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Class XII, Applied Mathematics *Worksheet 2-Algebra*
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1. If A is a square matrix such that $(A - 2I)(A + I) = 0$, then A^{-1} is
 - (a) $\frac{A-I}{2}$
 - (b) $\frac{A+I}{2}$
 - (c) $2(A - I)$
 - (d) $2A + I$
2. If $A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ then $A^2 + 2A$ equals
 - (a) $4A$
 - (b) $3A$
 - (c) $2A$
 - (d) A
3. If $\begin{bmatrix} x+y & 2x+z \\ x-y & 2z+w \end{bmatrix} = \begin{bmatrix} 4 & 7 \\ 0 & 10 \end{bmatrix}$, then the values of x, y, z and w respectively are
 - (a) 2, 2, 3, 4
 - (b) 2, 3, 1, 2
 - (c) 3, 3, 0, 1
 - (d) None of these
4. If $A = [a_{ij}]$ is a matrix of order 2, where $a_{ij} = \frac{(i+2j)^2}{2}$, then A is equal to
 - (a) $\begin{bmatrix} 9 & 25 \\ 8 & 18 \end{bmatrix}$
 - (b) $\begin{bmatrix} 9 & 25 \\ 2 & 2 \end{bmatrix}$
 - (c) $\begin{bmatrix} 9 & 25 \\ 4 & 9 \end{bmatrix}$
 - (d) $\begin{bmatrix} 9 & 15 \\ 2 & 2 \end{bmatrix}$
5. A square matrix $A = [a_{ij}]$ of order n is called a lower triangular matrix if $a_{ij} = 0$ for
 - (a) $i = j$
 - (b) $i < j$
 - (c) $i > j$
 - (d) None of these
6. A square matrix $A = [a_{ij}]$ of order n is called a diagonal matrix if $a_{ij} = 0$ for
 - (a) $i = j$
 - (b) $i < j$
 - (c) $i > j$
 - (d) $i \neq j$
7. For any square matrix A , AA^T is a
 - (a) Unit matrix
 - (b) symmetric matrix
 - (c) skew-symmetric matrix
 - (d) diagonal matrix
8. If a matrix A is both symmetric and skew-symmetric, then
 - (a) A is a diagonal matrix
 - (b) A is zero matrix
 - (c) A is a scalar matrix
 - (d) A is square matrix
9. If $A = \text{diag}(3, -1)$, then matrix A is
 - (a) $\begin{bmatrix} 0 & 3 \\ 0 & -1 \end{bmatrix}$
 - (b) $\begin{bmatrix} -1 & 0 \\ 3 & 0 \end{bmatrix}$
 - (c) $\begin{bmatrix} 3 & 0 \\ 0 & -1 \end{bmatrix}$
 - (d) $\begin{bmatrix} 3 & -1 \\ 0 & 0 \end{bmatrix}$
10. Total number of possible matrices of order 2×3 with each entry 1 or 0 is
 - (a) 6
 - (b) 36
 - (c) 32
 - (d) 64

11. If A is a square matrix such that $A^2=A$, then $(I + A)^2 - 3A$ is

- (a) I (b) 2A
(c) 3I (d) A

12. If matrices A and B are inverse of each other then

- (a) $AB = BA$ (b) $AB = BA = I$
(c) $AB = BA = 0$ (d) $AB = 0, BA = I$

13. If $A = \begin{bmatrix} 0 & 2 \\ 2 & 0 \end{bmatrix}$, then A^2 is

- (a) $\begin{bmatrix} 0 & 4 \\ 4 & 0 \end{bmatrix}$ (b) $\begin{bmatrix} 4 & 0 \\ 4 & 0 \end{bmatrix}$
(c) $\begin{bmatrix} 0 & 4 \\ 0 & 4 \end{bmatrix}$ (d) $\begin{bmatrix} 4 & 0 \\ 0 & 4 \end{bmatrix}$

14. If $A = \begin{bmatrix} 5 & x \\ y & 0 \end{bmatrix}$ and $A = A'$ then

- (a) $x = 0, y = 5$ (b) $x = y$
(c) $x + y = 5$ (d) $x - y = 5$

15. If $A = \begin{bmatrix} 3 & -1 & 2 \\ 4 & 5 & 9 \\ 1 & 3 & 4 \end{bmatrix}$, then the value $3a_{22} - 4a_{33}$ is

- (a) 1 (b) -1
(c) 0 (d) 2

16. If $A = \begin{bmatrix} 0 & a \\ 0 & 0 \end{bmatrix}$ then A^{16} is

- (a) $\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$ (b) $\begin{bmatrix} 0 & a \\ 0 & 0 \end{bmatrix}$
(c) $\begin{bmatrix} 0 & a \\ a & 0 \end{bmatrix}$ (d) None of these

17. If a matrix $A = \begin{bmatrix} 0 & 2 \\ 0 & 0 \end{bmatrix}$ and $f(x) = 1 + x + x^2 + x^4 + x^8 + x^{16}$ then $f(A)$ is

