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CAMBRIDGE International Education

Cambridge IGCSE™

CANDIDATE NAME

CENTRE NUMBER

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* 8 9 3 0 6 7 8 2 3 7 *

ADDITIONAL MATHEMATICS **0606/22**

Paper 2 **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.
- You should use a scientific calculator where appropriate.
- You must show all necessary working clearly.
- Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place for angles in degrees, unless a different level of accuracy is specified in the question.
- For π, use either your calculator value or 3.142.

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.

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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

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

1 The function f is defined by $f(x) = 2x^2 - 6x + 4$ for all real values of x.

(a) Write $f(x)$ in the form $a(x+b)^2 + c$ where a, b and c are constants. [3]

(b) Hence find the range of f. [1]

(c) The function g is defined by $g(x) = 2x^2 - 6x + 4$ for $x \leqslant k$, where k is a constant.

Given that g has an inverse, state the largest possible value of k. [1]

(d) The function h is defined by $h(x) = e^{3x} - 1$ for $x \leqslant 0$.

Given that $gh(x)$ exists, find $gh(x)$, simplifying your answer. [3]

2 Points A and B have coordinates $(1, 3)$ and $(-7, 1)$.
The point P with coordinates $(2, a)$ lies on the perpendicular bisector of AB.

(a) Find the value of a. [4]

(b) The point Q is the reflection of P in the line AB.

Find the coordinates of Q. [2]

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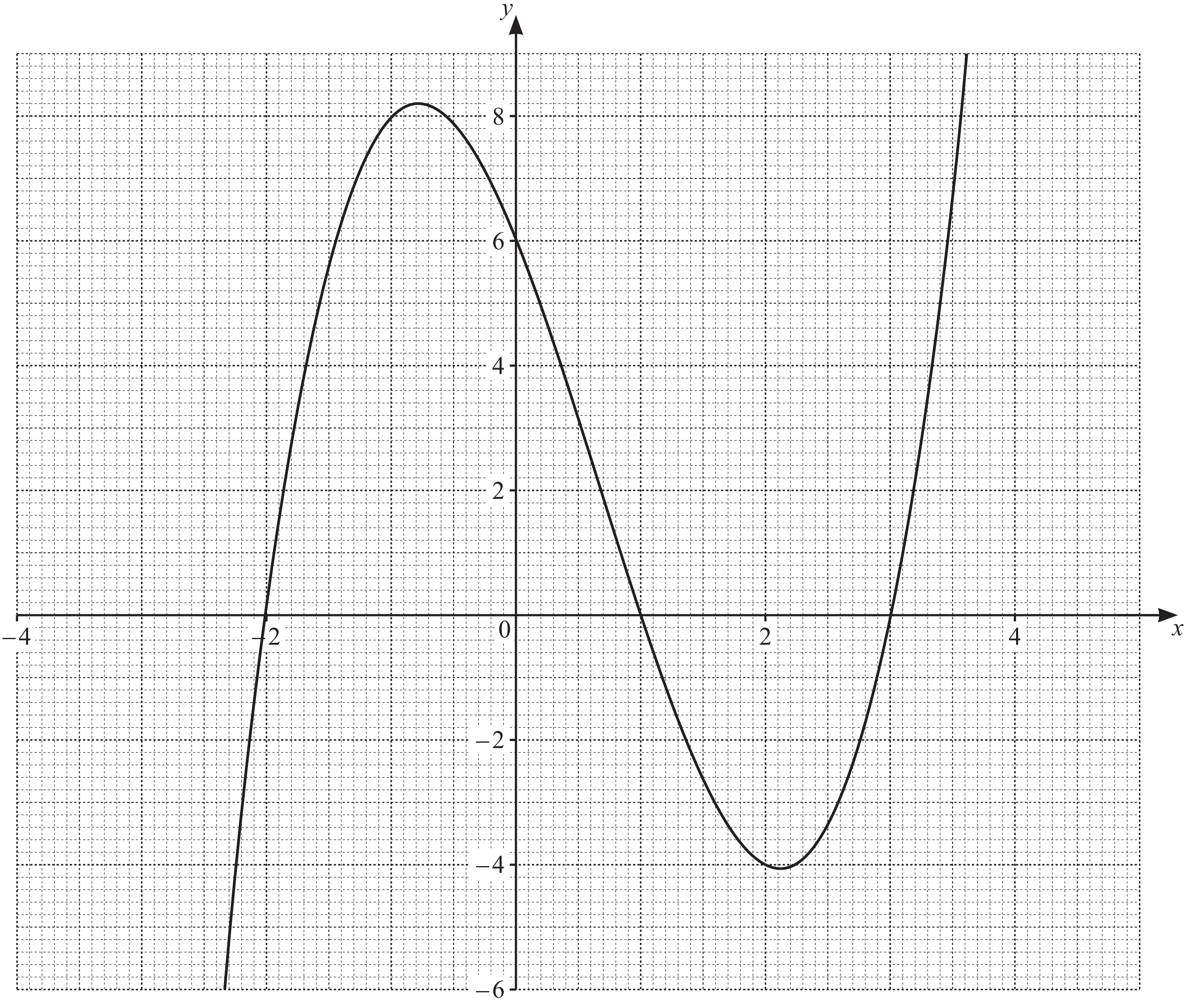
3



