



Quiz 2

Grade	AS
Subject	Pure Mathematics
Paper Name	Paper 3
Duration	40 minutes

Student's Information

Name (Pinyin)	English Name	Class	Group

Instructions

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Do **not** use an erasable pen or correction fluid.
- Write your answer to each question in the space provided.
- 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.
- **You are reminded of the need for clear representation in your answers.**

Information:

- The total mark for this paper is 28.
- The number of marks for each question or part question is shown in brackets [].

2. The diagram shows the curve with equation

$$x^3 + xy^2 + ay^2 - 3ax^2 = 0,$$

where a is a positive constant. The maximum point on the curve is M . Find the x -coordinate of M in terms of a . [6]

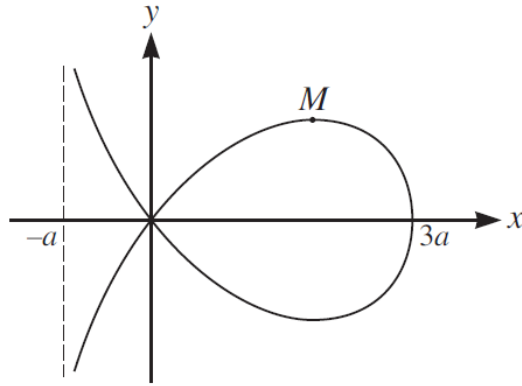


Figure 1: Curve

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3. The parametric equations of a curve are

$$x = \ln(\tan t), \quad y = \sin^2 t,$$

where $0 < t < \frac{1}{2}\pi$.

(i) Express $\frac{dy}{dx}$ in terms of t . [4]

(ii) Find the equation of the tangent to the curve at the point where $x = 0$. [3]

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4. The diagram shows the curve $y = 10e^{-\frac{1}{2}x} \sin 4x$ for $x \geq 0$. The stationary points are labelled T_1, T_2, T_3, \dots as shown.

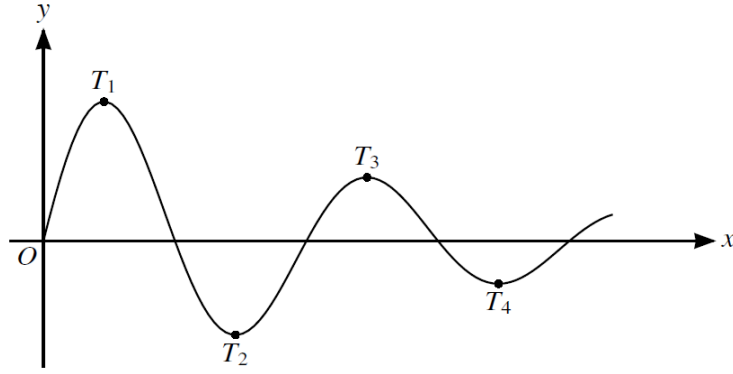


Figure 2: Curve

- (i) Find the x -coordinates of T_1 and T_2 , giving each x -coordinate correct to 3 decimal places. [6]
- (ii) It is given that the x -coordinate of T_n is greater than 25. Find the least possible value of n . [4]

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