MATHS

BOOKS - NAGEEN PRAKASHAN ENGLISH

MATRICES

Solved Example

1. construst a matrix of order 2×2 whose elements are defined as $a_{ij} = i + 3j$.

A. $A = \begin{bmatrix} -4 & 7 \\ -5 & 8 \end{bmatrix}$.

B. $A = \begin{bmatrix} 4 & -7 \\ 5 & -8 \end{bmatrix}$.

C. $A = \begin{bmatrix} 4 & 7 \\ 5 & 8 \end{bmatrix}$.

D. $A = \begin{bmatrix} 4 & -7 \\ 5 & 8 \end{bmatrix}$.

Answer: C

Watch Video Solution

2. if a matric has 10 elements , write all possible order of the matrix.

Watch Video Solution

3. if $A\begin{bmatrix}1 & 3\\ -2 & 4\end{bmatrix}$ and $B=\begin{bmatrix}3 & 0\\ -1 & 2\end{bmatrix}$, then find 5A - 2B .

Watch Video Solution

4. if A =diag[2 -3 4], B= diag[3 1 -2)and C= diag[-1 2 2] then find

2A-B+3C.

Watch Video Solution

5. if $A = \begin{bmatrix} 1 & 6 \\ 2 & 4 \\ -3 & 5 \end{bmatrix} B = \begin{bmatrix} 3 & 4 \\ 1 & -2 \\ 2 & -1 \end{bmatrix}$, then find a matrix C such that 2A-B+c=0

Watch Video Solution

6. if $2A + B = \begin{bmatrix} 5 & -1 \\ 3 & 2 \end{bmatrix}$ and $A - 2B = \begin{bmatrix} 1 & -4 \\ 0 & 5 \end{bmatrix}$ then find the matrices A and B .

Watch Video Solution

7. Find the values of X and Y

$$\begin{bmatrix} x + y \\ 3x \end{bmatrix} = \begin{bmatrix} -2 \\ 6 \end{bmatrix}.$$

Watch Video Solution

8. if $A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{bmatrix}$ and $B = \begin{bmatrix} -3 & -2 \\ 0 & 1 \\ -4 & -5 \end{bmatrix}$, then find AB and BA ,

Watch Video Solution

9. if $A = \begin{bmatrix} 3 & -1 & 2 \\ 0 & 5 & -3 \\ 1 & -2 & 7 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$, find whether AB=BA or Not .

Watch Video Solution

10. if $A = \begin{bmatrix} 2 & -3 \\ 1 & 4 \end{bmatrix}, B = \begin{bmatrix} -1 & 0 \\ 1 & 2 \end{bmatrix}, C = \begin{bmatrix} 3 & 1 \\ 1 & 2 \end{bmatrix}$, then show that A (BC)=(AB)c.

Watch Video Solution

11. If $A = \begin{bmatrix} \cos^2\theta & \sin\theta\cos\theta \\ \sin\theta\cos\theta & \sin^2\theta \end{bmatrix}, B = \begin{bmatrix} \cos^2\phi & \sin\phi\cos\phi \\ \sin\phi\cos\phi & \sin^2\phi \end{bmatrix}$ and θ and ϕ differs by $\frac{\pi}{2}$, then AB=

Watch Video Solution

12. find the transpose of the matrix $A = \begin{bmatrix} 1 & 3 & -4 \\ 0 & 2 & 1 \end{bmatrix}$.

Watch Video Solution

13. if $A = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} a & c \\ b & d \end{bmatrix}$, then show that $(AB)' = B'A'$

Watch Video Solution

14. Expess the matrix $A = \begin{bmatrix} 2 & 0 & -4 \\ -3 & 1 & 5 \\ 4 & -2 & 3 \end{bmatrix}$ as a sum of symmetic and skew symmetric matrices.

Watch Video Solution

15. Find the inverase of A $= \begin{bmatrix} 5 & -1 \\ 1 & 1 \end{bmatrix}$ by using elementary row transformation.

Watch Video Solution

16. Find the inverse of Matrix $A = \begin{bmatrix} 1 & 3 & -2 \\ -3 & 0 & -5 \\ 2 & 5 & 0 \end{bmatrix}$ by using elementary row transformation.

Watch Video Solution

17. find the inverse of matrix $A = \begin{bmatrix} 4 & 7 \\ 3 & 5 \end{bmatrix}$ by using elementary column transformation .

Watch Video Solution

Exercise 3 A

1. if $A = \begin{bmatrix} 1 & 2 & 3 \\ -4 & 5 & 0 \end{bmatrix}$, then

(I) how many columns are in A ?

(ii) How many rows are in A?

(iii) write the order of A ,

(Iv) how many elements are in A?

Watch Video Solution

2. $A = \begin{bmatrix} 2 & 0 & -1 \\ 3 & 2 & 5 \\ -1 & 4 & -3 \\ 0 & 1 & 7 \end{bmatrix}$, $then$ (i) how many cloumns are in A ? (ii) how many rows are inA ?

(iii) what is the order of A ?

(iv) How many elements are in A?

Watch Video Solution

3. (i) A matric has 12 elements ,write all possible orders of this matrix.

(ii) A matrix has 8 elements write all possible orders of this matrix.

(iii) A matrix has 15 elements , write all possible orders of this matrix.