The diagram shows the graph of $y = (x+2)(x-1)(x-3)$.

By drawing a suitable line on the diagram, solve the inequality $(x+2)(x-1)(x-3) > 7$. [4]

4 **(a)** A 6-digit number is to be formed from the digits 1, 2, 3, 4, 5, 6, 7, 8, 9.
No digit may be used more than once in any 6-digit number.

Find how many 6-digit numbers can be formed in the following cases.

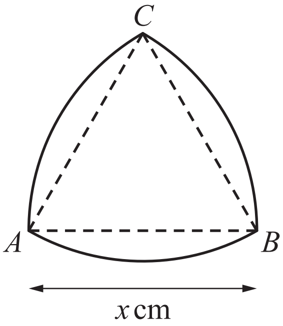
(i) There are no further restrictions. [1]

(ii) The 6-digit number includes the digit 4. [2]

(b) A class contains 10 girls and 12 boys.
A group of 6 students is to be selected from the class.
There must be at least 2 girls and at least 2 boys in the group.

Find the number of different selections that can be made. [3]

5 The diagram shows a design for a badge.



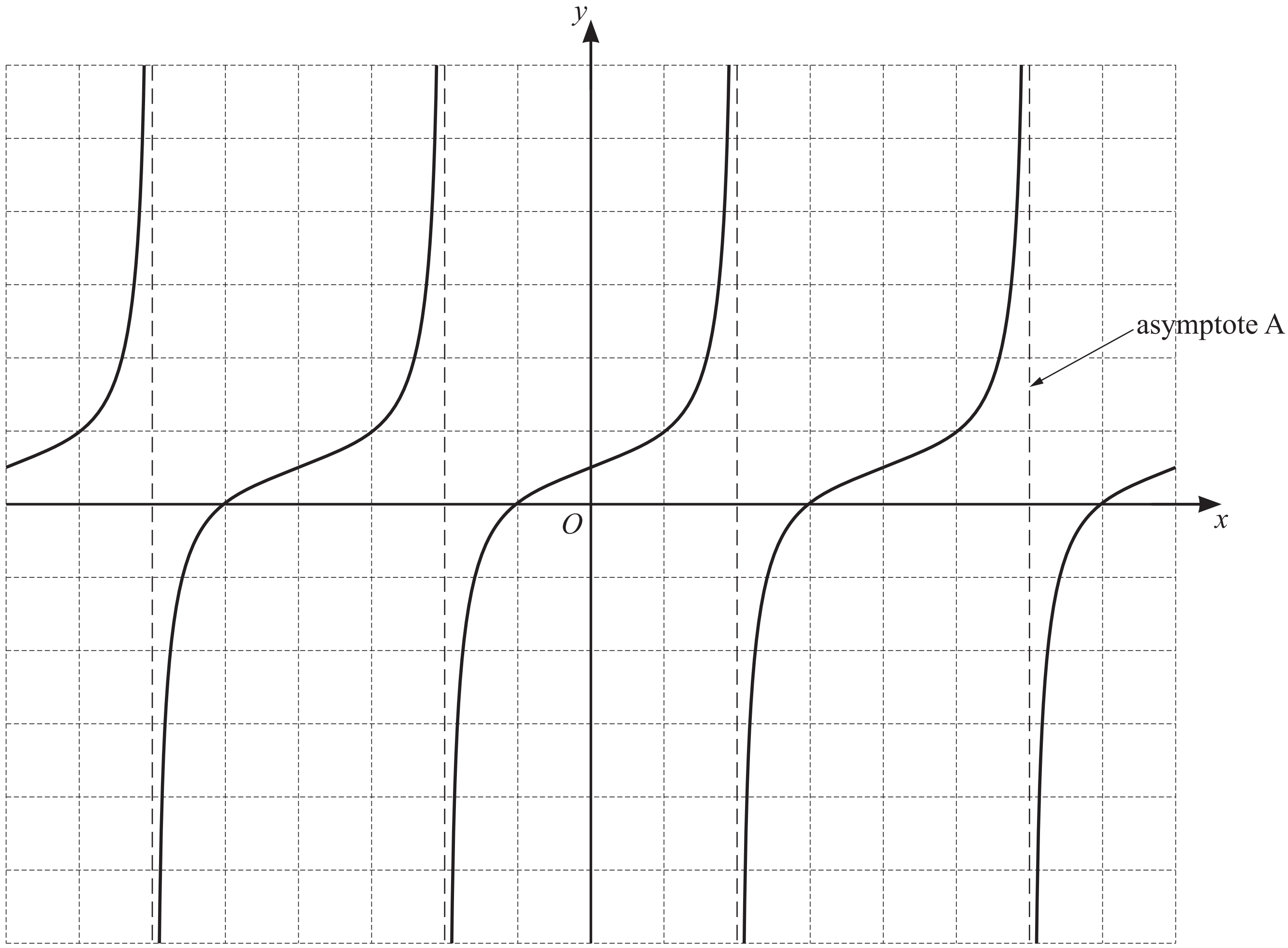
ABC is an equilateral triangle with side x cm.
The arcs BC, CA and AB are parts of the circles with centres A, B and C respectively.

