CAMBRIDGE
International Education

Cambridge IGCSE™

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

ADDITIONAL MATHEMATICS **0606/12**

Paper 1 Non-calculator **February/March 2026**

2 hours

You must answer on the question paper.

No additional materials are needed.

INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen. Do **not** use correction fluid or tape.
- Do **not** write on any bar codes.
- Calculators must **not** be used in this paper.
- You must show all necessary working clearly.

INFORMATION

- The total mark for this paper is 80.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **16** pages.

DC (CE/CB) 359462/1

List of formulas

Equation of a circle with centre (a, b) and radius r. $(x-a)^2+(y-b)^2=r^2$

Curved surface area, A, of cone of radius r, sloping edge l. $A=\pi rl$

Surface area, A, of sphere of radius r. $A=4\pi r^2$

Volume, V, of pyramid or cone, base area A, height h. $V=\frac{1}{3}Ah$

Volume, V, of sphere of radius r. $V=\frac{4}{3}\pi r^3$

Quadratic equation

For the equation $ax^2+bx+c=0$,

$$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$$

Binomial theorem

$$(a+b)^n=a^n+\binom{n}{1}a^{n-1}b+\binom{n}{2}a^{n-2}b^2+\ldots+\binom{n}{r}a^{n-r}b^r+\ldots+b^n,$$

where n is a positive integer and $\binom{n}{r}=\frac{n!}{(n-r)!r!}$

Arithmetic series

$$u_n=a+(n-1)d$$
$$S_n=\frac{1}{2}n(a+l)=\frac{1}{2}n\{2a+(n-1)d\}$$

Geometric series

$$u_n=ar^{n-1}$$
$$S_n=\frac{a(1-r^n)}{1-r}\quad(r\neq 1)$$
$$S_\infty=\frac{a}{1-r}\quad(|r|<1)$$

Identities

$$\sin^2A+\cos^2A=1$$
$$\sec^2A=1+\tan^2A$$
$$\operatorname{cosec}^2A=1+\cot^2A$$

Formulas for ΔABC

$$\frac{a}{\sin A}=\frac{b}{\sin B}=\frac{c}{\sin C}$$
$$a^2=b^2+c^2-2bc\cos A$$
$$\Delta=\frac{1}{2}ab\sin C$$

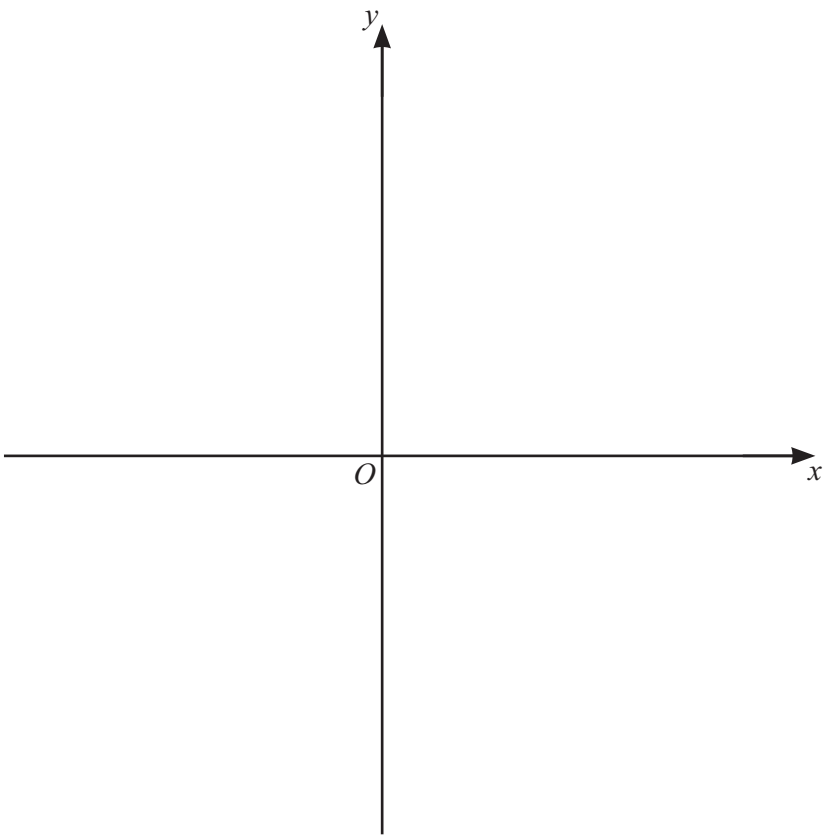
Calculators must **not** be used in this paper.