Watch Video Solution

4. A Matrix has elements a,b,c and d constant the matrix formed with these elements :

(i) a Matrix of order 1×4

(ii) a matrix of order 4×1

(iii) 4 matrix of order 2×2

Watch Video Solution

5. Construct a 2×2 matrix $A = [a_{ij}]$ whose elements a_{ij} are given by:

(i) $a_{ij} = i + j$ (ii) $a_{ij} = \frac{(i+j)^2}{2}$

Watch Video Solution

6. Construct a matrix $[a_{ij}]_{3\times 3}$,where $a_{ij} = \frac{i-j}{i+j}$.

Watch Video Solution

7. Construct a matrix $[a_{ij}]_{3\times 3}$, where $a_{ij} = 2i - 3j$.

Watch Video Solution

8. if $A = \begin{bmatrix} 3 & -2 \\ 7 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 3 \\ -1 & 4 \end{bmatrix}$, then find

$(i)A + B(ii)A - 2B$

Watch Video Solution

9. if $A = \begin{bmatrix} 1 & 2 & -5 \\ -3 & 4 & 6 \end{bmatrix}$ and $B\begin{bmatrix} -2 & 3 & -4 \\ 1 & 2 & 3 \end{bmatrix}$' then find 2A+B.

Watch Video Solution

10. if $A = \begin{bmatrix} 1+i & -2i \\ 7 & 3-i \end{bmatrix}$ and $B = \begin{bmatrix} 1-i & 2i \\ -3 & 3+i \end{bmatrix}$, then find A+B. `

Watch Video Solution

11. if $A = \begin{bmatrix} 4 & 2 \\ -3 & 2 \\ 1 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} -1 & 3 \\ 0 & 2 \\ 2 & -4 \end{bmatrix}$, then find 3A-4B.

Watch Video Solution

12. if $A = \begin{bmatrix} 1 & -4 & 5 \\ 2 & 1 & -3 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 3 & -1 \\ 1 & 2 & 3 \end{bmatrix}$ then find a matrix C if 2A+3B -4C is a zero matrix.

Watch Video Solution

13. if A= $diag[1 \quad 3 \quad 4], B = \text{diag}[-2 \quad 1 \quad -1], C = \text{Diag}[3 \quad -1 \quad -2]$

then find 2A +B-C.

Watch Video Solution

14. Simplify the following :

$$\cos\theta\begin{bmatrix}\cos\theta & -\sin\theta\\ \sin\theta & \cos\theta\end{bmatrix}+\sin\theta\begin{bmatrix}\sin\theta & \cos\theta\\ -\cos\theta & \sin\theta\end{bmatrix}$$

Watch Video Solution

15. (i) if $A+B=\begin{bmatrix}3 & 4\\ -1 & 0\end{bmatrix}$ and $A-B=\begin{bmatrix}1 & 2\\ 5 & 6\end{bmatrix}$, then find the matrix A and B.

(ii) if $X+Y=\begin{bmatrix}2 & 1\\ 1 & 2\end{bmatrix}$ and $2X-Y=\begin{bmatrix}1 & 2\\ 2 & 1\end{bmatrix}$ then find X and Y .

Watch Video Solution

16. if $2A - 3B = \begin{bmatrix} 4 & 2 \\ -1 & 0 \\ 3 & -2 \end{bmatrix}$ and $3A + B = \begin{bmatrix} 1 & 0 \\ 3 & 5 \\ -1 & 4 \end{bmatrix}$, then find the matrices A And B,

Watch Video Solution

17. Find the values of x and y from each of the following matrix equation : $(i) \begin{bmatrix} x+y \\ x-y \end{bmatrix} = \begin{bmatrix} 3 \\ 1 \end{bmatrix} (ii) \begin{bmatrix} x+y & 7 \\ 0 & 2x \end{bmatrix} = \begin{bmatrix} -1 & 7 \\ 0 & 6 \end{bmatrix}$

Watch Video Solution

18. Find the values of x,y,z from the following matrix equation : $\begin{bmatrix} x+y & x+y+z \\ 2x+y & 0 \end{bmatrix} = \begin{bmatrix} 3 & 6 \\ 5 & 0 \end{bmatrix}$

Watch Video Solution

19. find the values of x, y,z from the following matrix equation :

$$2\begin{bmatrix} x & y \\ z & o \end{bmatrix} = \begin{bmatrix} x & 6 \\ 2 & 0 \end{bmatrix} + \begin{bmatrix} 4 & x+y \\ x & 0 \end{bmatrix}$$

Watch Video Solution

20. if $A = \begin{bmatrix} 2 & -3 \\ 4 & -1 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 0 \\ -1 & 2 \end{bmatrix}$, then find matrix C such that 2A-B+3c is a unit matrix.

Watch Video Solution

Exercise 3 B

1. Find AB and BA if exists from the following matrices A and B:

$$(i) A = \begin{bmatrix} 2 & 3 & -1 \\ 0 & 1 & 2 \end{bmatrix} \text{ and } B = \begin{bmatrix} 2 & -6 \\ -4 & 0 \end{bmatrix}$$

(ii) $A = \begin{bmatrix} 1 & 2 & 3 \\ 0 & 1 & -2 \\ -1 & 0 & -1 \end{bmatrix}$ and $B = \begin{bmatrix} 0 & 0 & 2 \\ 2 & 0 & 0 \\ 0 & 2 & 0 \end{bmatrix}$

$(iii) A = \begin{bmatrix} 0 & 3 & 4 \\ 2 & 1 & -2 \\ 1 & -3 & -1 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 1 & 3 \\ -1 & 0 & -2 \end{bmatrix}$

Watch Video Solution

2. if $A = \begin{bmatrix} 4 & 0 & -3 \\ 1 & 2 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 1 \\ 1 & -2 \\ 3 & 4 \end{bmatrix}$ 'then find AB and BA.