(a) Write down the size of angle ABC in radians.
Give your answer in terms of π. [1]

(b) The area of the badge is $2(\pi - \sqrt{3})\ \text{cm}^2$.

Find x. [5]

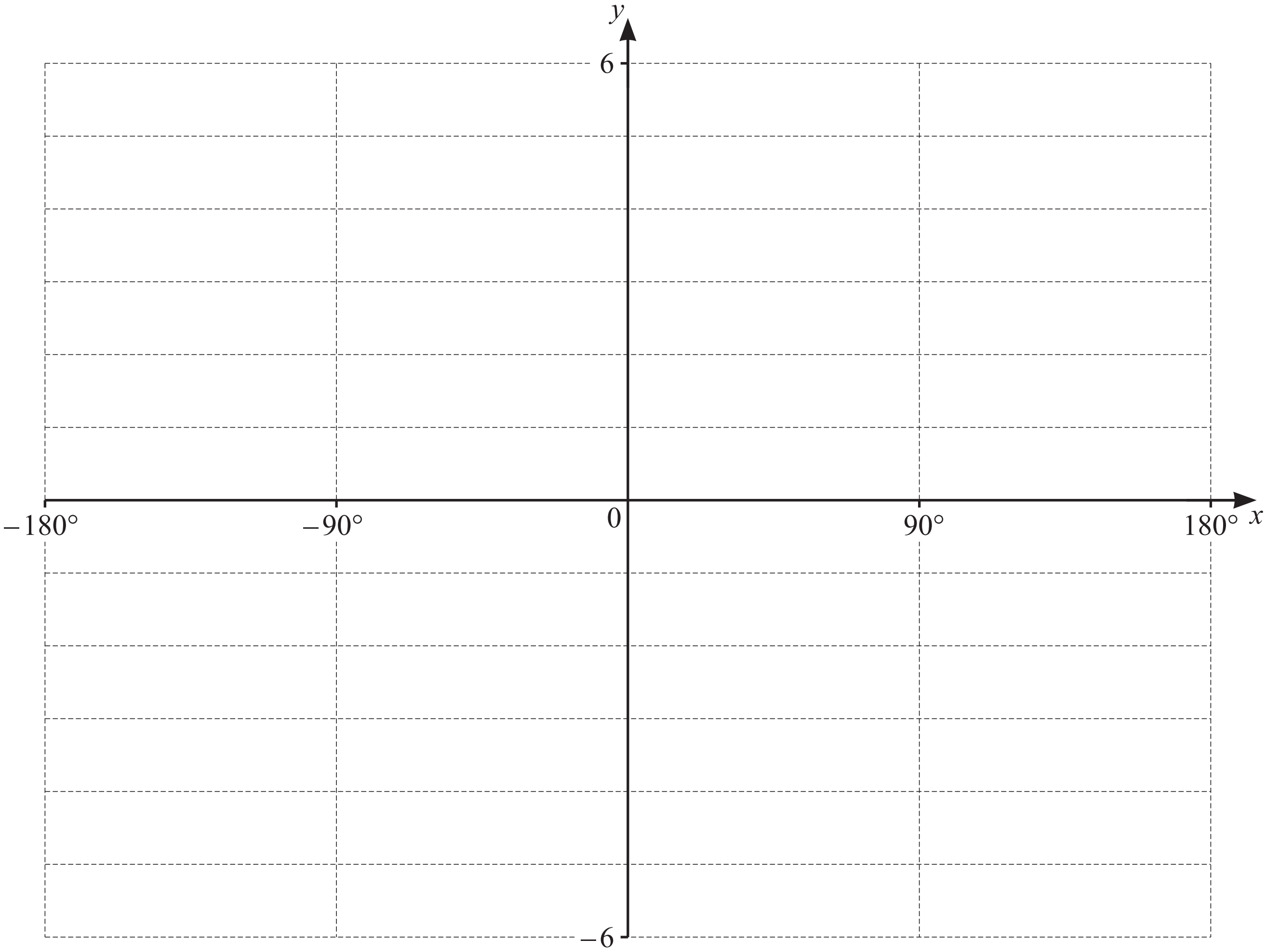
6 **(a)** The diagram shows part of the graph of $y = 1 + \tan\frac{1}{2}x$ where x is measured in degrees.



(i) Write down the period of $1 + \tan\frac{1}{2}x$. [1]

(ii) Write down the equation of the asymptote A. [1]

(b) On the axes below, sketch the graph of $y = 3\cos 2x + 1$ for $-180° \leqslant x \leqslant 180°$. [3]



7 A ship is sailing with speed $v\,\mathrm{km\,h}^{-1}$.
The sailing cost per hour, $\$C$, is given by $C = v^2 + \dfrac{3000}{v} + 100$.

(a) Find the speed that makes C a minimum.
Justify that this value of C is a minimum. [5]

(b) Hence find the minimum sailing cost for a journey of $150\,\mathrm{km}$. [3]

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8 A circle has centre $(-2, 0)$ and radius 5.
A line has equation $y = 2x + k$, where k is a constant.
The line does **not** meet the circle.

Find the set of possible values of k. [8]