- (a) $\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$ (b) $\begin{bmatrix} 1 & 2 \\ 0 & 1 \end{bmatrix}$
(c) $\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$ (d) None of these

18. If $A = \begin{bmatrix} 0 & 2 \\ 3 & -4 \end{bmatrix}$ and $kA = \begin{bmatrix} 0 & 3a \\ 2b & 24 \end{bmatrix}$, then the values of k, a and b are respectively

- (a) -6, -4, -9 (b) -6, 12, 18
(c) -6, -12, -18 (d) -6, 4, 9

19. If the matrix $A = \begin{bmatrix} 0 & a & -3 \\ 2 & 0 & -1 \\ b & 1 & 0 \end{bmatrix}$ is skew symmetric matrix then

- (a) $a = 0, b = 5$ (b) $a = -2, b = 3$
(c) $a = 2, b = -3$ (d) None of these

20. If A is matrix of order $m \times n$ and B is a matrix such that AB and BA^T are both defined, then order of matrix B is

- (a) $m \times m$ (b) $n \times n$
(c) $n \times m$ (d) $m \times n$

21. The matrix $A = \begin{bmatrix} 3 & -2 & 7 \\ -2 & 1 & -3 \\ 7 & -3 & 5 \end{bmatrix}$ is a

- (a) Symmetric Matrix (b) Skew-Symmetric matrix
(c) Diagonal Matrix (d) Scalar Matrix

22. If $A = \begin{pmatrix} 2x & -x \\ x & 4x - 1 \end{pmatrix}$ and $A + A^T = I$, then $x = \underline{\hspace{2cm}}$.

- (a) 0 (b) 1
(c) $\frac{1}{2}$ (d) none of these

23. If $A = \begin{bmatrix} \alpha & \beta \\ \gamma & -\alpha \end{bmatrix}$ Is such that $A^2 = I$ then

- (a) $1 + \alpha^2 + \beta\gamma = 0$ (b) $1 - \alpha^2 + \beta\gamma = 0$
 (c) $1 - \alpha^2 - \beta\gamma = 0$ (d) $1 + \alpha^2 - \beta\gamma = 0$

24. The matrix $A = \begin{bmatrix} 0 & -5 & 7 \\ 5 & 0 & 3 \\ -7 & -3 & 0 \end{bmatrix}$ is a

- (a) Symmetric Matrix (b) Skew-Symmetric matrix
 (c) Diagonal Matrix (d) Scalar Matrix

25. The matrix $A = \begin{bmatrix} 0 & 0 & 5 \\ 0 & 5 & 0 \\ 5 & 0 & 0 \end{bmatrix}$ is a

- (a) Scalar matrix (b) Diagonal matrix
 (c) Unit matrix (d) Square matrix

26. If A and B are 2×2 matrices, then which of the following is true?

- (a) $(A + B)^2 = A^2 + B^2 + 2AB$ (b) $(A - B)^2 = A^2 + B^2 - 2AB$
 (c) $(A - B)(A + B) = A^2 + AB - BA - B^2$ (d) $(A + B)(A - B) = A^2 - B^2$

27. If A, B and C are three matrices of order 2×3 , 3×3 and 2×3 respectively, then order of $AB + C =$ ____

- a) 3×3 (b) 2×2
 (c) 2×3 (d) none of these

28. If $A = \begin{bmatrix} 1 & 0 \\ 1 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 0 \\ 2 & 1 \end{bmatrix}$ then AB is

- a) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ b) $\begin{bmatrix} 1 & 0 \\ 3 & 1 \end{bmatrix}$ c) $\begin{bmatrix} 1 & 0 \\ 0 & 3 \end{bmatrix}$ d) $\begin{bmatrix} 1 & 0 \\ 0 & 0 \end{bmatrix}$

29. If $\begin{bmatrix} x + y + z \\ x + y \\ y + z \end{bmatrix} = \begin{bmatrix} 9 \\ 5 \\ 7 \end{bmatrix}$ then the value of (x, y, z) is

- (a) (4, 3, 2) (b) (3, 2, 4)
 (c) (2, 3, 4) (d) None of these

30. $\begin{bmatrix} 1 & 3 & 2 \\ 0 & 5 & 1 \\ 0 & 3 & 2 \end{bmatrix} \begin{bmatrix} x \\ 1 \\ -2 \end{bmatrix} = 0$ then the value of x is

- (a) $-\frac{1}{2}$ (b) $\frac{1}{2}$
 (c) 1 (d) -1

ANSWER

1.	a	7.	b	13.	d	19.	b	25.	d
2.	b	8.	b	14.	b	20.	b	26.	c
3.	a	9.	c	15.	b	21.	a	27.	c
4.	b	10.	d	16.	a	22.	c	28.	b
5.	b	11.	a	17.	b	23.	c	29.	c
6.	d	12.	b	18.	a	24.	c	30.	b