Watch Video Solution

3. if $A \begin{bmatrix} 0 & 3 \\ 2 & 1 \end{bmatrix}$, then find A^2

Watch Video Solution

4. if $A = \begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix}$, then show that : $A^2 = \begin{bmatrix} \cos 2\theta & \sin 2\theta \\ -\sin 2\theta & \cos 2\theta \end{bmatrix}$

Watch Video Solution

5. (i) if $A = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}, B = \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$ and $C = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$, then show that $A^2 = B^2 = C^2 = I_2$.

(ii) if $A = \begin{bmatrix} 1 & 0 \\ 1 & 1 \end{bmatrix}, B = \begin{bmatrix} 2 & 0 \\ 1 & 1 \end{bmatrix}$ and $C = \begin{bmatrix} -1 & 2 \\ 3 & 1 \end{bmatrix}$, then show that A(B+C)=AB+AC. (iii) if $A = \begin{bmatrix} 1 & -1 \\ -1 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$, then show that AB is a zero matrix.

Watch Video Solution

6. if $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}, B = \begin{bmatrix} -1 & 0 \\ 2 & 3 \end{bmatrix}$ and $C = \begin{bmatrix} 1 & -1 \\ 0 & 1 \end{bmatrix}$, then show that : (i) A(B+C)=AB+AC (ii) (A-B)C=AC-BC.

Watch Video Solution

7. if $A = \begin{bmatrix} 3 & 2 & 1 \\ 1 & 2 & 3 \\ 3 & -6 & 1 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 4 & 0 \\ 2 & -3 & 0 \\ 1 & 2 & 0 \end{bmatrix}$ and $C = \begin{bmatrix} 1 & 2 & 3 \\ 3 & 2 & 1 \\ 8 & 7 & 9 \end{bmatrix}$, then find AB-AC.

Watch Video Solution

8. if $A \begin{bmatrix} 1 & 3 & -1 \\ 2 & 2 & -1 \\ 3 & 0 & -1 \end{bmatrix}$ and $B = \begin{bmatrix} -2 & 3 & -1 \\ -1 & 2 & -1 \\ -6 & 9 & -4 \end{bmatrix}$, then show that AB=BA.

Watch Video Solution

9. if $A \begin{bmatrix} 2 & -3 & -5 \\ -1 & 4 & 5 \\ 1 & -3 & -4 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & -2 & -4 \\ -1 & 3 & 4 \\ 1 & -2 & -3 \end{bmatrix}$, then show that (i) AB=A and BA=B.

Watch Video Solution

10. (i) if $A = \begin{bmatrix} 4 & -1 & -4 \\ 3 & 0 & -4 \\ 3 & -1 & -3 \end{bmatrix}$, then show that `A^(2)=I

Watch Video Solution

11. (i) if $A = \begin{bmatrix} 1 & -1 \\ 2 & 3 \end{bmatrix}$, then show that $A^2 - 4A + 5I = O$.

(ii) if $f(x) = x^2 + 3x - 5$ and $A = \begin{bmatrix} 2 & -1 \\ 4 & 3 \end{bmatrix}$, then find f(A).

Watch Video Solution

12. if $A \begin{bmatrix} 1 & 3 & 2 \\ 2 & 0 & 3 \\ 1 & -1 & 1 \end{bmatrix}$, then find $A^3 - 2A^2 + A - I_3$.

Watch Video Solution

13. if $A = \begin{bmatrix} 3 & -4 \\ 1m & -1 \end{bmatrix}$, then show that $A^n = \begin{bmatrix} 1+2n & -4n \\ n & 1-2n \end{bmatrix}$ is true for all natural values of n.

Watch Video Solution

14. Ram bought 5 dozen mangoes ,8 dozen bananas and 4 dozen oranges , the cost price of mango banana and orange are Rs. 40, Rs, 25 and Rs. 20 per dozen ,Represent the fruits in row matrix and price of the fruits .

Watch Video Solution

15. There are 20 dozen shirts , 15 Dozen pants and 25 Dozen a pair of socks in rajesh 's shop , if the cost of a shrit , a pant and a pair of socks are respectivley Rs. 60, Rs. 110 and Rs. 25, ,then find the total selling price of these things.

Watch Video Solution

Exercise 3 C

1. find the transpore of matrix $A = \begin{bmatrix} 2 & 0 \\ -1 & 4 \end{bmatrix}$.

