

## Subject: Mathematics

Total Marks: 80

Instructions: Answer all 16 questions. Each question carries 5 marks.

1. Solve:  $(x + 2)^2 - 4(x + 1)$
2. Find the derivative of  $f(x) = x^2 + 3x + 2$ .
3. Evaluate: Integral of  $(2x + 3) dx$
4. Solve the quadratic equation:  $x^2 - 5x + 6 = 0$
5. Define and prove the associative property of addition.
6. Find the value of determinant:  $\begin{vmatrix} 1 & 2 \\ 3 & 4 \end{vmatrix}$
7. Prove that:  $\sin^2(\theta) + \cos^2(\theta) = 1$
8. Find the area under the curve  $y = x^2$  from  $x = 0$  to  $x = 2$ .
9. If  $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ , find transpose of A.
10. Find the slope of the line joining points (2,3) and (4,7).
11. Solve for x:  $2x - 3 = 5x + 1$
12. Define a matrix. What are its types?
13. Find the LCM and HCF of 24 and 36.
14. Solve:  $\log_{\text{base } x} 81 = 4$
15. Find the angle between two lines whose slopes are 2 and 3.
16. Solve the differential equation:  $dy/dx = 3x^2$