

Mark Scheme

Edexcel Higher Mock Set B Paper 1

For Pearson Edexcel GCSE Mathematics (1MA1)

Higher tier • Paper 1 (Non-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)	210	180	150	118	85	53	37
This paper alone, rough guide (out of 80)	70	60	50	39	28	18	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)	$2\frac{5}{12}$	M1	for both fractions written as improper fractions or as fractions with a common denominator, eg $\frac{50}{12}$ and $\frac{21}{12}$, or for $3 + \frac{2}{12} - \frac{9}{12}$ oe
		A1	for $2\frac{5}{12}$ oe, eg $2\frac{10}{24}$ <i>Additional guidance:</i> $\frac{29}{12}$ as the final answer scores M1A0.
1(b)	$\frac{21}{8} \times \frac{5}{7} = \frac{105}{56} = \frac{15}{8} = 1\frac{7}{8}$	M1	for both mixed numbers as improper fractions and a correct method to divide, eg $\frac{21}{8} \times \frac{5}{7}$, or $\frac{105}{40} \div \frac{56}{40}$
		A1	for completing the working to $1\frac{7}{8}$, eg $\frac{105}{56} = \frac{15}{8} = 1\frac{7}{8}$ <i>Additional guidance:</i> Working that starts from $1\frac{7}{8}$ (eg $1\frac{7}{8} \times 1\frac{2}{5} = 2\frac{5}{8}$) scores M0A0. Decimal methods are not acceptable.
Total for Question 1: 4 marks			
2	$2^2 \times 5 \times 7^2$	M1	for at least two correct steps in a factor tree or repeated division, eg $980 = 2 \times 490$, $490 = 2 \times 245$, or $980 = 10 \times 98$, $98 = 2 \times 49$
		A1	for $2^2 \times 5 \times 7^2$ oe <i>Additional guidance:</i> $2 \times 2 \times 5 \times 7 \times 7$ scores M1A0 (powers are required). Prime factors listed as 2, 2, 5, 7, 7 score M1A0.
3(a)	$53 - 6n$	M1	for $-6n + k$ where $k \neq 53$, or $53 + kn$ where $k \neq -6$, or 53 identified as the zero term
		A1	for $53 - 6n$ oe
3(b)	No. $53 - 6n = -100$ gives $n = 25.5$, which is not a whole number.	C1	for "No" with a correct reason, eg $53 - 6n = -100$ gives $n = 25.5$ (not an integer), or the terms either side are -97 and -103 , or all terms are 5 more than a multiple of 6 and -100 is not <i>Additional guidance:</i> ft their linear n th term from (a).
Total for Question 3: 3 marks			
4(a)	0.09	M1	for $1 - (0.3 + 0.25)$ ($= 0.45$), or for $x + 4x + 0.3 + 0.25 = 1$ oe
		A1	for 0.09 oe <i>Additional guidance:</i> $0.45 \div 4$ ($= 0.1125$) scores M1A0.
4(b)	54	M1	for 200×0.36 ($= 72$) or 200×0.09 ($= 18$) or 200×0.27 , ft their (a)
		A1	for 54, ft their (a)

(continued)

Q	Answer	Marks	Guidance
			<i>Additional guidance:</i> ft: award A1 for $200 \times 3 \times$ their P(D) provided P(D) is less than 0.45.
			Total for Question 4: 4 marks
5	60	P1	for a complete process for one ingredient, eg $900 \div 225 \times 15 (= 60)$ or $650 \div 150 \times 15 (= 65)$, or a unit amount, eg $225 \div 15 (= 15 \text{ g of oats per flapjack})$
		P1	for a complete process to compare all four ingredients, eg 60, 65, 75 and 71(.4 ...), or for showing that 60 flapjacks need 600 g butter, 360 g sugar and 420 g syrup
		A1	for 60 cao <i>Additional guidance:</i> Using 0.9 kg as 90 g or 9000 g can score P1P1A0 if the process is complete. An answer of 65 with butter as the limit (oats not considered) scores P1P0A0.
6	Enlargement, scale factor $\frac{1}{3}$, centre $(-5, 4)$	B2	for enlargement, scale factor $\frac{1}{3}$, centre $(-5, 4)$
		(B1)	for enlargement with scale factor $\frac{1}{3}$ or centre $(-5, 4)$ <i>Additional guidance:</i> Accept 0.3 recurring or $1 \div 3$ for the scale factor; do not accept 0.3 or 0.33. More than one transformation scores B0. Do not accept “reduction” or “shrink” for enlargement.
7(a)	12:27:10	M1	for two ratios with equal red parts, eg 12:27 and 12:10, or 24:54:20
		A1	for 12:27:10 oe
7(b)	245	P1	for using the difference in parts, eg $27 - 10 (= 17)$, ft their (a)
		P1	for $85 \div “17” (= 5)$
		A1	for 245 cao <i>Additional guidance:</i> Using 4:9:5 (giving $9 - 5 = 4$ parts, 21.25 per part) can score P1P1A0.
			Total for Question 7: 5 marks
8	95°	M1	for one correct angle in terms of x , eg angle $EFG = 2x + 10$, or angle $EGF = 180 - (6x - 5)$, or angle $QEG = 180 - (2x + 10) - 3x$ (may be on the diagram)