Watch Video Solution

2. if $A = \begin{bmatrix} 2 & 8 \\ -7 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} -1 & 3 \\ 2 & -4 \end{bmatrix}$, then show that : (i) (A+B)'=A+B' (ii) (A+2B)'=A'+2B' (iii) (AB)'=B'A'

Watch Video Solution

3. if $A = \begin{bmatrix} 1 & 0 & -3 \\ 2 & 3 & 4 \\ -4 & 5 & -2 \end{bmatrix}$ and $b = \begin{bmatrix} 3 & 0 & -1 \\ 2 & 5 & -4 \\ 4 & -1 & 2 \end{bmatrix}$, then show that :

$(AB)' = B'A'$

Watch Video Solution

4. if $A = \begin{bmatrix} 0 \\ 1 \\ 2 \end{bmatrix}$ and $B = [3 \quad 2 \quad 1]$, then show that :

$(AB)' = B'A'$

Watch Video Solution

5. (i) if $A = \begin{bmatrix} 1 & -4 \\ 3 & 1 \end{bmatrix}$ and $b = \begin{bmatrix} 1 & 0 & 5 \\ -2 & 4 & 3 \end{bmatrix}$, then show that :

$(AB)' = B'A'$

(ii) if $A = \begin{bmatrix} 2 & 3 \\ 0 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 4 \\ 2 & 1 \end{bmatrix}$, then prove that :

$(AB)' = B'A'$

Watch Video Solution

6. if $A = \begin{bmatrix} 2 & 1 & 3 \\ 1 & -1 & 2 \\ 4 & 1 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & -1 & 2 \\ 2 & 1 & 5 \\ 4 & 1 & 3 \end{bmatrix}$, then show that :

$(i)(A+B)' = A' + B'(ii)(A+4B)' = A' + 4B'$

Watch Video Solution

7. If matrix $A = \begin{bmatrix} 1 & -4 \\ 3 & 0 \end{bmatrix}$ is express as a sum of symmetric and skew symmetric matrices as $\begin{bmatrix} 1 & x \\ -\frac{1}{2} & 0 \end{bmatrix} + \begin{bmatrix} 0 & -\frac{7}{2} \\ y & 0 \end{bmatrix}$ then $x + y = ?$

A. 0

B. 1

C. 2

D. 3

Answer: D

Watch Video Solution

8. express the following matrices as a sum of symmetric and skew symmetric matrices :

$(i) \begin{bmatrix} 3 & -7 \\ 4 & 2 \end{bmatrix}$

Watch Video Solution

9. If A and B are symmetric of the same order, then (A) AB is a symmetric matrix (B) A-B is skew symmetric (C) AB-BA is symmetric matrix (D) AB+BA is a symmetric matrix

Watch Video Solution

10. Let A be a square matrix. Then prove that $(i) A + A^T$ is a symmetric matrix,$(ii) A - A^T$ is a skew-symmetric matrix and$(iii) \forall^T$ and $A^T A$ are symmetric matrices.

Watch Video Solution

Exercise 3 D

1. find the inverse of the following matrix : $\begin{bmatrix} 1 & -1 \\ 2 & 3 \end{bmatrix}$

Watch Video Solution

2. Find the inverse of the following matrices $\begin{bmatrix} 3 & -1 \\ -4 & 2 \end{bmatrix} (ii) \begin{bmatrix} 2 & -6 \\ 1 & -2 \end{bmatrix}$

Watch Video Solution

3. if $A = \begin{bmatrix} 1 & -1 & 1 \\ 2 & 1 & -1 \\ -1 & -2 & 2 \end{bmatrix}$ then show that A^{-1} Does not exist.

Watch Video Solution

Exercise 3 E

1. A matrix of order $m \times n$ contains 7 elements, then how many different order pairs (m,n) can take ?

A. 2

B. 1

C. 3

D. 7

Answer: A

Watch Video Solution

2. Matrix $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ is :

A. Zero matrix

B. Identity matrix

C. Scalar matrix

D. None of these

Answer: B

Watch Video Solution

3. $\cos\theta\begin{bmatrix}\cos\theta & -\sin\theta\\ \sin\theta & \cos\theta\end{bmatrix}+\sin\theta\begin{bmatrix}\sin\theta & \cos\theta\\ -\cos\theta & \sin\theta\end{bmatrix}=?$

A. $\begin{bmatrix}0 & 0\\ 0 & 0\end{bmatrix}$

B. $\begin{bmatrix}1 & 0\\ 0 & 1\end{bmatrix}$

C. $\begin{bmatrix}0 & 1\\ 1 & 0\end{bmatrix}$

D. None of these

Answer: B

Watch Video Solution

4. If the order of matrix A is m $\times$ n, then the order of the transpose of matrix A is :

A. $m\times n$

B. $n\times n$

C. $n\times m$

D. $m\times m$

Answer: C

Watch Video Solution

5. If $f(x) = x^2 - 5x + 6$. Find $f(A)$, if $A = \begin{bmatrix} 2 & 0 & 1 \\ 2 & 1 & 3 \\ 1 & -1 & 0 \end{bmatrix}$.

A. $\begin{bmatrix} 1 & -1 & -3 \\ -1 & 1 & 10 \\ -5 & 4 & 4 \end{bmatrix}$

B. $\begin{bmatrix} 1 & -1 & -3 \\ -1 & -1 & -10 \\ -5 & -4 & -4 \end{bmatrix}$

C. $\begin{bmatrix} 1 & -1 & -3 \\ -1 & -1 & -10 \\ -5 & 4 & 4 \end{bmatrix}$

D. None of these

Answer: C

Watch Video Solution

6. If A $A = [3 - 24 - 2]$and $I = [1001]$, find k so that $A^2 = kA - 2I$.

A. 1

B. -1

C. 2

D. None of these

Answer: A

Watch Video Solution

7. if $x\begin{bmatrix} 2 \\ 3 \end{bmatrix} + y\begin{bmatrix} -1 \\ 5 \end{bmatrix} = \begin{bmatrix} 4 \\ 19 \end{bmatrix}$, then the values of x and y are:

