



INDIAN SCHOOL AL WADI AL KABIR
Dept. of Mathematics 2026 – 2027
Class XII – Mathematics
Work Sheet – Matrices



1	If A and B are square matrices of the same order, then $(A + B)(A - B)$ is equal to (a) A (b) B (c) $A^2 - B^2$ (d) $A^2 - BA + AB + B^2$
2	If A and B are two matrices of the order $3 \times m$ and $3 \times n$, respectively, and $m = n$, then write order of matrix $(5A - 2B)$: (a) 3×3 (b) $m \times n$ (c) $3 \times m$ (d) none of these
3	If the matrix $\begin{bmatrix} 0 & a & 3 \\ 2 & b & -1 \\ c & 1 & 0 \end{bmatrix}$ is a skew-symmetric matrix, then the value of a, b and c are : (a) $A=1, b=2, c=3$ (b) $a=-1, b=2, c=-3$ (c) $a=-2, b=0, c=-3$ (d) none of these
4	A matrix which is both symmetric and skew symmetric is (a) Row matrix (b) column matrix (c) null matrix (d) None of these
5	For a 2×2 matrix $A = [a_{ij}]$, whose elements are given by $a_{ij} = \frac{i}{j}$ then the value of a_{12} (a) $1/2$ (b) 2 (c) $1/3$ (d) None of these
6	The value of α for which the matrix $A = \begin{bmatrix} \cos \alpha & -\sin \alpha \\ \sin \alpha & \cos \alpha \end{bmatrix}$ is an identity matrix will be : (a) $\frac{\pi}{2}$ (b) 0 (c) $\frac{\pi}{3}$ (d) π
7	If $\begin{bmatrix} 2 & 3 \\ 7 & x \end{bmatrix} = \begin{bmatrix} y & z \\ 7 & -5 \end{bmatrix}$ then the value of $(x-y+z)$ is: (a) 0 (b) -4 (c) 4 (d) 3
8	The matrix $A = \begin{bmatrix} 0 & 2 & -1 \\ -2 & 0 & -4 \\ 1 & 4 & 0 \end{bmatrix}$ is : (a) Symmetric (b) skew symmetric (c) both symmetric and skew symmetric (d) None of these
9	If the matrix $A = \begin{bmatrix} 0 & 2b & -2 \\ 3 & 1 & 3 \\ 3a & 3 & -1 \end{bmatrix}$ is symmetric, the value of $3a + 2b$ is 0 (b): -1 (c): $\frac{5}{6}$ (d): 1

10	The number of all possible matrices of order 2×2 with each entry 5, 8 or 9 is: (a): 9 (b): 6 (c): 81 (d): 27
11	The order of matrices P, W and Y are $p \times k$, $n \times 3$ and $3 \times k$ respectively. If $PY + WY$ will be defined, then (a): $k=3$, $p=n$ (b): k is arbitrary, $p=2$ (c): p is arbitrary, $k=3$ (d): $k=2$, $p=3$
12	Given that $A = \begin{bmatrix} \alpha & \beta \\ \gamma & -\alpha \end{bmatrix}$ and $A^2 = 3I$, then (a). $1 + \alpha^2 + \beta \gamma = 0$ (b). $1 - \alpha^2 - \beta \gamma = 0$ (c). $3 - \alpha^2 - \beta \gamma = 0$ (d). $3 + \alpha^2 - \beta \gamma = 0$
13	Which of the given values of x and y make following pair of matrices equal? $\begin{bmatrix} 3x+7 & 5 \\ y+1 & 2-3x \end{bmatrix}$ and $\begin{bmatrix} 0 & y-2 \\ 8 & 4 \end{bmatrix}$ (a) $x = -\frac{7}{3}$, $y = 7$ (b) $x = -\frac{2}{3}$, $y = 7$ (c) $x = -\frac{7}{3}$, $y = -\frac{2}{3}$ (d) None of these
14	If $\begin{bmatrix} 4 & -5 & -1 \end{bmatrix} \begin{bmatrix} 1 & 0 & 2 \\ 0 & 2 & 1 \\ 2 & 0 & 3 \end{bmatrix} \begin{bmatrix} 4 \\ 4 \\ 1 \end{bmatrix} = A$, then the order of A is (a): 1×1 (b): 3×1 (c): 1×3 (d): 3×3
15	If $A = [a_{ij}]$ is a square matrix of order 2 such that $a_{ij} = \begin{cases} 1, & \text{when } i = j \\ 0, & \text{when } i \neq j \end{cases}$, Then find the value of A^2 (a): $\begin{bmatrix} 1 & 0 \\ 1 & 0 \end{bmatrix}$ (b): $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ (c): $\begin{bmatrix} 1 & 1 \\ 1 & 0 \end{bmatrix}$ (d): $\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$
	Choose appropriate option (a). Both A & R are true & R is the correct explanation of A (b). Both A & R are true but R is not the correct explanation of A (c). A is true but R is false (d). A is false but R is true
16	A and B square matrices of same order. Assertion (A): $(A + B)^2 \neq A^2 + 2AB + B^2$ Reason (R): Generally, $AB \neq BA$
17	Assertion (A): If $A = \begin{bmatrix} 2 & 3 \\ 1 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} -2 & 3 \\ 1 & -2 \end{bmatrix}$, then B is the inverse of A Reason(R): If A is a square matrix of order m and if there exists another square matrix B of the same order m , such that $AB=BA=I$, then B is called the inverse of A

