



Cambridge International AS & A Level

CANDIDATE
NAME
CENTRE
NUMBER

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CANDIDATE
NUMBER

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MATHEMATICS

9709/32

Paper 3 Pure Mathematics 3

February/March 2025

1 hour 50 minutes

You must answer on the question paper.

You will need: List of formulae (MF19)

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.
- If additional space is needed, you should use the lined page at the end of this booklet; the question number or numbers must be clearly shown.
- 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 75.
- The number of marks for each question or part question is shown in brackets [].

This document has **20** pages. Any blank pages are indicated.



4Uadmission




$$\ln(1 - e^{-2x}) + 3 = 0.$$

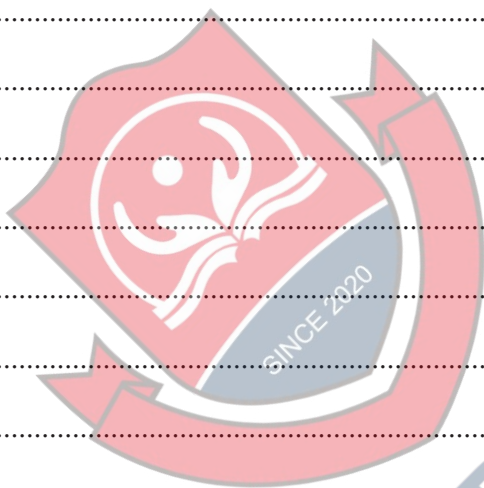
[3]



The logo is a red shield with a white border. Inside the shield, there is a stylized white sun with rays and a white book. Below the shield, there is a red banner with the text 'SINCE 2020' in white. To the right of the shield, there is a large, light blue, diagonal watermark that reads '4Uadmission'.

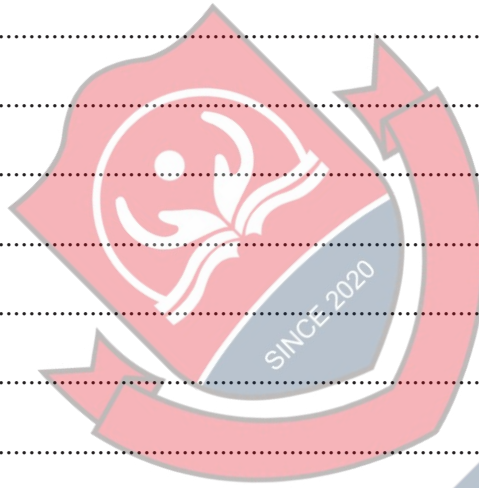
The image shows a portion of the University of Jaffa logo in the top left corner, featuring a red and white emblem with the text "SINCE 2020". A large, light blue diagonal watermark reading "4Uadmission" is overlaid across the entire page. The page is ruled with horizontal dotted lines.

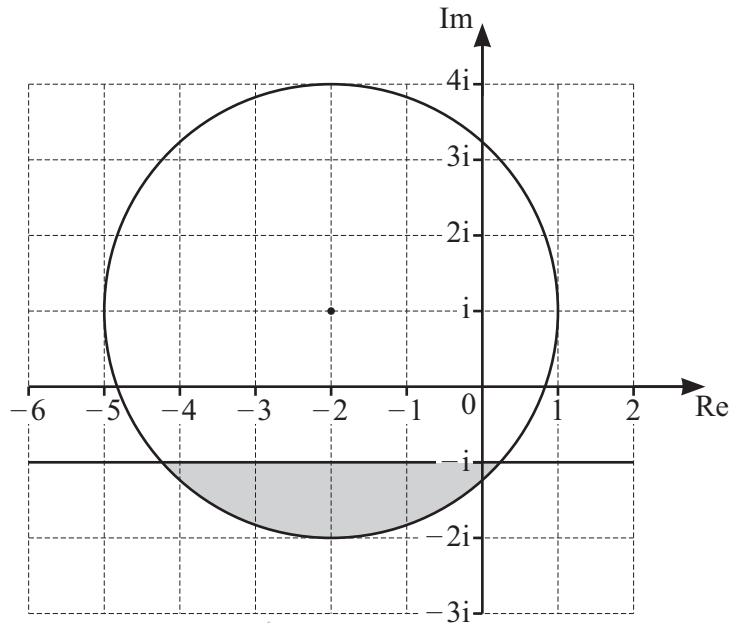
- Find the gradient of the curve at the point where $x = 0$.



