* 0000800000001 * DFD

Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

7782727873

ADDITIONAL MATHEMATICS **0606/11**

Paper 1 Non-calculator **October/November 2025**

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 or correction fluid.
- 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.

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

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

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.

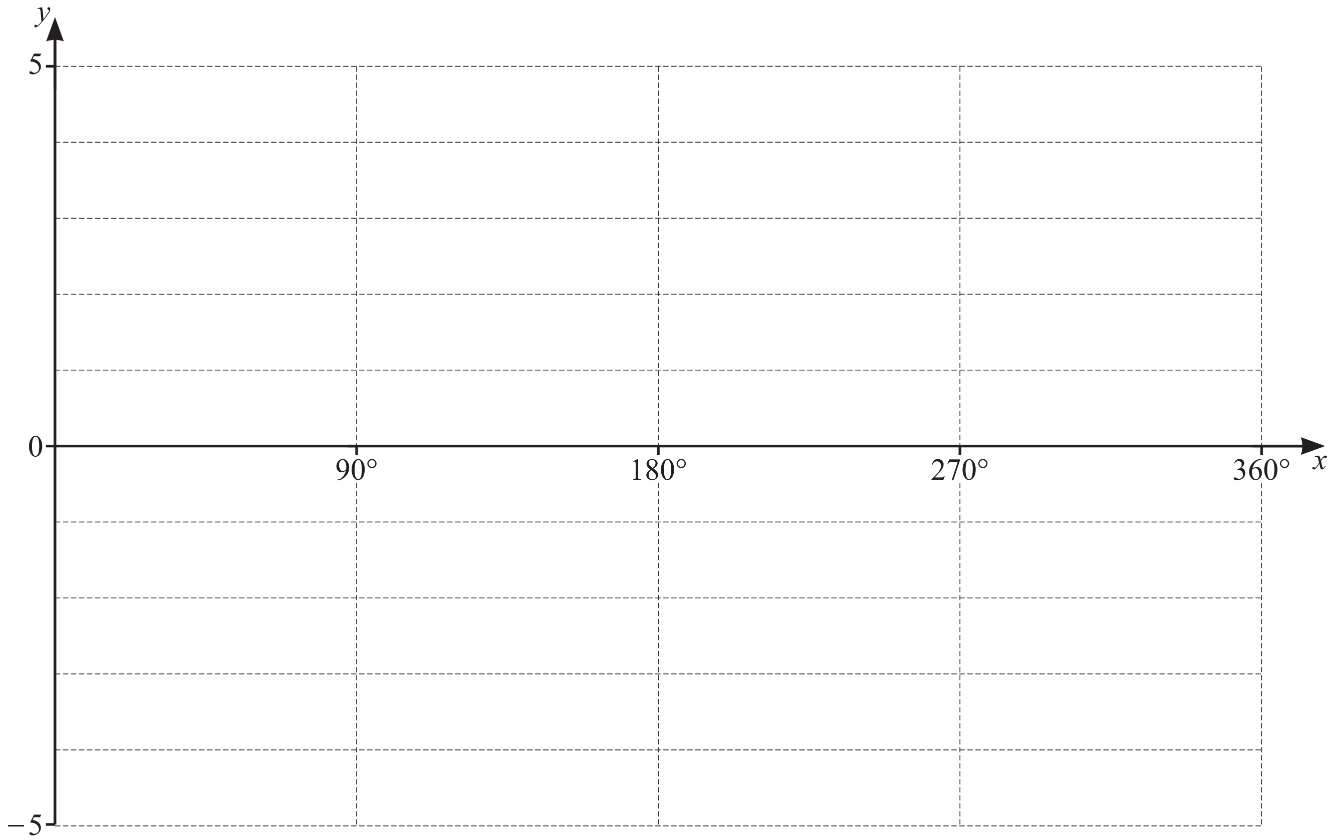
1 **(a)** Write down the amplitude and period of $3\cos 2x - 1$.

Amplitude = ...

Period = ...

[2]

(b) Sketch the graph of $y = 3\cos 2x - 1$ for $0° \leqslant x \leqslant 360°$. [3]

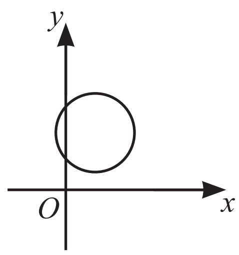


2 Find the set of values of k for which the line $y = kx - 3$ meets the curve $y = x^2 + 2x$ at two distinct points.
Give your answer in simplest surd form. [6]

3 **(a)** Solve the equation $\log_2 x - 4 = 5\log_x 2$. [5]

