

Mark Scheme

Summer 2027 (Predicted)

GCSE Mathematics (Edexcel-style 1MA1)

Higher (Calculator) Paper 2

This is an original mark scheme written for a predicted practice paper. It is NOT an official Edexcel mark scheme and is NOT endorsed by or affiliated with Pearson Edexcel.

For use with the Predicted Practice Paper 2 question paper.

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.

Mark the last script in exactly the same way as the first.

2 Mark positively.

The mark scheme is designed so that every mark can be awarded. Give credit for what is correct, and award zero only when a response deserves no credit. If the answer line is wrong or blank, always check the working and any diagrams first.

3 Working not required / working required.

Where working is not required, a correct answer alone earns full marks. Where a question specifically requires working (for example “show that” or a proof), a candidate who shows no working earns no marks.

4 Crossed-out work.

Mark crossed-out work unless the candidate has replaced it with a new response.

5 Choice of method.

Where several methods are shown, mark the method that leads to the answer given on the answer line. If there is no answer on the line, mark every method shown and award the lower total.

6 Incorrect method.

If the working clearly produces a “correct” answer by an incorrect method, award no marks.

7 Follow-through marks.

A follow-through mark involving a single calculation step can be awarded from the answer alone. One involving more than one step can only be awarded if the relevant working is seen, even when there seems to be only one possible route to the answer.

8 Ignoring subsequent work.

Ignore extra work that does not spoil a correct answer (for example an incorrectly cancelled fraction where the uncanceled form would earn full marks). Do not ignore extra work that makes the answer incorrect.

9 Probability.

Give probabilities as a fraction, percentage or decimal. A decimal equivalent should have at least 2 decimal places. Penalise poor notation on the accuracy mark only, keeping any method marks.

10 Linear equations.

Full marks can be given for the solution alone on the answer line (or clearly shown in working). If the solution is only shown substituted back into the equation, the accuracy mark is lost but method marks can still be awarded.

11 Range of answers.

A range such as 3.5 – 4.2 includes both end points and every value between them.

12 Number in brackets after a calculation.

Where a bracketed value follows a calculation, for example $2 \times 6 (= 12)$, the mark can be given either for the correct method or for the correct bracketed answer.

13 Word in square brackets.

Where a word appears in square brackets, for example $[\text{area}] \times 1.5$, the value used for $[\text{area}]$ does not need to come from correct working — use the candidate's value, subject to any limits stated in the mark scheme.

14 Misread.

If a candidate misreads a number from the question (for example 252 for 255), method marks can still be awarded provided the question has not been made easier.

Paper: 1MA1/2H				
Question	Answer	Mark	Mark scheme	Additional guidance
1	70.56	B1	70.56	AO1
2	87.5%	M1 A1	$7 \div 8 = 0.875$; 87.5%	AO1
3	£48.60	M1 A1	45×1.08 (or 8% of $45 = 3.60$); £48.60	AO1
4	60°	M1 A1	$180 - 52 - 68$; 60°	AO1
5	153.9 cm^2	M1 A1 A1	$\pi \times 7^2$; 153.938...; 153.9	AO1
6	$x > 6$	M1 A1	$5x > 30$; $x > 6$	AO1
7	72 km/h	M1 M1 A1	$3\text{h } 20\text{m} = 10/3 \text{ h}$; $240 \div 10/3$; 72	AO2
8(a)	12, 8, 6, 4	B1	Venn regions completed: 12, 8, 6, 4	AO1
8(b)	2/15	M1 A1	$30 - (12 + 8 + 6) = 4$; $4/30 = 2/15$	AO3; follow through their Venn values
8(c)	2/5	B1	$12/30 = 2/5$	AO3; follow through their Venn values
9	8.5 cm	M1 A1 A1	$BC^2 = 8^2 + 11^2 - 2 \times 8 \times 11 \times \cos 50^\circ$; 71.869...; 8.5	AO2
10	$(-1, 1)$, $(-3, 1)$, $(-1, 4)$	B1 B1	$(-1, 1)$; $(-3, 1)$ and $(-1, 4)$	AO1
11(a)	$140 \leq h < 150$	B1	$140 \leq h < 150$	AO1
11(b)	143.3 cm	M1 M1 A1	Midpoints 125, 135, 145, 155, 165; $\Sigma fx = 8600$; $8600 \div 60 = 143.3$	AO1
12	$(x + 3)^2 - 4$	M1 A1	$(x + 3)^2$ seen; $(x + 3)^2 - 4$	AO1
13	1.714, 1.291, 0.879	B1 B1 B1	$x_1 = 1.714$; $x_2 = 1.291$; $x_3 = 0.879$	AO2; allow ± 0.001
14	$2 < x < 3$	M1 A1 A1	Factorises to $(x - 2)(x - 3)$; critical values 2 and 3; $2 < x < 3$	AO2
15	34.7 cm^2	M1 A1 A1	Area = $\frac{1}{2} \times 9 \times 12 \times \sin 40^\circ$; 34.7105...; 34.7	AO2
16(a)	14.1 cm	M1 A1	$AG^2 = 6^2 + 8^2 + 10^2$; $AG = 14.1$	AO2
16(b)	45°	M1 M1 A1	Base diagonal $AC = 10$; $\tan(\text{angle}) = 10/10$; angle = 45°	AO2
17	8	M1 A1 A1	$T = k/x^2$; $k = 18 \times 16 = 288$; $T = 288/36 = 8$	AO2
18(a)	$(x - 3)/(x + 2)$	M1 A1	$(x - 3)(x + 3)$ over $(x + 3)(x + 2)$; $(x - 3)/(x + 2)$	AO1
18(b)	$(5x - 4)/((x + 1)(x - 2))$	M1 A1 A1	Common denominator $(x + 1)(x - 2)$; $3(x - 2) + 2(x + 1)$; fully simplified single fraction	AO2
19	30	M1 A1	$90 \times 180/(240 + 180 + 120)$; 30	AO2
20	84.8 cm^2	M1 A1	$(120/360) \times \pi \times 9^2$; 84.8	AO1

