

PREDICTION PAPER - MAY/JUNE 2025 Cambridge IGCSE[™]

CANDIDATE NAME

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MATHEMATI	Email	Email us :		
Paper 4 Calcul	ator (Extended)		2025	
	mathtonicsolutio	ons@gmail.com	2 hours	
You must answ	ver on the question paper.			
You will need:	Geometrical instruments			
 INSTRUCTION Answer al Use a blac Write your Write your Do not us Do not us Do not wr You should You may u You must state Give non-eddegrees, u For π, use 	NS I questions. ck or dark blue pen. You may use an HB pencil fo name, centre number and candidate number in t answer to each question in the space provided. e an erasable pen or correction fluid. ite on any bar codes. d use a scientific calculator where appropriate. use tracing paper. show all necessary working clearly. exact numerical answers correct to 3 significant fi unless a different level of accuracy is specified in either your calculator value or 3.142.	any diagrams or graphs. ne boxes at the top of the page. gures, or 1 decimal place for angles he question.	s in	
INFORMATIO	N			

- The total mark for this paper is 100.
- The number of marks for each question or part question is shown in brackets [].

List of formulas

Area, A , of triangle, base b , height h .	$A = \frac{1}{2}bh$
Area, A , of circle of radius r .	$A = \pi r^2$
Circumference, C , of circle of radius r .	$C = 2\pi r$
Curved surface area, A , of cylinder of radius r , height h .	$A = 2\pi rh$
Curved surface area, A , of cone of radius r , sloping edge l .	$A = \pi r l$
Surface area, A , of sphere of radius r .	$A = 4\pi r^2$
Volume, <i>V</i> , of prism, cross-sectional area <i>A</i> , length <i>l</i> .	V = Al
Volume, V, of pyramid, base area A, height h.	$V = \frac{1}{3}Ah$
Volume, V , of cylinder of radius r , height h .	$V = \pi r^2 h$
Volume, V , of cone of radius r , height h .	$V = \frac{1}{3}\pi r^2 h$
Volume, V , of sphere of radius r .	$V = \frac{4}{3}\pi r^3$
For the equation $ax^2 + bx + c = 0$, where $a \neq 0$,	$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
For the triangle shown	

For the triangle shown,



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

Write 90 as a product of its prime factors.

2.

Expand and simplify.

$$2(t+w) + 3(w-t)$$



 $h = \dots$ [2]

(b) The area of the smaller shape is 16 cm^2 .

Calculate the area of the larger shape.

4.

 $T = \sqrt{3d - e}$

Rearrange the formula to make *d* the subject.

5.

A cylinder with height 12.5 cm has a curved surface area of 105π cm².

Calculate the volume of the cylinder.



......[2]

 $\frac{x-5}{x^2-25}$

(b) Simplify.

......[2]

F is proportional to the product of m and a.

Calculate the percentage change in F when m is increased by 40% and a is decreased by 15%.



Angle $PRQ = \dots$ [4]

Solve.

 $4(2x-3) \ge 43+3x$

10.

.....[3]

Write 0.42 as a fraction in its simplest form. You must show all your working.



11.

At the end of 2021 there were 27000 rhinos living in the wild. The number of rhinos is expected to decrease exponentially by 3% each year.

Work out the number of rhinos expected to be living in the wild 4 years later, at the end of 2025. Give your answer correct to the nearest whole number.

......[3]



By shading the **unwanted** regions of the grid, draw and label the region R which satisfies these inequalities.



13.

P = 2w + 2h

w = 11 and h = 9.5, both correct to 2 significant figures.

Find the lower bound and the upper bound for P.

Lower	bound	=	 	 	 	 	

The distance-time graph shows information about Kai's journey from home to the office.



(a) Calculate the average speed, in km/h, for Kai's journey from home to the office.

..... km/h [2]

(b) When Kai arrives at the office, he finds his meeting is cancelled. He immediately returns home at a constant speed of 50 km/h.

Complete the distance–time graph to show his journey home. [1]



The diagram shows the position of three towns, U, V and W. U is due west of V and angle $UVW = 125^{\circ}$.

Calculate the bearing of U from W.





On the diagram, sketch the graph of $y = \sin x$ for $0^{\circ} \le x \le 360^{\circ}$. [2]

(ii) Solve the equation $3\sin x + 1 = 0$ for $0^\circ \le x \le 360^\circ$.



The line y = 5 - 2x intersects the graph of $y = x^2 - 3x - 28$ at point *P* and point *Q*.

Find the coordinates of P and Q. You must show all your working and give your answers correct to 2 decimal places.



A curve has the equation $y = x^3 - 9x^2 - 48x$.

(a) Differentiate $x^3 - 9x^2 - 48x$.

-[2]
- (b) Find the coordinates of the turning points of the graph of $y = x^3 9x^2 48x$. You must show all your working.



(c) Determine whether each of the turning points is a maximum or a minimum. Give reasons for your answers.



This sector of a circle has radius r and perimeter 20 cm.

Find the value of *z*.



20. These are the first four terms of a sequence.

The *n*th term of this sequence is $\frac{1}{4}n^3 + an^2 + bn$.

Calculate the value of *a* and the value of *b*.

$$a = \dots$$

$$b = \dots \qquad [5]$$

21.
$$f(x) = 6x - 7$$
 $g(x) = x^{-3}$

- (a) Find f(x+2). Give your answer in its simplest form.
- (b) Find $f^{-1}(x)$. [2]



Bag *A* and bag *B* each contain red sweets and yellow sweets. Anna picks a sweet at random from bag *A*. Ben picks a sweet at random from bag *B*. The probability that Anna picks a red sweet is $\frac{2}{5}$. The probability Anna and Ben both pick a yellow sweet is $\frac{1}{10}$.

Find the probability that Anna and Ben both pick a red sweet.

......[3]



NOT TO SCALE

In the diagram, $\overrightarrow{OA} = \mathbf{a}$ and $\overrightarrow{OB} = \mathbf{b}$. AK : KB = 2 : 1. OK = KC.

Find \overrightarrow{AC} in terms of **a** and **b**. Give your answer in its simplest form.

(a) The table shows information about the mass, in kilograms, of each of 50 children.

Mass (kkg)	$0 < k \le 10$	$10 < k \leq 25$	$25 < k \leq 35$	$35 < k \leq 40$	$40 < k \le 50$
Frequency	3	19	21	5	2

(i) Complete the cumulative frequency table.

Mass (kkg)	$k \leq 10$	<i>k</i> ≤ 25	<i>k</i> ≤ 35	$k \leq 40$	$k \leq 50$
Cumulative frequency					

(ii) On the grid, draw a cumulative frequency diagram to show this information.



(iii) Use your diagram to find an estimate of the number of children with a mass of 32 kg or less.

[2]