AS MATHEMATICS 7356/1

Paper 1

Mark scheme

June 2026

Version: 1.0 Final

Mark schemes are prepared by the Lead Assessment Writer and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all associates participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every associate understands and applies it in the same correct way. As preparation for standardisation each associate analyses a number of students' scripts. Alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

No student should be disadvantaged on the basis of their gender identity and/or how they refer to the gender identity of others in their exam responses.

A consistent use of 'they/them' as a singular and pronouns beyond 'she/her' or 'he/him' will be credited in exam responses in line with existing mark scheme criteria.

Further copies of this mark scheme are available from aqa.org.uk

Mark scheme instructions to examiners

General

The mark scheme for each question shows:

- the marks available for each part of the question
- the total marks available for the question
- marking instructions that indicate when marks should be awarded or withheld including the principle on which each mark is awarded. Information is included to help the examiner make his or her judgement and to delineate what is creditworthy from that not worthy of credit
- a typical solution. This response is one we expect to see frequently. However credit must be given on the basis of the marking instructions.

If a student uses a method which is not explicitly covered by the marking instructions the same principles of marking should be applied. Credit should be given to any valid methods. Examiners should seek advice from their senior examiner if in any doubt.

Key to mark types

M	mark is for method
R	mark is for reasoning
A	mark is dependent on M marks and is for accuracy
B	mark is independent of M marks and is for method and accuracy
E	mark is for explanation
F	follow through from previous incorrect result

Key to mark scheme abbreviations

CAO	correct answer only
CSO	correct solution only
FT	follow through from previous incorrect result
'their'	indicates that credit can be given from previous incorrect result
AWFW	anything which falls within
AWRT	anything which rounds to
ACF	any correct form
AG	answer given
SC	special case
OE	or equivalent
NMS	no method shown
ISW	ignore subsequent working
PI	possibly implied
sf	significant figure(s)
dp	decimal place(s)

AS/A-level Maths/Further Maths assessment objectives

AO		Description
AO1	AO1.1a	Select routine procedures
	AO1.1b	Correctly carry out routine procedures
	AO1.2	Accurately recall facts, terminology and definitions
AO2	AO2.1	Construct rigorous mathematical arguments (including proofs)
	AO2.2a	Make deductions
	AO2.2b	Make inferences
	AO2.3	Assess the validity of mathematical arguments
	AO2.4	Explain their reasoning
	AO2.5	Use mathematical language and notation correctly
AO3	AO3.1a	Translate problems in mathematical contexts into mathematical processes
	AO3.1b	Translate problems in non-mathematical contexts into mathematical processes
	AO3.2a	Interpret solutions to problems in their original context
	AO3.2b	Where appropriate, evaluate the accuracy and limitations of solutions to problems
	AO3.3	Translate situations in context into mathematical models
	AO3.4	Use mathematical models
	AO3.5a	Evaluate the outcomes of modelling in context
	AO3.5b	Recognise the limitations of models
	AO3.5c	Where appropriate, explain how to refine models

Examiners should consistently apply the following general marking principles:

No Method Shown

Where the question specifically requires a particular method to be used, we must usually see evidence of use of this method for any marks to be awarded.

Where the answer can be reasonably obtained without showing working and it is very unlikely that the correct answer can be obtained by using an incorrect method, we must award **full marks**. However, the obvious penalty to students showing no working is that incorrect answers, however close, earn **no marks**.

Where a question asks the student to state or write down a result, no method need be shown for full marks.

Where the permitted calculator has functions which reasonably allow the solution of the question directly, the correct answer without working earns **full marks**, unless it is given to less than the degree of accuracy accepted in the mark scheme, when it gains **no marks**.

Otherwise we require evidence of a correct method for any marks to be awarded.

Diagrams

Diagrams that have working on them should be treated like normal responses. If a diagram has been written on but the correct response is within the answer space, the work within the answer space should be marked. Working on diagrams that contradicts work within the answer space is not to be considered as choice but as working, and is not, therefore, penalised.

Work erased or crossed out

Erased or crossed out work that is still legible and has not been replaced should be marked. Erased or crossed out work that has been replaced can be ignored.