Question	Answer	Mark	Mark scheme	Additional guidance
21(a)	31	M1 A1	$g(4) = 13$; $fg(4) = 2 \times 13 + 5 = 31$	AO1
21(b)	$\sqrt{x+3}$	M1 A1	$y = x^2 - 3$ gives $x = \sqrt{y+3}$; $g^{-1}(x) = \sqrt{x+3}$	AO2
21(c)	$\sqrt{6}$ or $-\sqrt{6}$	M1 A1	$2x^2 - 1 = 11$; $x = \sqrt{6}$ or $x = -\sqrt{6}$	AO2; accept ± 2.45
22	$y = -1/3 x + 17/3$	M1 M1 A1	Gradient of M = $-1/3$; $5 = -1/3 \times 2 + c$; $y = -1/3 x + 17/3$	AO2; accept equivalent forms, e.g. $3y + x = 17$
23(a)	5	B1	5	AO1
23(b)	$y = -3/4 x + 25/4$	M1 M1 A1	Gradient of radius OP = $4/3$; gradient of tangent = $-3/4$; $y = -3/4 x + 25/4$	AO3; accept equivalent forms, e.g. $4y + 3x = 25$
24	0.55	M1 M1 A1	0.3×0.2 and 0.7×0.7 ; 0.06 and 0.49; 0.55	AO3
25	Two valid comparisons	B1 B1	e.g. boys' median (14.2 s) lower than girls' (15.5 s); girls' IQR (1.5 s) smaller than boys' (1.9 s)	AO2; accept any two valid comparisons
26	19.2 g/cm^3	M1 A1	$2.4 \text{ kg} = 2400 \text{ g}$; $2400 \div 125 = 19.2$	AO1
27	$x = 0, y = -5$ and $x = 4, y = 3$	M1 M1 A1 A1	$x^2 + (2x - 5)^2 = 25$; $5x(x - 4) = 0$; $x = 0$ and $x = 4$; $y = -5$ and $y = 3$, paired correctly	AO3

