	Denominator $(\sqrt{2})^2 - 9 = -7$
		A1	for a complete, correct derivation of $(3\sqrt{2} - 2)/7$	

Paper: PA-1MA1/2H				
Question	Answer	Mark	Mark Scheme	Additional guidance
16 (b)	$5\sqrt{5}$	M1 A1	for simplifying surds: $2\sqrt{5} + 3\sqrt{5}$ cao	
17	$x = 4$ or $x = -9/4$	M1 M1 A1	for a correct common denominator $x^2 - 9$ and combining the fractions for correctly expanding $(x - 3)^2$ and $(x + 3)^2$ and simplifying for $x = 4$ and $x = -9/4$ ($= -2.25$) oe	No common denominator: M0 Sign error in expansion: M1A0 ft correct setup if manipulation slips
18 (a) 18 (b)	$-(3a + 2b)$ $(-3a - 14b)/3$	B1 M1 M1 A1	for $BD = -(3a + 2b)$ oe for using the section ratio $EF : FD = 2 : 1$ to position F on ED for a correct route for AF using vector addition / position vectors for $AF = (-3a - 14b)/3$ oe	Reversed ratio (FD:EF): M1A0
19	13 : 12	P1 P1 P1 P1 A1	for VAT, eg 25% of 12 000 = 3000 for total cost $12\,000 + 3000 = 15\,000$ for $12 \times 600 = 7200$ for deposit $15\,000 - 7200 = 7800$ for 13 : 12 in simplest form	No VAT calculated: P0 throughout Ratio unsimplified (7800:7200): P4A0
20 (a) 20 (b)	$1.75 \text{ (m/s}^2\text{)}$ $48 - 48.5 \text{ (m)}$	M1 M1 A1 M1 M1 A1	for reading initial and final velocities (0 and 7) from the graph for acceleration = change in velocity $\div$ time for 1.75 oe for strip width 2 s and four velocity readings from the graph for a correct trapezium area for each strip for an answer in the range 47 – 49 (m)	Wrong readings: M1A0A0 8 strips used: M1A0 Adding readings only: M0
21	$2.545 \text{ (cm}^2\text{)}$	M1 M1 M1 M1 A1	for the sector formula $\pi r^2 \theta \div 360$ for correct substitution $\pi \times 25 \times 30 \div 360$ ($= 6.54\dots$) for triangle area $\frac{1}{2} \times 4 \times 4 \times \sin 30^\circ$ ($= 4$) for sector – triangle for 2.545 (accept 2.54) cm^2 2.542 (pi = 3.14) oe	Using $r = 5$ for triangle: M0 for triangle awrt 2.545

Paper: PA-1MA1/2H				
Question	Answer	Mark	Mark Scheme	Additional guidance
22	$y = 2$	M1	for expressing bases as powers of 3, ie $243 = 3^5$ and $27 = 3^3$	$243^{(2/5)} = 2$: M0
		M1	for simplifying to $9 \times 3^y = 81$, ie $3^2 \times 3^y = 3^4$	
		A1	for $y = 2$	
23 (a)	correct construction	B1	for $BC = 4$ cm drawn accurately	Set square or compass method accepted
23 (b)	$PQ = 6$, $QR = 7.5$	B1	for the perpendicular at B and A located (3 cm)	
		B1	for identifying scale factor applies to side lengths (e.g., base becomes 6cm)	
		B1	for fully correct ΔPQR	7.4 – 7.6 cm accepted
24	$2\sqrt{17} < n < 7\sqrt{2}$	M1	for solving the left inequality: $\times 5$, $+ 8$, $\sqrt{\quad}$ to give $n > 2\sqrt{17} (\approx 8.25)$	Not multiplying by 5: M0
		A1	for the right inequality giving $n < 7\sqrt{2} (\approx 9.90)$, ie $2\sqrt{17} < n < 7\sqrt{2}$	Decimal equivalents accepted with working