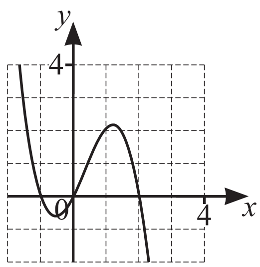
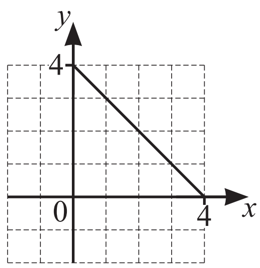
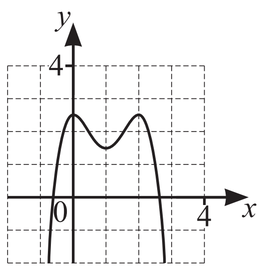
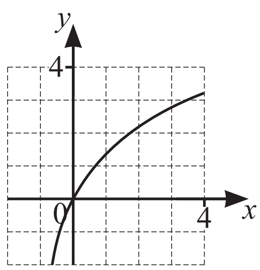
(b) Solve the equation $e^{x^2-3} = 25e^{7-x^2}$. [4]

4 **(a)**



Explain why this graph does **not** represent a function. [1]

(b) The table shows the graphs of four different functions.

	is one-one	is many-one	is its own inverse
			
			
			
			

Tick (✓) each correct box in the table.
There may be more than one tick in a row or a column. [4]

(c) Functions f and g are defined as follows.

$\mathrm{f}: x \mapsto \sin x \qquad \text{for } 30° \leqslant x \leqslant a°$

$\mathrm{g}: x \mapsto \sqrt{x - \frac{1}{2}} \qquad \text{for } x \geqslant \frac{1}{2}$

It is given that the function gf exists.

(i) Find the value of a so that the domain of gf is as large as possible.

You may use the information that $\sin 30° = \frac{1}{2}$. [2]

(ii) For the domain found in **part (i)**, find the range of the function gf. [2]

(iii) Determine whether the function g^2 exists. [1]

5 **(a)** In an arithmetic progression:

- the first term is 3
- the sum of the first 10 terms is 4 times the sum of the first 5 terms.

Find the common difference. [3]

(b) The 1st, 2nd and 5th terms of another arithmetic progression are the 1st, 2nd and 3rd terms of a geometric progression.

It is given that the 1st terms of the progressions are **not** 0.
Find the common ratio, r, where $r \neq 1$, of the geometric progression. [4]

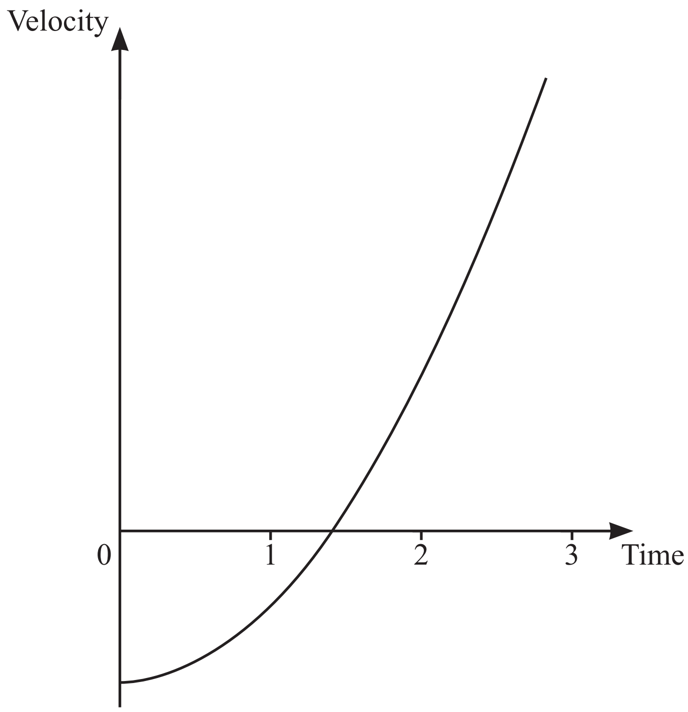
6 Solve the equation $\left|x^2 - 5x\right| = 6$. [5]

7 **(a)** Differentiate $\dfrac{\sin x + \cos x}{e^{1-3x}}$ with respect to x. [4]

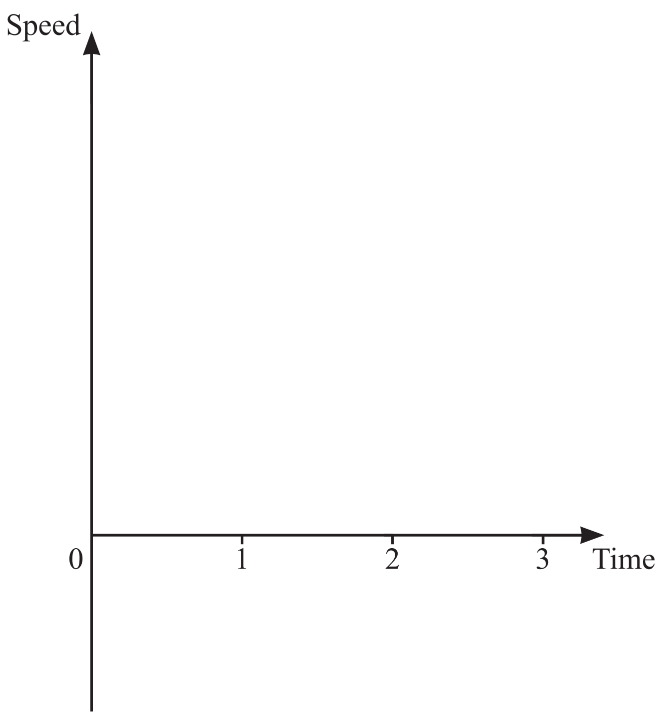
(b) Find $\int \left(1 + \tan^2 3x\right) dx$. [3]