A. $x = y, y = 3$

B. $x = 6, y = 8$

C. $x = 3, y = 2$

D. None of these

Answer: C

Watch Video Solution

8. If $A = \begin{bmatrix} 3 & -1 \\ 2 & 5 \end{bmatrix}$, then $A + A^T = ?$

A. $\begin{bmatrix} 3 & 1/2 \\ 1/2 & 5 \end{bmatrix}$

B. $\begin{bmatrix} 6 & 1 \\ 1 & 10 \end{bmatrix}$

C. $\begin{bmatrix} 0 & -3 \\ 3 & 0 \end{bmatrix}$

D. None of these

Answer: B

Watch Video Solution

9. if $A = \begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix}$, then AA^T=?`

A. $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

B. $\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$

C. $\begin{bmatrix} 1 & 0 \\ 0 & -1 \end{bmatrix}$

D. None of these

Answer: A

Watch Video Solution

10. if A and B are symmetric matrices of same order then $(AB - BA)$ is :

A. Zero matrix

B. identity matrix

C. skew symmetric matrix

D. symmetric matrix

Answer: C

Watch Video Solution

Watch Video Solution

Exercise 3 F

1. If $F(x) = \begin{bmatrix} \cos^2 x & \cos x \sin x \\ \cos x \sin x & \sin^2 x \end{bmatrix}$ and the difference of x and y is the odd Multiple of $\frac{\pi}{2}$, then $F(x)F(y)$is :

A. Zero matrix

B. unit matrix

C. diagonal matrix

D. None of these

Answer: B

Watch Video Solution

2. If $A = \begin{bmatrix} a & b \\ b & a \end{bmatrix}$ and $A^2 = \begin{bmatrix} \alpha & \beta \\ \beta & \alpha \end{bmatrix}$ then

A. $\alpha = a^2 - b^2, \beta = 2ab$

B. $\alpha = 2ab, \beta = a^2 + b^2$

C. $\alpha = a^2 + b^2, \beta = 2ab$

D. $\alpha = 2ab, \beta = a^2 - b^2$

Answer: C

Watch Video Solution

3. if $\begin{bmatrix} 2 & 1 \\ 3 & 2 \end{bmatrix} A \begin{bmatrix} -3 & 2 \\ 5 & -3 \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$, then $A = ?$

A. $\begin{bmatrix} 0 & 1 \\ 1 & 1 \end{bmatrix}$

B. $\begin{bmatrix} 1 & 1 \\ 1 & 0 \end{bmatrix}$

C. $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

D. None of these

Answer: B

Watch Video Solution

4. If A and B are square matrices of same order, then which of the following is true -

A. A-B = B-A

B. A+B = B-A

C. A+B = B+A

D. None of these

Answer: B

Watch Video Solution

5. $A,\ B$ are two matrices such that AB and $A+B$ are both defined; show that $A,\ B$ are square matrices of the same order.

A. the order of A and B are not same necessarily,

B. No. of columns in $A = N \odot$ of rows in B.

C. A and B are square matrices of same order.

D. No. of rows in A=No. Of columns in B.

Answer: C

Watch Video Solution

6. if $A = \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}, \text{then} A^4 = ?$

A. $\begin{bmatrix} 1 & 1 \\ 0 & 0 \end{bmatrix}$

B. $\begin{bmatrix} 0 & 1 \\ 0 & 1 \end{bmatrix}$

C. $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

D. None of these

Answer: C

Watch Video Solution

7. if $A = \begin{bmatrix} 4 & x+2 \\ 2x-3 & x+1 \end{bmatrix}$ is symmetric, then x is equal to

A. 2

B. 3

C. 4

D. 5

Answer: D

Watch Video Solution

8. about to only mathematics

A. 2AB

B. 2BA

C. A+B

D. AB

Answer: C

Watch Video Solution

9. If A is a skew-symmetric matrix and n is odd positive integer, then A^n is

A. a skew symmertric matrix

B. a symmetric matrix

C. a zero matrix

D. None of these

Answer: A

Watch Video Solution

10. If A is a symmetric matrixfand $n \in N$, then A^n is

A. a skew symmetric matrix

B. a symmetric matrix

C. a zero matrix

D. None of these

Answer: B

Watch Video Solution

Exercise 3 1

1. in the matrix $a = \begin{bmatrix} 2 & 5 & 19 & -7 \\ 35 & -2 & \frac{5}{2} & 12 \\ \sqrt{3} & 1 & -5 & 17 \end{bmatrix}$, write:

(i) the order of the matrix,

(ii) the number of elements ,

(iii) write the elements ,$a_{13}, a_{21}, a_{33}, a_{24}, a_{23}$.

Watch Video Solution

2. If a matrix has 24 elements, what are the possible orders it can have?

What, if it has 13 elements?

Watch Video Solution

3. If a matrix has 18 elements, what are the possible orders it can have?

What, if it has 5 elements?

