

Mark Scheme

Edexcel Higher Mock Set A Paper 2

For Pearson Edexcel GCSE Mathematics (1MA1)

Higher tier • Paper 2 (Calculator)

Total 80 marks

Key to the marks

M	Method mark: for a correct method or a correct part of a method.
P	Process mark: for a correct step in the process of solving a problem.
A	Accuracy mark: for a correct answer or value after a correct method or process.
B	Unconditional accuracy mark: no method needs to be seen.
C	Communication mark: for a fully correct statement or conclusion with no contradiction.
()	A mark in brackets, e.g. (B1), is an alternative partial mark when full marks are not given.
oe	Or equivalent.
cao	Correct answer only.
ft	Follow through from an earlier answer.
isw	Ignore subsequent working once the correct answer is seen.
awrt	Answer which rounds to.
sc	Special case.
dep	Dependent on the mark before it.
“ ”	A value in quotation marks, e.g. “12” $\times$ 5, must come from a correct method, but may contain an arithmetic slip.

Give credit for any correct method, including ones not listed here. A correct answer with no working scores full marks unless the question asks for working (for example “show that” or “you must show your working”). If a correct answer is followed by further work that does not change it, ignore the further work. Probabilities must be written as fractions, decimals or percentages.

Indicative grade boundaries

Grade	9	8	7	6	5	4	3
Whole set: Papers 1, 2 and 3 (out of 240)	209	179	149	116	84	52	36
This paper alone, rough guide (out of 80)	70	60	50	39	28	17	12

Indicative only. Based on the real Pearson Edexcel boundaries for June 2023 to June 2026 (median), adjusted for how this set compares in difficulty with the real papers. Grades are awarded on the total for all three papers; the single-paper guide is about one third of the set boundaries.

These are estimates to help you judge performance on a practice paper; real boundaries change every year.

Marking guidance

Q	Answer	Marks	Guidance
1(a)	She worked out $2 \times 4 = 8$ instead of $2^4 = 16$ (the answer should be $16x^{12}y^4$).	C1	for identifying the mistake, eg she has worked out 2×4 instead of 2^4 , or the 8 should be 16 because $2^4 = 16$ <i>Additional guidance:</i> Do not accept a comment about the powers of x or y , or “she should have got 16” with no reference to the 2 or the 8.
1(b)	$6xy(2y - 3x)$	B2 (B1)	$6xy(2y - 3x)$ for a correct partial factorisation with at least two factors outside the bracket, eg $6x(2y^2 - 3xy)$, $3xy(4y - 6x)$, $2xy(6y - 9x)$, or $6xy(\dots)$ with one correct term in the bracket) <i>Additional guidance:</i> Accept $6xy(-3x + 2y)$ or $-6xy(3x - 2y)$.
1(c)	$4x^2 + 21x - 18$	M1 A1	for 4 correct terms ignoring signs, or 3 correct terms with correct signs, eg $4x^2 + 24x - 3x - 18$ $4x^2 + 21x - 18$ cao
Total for Question 1: 5 marks			
2	6.82	M1 A1	for 26.6(5 ...) or 3.90(6 ...) or 6.823(2 ...) seen 6.82 cao <i>Additional guidance:</i> An answer of 6.823(2 ...) with no rounding scores M1A0.
3	11.3 cm	M1 A1	for $14.6^2 - 9.3^2$ ($= 126.67$) or $\sqrt{14.6^2 - 9.3^2}$ 11.2 to 11.3 <i>Additional guidance:</i> $\sqrt{14.6^2 + 9.3^2}$ ($= 17.3 \dots$) scores MOA0.
4(a)	$2^3 \times 3^2 \times 13$	M1 A1	for a complete method to find the prime factors, shown on a factor tree or by repeated division, with at most one arithmetic error, or for 2, 2, 2, 3, 3, 13 $2^3 \times 3^2 \times 13$ or $2 \times 2 \times 2 \times 3 \times 3 \times 13$ <i>Additional guidance:</i> Condone the inclusion of 1 for M1 only.
4(b)	$2^3 \times 3^4 \times 5^2 \times 7$	B1	$2^3 \times 3^4 \times 5^2 \times 7$ oe <i>Additional guidance:</i> 113 400 (not in index form) scores B0.
Total for Question 4: 3 marks			
5	Shop B, by £10.40	P1	for a process to find the cost at Shop A, eg 14×8.20 ($= 114.80$) or $18 \times 8.20 - 4 \times 8.20$, or 12×8.20 ($= 98.40$) for 16 rolls

(continued)