18	If $A = \begin{bmatrix} 0 & 2 \\ 3 & -4 \end{bmatrix}$ and $kA = \begin{bmatrix} 0 & 3\alpha \\ 2\beta & 24 \end{bmatrix}$, then find the values of k , α , and β
19	For what values of x and y are the following matrices equal? $A = \begin{bmatrix} 2x+1 & 3y \\ 0 & y^2-5y \end{bmatrix}$ and $A = \begin{bmatrix} x+3 & y^2+2 \\ 0 & -6 \end{bmatrix}$
20	If $A^T = \begin{bmatrix} 1 & -1 \\ 2 & 3 \\ 2 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 1 & 5 \\ 0 & 1 & -1 \end{bmatrix}$, then find $A-B$
21	If $A = \begin{bmatrix} 3 & x-1 \\ 2x+3 & x+2 \end{bmatrix}$ is a symmetric matrix. Find the value of x
22	Find the matrix A satisfying $\begin{bmatrix} 2 & 1 \\ 3 & 2 \end{bmatrix} A \begin{bmatrix} -3 & 2 \\ 5 & -3 \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$
23	If $A = \begin{bmatrix} 1 & 0 \\ -1 & 7 \end{bmatrix}$, find k such that $A^2 - 8A + kI = O$
24	If $F(x) = \begin{bmatrix} \cos x & -\sin x & 0 \\ \sin x & \cos x & 0 \\ 0 & 0 & 1 \end{bmatrix}$, prove that $F(x) F(y) = F(x+y)$
25	Let $A = \begin{bmatrix} 0 & -\tan \frac{a}{2} \\ \tan \frac{a}{2} & 0 \end{bmatrix}$ and I be identity matrix of order 2. Show that $I+A = (I-A) \begin{bmatrix} \cos a & -\sin a \\ \sin a & \cos a \end{bmatrix}$
26	If $A = \begin{bmatrix} 2 & 3 \\ -1 & 2 \end{bmatrix}$, then show that $A^2 - 4A + 7I = O$. Hence find A^5
27	If $A = \begin{bmatrix} 2 & -1 \\ 1 & 2 \end{bmatrix}$ then find the value of $A^2 + 2A - 3I$.
28	If $A = \begin{bmatrix} 1 & 5 \\ 7 & 12 \end{bmatrix}$ and $B = \begin{bmatrix} 9 & 1 \\ 7 & 8 \end{bmatrix}$, find a matrix C such that $3A + 5B + 2C$ is a null matrix.
29	Find the matrix A satisfying the matrix equation: $\begin{bmatrix} 2 & 1 \\ 3 & 2 \end{bmatrix} A \begin{bmatrix} 3 & 2 \\ 5 & 3 \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$.
30	If $A = \begin{bmatrix} 3 & 5 \\ 4 & 2 \end{bmatrix}$, then find $A^2 - 5A - 14I$. Hence, obtain A^3 .
31	Express the following matrix as the sum of a symmetric and skew-symmetric matrix. $A = \begin{bmatrix} 3 & -2 & -4 \\ 3 & -2 & -5 \\ -1 & 1 & 2 \end{bmatrix}$.

