

Candidate Name :

MPSK

February 2024
General Examination

Further Pure Mathematics

Sample Trainees Paper

2024 Early

GNU
G P L L I C E N S E

Upper Secondary Level

Topics Included :

- Logarithmic functions and Indices
- Quadratic Function
- Graphs
- Differentiation
- Integration
- Area Under Curve
- Trigonometry
- Rectangular Cartesian Coordinates

Instructions

- Use **black** ink or ball-point pen.
- Fill in the boxes at the top of this page with your name and centre name.
- Answer all questions.
- Without sufficient working, correct answers may be awarded no marks.
- You must **NOT** write anything on the formulae page. Anything you write on the formulae page will gain NO credit.

Details

- This paper was made by **MIN PYAE SONE KHAT**.
- All questions were made independently and **NO** questions were ever reused.
- The paper is **Copyrighted** and reserved under the **GPL 2.0** License.
- This was created using **Figma** and **Geogebra**.



1

$$f(x) = ax^3 - 6x^2 + 11x + b \text{ where } a \text{ and } b \text{ are both non zero integers.}$$

When $f(x)$ is divided by $(x - 5)$ the remainder is 24

Given that curve **C**, $y = f(x)$ intersects at y-axis. The curve **C** is shown in the **Figure 1**.

(a) Find the value of **a** and **b**

(5)

(b) Hence factorise $f(x)$ completely.

(3)

Curve **C** consists of two stationary points.

(c) Find the coordinates of (i) Local Maximum

(ii) Local Minimum

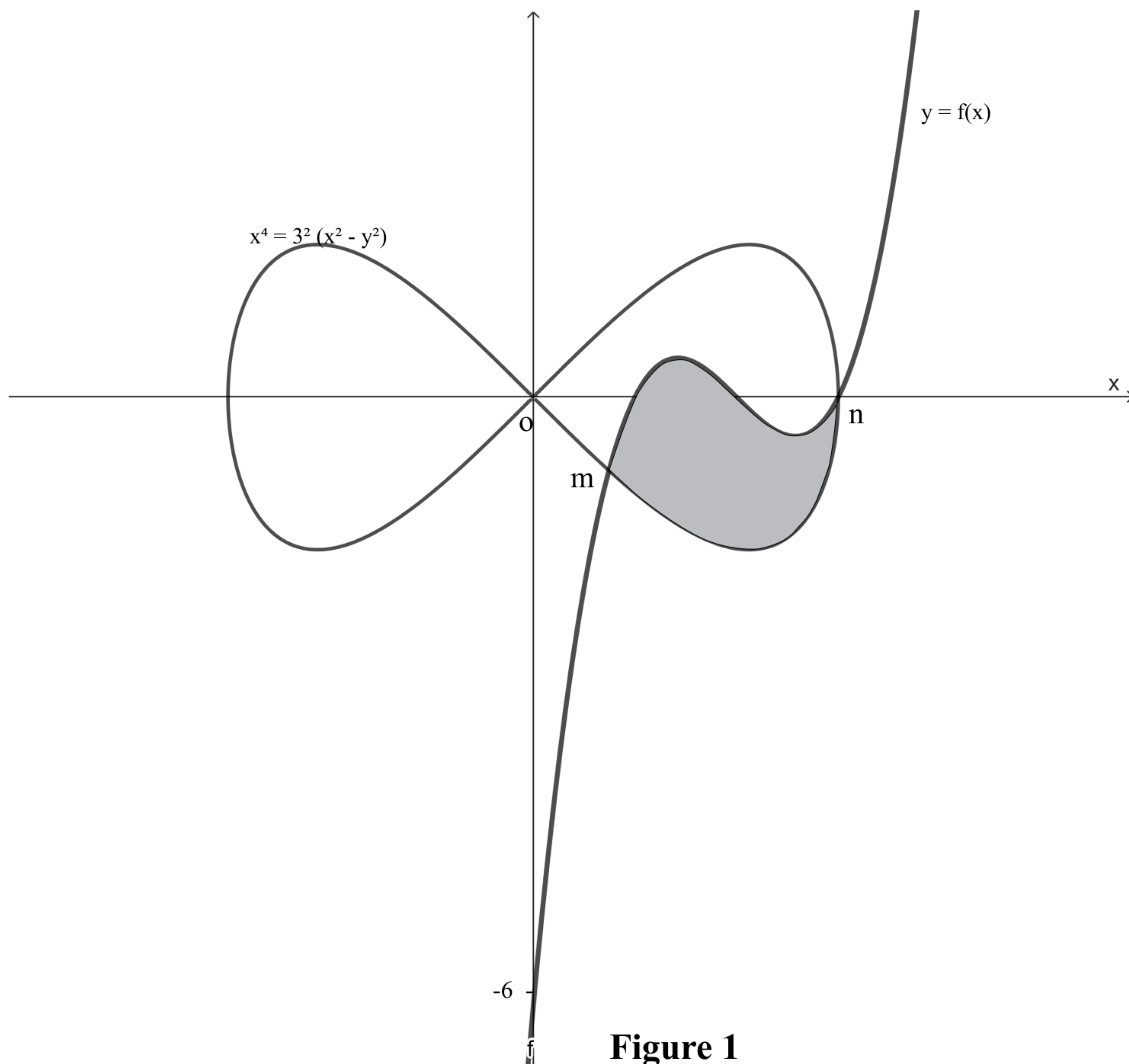


Diagram **NOT**
accurately drawn

Made with **GeoGebra**

Figure 1

Figure 1 also shows part of the curve **G** with equation $x^4 = 3^2(x^2 - y^2)$

(d) Find the points of intersections of curve **G** with the x-axis.

(4)

Given that curve **G** intersects curve **C** at points **m** and **n**.

(e) Find the coordinates of **m** and **n**.

(3)

The region shaded in Figure 1 is bounded by the curve **C**, curve **G** and x-axis.

(f) Use algebraic integration to find the area of the shaded region to 3 decimal places.

(3)

The finite region is then bounded by the line equations $y = 1.5$ and $y = -1.5$ with curve **G**. Neglect y-axis for this region.

The region, is then rotated through 2π radians about y-axis.

(g) Use algebraic integration to find the volume of the solid generated to 3 decimal places.

(7)

(h) Hence sketch the solid formed from above with points of intersections, equations **clearly** labelled.

(5)

(Total for Question 1 is 30 marks)