SINCE 2020

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The image features the University of Alberta logo in the top left corner, which includes a stylized red and white flower and a blue shield with the text 'SINCE 2020'. A large, light blue diagonal watermark reading '4U Admission' spans across the entire page. The background is white with horizontal dotted lines.



The shaded region on the Argand diagram shows points representing complex numbers z defined by two inequalities. The shaded region is bounded by a circle and a line parallel to the real axis. The boundaries of the region are included in the shaded region.

- (a) Find two inequalities in terms of z that define the shaded region. [3]

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- (b) Find the greatest value of $|z|$ for points in this region. [3]

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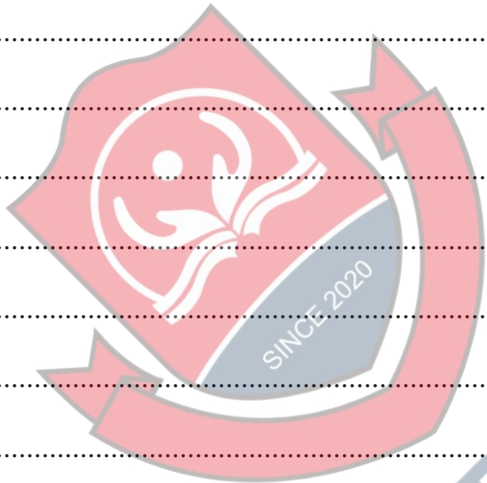
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- 4Uadmission



- By first forming a quartic equation in x or y , find the square roots of $-4+6\sqrt{5}i$ in exact Cartesian form. [5]



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- 6 The variables x and θ satisfy the differential equation

$$\frac{dx}{d\theta} = \left(\frac{1}{5}x + 1\right) \sin^2 2\theta,$$

and $x = 5$ when $\theta = 0$.

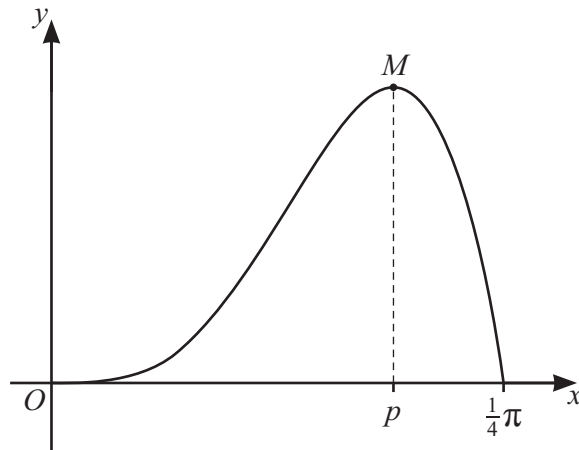
Solve the differential equation and obtain an expression for x in terms of θ .

[7]



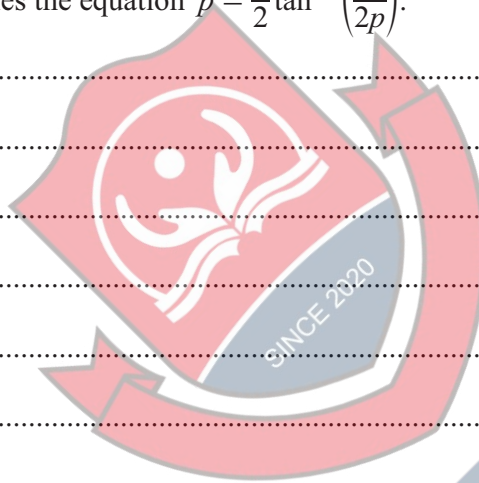
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The diagram shows the curve $y = x^3 \cos 2x$ for $0 \leq x \leq \frac{1}{4}\pi$. The curve has a maximum point at M , where $x = p$.