Watch Video Solution

4. Construst a 2×2 matrix ,A=[a_{ij}], whose elements are given by :

$(i) a_{ij} = \frac{(i+j)^2}{2} (ii) a_{ij} = \frac{i}{j}$

$(iii) a_{ij} = \frac{(i+2j)^2}{2}$

Watch Video Solution

5. Construct a 3×4matrix, whose elements are given by:(i) $a_{ij} = \frac{1}{2}|-3i+j|$ (ii) $a_{ij} = 2i - j$

Watch Video Solution

6. find the values of x,y and zfrom the following equations :

$$(i)\begin{bmatrix} 4 & 3 \\ x & 5 \end{bmatrix} = \begin{bmatrix} y & z \\ 1 & 5 \end{bmatrix}$$

$$(ii)\begin{bmatrix} x+y & 2 \\ 5+z & xy \end{bmatrix} = \begin{bmatrix} 6 & 2 \\ 5 & 8 \end{bmatrix}$$

$$(iii)\begin{bmatrix} x+y+z \\ x+z \\ y+z \end{bmatrix} = \begin{bmatrix} 9 \\ 5 \\ 7 \end{bmatrix}$$

Watch Video Solution

7. Find the value of a, b, c and d from the equation: $[[a-b], [2a+c][2a-b, 3c+d]] = \begin{bmatrix} -1 & 5 \\ 0 & 13 \end{bmatrix}$

Watch Video Solution

8. A square matrix $A = [a_{ij}]$ in which $a_{ij} = 0$ for $i \neq j$ and $[a]_{ij} = k$ (constant) for $i = j$ is called a

A. unit matrix

B. scalar matrix

C. null matrix

D. diagonal matrix

Answer: B

Watch Video Solution

9. Which of the given values of x and y make the following pair of matrices equal $[3x + 75y + 12 - 3x], [0y - 284]$ (a) $x = \frac{-1}{3}, y = 7$ (b) Not possible to find (c) $y = 7, x = \frac{-2}{3}$ (d) $x = \frac{-1}{3}, y = \frac{-2}{3}$

Watch Video Solution

10. The number of all possible matrices of order 3×3 with each entry 0 or 1 is:

A. 27

B. 28

C. 81

D. 512

Answer: D

Watch Video Solution

Exercise 3 2

1. $A = \begin{bmatrix} 2 & 4 \\ 3 & 2 \end{bmatrix}, B = \begin{bmatrix} 1 & 3 \\ -2 & 5 \end{bmatrix}, C = \begin{bmatrix} -2 & 5 \\ 3 & 4 \end{bmatrix}$

find each of the following :

(i) A+B (ii) A-B

(iii) 3A-C (iv) AB

(V) BA

Watch Video Solution

2. compute the following :

$$(i)\begin{bmatrix} a & b \\ -b & a \end{bmatrix} + \begin{bmatrix} a & b \\ b & a \end{bmatrix}$$

$$(ii)\begin{bmatrix} a^2+b^2 & b^2+c^2 \\ a^2+c^2 & a^2+b^2 \end{bmatrix} + \begin{bmatrix} 2ab & 2bc \\ -2ac & -2ab \end{bmatrix}$$

$$(iii)\begin{bmatrix} -1 & 4 & -6 \\ 8 & 5 & 16 \\ 2 & 8 & 5 \end{bmatrix} + \begin{bmatrix} 12 & 7 & 6 \\ 8 & 0 & 5 \\ 3 & 2 & 4 \end{bmatrix}$$

$$(iv)\begin{bmatrix} \cos^2 x & \sin^2 x \\ \sin^2 x & \cos^2 x \end{bmatrix} + \begin{bmatrix} \sin^2 & \cos^2 x \\ \cos^2 x & \sin^2 x \end{bmatrix}$$

Watch Video Solution

3. compute the indicated products .

$$(i)\begin{bmatrix} a & b \\ -b & a \end{bmatrix}\begin{bmatrix} a & -b \\ b & a \end{bmatrix} (ii)\begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}\begin{bmatrix} 2 & 3 & 4 \end{bmatrix} \quad (iii)\begin{bmatrix} 1 & -2 \\ 2 & 3 \end{bmatrix}\begin{bmatrix} 1 & 2 & 3 \\ 2 & 3 & 1 \end{bmatrix}$$

$(iv)\begin{bmatrix}2 & 3 & 4\\3 & 4 & 5\\4 & 5 & 6\end{bmatrix}\begin{bmatrix}1 & -3 & 5\\0 & 2 & 4\\3 & 0 & 5\end{bmatrix}$ (V) $\begin{bmatrix}2 & 1\\3 & 2\\-1 & 1\end{bmatrix}\begin{bmatrix}1 & 0 & 1\\-1 & 2 & 1\end{bmatrix}$ (vi) $\begin{bmatrix}3 & -1 & 3\\-1 & 0 & 2\end{bmatrix}\begin{bmatrix}2 & -3\\1 & 0\\3 & 1\end{bmatrix}$

Watch Video Solution

4.

if $A=\begin{bmatrix}1 & 2 & -3\\5 & 0 & 2\\1 & -1 & 1\end{bmatrix}, B=\begin{bmatrix}3 & -1 & 2\\4 & 2 & 5\\2 & 0 & 3\end{bmatrix}$ and $c=\begin{bmatrix}4 & 1 & 2\\0 & 3 & 2\\1 & -2 & 3\end{bmatrix}$,

then compure (A+B) and (B-C), Also , verify that A+(B-C)=(A+B)-C.`

Watch Video Solution

5. If $A=\begin{bmatrix}\frac{2}{3} & 1 & \frac{5}{3}\\\frac{1}{3} & \frac{2}{3} & \frac{4}{3}\\\frac{7}{3} & 2 & \frac{2}{3}\end{bmatrix}$ and $B=\begin{bmatrix}\frac{2}{3} & \frac{3}{5} & 1\\\frac{1}{5} & \frac{2}{5} & \frac{4}{5}\\\frac{7}{3} & \frac{6}{5} & \frac{2}{5}\end{bmatrix}$, then compute $3A-5B$

.