32	If A is a square matrix such that $A^2 = I$, find the value of $(A + I)^3 + (A - I)^3 - 7A$.																
33	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 $A^T - B^T$																
34	If $A = \begin{bmatrix} 1 & 3 & 2 \\ 2 & 0 & -1 \\ 1 & 2 & 3 \end{bmatrix}$, then show that $A^3 - 4A^2 - 3A + 11 I_3 = O$																
35	Solve for x and y: $x \begin{bmatrix} 2 \\ 1 \end{bmatrix} + y \begin{bmatrix} 3 \\ 5 \end{bmatrix} + \begin{bmatrix} -8 \\ -11 \end{bmatrix} = 0$																
36	Three schools A, B and C organized a mela for collecting funds for helping the rehabilitation of flood victims. They sold hand made fans, mats and plates from recycled material at a cost of ₹25, ₹100 and ₹50 each. The number of articles sold are given below: <table><tr><td>School → Articles ↓</td><td>A</td><td>B</td><td>C</td></tr><tr><td>Hand Fans</td><td>40</td><td>25</td><td>35</td></tr><tr><td>Mats</td><td>50</td><td>40</td><td>50</td></tr><tr><td>Plates</td><td>20</td><td>30</td><td>40</td></tr></table> Find the funds collected by each school separately by selling the given articles. Also find the total funds collected for the purpose.	School → Articles ↓	A	B	C	Hand Fans	40	25	35	Mats	50	40	50	Plates	20	30	40
School → Articles ↓	A	B	C														
Hand Fans	40	25	35														
Mats	50	40	50														
Plates	20	30	40														
37	A trust fund, ₹35,000 is to be invested in two different types of bonds. The first bond pays 8% interest per annum which will be given to orphanage and second bond pays 10% interest per annum which will be given to an NGO (Cancer Aid Society). Using matrix multiplication, determine how to divide ₹35,000 among two types of bonds if the trust fund obtains an annual total interest of ₹3,200.																
38	A coaching institute of English (subject) conduct classes in two batches I and II and fees for rich and poor children are different. In batch I, it has 20 poor and 5 rich children and total monthly collection is ₹9,000, whereas in batch II, it has 5 poor and 25 rich children and total monthly collection is ₹26,000. Using matrix method find the monthly fees paid by each child of two types.																
39	If $A = \begin{bmatrix} 2 & 1 & 1 \\ 1 & 2 & 1 \\ 1 & 1 & 2 \end{bmatrix}$ and $f(x) = 2x^2 - 5x + 7$, find $f(A)$																
40	If $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$, verify: $A^2 - 4A - 5I = O$.																

Answers

1	D
2	C
3	C
4	C
5	A
6	B
7	B
8	B
9	D
10	C
11	A
12	C
13	D
14	A
15	B
16	A
17	D
18	$k = -6, \alpha = -4, \beta = -9$
19	$x = 2$ and $y = 3$

20	$\begin{bmatrix} -1 & 1 & -3 \\ -1 & 2 & 1 \end{bmatrix}$
21	$x = -4$
22	$\begin{bmatrix} 1 & 1 \\ 1 & 0 \end{bmatrix}$
23	$k = 7$
26	$\begin{bmatrix} -118 & -93 \\ 31 & -118 \end{bmatrix}$
27	$A^2 + 2A - 3I = \begin{bmatrix} 4 & -6 \\ 6 & 4 \end{bmatrix}$
28	$C = \begin{bmatrix} -24 & -10 \\ -28 & -38 \end{bmatrix}$
29	$A = \begin{bmatrix} -11 & 7 \\ 19 & -12 \end{bmatrix}$
30	$A^3 = \begin{bmatrix} 187 & 195 \\ 156 & 148 \end{bmatrix}$
31	$A = \begin{bmatrix} 3 & 1/2 & -5/2 \\ 1/2 & -2 & -2 \\ -5/2 & -2 & 2 \end{bmatrix} + \begin{bmatrix} 0 & -5/2 & -3/2 \\ 5/2 & 0 & -3 \\ 3/2 & 3 & 0 \end{bmatrix}$
33	$A^T - B^T = \begin{bmatrix} 4 & 3 \\ -3 & 0 \\ -1 & -2 \end{bmatrix}$
35	$X = 1, Y = 2$
36	Total = $7,000 + 6,125 + 7,875 = 21,000$
37	First Bond (8%): 15000 Second Bond (10%) : 20000
38	$X = 200, Y = 1000$
39	$f(A) = \begin{bmatrix} 9 & 5 & 5 \\ 5 & 9 & 5 \\ 5 & 5 & 9 \end{bmatrix}$