(continued)

Q	Answer	Marks	Guidance
		M1	for a correct equation in x , eg $2x + 10 + 3x + 185 - 6x = 180$, or $6x - 5 = 2x + 10 + 3x$, or $170 - 5x + 6x - 5 = 180$
		A1	for 95 cao
		C1	(dep on M1) for appropriate reasons linked to their method, eg alternate angles are equal, angles on a straight line add up to 180° , angles in a triangle add up to 180° , co-interior angles add up to 180° <i>Additional guidance:</i> $x = 15$ with no angle found scores M1M1A0 (and C1 if the reasons are correct). Reasons must use correct terms: "Z angles" or "F angles" are not acceptable. Answer of 85 (angle EGS) scores M1M1A0.
9	2100 newtons/m ²	M1	for 1.1×0.4 ($= 0.44$) or 110×40 ($= 4400$)
		M1	for $924 \div "0.44"$, or $924 \div 4400 \times 10\,000$
		A1	for 2100 cao <i>Additional guidance:</i> $924 \div 4400 = 0.21$ (newtons/cm ²) scores M1M1A0. $1.1 \times 40 = 44$, $924 \div 44 = 21$ scores M0M1A0.
10	No. The mean of the other 8 is $25.2 \div 8 = 3.15$ kg, which is more than 3 kg.	P1	for 12×4.5 ($= 54$) or 4×7.2 ($= 28.8$)
		P1	for $("54" - "28.8") \div 8$, or for 25.2 and 8×3 ($= 24$)
		C1	for "No" with 3.15, or "No" with 25.2 and 24 compared <i>Additional guidance:</i> "No" with no supporting figures scores P0P0C0. $(4.5 \times 12 - 7.2) \div 8$ ($= 5.85$) scores P1P0C0.
11	£440	M1	for $286 \div 0.65$ oe, or $286 \div 65$ ($= 4.4$), or $286 \div 13$ ($= 22$)
		A1	for 440 cao <i>Additional guidance:</i> 286×1.35 ($= 386.10$) scores M0A0.
12(a)	Bars from 0–10 height 1.2, 10–25 height 2, 25–40 height 2.4, 40–70 height 1, 70–90 height 0.6	B3	for a fully correct histogram (bars at heights 1.2, 2, 2.4, 1, 0.6 on a correct scale)
		(B2)	for 4 correct bars of different widths

(continued)

Q	Answer	Marks	Guidance
		(B1)	for 2 correct bars of different widths, or for all frequency densities correctly calculated (may be in the table) <i>Additional guidance:</i> Accept any correct scale, or a key, eg $1\text{ cm}^2 = 4$ saplings. Bars drawn with heights equal to the frequencies score B0 unless frequency densities are seen.
12(b)	44	M1	for $\frac{10}{15} \times 36 (= 24)$ or $\frac{20}{30} \times 30 (= 20)$, or 2.4×10 or 1×20
		A1	for 44 cao
Total for Question 12: 5 marks			
13(a)	$\frac{3}{2}$	B1	for $\frac{3}{2}$ oe, eg $1\frac{1}{2}$ or 1.5
13(b)	$\frac{1}{27}$	M1	for $\sqrt[4]{81} = 3$ or 27 seen or $\frac{1}{81^{3/4}}$ or $\frac{1}{3}$ seen
		A1	for $\frac{1}{27}$ oe <i>Additional guidance:</i> 27 as the final answer scores M1A0. –27 scores M1A0.
Total for Question 13: 3 marks			
14	No. $14 \times 13 = 182$ counts every game twice, so there are $182 \div 2 = 91$ games.	M1	for $\frac{14 \times 13}{2}$ oe or $13 + 12 + 11 + \dots + 1$
		C1	for “No” with 91, or for “No” with a correct explanation that 182 counts each game twice <i>Additional guidance:</i> “No” with $14 \times 14 \div 2 (= 98)$ scores M0C0.
15(a)	$(5x - 2)(x + 3)$	B2	for $(5x - 2)(x + 3)$
		(B1)	for $(5x \pm a)(x \pm b)$ where $ab = -6$ or $a + 5b = 13$, or for $5x(x + 3) - 2(x + 3)$
15(b)	$x < -3$ or $x > \frac{2}{5}$	M1	for the critical values -3 and $\frac{2}{5}$, ft their (a)
		A1	for $x < -3$, $x > \frac{2}{5}$ oe, eg $\{x: x < -3\} \cup \{x: x > 0.4\}$ <i>Additional guidance:</i> $-3 < x < \frac{2}{5}$ scores M1A0. Using $\leq$ or $\geq$ scores M1A0.
Total for Question 15: 4 marks			
16(a)	7	M1	for $f(6) = 2$, or for $4 \times \frac{18}{x+3} - 1$ oe
		A1	for 7 cao