Watch Video Solution

6. Simplify:

$$\cos\theta\begin{bmatrix}\cos\theta & \sin\theta\\ -\sin\theta & \cos\theta\end{bmatrix}+\sin\theta\begin{bmatrix}\sin\theta & -\cos\theta\\ \cos\theta & \sin\theta\end{bmatrix}$$

Watch Video Solution

7. Find X and Y, if(i) $X+Y=[7025]$and $X-Y=[3003]$(ii) $2X+3Y=[2340]$and $3X+2Y=[2-2-15]$

Watch Video Solution

8. Find X if $Y=[3,2,1,4]$ and $2X+Y=[1,0,-3,2]$.

Watch Video Solution

9. Find X and Y,if

$$2\begin{bmatrix}1 & 3\\ 0 & x\end{bmatrix}+\begin{bmatrix}y & 0\\ 1 & 2\end{bmatrix}=\begin{bmatrix}5 & 6\\ 1 & 8\end{bmatrix}$$

Watch Video Solution

Watch Video Solution

10. Solve the equation for x, y, z and t, if $2[x, z, y, t] + 3[1, -1, 0, 2] = 3[3, 5, 4, 6]$

Watch Video Solution

11. if $x\begin{bmatrix} 2 \\ 3 \end{bmatrix} + y\begin{bmatrix} -1 \\ 1 \end{bmatrix} = \begin{bmatrix} 10 \\ 5 \end{bmatrix}$, find the values of x and y.

Watch Video Solution

12. Given $3[xyzw] - [x6 - 12w] + [4x + yz + w3]$, find the values of x, y, z and w.

Watch Video Solution

13. If f(x) = $\begin{bmatrix} \cos x & -\sin x & 0 \\ \sin x & \cos x & 0 \\ 0 & 0 & 1 \end{bmatrix}$ then show f(x) . f(y) = f(x+y)

Watch Video Solution

14. Show that(i) $[5-167][2134] \neq [2134][5-167]$(ii) $[123010110][-1100-11234] \neq [-1100-11234][123010110]$

Watch Video Solution

15. If $f(x) = x^2 - 5x + 6$. Find $f(A)$, if $A = \begin{bmatrix} 2 & 0 & 1 \\ 2 & 1 & 3 \\ 1 & -1 & 0 \end{bmatrix}$.

Watch Video Solution

16. if $A = \begin{bmatrix} 1 & 0 & 2 \\ 0 & 2 & 1 \\ 2 & 0 & 3 \end{bmatrix}$, prove that $A^3 - 6A^2 + 7A + 2I = 0$

Watch Video Solution

Watch Video Solution

17. If A $A = [3 - 24 - 2]$and $I = [1001]$, find k so that $A^2 = kA - 2I$.

Watch Video Solution

18. Let $A = [0 - \tan(\alpha/2)\tan(\alpha/2)0]$ and I be the identity matrix of order 2. Show that $I + A = (I - A)[\cos\alpha - \sin\alpha\sin\alpha\cos\alpha]$.

Watch Video Solution

19. A trust fund has Rs. 30000 that must be invested in two different types of bonds. The first bond pays 5% interest per year, and the second bond pays 7% interest per year. Using matrix multiplication, determine how to divide Rs 30000 among the two types of bonds. If the trust fund must obtain an annual total interest of (i) Rs 1800 (ii) 2000.

Watch Video Solution

Watch Video Solution

20. The bookshop of a particular school has 10 dozen chemistry books, 8 dozen physics books, 10 dozen economics books. Their selling prices are Rs 80, Rs 60 and Rs 40 each respectively. Find the total amount the bookshop will receive from selling all

Watch Video Solution

21. the restriction on n, k and p so that PY +Wywill be defined are :

A. K=3,p=n

B. K is arbitrary , p=2

C. p is arobitray , k-3

D. $k = 2, p = 3$

Answer: A

Watch Video Solution

22. Assume X,Z are the matrices of order $2 \times n$,$2 \times p$ respectively. If $n = p$, then the order of the matrix $7X - 5Z$is:(A) $p \times 2$ (B) $2 \times n$ (C) $n \times 3$ (D) $p \times n$

A. $p \times 2$

B. $2 \times n$

C. $n \times 3$

D. $p \times n$

Answer: A

Watch Video Solution

Exercise 3 3

1. Find the transpose of each of the following matrices:(i) $\begin{bmatrix} 5 & 1 \\ 2 & 1 \end{bmatrix}$ (ii) $\begin{bmatrix} 1 & -1 \\ 2 & 3 \end{bmatrix}$ (iii) $\begin{bmatrix} -1 & 5 & 6 \\ \sqrt{3} & 5 & 6 \\ 2 & 3 & -1 \end{bmatrix}$

Watch Video Solution

2.

if $A = [(-1, 2, , 3), (5, 7, 9), (-2, 1, 1)]$ and $B = \begin{bmatrix} -4 & 1 & -5 \\ 1 & 2 & 0 \\ 1 & 3 & 1 \end{bmatrix}$,

then verify that $(I)(A+B)' = A' + B', (ii)(A-b)' = A' = B'$

Watch Video Solution

3. if $A' = \begin{bmatrix} 3 & 4 \\ -1 & 2 \\ 0 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} -1 & 2 & 1 \\ 1 & 2 & 3 \end{bmatrix}$, then verify that $(i)(A+B)' = A' + B'(ii)(A-B)' = A' - B'$

Watch Video Solution

4. If $A' = \begin{bmatrix} -2 & 3 \\ 1 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} -1 & 0 \\ 1 & 2 \end{bmatrix}$, find $[A + 2B]'$.