Q	Answer	Marks	Guidance
		P1	for a process to find the cost at Shop B, eg $18 \times 7.25 \times 0.8$ oe or 18×7.25 (= 130.50) and 130.50×0.2 (= 26.10)
		A1	for 114.80 and 104.40
		C1	for Shop B with a correct difference of £10.40 (ft their totals if both P marks scored) <i>Additional guidance:</i> Shop A worked out as 15×8.20 (= 123) for 20 rolls can score P1 if clearly the cheapest way to get at least 18 rolls is intended, but cannot score the A1. A correct conclusion with no supporting figures scores no marks.
6	$105 \leq m < 115$	B1	for 105
		B1	for 115 <i>Additional guidance:</i> Do not accept 114.9 or 114.9̇ for the upper bound.
7	No. The scooter is worth £848.80, which is more than $\frac{2}{3}$ of £1250 (£833.33), so it has lost less than a third (about 32.1%).	P1	for 1250×0.82 (= 1025) or $1250 - 1250 \times 0.18$ oe, or for 0.82×0.91 oe
		P1	for a complete process to find the value after 3 years, eg $1250 \times 0.82 \times 0.91^2$ (= 848.80), or the overall multiplier 0.82×0.91^2 (= 0.679 ...)
		C1	for 'No' with correct figures that can be compared, eg 848.8(0) and 833.3(3 ...), or 401.2(0) and 416.6(6 ...), or 32.1% and 33.3%, or 0.679 and 0.666 ... <i>Additional guidance:</i> Adding the percentages, $18 + 9 + 9 = 36\%$ (so 'Yes'), scores POPOCO. $1250 \times 0.82 \times 0.91$ (= 932.75) alone scores P1POCO. 'No' with no supporting figures scores no marks.
8	8.98×10^{-4} g	M1	for $2.2 \times 10^3 \div 2.45 \times 10^6$ oe or 0.000 89(7 ...) seen
		A1	8.98×10^{-4} cao <i>Additional guidance:</i> 0.000 898 (not in standard form) scores M1AO.
9(a)	Triangle with vertices (−3, −2), (−5, −2) and (−3, −3)	B2	for a correct triangle with vertices at (−3, −2), (−5, −2), (−3, −3)

(continued)

Q	Answer	Marks	Guidance
		(B1)	for a triangle of the correct size and orientation in the wrong position, or two vertices correct, or a correct enlargement with scale factor $\frac{1}{2}$, centre $(-1, 0)$, ie vertices $(1, 2)$, $(3, 2)$, $(1, 3)$
9(b)	Rotation 90° anticlockwise, centre $(-1, -1)$	B2	for rotation 90° anticlockwise about $(-1, -1)$
		(B1)	for rotation 90° anticlockwise or rotation about $(-1, -1)$ <i>Additional guidance:</i> Accept 270° clockwise or -90° for anticlockwise 90° . Award no marks if more than one transformation is given.
Total for Question 9: 4 marks			
10	$x = -\frac{5}{14}$	M1	for a correct first step to clear the fractions, eg $4(5x + 2) - 3(2x - 7) = 24$ or $\frac{4(5x + 2) - 3(2x - 7)}{12} = 2$
		M1	for a correct method to isolate the x terms, eg $20x - 6x = 24 - 8 - 21$ or $14x = -5$
		A1	$-\frac{5}{14}$ oe <i>Additional guidance:</i> Accept $-0.357(\dots)$. Condone one sign error in the expansion for the second M1 only.
11	No. $P(\text{exactly one win}) = 0.345$, which is less than $P(\text{win both}) = 0.385$	P1	for $0.55 \times 0.7 (= 0.385)$ or $0.55 \times 0.3 (= 0.165)$ or $0.45 \times 0.4 (= 0.18)$
		P1	for $0.55 \times 0.3 + 0.45 \times 0.4$ oe $(= 0.345)$
		C1	for 'No' with 0.345 and 0.385 oe <i>Additional guidance:</i> Accept fractions or percentages, eg $\frac{69}{200}$ and $\frac{77}{200}$, or 34.5% and 38.5%. Treating the matches as independent, eg $2 \times 0.55 \times 0.45 (= 0.495)$ for exactly one win or 0.55^2 for both, is not a correct process and scores P0 for that probability. 'No' with no supporting figures scores no marks.
12	$3n^2 - 2n + 4$	M1	for $3n^2$ seen, or for a correct method to find a , eg $2a = 6$
		M1	for $5 - 3$, $12 - 12$, $25 - 27$, ... $(= 2, 0, -2, \dots)$, or for forming two correct equations, eg $a + b + c = 5$ and $3a + b = 7$

(continued)