Choice

When a choice of answers and/or methods is given and the student has not clearly indicated which answer they want to be marked, mark positively, awarding marks for all of the student's best attempts. Withhold marks for final accuracy and conclusions if there are conflicting complete answers or when an incorrect solution (or part thereof) is referred to in the final answer.

Q	Marking instructions	AO	Marks	Typical solution
1	Circles first answer	1.1b	B1	$-\frac{5}{4}$
	Question 1 Total		**1**	

Q	Marking instructions	AO	Marks	Typical solution
2	Circles fourth answer	1.1b	B1	$\frac{11}{6x^2}$
	Question 2 Total		**1**	

Q	Marking instructions	AO	Marks	Typical solution
3	Obtains $a = 3$	1.1b	B1	$3(x-1)^2 - 11$
	Obtains $b = 1$	1.1b	B1	
	Obtains $c = -11$	1.1b	B1	
	Question 3 Total		**3**	

Q	Marking instructions	AO	Marks	Typical solution
4	Take logs to the same base of both sides of the equation PI $2x + 5 = \log_5 12^{100}$	1.1a	M1	$\log_5 5^{2x+5} = \log_5 12^{100}$ $2x + 5 = \log_5 12^{100}$ $x = \frac{100\log_5 12 - 5}{2}$ $x = 74.7$
	Uses power law correctly to express $\log_a b^k = k\log_a b$ where $a \neq b$	1.1a	M1	
	Obtains AWRT 74.7	1.1b	A1	
	Question 4 Total		**3**	

Q	Marking instructions	AO	Marks	Typical solution
5	Simplifies to a three-term quadratic with at least two terms correct PI by correct critical values	1.1a	M1	$2x^2 + 3x - 5 < 0$ $-\frac{5}{2} < x < 1$ $\left\{x : -\frac{5}{2} < x < 1\right\}$
	Obtains $-\frac{5}{2}$ and 1	1.1b	A1	
	Gives answer in any correct set notation. For example: $\left\{x : -\frac{5}{2} < x < 1\right\}$ $\left\{x \in \mathbb{R} : -\frac{5}{2} < x < 1\right\}$ $\left(-\frac{5}{2}, 1\right)$	2.5	R1	
	Question 5 Total		**3**	

Q	Marking instructions	AO	Marks	Typical solution
6(a)	Uses $\cos^2 x = 1 - \sin^2 x$	1.1a	M1	$2\sin x - 1 = 2\cos^2 x$ $2\sin x - 1 = 2(1 - \sin^2 x)$ $2\sin x - 1 = 2 - 2\sin^2 x$ $2\sin^2 x + 2\sin x - 3 = 0$
	Completes reasoned argument to obtain $2\sin^2 x + 2\sin x - 3 = 0$ Must see one intermediate line of working AG	2.1	R1	
	Subtotal		**2**	

Q	Marking instructions	AO	Marks	Typical solution
6(b)	Obtains $\frac{-1-\sqrt{7}}{2}$ or $\frac{-1+\sqrt{7}}{2}$ AWRT -1.82 or 0.82	1.1b	B1	$\sin x = \frac{-1-\sqrt{7}}{2}$ or $\sin x = \frac{-1+\sqrt{7}}{2}$ As $-1 \leq \sin x \leq 1$, $\frac{-1-\sqrt{7}}{2}$ is out of range $x = 55°, 125°$
	Explains why $\sin x = \frac{-1-\sqrt{7}}{2}$ is not a valid solution with reference to the range of sine	2.4	E1	
	Obtains AWRT 55	1.1a	M1	
	Obtains AWRT 55 and 125 and no others within the interval	1.1b	A1	
	Subtotal		**4**	

	Question 6 Total		**6**	

Q	Marking instructions	AO	Marks	Typical solution
7	Select an appropriate method by either Using sine rule to find angle *BAC* or Using cosine rule to find *AC*	3.1a	M1	$\frac{\sin\theta}{7} = \frac{\sin 100°}{12}$ $\theta = 35.1°$ $ABC = 180° - 100° - 35.1°$ $ABC = 44.9°$ Shortest distance $= 7 \times \sin 44.9°$ $= 4.9$ cm
	Obtains AWRT 35.1 for angle *BAC* or AWRT 8.6 for *AC*	1.1b	A1	
	Forms an equation or expression to find the perpendicular distance from *C* to *AB*	3.1a	M1	
	Obtains AWRT 4.9 Condone missing units	1.1b	A1	
	Question 7 Total		**4**	