9 **(a)** Show that $\tan\theta + \cot\theta + 2\sec\theta$ can be written as $\dfrac{1+2\sin\theta}{\sin\theta\cos\theta}$. [3]

(b) Hence solve the equation $\tan 2x + \cot 2x + 2\sec 2x = 0$ for $-180° \leqslant x \leqslant 180°$. [4]

(c) Solve the equation $3\sec(x-1)-1=\tan^2(x-1)$ where x is in radians and $-1 < x < 3$. [5]

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

For $t \geqslant 0$, a particle moves on the positive x-axis.
At time t the acceleration of the particle is $2t-9$.
At time $t = 7$ the velocity of the particle is 4.

(a) Find the times when the velocity of the particle is 0. [4]

(b) At time $t = 12$, the displacement of the particle from the origin O is 150.

(i) Find an expression for the displacement of the particle at time t. [3]

(ii) Find the distance travelled by the particle in the first 6 seconds. [3]

Question 11 is on the back page.

11 (a) Find, in descending powers of x, the first three terms in the expansion of $\left(x^2 + \frac{1}{2x}\right)^9$.
Give each term in its simplest form. [3]

(b) The expansion of $\left(x^2 + \frac{1}{2x}\right)^n$, where n is a positive integer, has a term that is independent of x.

Show that n is divisible by 3. [4]