BIRPARA COLLEGE
Affiliated to: University of North Bengal
Government aided co education degree colleges
Accredited by NAAC

Department of Mathematics

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Ref. No: **BC/N/674**

Dept. Ref. No: **BC/MATH/002**
Date: **10/Feb/2026**

General Notice

This is to inform all the students of 1st Semester that they have to submit Assignment in Mathematics.
The questions are given in 2nd page.
Questions will be asked from this assignment in the class; therefore, students are advised to prepare the assignment thoroughly and come prepared.
The assignment must be written neatly in the assignment copy and submitted on 17th February 2026.

HOD
Department of Mathematics

Dr. Kaustav Chakrabarti
Principal
Birpara College

Answer the following questions:

1. Apply Descartes's rule of signs, find the nature of the roots of the equation:
$$x^4+2x^2+3x-2=0$$

2. Solve by Cardan's method: $x^3+9x^2+15x-25=0$

3. Find all the values of $(1+i)^{\frac{2}{3}}$ and find the continued product of these values.

4. Solve the equation by Ferrari's method: $2x^4+6x^3-3x^2+2=0$
5. If α, β, ν, μ be the roots of the equation $x^4-3x^3+4x^2-5x+6=0$, show that the value of $(\alpha^2+3)(\beta^2+3)(\nu^2+3)(\mu^2+3)$ is 57.

6. Define row reduced echelon form of a matrix. Reduce the following matrix to a row reduced echelon matrix and hence fund the rank: $\begin{pmatrix} 2 & 0 & 4 & 2 \\ 3 & 2 & 6 & 5 \\ 5 & 2 & 10 & 7 \\ 0 & 3 & 2 & 5 \end{pmatrix}$

7. Show that $8xyz < (1-x)(1-y)(1-z) < \frac{8}{27}$, where $x+y+z=1$

8. Determine the conditions for which the system of equations:
   $x+y+z = 1$
   $x+2y-z = b$
   $5x+7y+az = b^2$
   Admits of (i) only one solution (ii) no solution (iii) many solutions.