Q	Marking instructions	AO	Marks	Typical solution
8(a)	Differentiates with at least one term correct	1.1a	M1	$\frac{dy}{dx} = 2x - 8$
	Obtains $2x - 8$	1.1b	A1	
	Subtotal		**2**	

Q	Marking instructions	AO	Marks	Typical solution
8(b)	Substitutes $x = 3$ into their $\frac{dy}{dx}$ to obtain a value	1.1a	M1	When $x = 3$, $y = 5$ When $x = 3$, $\frac{dy}{dx} = -2$ $y - 5 = -2(x - 3)$ When $x = 0$, $y = 11$ When $y = 0$, $x = \frac{11}{2}$ Area $= \frac{1}{2} \times \frac{11}{2} \times 11$ $= \frac{121}{4}$
	obtains $\frac{dy}{dx} = -2$	1.1b	A1	
	Uses an appropriate method to find a value of the x- intercept or the y- intercept	3.1a	M1	
	Obtains $x = \frac{11}{2}$ **and** $y = 11$	2.2a	A1	
	Forms an expression for the area of *OAB* using their x- and y-intercepts	3.1a	M1	
	Obtains 30.25 OE	1.1b	A1	
	Subtotal		**6**	

	Question 8 Total		**8**	

Q	Marking instructions	AO	Marks	Typical solution
9	Expands at least one of $(3n+4)^2$ or $(3n-4)^2$ correctly Or Uses difference of two squares to obtain at least one correct factor	1.1a	M1	$(3n+4)^2-(3n-4)^2$ $=9n^2+24n+16-9n^2+24n-16$ $=48n$ $=12(4n)$ which is a multiple of 12 for all integer values of n
	Obtains $48n$ or $12(4n)$ or $(6n)(8)$	1.1b	A1	
	Completes a reasoned argument to show that $(3n+4)^2-(3n-4)^2$ is a multiple of 12 for all integer values of n	2.1	R1	
	Question 9 Total		**3**	

Q	Marking instructions	AO	Marks	Typical solution
10(a)	Substitutes $x = 2$ into $f(x)$ and equates to 0	1.1a	M1	$(2)^3 - 2a(2)^2 + 28(2) + 4b = 0$ $8 - 8a + 56 + 4b = 0$ $8a - 4b = 64$ $2a - b = 16$
	Completes a reasoned argument to obtain $2a - b = 16$ Must see evaluation of terms before dividing. AG	2.1	R1	
	Subtotal		**2**	

Q	Marking instructions	AO	Marks	Typical solution
10(b)(i)	Substitutes $x = 2$ into $g(x)$ and equates to 0	1.1a	M1	$2(2)^3 - a(2)^2 - 4(2) - 2b = 0$ $16 - 4a - 8 - 2b = 0$ $4a + 2b = 8$ $2a - b = 16$ $a = 5,\ b = -6$
	Solves their linear simultaneous equations to obtain values for a and b	1.1a	M1	
	Obtains $a = 5$ and $b = -6$	1.1b	A1	
	Subtotal		**3**	

Q	Marking instructions	AO	Marks	Typical solution
10(b)(ii)	Substitutes their a and b correctly into $f(x)$ and $g(x)$	1.1a	M1	$x^3 - 10x^2 + 28x - 24 = 2x^3 - 5x^2 - 4x + 12$ $x^3 + 5x^2 - 32x + 36 = 0$ $(x-2)(x^2 + 7x - 18) = 0$ $(x-2)(x-2)(x+9) = 0$ $x = 2$ and $x = -9$ $\therefore$ exactly two distinct solutions because $x = 2$ is a repeated root
	Factorises $f(x) - g(x)$ as $(x - 2)$(quadratic) or Factorises $f(x)$ as $(x - 2)$(quadratic) and $g(x)$ as $(x - 2)$(quadratic)	3.1a	M1	
	Obtains $(x - 2)(x - 2)(x + 9) = 0$ or $(x - 2)(x - 2)(x - 6) =$ $(x - 2)(x - 2)(2x + 3)$	1.1b	A1	
	Obtains $x = -9$ or $(x + 9)$	1.1b	B1	
	Completes a reasoned argument to show there are exactly two distinct solutions CSO	2.1	R1	
	Subtotal		**5**	