- (a) Show that p satisfies the equation $p = \frac{1}{2} \tan^{-1} \left(\frac{3}{2p} \right)$. [3]



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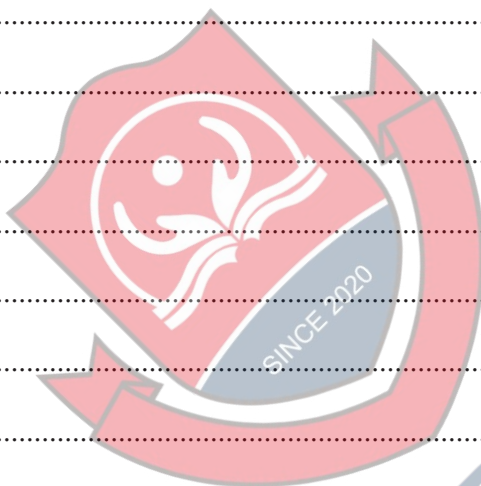
[2]

[3]

- 8

(a) Show that the lines are skew.

[5]

The image features a red and white shield logo in the top left corner with the text 'SINCE 2020' inside. A large, light blue diagonal watermark reading '4U admission' spans across the entire page. The background is white with horizontal dotted lines.



[3]



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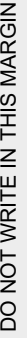
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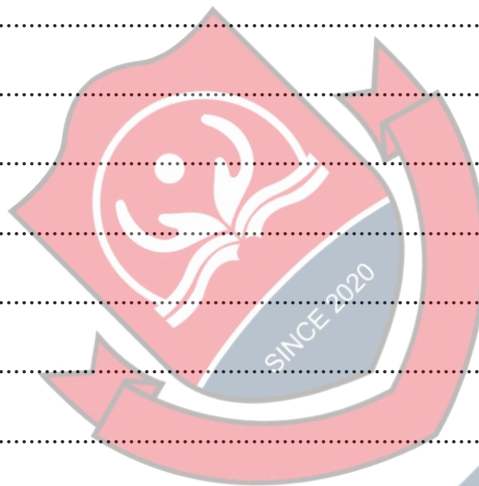
[6]





- 11 Find the exact value of $\int_0^{\pi} x^2 \cos \frac{1}{3}x \, dx$.

[6]

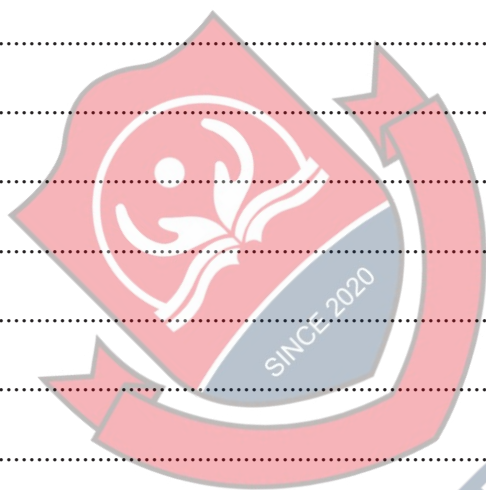


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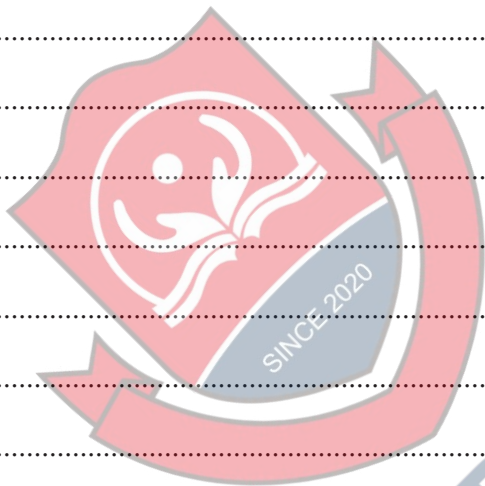


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