8 Solve the simultaneous equations $\frac{x}{2y} - \frac{4y}{x} = -1$ and $x = 1 - 6y$. [5]

9 The diagram shows the velocity–time graph for a particle moving in a straight line.

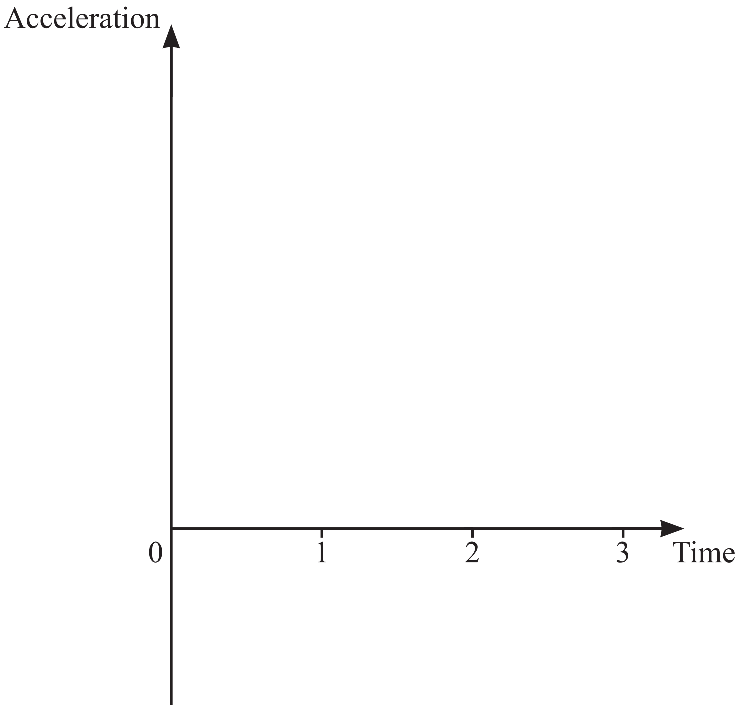


(a) On the diagram below, sketch the speed–time graph for the motion of this particle. [1]

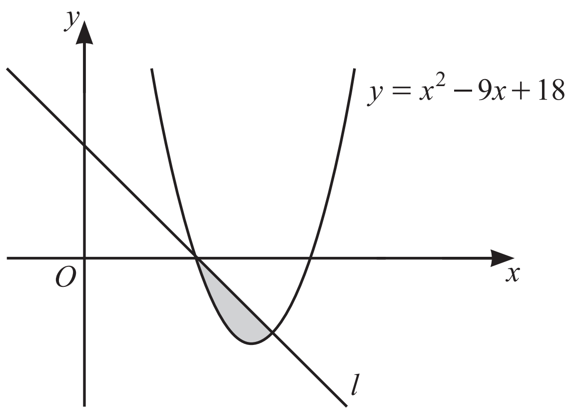


It is given that the velocity–time graph is part of a quadratic curve.
The curve has gradient 0 when time is 0.

(b) On the diagram below sketch a possible acceleration–time graph for the motion of the particle. [2]



10



The diagram shows the curve $y = x^2 - 9x + 18$ and the line l, which is the normal to this curve at the point where $x = 5$.

Find the area of the shaded region. [11]

Continuation of working space for Question 10.

11 The number of permutations of n items taken 4 at a time is equal to $\frac{1}{6}\times$ the number of permutations of $2n$ items taken 3 at a time.

(a) Show that n satisfies the equation $3n^2 - 19n + 20 = 0$. [4]

(b) Hence find the value of n. [2]

Question 12 is printed on the next page.

12 Solutions to this question by accurate drawing will not be accepted.

Relative to an origin O, the position vectors of the points A, B and C are

$\overrightarrow{OA} = \begin{pmatrix} 1 \\ 7 \end{pmatrix}$, $\overrightarrow{OB} = \begin{pmatrix} 7 \\ 4 \end{pmatrix}$ and $\overrightarrow{OC} = k\begin{pmatrix} 1 \\ 2 \end{pmatrix}$, where k is a scalar constant.

Given that C lies on the line AB, use a vector method to find the ratio $AC : AB$. [6]