	Question 10 Total		**10**	

Q	Marking instructions	AO	Marks	Typical solution
11(a)	Completes a reasoned argument to show that $(2-\sqrt{3})^2 = 7-4\sqrt{3}$ Must see three or four correct terms. AG	2.1	R1	$(2-\sqrt{3})^2 = (2-\sqrt{3})(2-\sqrt{3})$ $= 4-2\sqrt{3}-2\sqrt{3}+3$ $= 7-4\sqrt{3}$
	Subtotal		**1**	

Q	Marking instructions	AO	Marks	Typical solution
11(b)	Factorises $21-12\sqrt{3}$ as $3(2-\sqrt{3})^2$, may be seen within an equation or a square root.	3.1a	B1	$x^2 = 21-12\sqrt{3}$ $x^2 = 3(7-4\sqrt{3})$ $x^2 = 3(2-\sqrt{3})^2$ $x = \pm\sqrt{3}(2-\sqrt{3})$ $x = -3+2\sqrt{3}$, $x = 3-2\sqrt{3}$
	Obtains $x = \sqrt{3}(2-\sqrt{3})$ or $x = -\sqrt{3}(2-\sqrt{3})$	1.1a	M1	
	Completes a reasoned argument to obtain $x = -3+2\sqrt{3}$, $x = 3-2\sqrt{3}$	2.1	R1	
	Subtotal		**3**	

	Question 11 Total		**4**	

Q	Marking instructions	AO	Marks	Typical solution
12(a)(i)	Obtains $(-5, -2)$	1.1b	B1	$(-5, -2)$
	Subtotal		**1**	

Q	Marking instructions	AO	Marks	Typical solution
12(a)(ii)	Obtains 5	2.2a	B1	5
	Subtotal		**1**	

Q	Marking instructions	AO	Marks	Typical solution
12(a)(iii)	Obtains $x = -10$	2.2a	B1	$x = -10$
	Subtotal		**1**	

Q	Marking instructions	AO	Marks	Typical solution
12(b)	Forms the expression $r^2 + 3.75^2$	3.1a	M1	$\sqrt{5^2 + 3.75^2} = 6.25$ Possible values for radius $6.25 - 5 = 1.25$ $6.25 + 5 = 11.25$
	Evaluates their 6.25 + their r or their 6.25 – their r	2.2a	M1	
	Obtains 1.25 or 11.25	1.1b	A1	
	Obtains 1.25 and 11.25	1.1b	A1	
	Subtotal		**4**	

	Question 12 Total		**7**	

Q	Marking instructions	AO	Marks	Typical solution
13	Circles third answer	1.1b	B1	$\begin{bmatrix} 4 \\ -5 \end{bmatrix}$
	Question 13 Total		**1**	

Q	Marking instructions	AO	Marks	Typical solution
14	Circles fourth answer	3.3	B1	78
	Question 14 Total		**1**	

Q	Marking instructions	AO	Marks	Typical solution
15(a)	Forms an expression for the area under the graph from 0 to 16, 16 to 25 or 0 to 25	1.1a	M1	$\text{distance} = \frac{12 \times 25}{2}$ $= 150 \text{ m}$
	Obtains 150 m Condone missing units	1.1b	A1	
	Subtotal		**2**	

Q	Marking instructions	AO	Marks	Typical solution
15(b)	Forms an expression for the gradient of the line from (16, 12) to (25, 0)	1.1a	M1	$\text{gradient} = \frac{0-12}{25-16}$ $= -\frac{4}{3}$ $\text{deceleration} = \frac{4}{3} \text{ m s}^{-2}$
	States deceleration $= \frac{4}{3} \text{ m s}^{-2}$ or AWRT 1.3 Condone missing units Condone $-\frac{4}{3} \text{ m s}^{-2}$ or AWRT -1.3	1.1b	A1	
	Subtotal		**2**	

	Question 15 Total		**4**	

Q	Marking instructions	AO	Marks	Typical solution
16(a)	Differentiates v with at least one term correct	3.4	M1	$v = 4t^3 - 3t$ $a = \frac{\mathrm{d}v}{\mathrm{d}t} = 12t^2 - 3$ m s^{-2}
	Obtains $12t^2 - 3$ Condone missing units	1.1b	A1	
	Subtotal		**2**	