Worked solutions

- Q1.** $8.4^2 = 8.4 \times 8.4 = 70.56$. Answer: 70.56
- Q2.** $7 \div 8 = 0.875$. As a percentage: $0.875 \times 100 = 87.5\%$. Answer: 87.5%
- Q3.** Booking fee = 8% of £45 = $0.08 \times 45 = £3.60$. Total = $45 + 3.60 = £48.60$. Answer: £48.60
- Q4.** Angles in a triangle sum to 180° . Angle ACB = $180 - 52 - 68 = 60^\circ$. Answer: 60°
- Q5.** Area = $\pi r^2 = \pi \times 7^2 = 49\pi = 153.9380\dots \text{ cm}^2$. To 1 decimal place: 153.9 cm^2 . Answer: 153.9 cm^2
- Q6.** $5x - 3 > 27$ gives $5x > 30$, so $x > 6$. Answer: $x > 6$
- Q7.** 3 hours 20 minutes = $10/3$ hours. Speed = $240 \div (10/3) = 240 \times 3/10 = 72 \text{ km/h}$. Answer: 72 km/h
- Q8.** (a) Both = 6. Football only = $18 - 6 = 12$. Tennis only = $14 - 6 = 8$. Neither = $30 - 12 - 8 - 6 = 4$. (b) $P(\text{neither}) = 4/30 = 2/15$. (c) $P(\text{football only}) = 12/30 = 2/5$.
- Q9.** Cosine rule: $BC^2 = 8^2 + 11^2 - 2 \times 8 \times 11 \times \cos 50^\circ = 185 - 113.1306\dots = 71.8693\dots$. $BC = \sqrt{71.8693\dots} = 8.4770\dots = 8.5 \text{ cm}$ (1 d.p.). Answer: 8.5 cm
- Q10.** Reflection in the y-axis maps (x, y) to $(-x, y)$. $(1, 1) \rightarrow (-1, 1)$; $(3, 1) \rightarrow (-3, 1)$; $(1, 4) \rightarrow (-1, 4)$.
- Q11.** (a) The class with the highest frequency (21) is $140 \leq h < 150$. (b) Midpoints 125, 135, 145, 155, 165. $\Sigma fx = 8 \times 125 + 15 \times 135 + 21 \times 145 + 11 \times 155 + 5 \times 165 = 8600$. Mean estimate = $8600 \div 60 = 143.333\dots \approx 143.3 \text{ cm}$.
- Q12.** $x^2 + 6x + 5 = (x + 3)^2 - 9 + 5 = (x + 3)^2 - 4$. Answer: $(x + 3)^2 - 4$
- Q13.** $x_0 = 2$. $x_1 = (2^3 + 4)/7 = 12/7 = 1.714285\dots = 1.714$. $x_2 = (1.714285\dots^3 + 4)/7 = 9.0379\dots/7 = 1.2911\dots = 1.291$. $x_3 = (1.2911\dots^3 + 4)/7 = 6.1526\dots/7 = 0.8789\dots = 0.879$. Answers: $x_1 = 1.714$, $x_2 = 1.291$, $x_3 = 0.879$
- Q14.** $x^2 - 5x + 6 = (x - 2)(x - 3)$. The quadratic is negative between its roots. Answer: $2 < x < 3$
- Q15.** Area = $\frac{1}{2}ab \sin C = \frac{1}{2} \times 9 \times 12 \times \sin 40^\circ = 54 \times 0.64278\dots = 34.7105\dots = 34.7 \text{ cm}^2$ (1 d.p.). Answer: 34.7 cm^2
- Q16.** (a) $AG^2 = AB^2 + AD^2 + AE^2 = 6^2 + 8^2 + 10^2 = 200$. $AG = \sqrt{200} = 14.1421\dots = 14.1 \text{ cm}$ (1 d.p.). (b) Base diagonal $AC = \sqrt{6^2 + 8^2} = 10 \text{ cm}$. In triangle ACG, $\tan(\text{angle CAG}) = 10/10 = 1$, so angle CAG = 45° . Answer: (a) 14.1 cm; (b) 45°
- Q17.** $T = k/x^2$. $18 = k/16$ gives $k = 288$. When $x = 6$: $T = 288/36 = 8$. Answer: 8
- Q18.** (a) $(x^2 - 9)/(x^2 + 5x + 6) = (x - 3)(x + 3)/((x + 3)(x + 2)) = (x - 3)/(x + 2)$. (b) $3/(x+1) + 2/(x-2) = [3(x - 2) + 2(x + 1)]/((x+1)(x-2)) = (5x - 4)/((x+1)(x-2))$.
- Q19.** Total students = $240 + 180 + 120 = 540$. Year 8 share = $90 \times 180/540 = 30$. Answer: 30
- Q20.** Area = $(120/360) \times \pi \times 9^2 = 27\pi = 84.8230\dots = 84.8 \text{ cm}^2$ (1 d.p.). Answer: 84.8 cm^2

- Q21.** (a) $g(4) = 16 - 3 = 13$. $fg(4) = f(13) = 2 \times 13 + 5 = 31$. (b) Let $y = x^2 - 3$, then $x^2 = y + 3$, so $x = \sqrt{y + 3}$. $g^{-1}(x) = \sqrt{x + 3}$. (c) $fg(x) = 2(x^2 - 3) + 5 = 2x^2 - 1$. $2x^2 - 1 = 11$ gives $2x^2 = 12$, $x^2 = 6$, $x = \sqrt{6}$ or $x = -\sqrt{6}$.
- Q22.** L has gradient 3, so M has gradient $-1/3$. Through (2, 5): $y - 5 = -1/3(x - 2)$, so $y = -1/3 x + 17/3$. Answer: $y = -(1/3)x + 17/3$
- Q23.** (a) $x^2 + y^2 = r^2$, so $r^2 = 25$ and $r = 5$. (b) Gradient of radius OP = $4/3$, so gradient of tangent = $-3/4$. At (3, 4): $y - 4 = -3/4(x - 3)$, so $y = -3/4 x + 25/4$.
- Q24.** $P(\text{cycles}) = 0.3 \times 0.2 + 0.7 \times 0.7 = 0.06 + 0.49 = 0.55$. Answer: 0.55
- Q25.** Boys: min 12.4, LQ 13.1, median 14.2, UQ 15.0, max 16.3 (IQR 1.9 s). Girls: min 13.8, LQ 14.6, median 15.5, UQ 16.1, max 17.2 (IQR 1.5 s). Two valid comparisons, e.g.: boys' median (14.2 s) is lower than girls' (15.5 s), so the boys were faster on average; girls' IQR (1.5 s) is smaller than boys' (1.9 s), so the girls' times were more consistent.
- Q26.** Mass = 2.4 kg = 2400 g. Density = $2400 \div 125 = 19.2 \text{ g/cm}^3$. Answer: 19.2 g/cm^3
- Q27.** Substitute $y = 2x - 5$ into $x^2 + y^2 = 25$: $x^2 + (2x - 5)^2 = 25$, so $5x^2 - 20x = 0$, i.e. $5x(x - 4) = 0$. $x = 0$ gives $y = -5$; $x = 4$ gives $y = 3$. Answers: $x = 0, y = -5$ and $x = 4, y = 3$