



# Cambridge IGCSE™

CANDIDATE  
NAME

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CENTRE  
NUMBER

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CANDIDATE  
NUMBER

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**ADDITIONAL MATHEMATICS**

**0606/02**

Paper 2 Calculator

**For examination from 2025**

SPECIMEN PAPER B

**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.
- 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  $\pi$ , 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. Any blank pages are indicated.

**1 Solutions to this question by accurate drawing will NOT be accepted.**

A circle has centre  $(3, 2)$  and radius 17.  
A different circle has centre  $(15, -4)$  and radius 29.

(a) Show that the circles have two points of intersection. [2]

(b) The points of intersection are  $(-5, 17)$  and  $(-13.8, -0.6)$ .

Using this information, or otherwise, find the equation of the common chord. [2]

**2** For variables  $x$  and  $y$ , plotting  $\lg y$  against  $x^4$  gives a straight line which passes through the points  $(2, 5)$  and  $(6, 7)$ .



(a) Find the value of  $\lg y$  when  $x^4 = 0$ . [2]

(b) It is given that  $y$  can be written in the form  $Ab^{Cx^4}$  where  $A$ ,  $b$  and  $C$  are constants.

Find the values of  $A$ ,  $b$  and  $C$ . [3]

3 In the expression  $12x^3 + ax^2 - 12x + b$ ,  $a$  and  $b$  are integers.



The expression has:

- a factor  $x - 2$  and
- a remainder of  $-15$  when divided by  $x + 1$ .

Find the other linear factors of this expression.

[8]

4 The seven digits 1, 2, 3, 4, 5, 7 and 9 are used to make a 4-digit number.

 In these 4-digit numbers, all the digits are different.

(a) Find how many such 4-digit numbers can be made that are even and less than 4000. [3]

(b) Find how many such 4-digit numbers can be made that are between 2000 and 7000 and have a final digit which is prime. [3]

5 The first four terms, in ascending powers of  $x$ , in the expansion of  $(2 + ax)^7$  can be written as

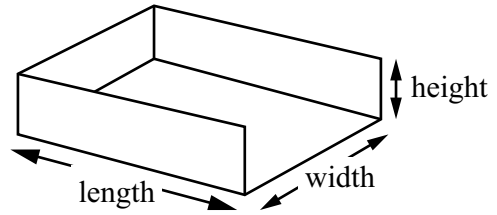
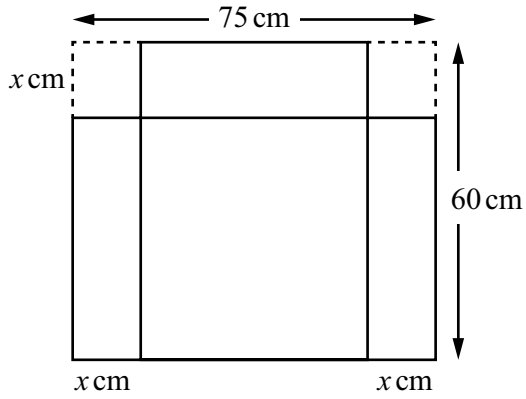


$$128 + bx + cx^2 - 15\,120x^3.$$

Find the values of  $a$ ,  $b$  and  $c$ .

[6]

6



A rectangular sheet of metal measures 75 cm by 60 cm.

A storage tray is made by cutting out squares of side  $x$  cm from two corners of the sheet and folding the remainder of the sheet, as shown.

A cuboid has the same length, width and height as the tray.

- (a) Show that the volume of the cuboid,  $V \text{ cm}^3$ , is given by  $V = ax^3 + bx^2 + cx$ , where  $a$ ,  $b$  and  $c$  are integers to be found. [3]

- (b) Given that  $x$  can vary, find the value of  $x$  for which  $V$  has a stationary value. [3]

7 (a) Show that  $\frac{\cos x}{1 - \sin x} + \frac{\cos x}{1 + \sin x}$  can be written as  $2 \sec x$ . [4]



(b) (i) Solve the equation  $5 \cos x - 4 \sin x = 0$  for  $-180^\circ \leq x \leq 180^\circ$ . [3]

(ii) Solve the equation  $10 \sin^2 2x - 9 = 3 \cos 2x$  for  $0 \leq x \leq \pi$ .