(continued)

Q	Answer	Marks	Guidance
16(b)	$f^{-1}(x) = \frac{18}{x} - 3$ $\left(\text{or } \frac{18 - 3x}{x}\right)$	M1	for a correct first step, eg $y(x + 3) = 18$ or $x(y + 3) = 18$ or $x + 3 = \frac{18}{y}$
		A1	for $\frac{18}{x} - 3$ oe, eg $\frac{18-3x}{x}$ <i>Additional guidance:</i> An answer in terms of y scores M1A0. $\frac{x+3}{18}$ scores M0A0.
Total for Question 16: 4 marks			
17	$108\pi \text{ cm}^2$	P1	for $\pi \times 4^2 \times 9$ ($= 144\pi$) and an equation, eg $\frac{1}{2} \times \frac{4}{3} \pi r^3 = 144\pi$
		P1	for a process to find r , eg $r^3 = 216$ leading to $r = 6$
		P1	for a complete process to find the total surface area, eg $\frac{1}{2} \times 4 \times \pi \times "6" + \pi \times "6" + \pi \times "6" + \pi \times "6"$
		A1	for 108π cao <i>Additional guidance:</i> An answer of 72π (curved surface only) scores P1P1P0A0. Using the volume of a whole sphere gives $r^3 = 108$; this can score POP1P1 for a correct surface area method with their r .
18(a)	Angle $BAC =$ angle DEC and angle $ABC =$ angle EDC (alternate angles), angle $ACB =$ angle ECD (vertically opposite), so the triangles are similar (AAA).	M1	for one pair of equal angles with a correct reason, eg angle $ACB =$ angle ECD (vertically opposite angles are equal)
		C1	for a complete proof: at least two pairs of equal angles, each with a correct reason, and a conclusion that the triangles are similar <i>Additional guidance:</i> Reasons must use correct terms ("alternate angles are equal"; "vertically opposite angles are equal"). "Z angles" is not acceptable. Statements of congruence (eg ASA) score C0.
18(b)	32 cm	P1	for using the ratio of corresponding sides to split AE or BD , eg $35 \div (3 + 2) \times 2$ ($= 14$) or $20 \div 5 \times 2$ ($= 8$)
		P1	for $CE = 14$ and $CD = 8$
		A1	for 32 cao

(continued)