Q	Marking instructions	AO	Marks	Typical solution
16(b)	Integrates v with at least one non-constant term correct	3.4	M1	$s = \int 4t^3 - 3t\,dt$ $s = t^4 - \frac{3}{2}t^2 + c$ $t = 1 \;\; s = 5$ $5 = (1)^4 - \frac{3}{2}(1)^2 + c$ $c = \frac{11}{2}$ $s = t^4 - \frac{3}{2}t^2 + \frac{11}{2}$ $t = 0 \;\; s = \frac{11}{2} = 5.5$ m
	Obtains $t^4 - \frac{3}{2}t^2 + c$ Condone missing constant term	1.1b	A1	
	Substitutes $t = 1 \;\; s = 5$ to find constant term	1.1a	M1	
	Obtains $t^4 - \frac{3}{2}t^2 + \frac{11}{2}$	1.1b	A1	
	Completes a reasoned argument to obtain displacement = 5.5 m when $t = 0$	2.1	R1	
	Subtotal		**5**	

	Question 16 Total		**7**	

Q	Marking instructions	AO	Marks	Typical solution
17(a)	Uses $v^2 = u^2 + 2as$ oe	3.4	M1	$v^2 = u^2 + 2as$ $(7.5)^2 = (4.5)^2 + 2a(100)$ $a = 0.18$
	Obtains 0.18	1.1b	A1	
	Subtotal		**2**	

Q	Marking instructions	AO	Marks	Typical solution
17(b)(i)	Forms a three-term equation of motion Allow a sign error	3.3	M1	$F - R = ma$ $80 - R = (50)(0.18)$ $R = 71$
	Forms a correct equation – FT their acceleration	3.4	A1F	
	Obtains 71	1.1b	A1	
	Subtotal		**3**	

Q	Marking instructions	AO	Marks	Typical solution
17(b)(ii)	States any valid limitation For example: • Resistance force unlikely to be constant • Driving force may vary over the motion	3.5b	E1	Resistance force will vary over the journey
	Subtotal		**1**	

	Question 17 Total		**6**	

Q	Marking instructions	AO	Marks	Typical solution
18(a)	Forms an equation of motion for Particle *A* Condone one sign error	3.3	M1	Equation of motion for particle *A* $T - 10x = xa$ Equation of motion for particle *B* $10(x + 2) - T = (x + 2)a$ Eliminating T $10(x + 2) - 10x = (x + 2)a + xa$ $10x + 20 - 10x = xa + 2a + xa$ $20 = (2x + 2)a$ $a = \frac{20}{2x+2} = \frac{10}{x+1}$
	Forms an equation of motion for Particle *B* Condone one sign error	3.3	M1	
	Forms two fully correct equations of motion	3.4	A1	
	Eliminates T to deduce an equation connecting a and x	2.2a	M1	
	Completes a reasoned argument to obtain $a = \frac{10}{x+1}$ AG	2.1	R1	
	Subtotal		**5**	

Q	Marking instructions	AO	Marks	Typical solution
18(b)	Uses $s = ut + \frac{1}{2}at^2$	1.1b	B1	$s=5,\ u=0,\ t=2,\ a = \frac{10}{x+1}$ $s = ut + \frac{1}{2}at^2$ $5 = 0 \times 2 + \frac{1}{2}\left(\frac{10}{x+1}\right)(2)^2$ $5 = \frac{20}{x+1}$ $x + 1 = 4$ $x = 3$
	Substitutes $s = 5$ $t = 2$ $u = 0$ or $ut = 0$ and $a = \frac{10}{x+1}$ into $s = ut + \frac{1}{2}at^2$ to find a value for x or Substitutes $s = 5$ $t = 2$ and $u = 0$ or $ut = 0$ into $s = ut + \frac{1}{2}at^2$ to find a numerical value for a	3.4	M1	
	Completes reasoned argument to show that $x = 3$ Must have define the variables s=5, u=0, t=2 AG	2.1	R1	
	Subtotal		**3**	

	Question 18 Total		**8**	

	Question Paper Total		**80**	