Q	Answer	Marks	Guidance
		A1	$3n^2 - 2n + 4$ oe
13(a)	Box plot with whiskers at 12 and 29, box from 19 to 24 and median at 22	B2	for a fully correct box plot
		(B1	for 3 or 4 correctly plotted values including the box or whiskers, or 5 correct values plotted with no box or whiskers) <i>Additional guidance:</i> Values: 12, 19, 22, 24, 29. Accept plotted values within half a small square.
13(b)	The beans of variety Y were longer on average (higher median, 22 cm > 18 cm) and their lengths were more consistent (smaller IQR, 5 cm < 6 cm).	C1	for a correct comparison of the medians, in context, eg the beans of variety Y were longer on average
		C1	for a correct comparison of the interquartile ranges or ranges, in context, eg the lengths of variety Y were more consistent <i>Additional guidance:</i> Values are not needed, but any given must be correct (ft their box plot for variety Y). Accept IQR X 6, Y 5; range X 18, Y 17. Comments must compare, not just state values.
Total for Question 13: 4 marks			
14	1.05 g/cm ³	P1	for $920 \div (3 + 20)$ (= 40) or for a volume of concentrate (120) or water (800)
		P1	for using density to find a mass, eg "120" $\times$ 1.36 (= 163.2) or "800" $\times$ 1 (= 800)
		P1	for ("163.2" + "800") $\div$ 920
		A1	1.046 to 1.05 <i>Additional guidance:</i> A weighted-mean method, $(3 \times 1.36 + 20 \times 1) \div 23$, is a correct process and scores full marks. Averaging the two densities, $(1.36 + 1) \div 2$ (= 1.18), scores no marks.
15(a)	$(3x + 2)(2x - 1) - x^2 = 25$, so $5x^2 + x - 27 = 0$	M1	for $(3x + 2)(2x - 1) - x^2$ oe, or for a correct method to find the area of the shape by splitting it into two rectangles, eg $(3x + 2)(x - 1) + x(2x + 2)$
		A1	for a correct expansion, eg $6x^2 - 3x + 4x - 2 - x^2$ (= $5x^2 + x - 2$), and = 25 leading to $5x^2 + x - 27 = 0$ with no errors seen

(continued)

Q	Answer	Marks	Guidance
			<i>Additional guidance:</i> This is a “show that”: the A1 needs every step, including the equation equal to 25 before rearranging. Working backwards from the given equation scores no marks.
15(b)	24.3 cm	M1	for $\frac{-1 \pm \sqrt{1^2 - 4 \times 5 \times -27}}{2 \times 5}$, allow one sign error, or 2.22(5 ...) seen
		M1	for a correct method for the perimeter using their positive value of x , eg $10 \times “2.2259” + 2$ or the sum of all six sides
		A1	24.2 to 24.3
			<i>Additional guidance:</i> Completing the square is acceptable for the first M1, eg $x = -\frac{1}{10} \pm \sqrt{\frac{541}{100}}$. Using $x = 2.23$ gives 24.3, which is fine. A perimeter of $3x + 2 + 2x - 1 (= 5x + 1)$ or one that leaves out the two cut edges scores M0 for the perimeter.
Total for Question 15: 5 marks			
16(a)	330	M1	for $\frac{7}{55}$ or $\frac{42}{N}$ or $55 \div 7 (= 7.85 \dots)$ or $42 \div 7 (= 6)$
		M1	for $\frac{42 \times 55}{7}$ oe or $\frac{42}{N} = \frac{7}{55}$ oe
		A1	cao
16(b)	The estimate of 330 is too high (an overestimate), because fewer marked snails were counted on Sunday than there should have been.	C1	for the estimate is too high (overestimate) oe, with a reason, eg fewer marked snails were counted on Sunday (7 is too small), so dividing by it gives too big an answer
			<i>Additional guidance:</i> Do not accept “it makes the estimate inaccurate” or “it is too low”. “The estimate would be too big” with no reason scores C0.
Total for Question 16: 4 marks			
17	$y = \frac{3}{2}x + 11$	M1	for finding the gradient of L, eg $-\frac{2}{3}$ or $y = -\frac{2}{3}x + 4$
		M1	for using $m = \frac{3}{2}$ (ft $-1 \div$ their gradient) with $(-4, 5)$, eg $5 = \frac{3}{2} \times -4 + c$ or $y - 5 = \frac{3}{2}(x + 4)$
		A1	$y = \frac{3}{2}x + 11$ oe

(continued)

