



Red Rose Sr. Sec. School
Work Sheet 1
Mathematics(Ch: 1,2,3 and 4
Class : 12

Roll No. :
Date :

Time -
MM - 60

1. Let R be a relation in the set of natural numbers N defined by $R = \{(a, b) \in N \times N : a < b\}$. Is relation R reflexive? Give a reason. 1
2. State the reason for the relation R in the set $\{1, 2, 3\}$ given by $R = \{(1, 2), (2, 1)\}$ not to be transitive. 1
3. Given set $A = \{a, b\}$ and relation R on A is defined as $R = \{(a, a), (b, b)\}$. Is relation an identity relation. 1
4. If $f : R \rightarrow R$ be defined by $f(x) = (3 - x^3)^{1/3}$, then find $f \circ f(x)$. 1
5. Let $f : R \rightarrow R$ is defined by $f(x) = |x|$. Is function f onto? Give a reason. 1
6. The binary operation $*$: $R \times R \rightarrow R$ is defined as $a * b = 2a + b$. Find $(2 * 3) * 4$. 1
7. $*$ is a binary operation defined on Q , given by $a * b = a + ab$, $a, b \in Q$. Is $*$ commutative? 1
8. If $R = \{(x, y) : x + 2y = 8\}$ is a relation on N , write the range of R . 1
9. A reflexive relation is identity relation also. State true or false. 1
10. If $f(x) = 27x^3$ and $g(x) = x^{1/3}$, find $g \circ f(x)$. 1
11. Prove that $f : R \rightarrow R$ given by $f(x) = x^3 + 1$ is one-one function. 1
12. Let $f : R - \left\{\frac{4}{3}\right\} \rightarrow R - \left\{\frac{4}{3}\right\}$ be a function defined as $f(x) = \frac{4x}{3x+4}$, find $f^{-1} : \text{Range of } f \rightarrow R - \left\{\frac{4}{3}\right\}$. 1
13. If the binary operation $*$ on the set of integers Z is defined by $a * b = a + 3b^2$, then find the value of $2 * 4$. 1
14. $*$ is a binary operation defined on the set of natural numbers N , defined by $a * b = a^b$. Find (i) $2 * 3$ (ii) $3 * 2$. 1
15. Show that division is not a binary operation on N . 1
16. Find the principal value of $\cot^{-1}(-\sqrt{3})$. 1
17. What is the domain of the function $\sin^{-1} x$? 1
18. Write the principal values of $\sec^{-1}(-2)$. 1
19. Write the principal values of $\sec^{-1}\left(\frac{2}{\sqrt{3}}\right)$. 1

20. Find the principal value of $\operatorname{cosec}^{-1}(2)$. 1
21. Write the principal value of $\operatorname{cosec}^{-1}(2)$. 1
22. Write the principal value of $\tan^{-1}(-\sqrt{3})$. 1
23. What is the domain of the function $\operatorname{cosec}^{-1}x$? 1
24. If a matrix has 5 elements, write all possible orders it can have. 1
25. A matrix has 18 elements, write the possible orders of the matrix. 1
26. If $A^T = \begin{bmatrix} 3 & 4 \\ -1 & 2 \\ 0 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} -1 & 2 & 1 \\ 1 & 2 & 3 \end{bmatrix}$, then find $A^T - B^T$. 1
27. If $\begin{bmatrix} y+2x & 5 \\ -x & 3 \end{bmatrix} = \begin{bmatrix} 7 & 5 \\ -2 & 3 \end{bmatrix}$, find the value of y . 1
28. What are the possible orders of a matrix having 24, elements. 1
29. Given zero matrices $\begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$ and $\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$. Are these matrices equal? Give reasons. 1
30. Form a 2×1 matrix $A = [a_{ij}]$ where $a_{ij} = i + 2j^2$. 1
31. If $X_{m \times 3} Y_{p \times 4} = Z_{2 \times b}$, for three matrices X, Y and Z , find the values of m, p and b . 1
32. Is matrix $A = \begin{bmatrix} 0 & -1 & 2 \\ 1 & 0 & -3 \\ -2 & 3 & 0 \end{bmatrix}$ symmetric or skew symmetric? Give a reason. 1
33. Matrix $A = \begin{bmatrix} 0 & 2b & -2 \\ 3 & 1 & 3 \\ 3a & 3 & -1 \end{bmatrix}$ is given to be symmetric, find values of a and b . 1
34. The matrix $\begin{bmatrix} 0 & 0 & 5 \\ 0 & 5 & 0 \\ 5 & 0 & 0 \end{bmatrix}$ is a scalar matrix. State true or false. If false then what type of matrix is this? 1
35. Use elementary column operations $C_2 \rightarrow C_2 - 2C_1$ in the matrix equation $\begin{bmatrix} 4 & 2 \\ 3 & 3 \end{bmatrix} = \begin{bmatrix} 1 & 2 \\ 0 & 3 \end{bmatrix} \begin{bmatrix} 2 & 0 \\ 1 & 1 \end{bmatrix}$. 1
36. Write the element a_{12} of the matrix $A = [a_{ij}]_{2 \times 2}$, whose elements a_{ij} are given by $a_{ij} = e^{2ix} \sin jx$. 1
37. If matrix $A = [1 \ 2 \ 3]$, write matrix AA' where A' is transpose of matrix A . 1
38. If $A = [a_{ij}] = \begin{bmatrix} 2 & 3 & -5 \\ 1 & 4 & 9 \\ 0 & 7 & -2 \end{bmatrix}$ and $B = [b_{ij}] = \begin{bmatrix} 2 & 1 & -1 \\ -3 & 4 & 4 \\ 1 & 5 & 2 \end{bmatrix}$, then find $3a_{12} - 5b_{21}$. 1