[5]

**8**  $f(x) = x^2 + 2x + 5$  for  $x \geq 0$

**7**  $g(x) = \frac{5x}{x+2}$  for  $x \geq 0$

(a) (i) Explain why the function  $f^{-1}$  can be formed. [2]

(ii) Find and simplify an expression for  $f^{-1}(x)$ . [4]

(b) (i) Explain why the function  $gf$  can be formed. [2]

(ii) Solve the equation  $gf(x) = 4$ . [4]

- 9 (a) A geometric progression has first term 3 and common ratio 1.25.



Find the sum of twelve terms of the progression, starting with the twentieth term.  
Give your answer to the nearest integer.

[4]

- (b) An arithmetic progression has first term 5 and common difference 3.  
The sum of the first  $5n$  terms is 23 times the sum of the first  $n$  terms.

Find the value of the positive integer  $n$ .

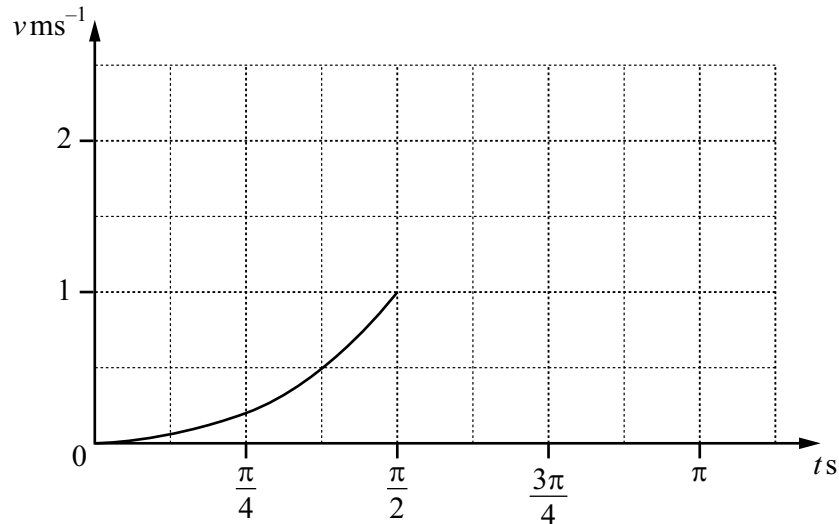
[4]

- 10** (a) A particle  $P$  travels in a straight line so that  $t$  seconds after leaving a fixed point  $O$  its velocity,  $v \text{ ms}^{-1}$ , is given by

$$v = \sec^2\left(\frac{t}{2}\right) - 1 \quad \text{for } 0 \leq t \leq \frac{\pi}{2},$$

$$v = \frac{2}{\pi} (\pi - t) \quad \text{for } t > \frac{\pi}{2}.$$

- (i) Complete the velocity–time graph for the first  $\pi$  seconds of the motion of particle  $P$ . [1]



- (ii) Find the distance, in metres, travelled by  $P$  in the first  $\pi$  seconds of its motion. You must show all your working. [5]

(b) A particle  $Q$  travels in a straight line from a fixed point  $O$ .

At time  $t$  seconds, its displacement from  $O$ ,  $s$  metres, is given by  $s = \frac{4 - e^{2t} - 3e^{-2t}}{2}$ .

- (i) Find the value of  $t$  when  $Q$  is at instantaneous rest.  
Give your answer correct to 4 significant figures.

[4]

- (ii) Find the distance travelled by  $Q$  in the first 0.5 seconds.

[3]