Q	Answer	Marks	Guidance
			<i>Additional guidance:</i> Accept any correct equivalent form, eg $2y = 3x + 22$, $y - 5 = 1.5(x + 4)$, $3x - 2y + 22 = 0$.
18	Farah £60, Jonah £24	P1 P1 P1 A1	for expressions for the amounts after the gift, eg $5x + 30$ and $2x + 30$ oe for a correct equation, eg $5(2x + 30) = 3(5x + 30)$ or $\frac{2x + 30}{5x + 30} = \frac{3}{5}$ oe for a correct process to solve their equation as far as $x = \dots$, eg $5x = 60$ Farah £60 and Jonah £24 <i>Additional guidance:</i> Trial and improvement with pairs in the ratio 5:2, checked against $\frac{3}{5}$ (or 5:3) after adding £30, scores full marks if it leads to £60 and £24. Correct values the wrong way round score P1P1P1A0.
19	24.8 cm ²	M1 A1	for $\frac{1}{2} \times 8.4 \times 6.7 \times \sin 118$ 24.8 to 24.9 <i>Additional guidance:</i> $\frac{1}{2} \times 8.4 \times 6.7 (= 28.14)$ scores M0A0.
20	An $\cap$ -shaped curve with maximum (1, 4), through (−1, 0), (0, 3) and (3, 0)	B2 (B1)	for a correct curve: $\cap$ shape with maximum at (1, 4), passing through (−1, 0) and (3, 0) for a U-shaped curve with minimum at (1, −4), or an $\cap$ -shaped curve with maximum at (−1, 4), or an $\cap$ -shaped curve through (−1, 0) and (3, 0) <i>Additional guidance:</i> Accept a sketch: the curve need not be exact, but the maximum and the x-intercepts must be in the correct places, within half a small square.
21	£450	P1 P1 P1 P1	for a correct cosine rule statement for angle BAC , eg $\cos BAC = \frac{52^2 + 71^2 - 38^2}{2 \times 52 \times 71} (= 0.853 \dots)$, or for angle $BAC = 31.4(\dots)$ for angle $CAD = 76 - "31.4" (= 44.5 \dots \text{ to } 44.6)$ for a correct sine rule statement to find CD or DA with their angles, eg $\frac{CD}{\sin "44.6"} = \frac{71}{\sin 60}$ for a complete process to find both $CD (= 57.5 \dots)$ and $DA (= 79.3 \dots)$, eg using angle $ACD = 180 - 60 - "44.6" (= 75.4 \dots)$

(continued)

Q	Answer	Marks	Guidance
		P1	for $(52 + 38 + "57.5" + "79.3") \div 20$ ($= 11.3 \dots$) and rounding up to 12 rolls, or for their perimeter $\div 20$ rounded up $\times 37.50$
		A1	450 cao <i>Additional guidance:</i> Rounding the angles to the nearest degree early gives $CD = 58.0$, $DA = 79.2$ and a perimeter of 227.2, which still leads to 12 rolls and £450 (full marks). An alternative for DA is the cosine rule in triangle ACD once CD is known. Including the path AC in the perimeter scores P0 for the fifth mark. 11.3×37.50 ($= 425.4 \dots$) scores the first four P marks only. Use of right-angled trigonometry in a non-right-angled triangle scores no marks for that step.
22	$-1 < x \leq 2$, ie $\{x: -1 < x \leq 2\}$	M1	for finding the critical values $-\frac{7}{3}$ and 2, eg $(3x + 7)(x - 2)$ or a correct substitution into the quadratic formula
		A1	for $-\frac{7}{3} \leq x \leq 2$ oe (condone $<$)
		B1	for $x > -1$
		A1	for $-1 < x \leq 2$ or $\{x: -1 < x \leq 2\}$ oe <i>Additional guidance:</i> Accept -2.33 for $-\frac{7}{3}$. The final answer must have the correct inequality signs: $-1 \leq x \leq 2$ or $-1 < x < 2$ scores A0. Answers shown only on a number line score A0 for the final mark.
23	2.00 litres	P1	for $\frac{1430}{880}$ ($= 1.625$) or $\frac{880}{1430}$ ($= 0.615 \dots$)
		P1	for $\sqrt{"1.625"}$ ($= 1.27 \dots$) or $\sqrt{"0.615 \dots"}$ ($= 0.784 \dots$)
		P1	for $(\text{"1.27 ..."})^3$ ($= 2.07 \dots$) or $(\text{"0.784 ..."})^3$ ($= 0.482 \dots$)
		P1	for $1950 \div 0.91$ ($= 2142.8 \dots$) or $1.95 \div 0.91$ ($= 2.14 \dots$)
		P1	for a complete process to find the volume of can A, eg $"2142.8" \div (\text{"2.07 ..."} - 1)$ or $"2142.8" \div (1 - \text{"0.482 ..."}) \times \text{"0.482 ..."}"$
		A1	1.99 to 2.01

(continued)

Q	Answer	Marks	Guidance
			<i>Additional guidance:</i> Using 1.625 as the volume scale factor gives $2142.8 \div 0.625 = 3428.5 \dots$ and scores P1P0P0P1P1A0. $2142.8 \div 2.07 \dots (= 1034.4 \dots)$, treating 1.95 kg as the whole of can B, scores P1P1P1P1P0A0. An answer of 2000 (cm^3, not converted to litres) scores P1P1P1P1P1A0.