39. If $\begin{bmatrix} 2x-1 \\ 5 \end{bmatrix} = \begin{bmatrix} 3 \\ x+y \end{bmatrix}$, find x and y . 1
40. For what value of k , the matrix $\begin{bmatrix} 0 & -1 & k \\ 1 & 0 & 5 \\ 4 & -5 & 0 \end{bmatrix}$ is skew symmetric? 1
41. Evaluate $\begin{vmatrix} a+ib & c+id \\ c-id & a-ib \end{vmatrix}$. 1
42. If $\begin{vmatrix} 2x+5 & 3 \\ 5x+2 & 9 \end{vmatrix} = 0$, find x . 1
43. If $A = \begin{bmatrix} 1 & 1 & -2 \\ 2 & 1 & -3 \\ 5 & 4 & -9 \end{bmatrix}$, find $|A|$. 1
44. What is the value of the following determinant? 1
- $$\Delta = \begin{vmatrix} 4 & a & b+c \\ 4 & b & c+a \\ 4 & c & a+b \end{vmatrix}$$
45. If $A = \begin{bmatrix} 5 & 6 & -3 \\ -4 & 3 & 2 \\ -4 & -7 & 3 \end{bmatrix}$, then write the cofactor of the element a_{21} . 1
46. For what value of k , the matrix $\begin{bmatrix} k & 2 \\ 3 & 4 \end{bmatrix}$ has no inverse? 1
47. Given a square matrix A of order 3×3 , such that $|A| = 12$, find the value of $|A \cdot \text{adj } A|$. 1
48. Evaluate the determinant $\begin{vmatrix} x^2-x+1 & x-1 \\ x+1 & x+1 \end{vmatrix}$. 1
49. Find the minor of the element of second row and third column (a_{23}) in the following determinant: 1
- $$\begin{vmatrix} 2 & -3 & 5 \\ 6 & 0 & 4 \\ 1 & 5 & 7 \end{vmatrix}$$
50. In the given determinant $\begin{vmatrix} 3 & -1 \\ 4 & 6 \end{vmatrix}$, find (i) M_{22} (ii) A_{21} . 1
51. For what value of x , the matrix $\begin{bmatrix} 5-x & x+1 \\ 2 & 4 \end{bmatrix}$ is singular? 1
52. If $A = \begin{bmatrix} \cos \theta & -\sin \theta \\ \sin \theta & \cos \theta \end{bmatrix}$, write $\text{adj } A$. 1
53. If the value of third order determinant is 12, then find the value of the determinant formed by its cofactors. 1

54. Find value of x , if $\begin{vmatrix} 2 & 3 \\ 4 & 5 \end{vmatrix} = \begin{vmatrix} x & 3 \\ 2x & 5 \end{vmatrix}$. 1
55. Evaluate $\begin{vmatrix} 1 & 0 & 0 \\ 2 & \cos x & \sin x \\ 3 & -\sin x & \cos x \end{vmatrix}$. 1
56. Evaluate $\begin{vmatrix} \sec 35^\circ & \tan 35^\circ \\ \cot 55^\circ & \operatorname{cosec} 55^\circ \end{vmatrix}$. 1
57. For what value of k , the matrix $\begin{bmatrix} k & 2 \\ 3 & 4 \end{bmatrix}$ is invertible? 1
58. Write the value of the determinant $\begin{vmatrix} 2 & 3 & 4 \\ 5 & 6 & 8 \\ 23 & 33 & 44 \end{vmatrix}$. 1
59. Write $|A^{-1}|$ for the matrix $A = \begin{bmatrix} 2 & 5 \\ 1 & 3 \end{bmatrix}$. 1
60. If A is a non singular matrix of order 3 and $|A| = -4$, find $|\operatorname{adj} A|$ 1