



Cambridge IGCSE™

CANDIDATE
NAME

CENTRE
NUMBER

--	--	--	--	--

CANDIDATE
NUMBER

--	--	--	--



ADDITIONAL MATHEMATICS

0606/22

Paper 2

October/November 2022

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 calculator where appropriate.
- You must show all necessary working clearly; no marks will be given for unsupported answers from a calculator.
- 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.

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 Solve the following simultaneous equations.



$$\begin{aligned}x + 5y &= -4 \\ 3y - xy &= 6\end{aligned}$$

[5]

2 Solve the equation $4e^{2x-3} = 7e^{5-x}$.



[4]

3 In this question a and b are constants.



The normal to the curve $y = \frac{a}{x} + 3x - 2$ at the point where $x = 1$ has equation $y = -\frac{1}{4}x + b$.
Find the values of a and b . [6]

4 Solve the equation $\log_3(11x - 8) = 1 + \frac{2}{\log_x 3}$ given that $x > 1$. [5]



5 DO NOT USE A CALCULATOR IN THIS QUESTION.

Find the x -coordinates of the points of intersection of the curves $y = 7x^3 - 7x^2 - 17x - 4$ and $y = x^3 - 2x^2 - 4x - 16$. [5]

6 A 4-digit code is to be formed using 4 different numbers selected from 2, 3, 4, 5, 6, 7, 8 and 9. Find how many possible codes there are if the code forms



(a) a number that is odd and greater than 5000, [3]

(b) a number greater than 5000 with a last digit that is prime. [3]

7 (a) Show that $\frac{\sin x}{1 - \cos x} + \frac{1 - \cos x}{\sin x} = 2 \operatorname{cosec} x$. [4]

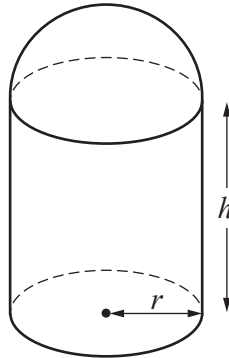


(b) Hence solve the equation $\frac{\sin x}{1 - \cos x} + \frac{1 - \cos x}{\sin x} = 3 \sin x - 1$ for $0^\circ < x < 360^\circ$. [4]

8 In this question all lengths are in centimetres.



The volume of a cylinder with radius r and height h is $\pi r^2 h$ and its curved surface area is $2\pi r h$.
The volume of a sphere with radius r is $\frac{4}{3}\pi r^3$ and its surface area is $4\pi r^2$.



The diagram shows a solid object in the shape of a cylinder of base radius r and height h , with a hemisphere of radius r on top. The total surface area of the object is 300 cm^2 .

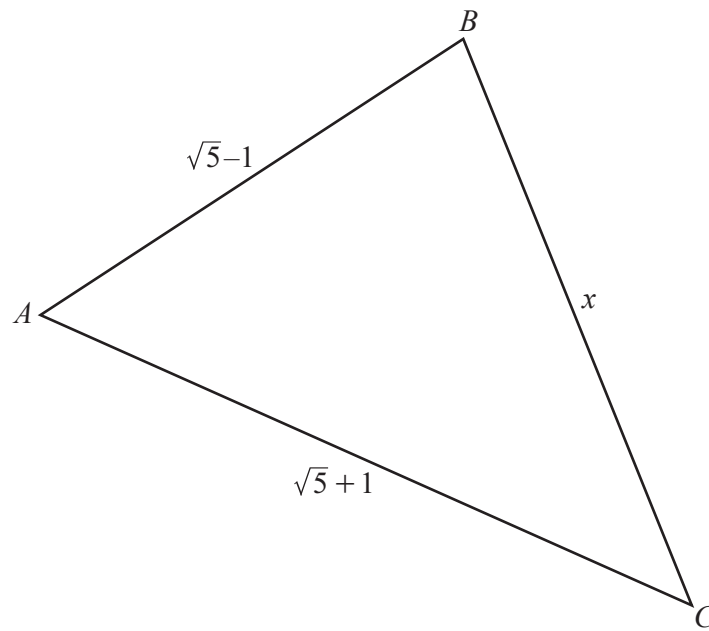
(a) Find an expression for h in terms of r . [2]

(b) Show that the volume, V , of the object is $150r - \frac{5}{6}\pi r^3$. [3]

(c) Find the maximum volume of the object as r varies.

[5]

9 In this question all lengths are in centimetres.



The diagram shows triangle ABC which has area $\frac{2\sqrt{5}}{3}\text{cm}^2$. Angle A is acute.

(a) Find the exact value of $\sin A$.

[3]

(b) Find the exact value of $\cos A$ and hence find the exact value of x .

[5]

(c) Find the exact value of $\sin B$.

[3]

- 10 (a) A geometric progression has third term 4.5 and sixth term 15.1875. Find the first term and the common ratio. [4]



- (b) Find the sum of ten terms of the progression, starting with the sixteenth term. Give your answer to the nearest integer. [4]

11 The coordinates of points A and B are $(-5, 6)$ and $(4, -6)$ respectively. The point C lies on the line AB , between A and B , such that $\frac{AC}{CB} = \frac{1}{2}$.

(a) Find the coordinates of C . [2]

(b) The line CD is perpendicular to AB . Find the equation of CD in the form $y = mx + c$. [4]

- (c) The length of BD is $\sqrt{125}$. Find the coordinates of the two possible positions of point D . [6]