Q	Answer	Marks	Guidance
			<i>Additional guidance:</i> Using $\frac{2}{3} \times 35$ and $\frac{2}{3} \times 20$ (giving 23.3 ... and 13.3 ..., perimeter 46.6 ...) scores P0P0A0. An answer of 22 (14 + 8, with <i>DE</i> left out) scores P1P1A0.
Total for Question 18: 5 marks			
19(a)	$12 - 2\sqrt{3} - 2\sqrt{3} + 1 = 13 - 4\sqrt{3}$	M1	for 3 out of 4 terms correct in $(2\sqrt{3})^2 - 2\sqrt{3} - 2\sqrt{3} + 1$, or 12 seen with $-4\sqrt{3}$
		A1	for $13 - 4\sqrt{3}$ from fully correct working
19(b)	$5\sqrt{7}$	M1	for $\sqrt{63} = 3\sqrt{7}$ or $\sqrt{28} = 2\sqrt{7}$
		A1	for $5\sqrt{7}$ cao
Total for Question 19: 4 marks			
20(a)	No. The graph is symmetrical about $x = 180$, so $\cos 100^\circ = \cos 260^\circ$ (both about -0.17).	C1	for "No" with a correct reason, eg the graph is symmetrical about $x = 180$ so they are equal, or readings at $x = 100$ and $x = 260$ shown to be the same (accept values from -0.1 to -0.25) <i>Additional guidance:</i> "No" with " $\cos 260^\circ$ is greater" scores C0. "No" with no reason scores C0.
20(b)	$x \approx 127$ and $x \approx 233$	M1	for $\cos x = -0.6$ oe, or the line $y = -0.6$ drawn, or one correct solution in range
		A1	for answers in the ranges 124 to 130 and 230 to 236 <i>Additional guidance:</i> Exact values (eg 126.9 and 233.1) are acceptable. Readings at $y = 0.6$ (53 and 307) score M0A0.
Total for Question 20: 3 marks			
21	Common ratio $\frac{1+2\sqrt{2}}{1+\sqrt{2}} = 3 - \sqrt{2}$, and $(1+2\sqrt{2})(3 - \sqrt{2}) = -1 + 5\sqrt{2}$, the third term, so the ratio is the same each time.	M1	for $\frac{1+2\sqrt{2}}{1+\sqrt{2}}$ or $\frac{-1+5\sqrt{2}}{1+2\sqrt{2}}$, or for $(1+2\sqrt{2})^2$ and $(1+\sqrt{2})(-1+5\sqrt{2})$
		M1	for a correct method to rationalise, eg $\frac{(1+2\sqrt{2})(\sqrt{2}-1)}{(1+\sqrt{2})(\sqrt{2}-1)}$, leading to $3 - \sqrt{2}$; or for expanding to get $9 + 4\sqrt{2}$ in one product

(continued)

Q	Answer	Marks	Guidance
		C1	for a complete argument with a conclusion, eg $(1 + 2\sqrt{2})(3 - \sqrt{2}) = -1 + 5\sqrt{2}$ so the common ratio is constant, or both ratios equal $3 - \sqrt{2}$, or both products equal $9 + 4\sqrt{2}$ <i>Additional guidance:</i> Decimal checks (eg 2.414, 3.828, 6.071 with ratios 1.586) score M1M0C0.
22	$BD = 8 \cos 60^\circ = 4$, $AD = 8 \sin 60^\circ = 4\sqrt{3}$, $DC = AD = 4\sqrt{3}$ (tan $45^\circ = 1$), so $BC = 4 + 4\sqrt{3} = 4(1 + \sqrt{3})$	M1	for $BD = 8 \cos 60 (= 4)$ or $AD = 8 \sin 60 (= 4\sqrt{3})$, with exact values used
		M1	for $DC = 4\sqrt{3}$, eg $\frac{4\sqrt{3}}{\tan 45}$ or isosceles triangle ADC stated, with $BD = 4$ found
		A1	for completing the proof, eg $4 + 4\sqrt{3} = 4(1 + \sqrt{3})$ with all values exact <i>Additional guidance:</i> Decimal working (eg 6.928 ...) scores M0M0A0. Any other complete method using exact values scores full marks.
23	25	P1	for substituting to get an equation in one variable, eg $(2y + 5)^2 + y^2 = 130$ or $x^2 + \left(\frac{x-5}{2}\right)^2 = 130$
		P1	for reducing to a correct three-term quadratic, eg $y^2 + 4y - 21 = 0$ or $5x^2 - 10x - 495 = 0$, and a correct method to solve it
		A1	for (11, 3) and (-9, -7)
		P1	for a complete process to find the area of triangle OAB using their points, eg $\frac{1}{2} \times 5 \times 3 + \frac{1}{2} \times 5 \times 7$, or $\frac{1}{2} \times 2.5 \times (11 + 9)$, or half of the rectangle with opposite corners A and B (100) minus two triangles
		A1	for 25 cao <i>Additional guidance:</i> Other complete processes for the fourth mark: $\frac{1}{2} \times 2.5 \times (11 + 9)$ using the y -intercept $(0, -2.5)$; $\frac{1}{2} x_A y_B - x_B y_A $; or the rectangle with opposite corners A and B ($20 \times 10 = 200$): half of it is 100, then $100 - \frac{1}{2} \times 20 \times 3 - \frac{1}{2} \times 10 \times 9 = 100 - 30 - 45$. Points found by trial with no algebra score P0P0A0, but can score the fourth P1 and the final A1.