1 A polynomial p is given by $\mathrm{p}(x) = 4x^3 + 8x^2 - x - 2$.

(a) Show that $x + 2$ is a factor of $\mathrm{p}(x)$. [1]

(b) Solve the equation $\mathrm{p}(x) = 0$. [3]

2 **(a)** On the axes, sketch the graph of $y = |x^2 - 2x - 3|$.
State the intercepts with the coordinate axes. [4]



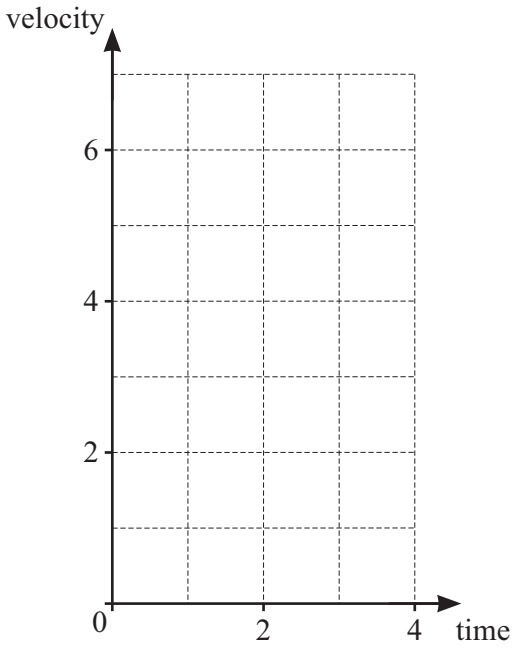
(b) The function g is defined by $g(x) = 4e^{x-2} - 1$ for all real x.

Find an expression for $g^{-1}(x)$. [2]

3 In this question, time t is in seconds and displacement s is in metres.

A particle starts from rest at the origin O and moves in a straight line with constant positive acceleration.
When $t = 4$, $s = 6$.

(a) Draw the velocity–time graph for $0 \leqslant t \leqslant 4$. [2]



(b) Hence find the acceleration. [1]

4 In an arithmetic progression:

- the common difference is -2
- the sum of the first 4 terms is equal to the sum of the first 10 terms.

Find the first term. [3]

5 A curve has equation $y = \frac{x^2 - 8}{3 - x}$.

P and Q are the stationary points on the curve.

Find $\frac{\mathrm{d}y}{\mathrm{d}x}$ and the exact length of the line PQ. [7]

6 **(a)** Solve the equation $|3x+2|=7$. [3]

(b) Solve the inequality $|2x-4|>|x+1|$. [4]

7 The variables x and y are related by $y = 3\sqrt{x} + \frac{1}{\sqrt{x}}$.

Use calculus to find the approximate change in y when x increases from 4 to $4 + h$, where h is small. [4]

8 A curve has equation $y = xe^{2x+1}$.

(a) Find $\frac{dy}{dx}$. [3]

(b) The line L is the tangent to the curve at the point where $x = \frac{1}{2}$.

Find the exact coordinates of the two points where L meets the axes. [5]

(c) Use your answer to **8(a)** to find $\int x e^{2x+1} \, dx$. [4]

9 **(a)** In this question, time is in seconds and distances are in metres.

At time $t = 0$, particle A starts at the origin and moves with velocity $\begin{pmatrix} 2 \\ 1 \end{pmatrix}$.

At the same time, particle B starts from the point with position vector $\begin{pmatrix} -3 \\ 4 \end{pmatrix}$ and moves with velocity $\begin{pmatrix} 4 \\ -2 \end{pmatrix}$.

(i) Write down the position vector of B at time t. [1]

(ii) Determine whether or not the particles collide. [4]

(b) The point Q has position vector $3\mathbf{i}+2\mathbf{j}$.
The point R has position vector $-\mathbf{i}+4\mathbf{j}$.
The point S has position vector $a\mathbf{i}+b\mathbf{j}$, where a and b are integers.

It is given that:

- S lies on the straight line QR
- $\left|\overrightarrow{RS}\right| = \sqrt{5}$.

Find the possible values of a and b. [5]

10 **(a)** Given that $\log_5\left(x^2\right) - \log_5 x - 3\log_x 5 = 2$, find x. [6]

(b) Solve the equation $2 \times 8^{2x+1} - 3 \times 2^{3x+4} - 64 = 0$. [4]

11 A curve has equation $y = -x^2 + 3ax - 2a^2$ where a is a positive constant.
The area of the region enclosed by the curve and the x-axis is $\frac{9}{16}$.

Find the value of a. [6]

Question 12 is on the back page.

12 Find the coordinates of the points of intersection of the circles with equations $x^2+2x+y^2-4y-20=0$ and $x^2-12x+y^2-6y+20=0$. [8]