Watch Video Solution

5. For the matrices A and B, verify that (AB)'=B'A', where (i) $A = \begin{bmatrix} -1 \\ 4 \\ 3 \end{bmatrix}$,

$B = [-1 \quad 2 \quad 1]$

Watch Video Solution

6. If (i) $A = [\cos\alpha \sin\alpha - \sin\alpha \cos\alpha]$, then verify that $A'A = I$

. (ii) $A = [\sin\alpha \cos\alpha - \cos\alpha \sin\alpha]$, then verify that $A'A = I$.

Watch Video Solution

7. (i) Show that the matrix $A = \begin{bmatrix} 1 & -1 & 5 \\ -1 & 2 & 1 \\ 5 & 1 & 3 \end{bmatrix}$ is a symmetric matrix.

(ii) Show that the matrix $A - \begin{bmatrix} 0 & 1 & -1 \\ -1 & 2 & 1 \\ 1 & -1 & 0 \end{bmatrix}$ is a skew symmetric matrix.

Watch Video Solution

8. for the matrix $A = \begin{bmatrix} 1 & 5 \\ 6 & 7 \end{bmatrix}$, verify that :

(I) (A+A') is a symmetric matrix.

(ii) (A-A') is a skew symmetric matrix.

Watch Video Solution

9. Find $\frac{1}{2}(A + A')$and $\frac{1}{2}(A - A')$, when $A = [0ab - a0c - b - c0]$

Watch Video Solution

10. Express the following matrices as the sum of a symmetric and a skew symmetricmatrix:(i) $[351 - 1]$ (ii) $[6 - 22 - 23 - 12 - 13]$ (iii) $[33 - 1 - 2 - 21452]$ (iv) $[15 - 12]$

Watch Video Solution

11. If A and B are symmetric matrices of the same order then (A) A-B is skew symmetric (B) A+B is symmetric (C) AB-BA is skew symmetric (D) AB+BA is symmetric

A. skew symmetric matrix

B. symmetric symmetric matrix

C. zero matrix

D. identity matrix

Answer: A

Watch Video Solution

12. If $A = \begin{bmatrix} \cos\alpha & -\sin\alpha \\ \sin\alpha & \cos\alpha \end{bmatrix}$ then $A + A' = I$ then $\alpha =$

A. $\frac{\pi}{6}$

B. $\frac{\pi}{3}$

C. Π

D. $\frac{3\pi}{2}$

Answer: A

Watch Video Solution

Exercise 3 4

1. $\begin{bmatrix} 1 & -1 \\ 2 & 3 \end{bmatrix}$ find the inverse of matrix

Watch Video Solution

2. $\begin{bmatrix} 2 & 1 \\ 1 & 1 \end{bmatrix}$ find the inverse of matrix

Watch Video Solution

3. $\begin{bmatrix} 1 & 3 \\ 2 & 7 \end{bmatrix}$ find the inverse of matrix

Watch Video Solution

4. $\begin{bmatrix} 2 & 3 \\ 5 & 7 \end{bmatrix}$ find the inverse of the matrix

Watch Video Solution

5. Multiplicative inverse of the matrix $\begin{bmatrix} 2 & 1 \\ 7 & 4 \end{bmatrix}$ is (i) $\begin{bmatrix} 4 & -1 \\ -7 & -2 \end{bmatrix}$ (ii) $\begin{bmatrix} -4 & -1 \\ 7 & -2 \end{bmatrix}$ (iii) $\begin{bmatrix} 4 & -1 \\ 7 & 2 \end{bmatrix}$ (iv) $\begin{bmatrix} 4 & -1 \\ -7 & 2 \end{bmatrix}$

Watch Video Solution

6. $\begin{bmatrix} 2 & 5 \\ 1 & 3 \end{bmatrix}$ using elementary method find the inverse of the matrix

Watch Video Solution

7. $\begin{bmatrix} 3 & 1 \\ 5 & 2 \end{bmatrix}$ using elementry method find the inverse of matrix

Watch Video Solution

8. $\begin{bmatrix} 4 & 5 \\ 3 & 4 \end{bmatrix}$ find the inverse of matrix

Watch Video Solution

9. $\begin{bmatrix} 3 & 10 \\ 2 & 7 \end{bmatrix}$ find the inverse of matrix

Watch Video Solution

10. Using elementary transformations, find the inverse of the matrix $\begin{bmatrix} 3 & -1 \\ -4 & 2 \end{bmatrix}$

Watch Video Solution

11. $\begin{bmatrix} 2 & -6 \\ 1 & -2 \end{bmatrix}$ find inverse of matrix

Watch Video Solution

12. find inverse using elementary operations $\begin{bmatrix} 6 & -3 \\ -2 & 1 \end{bmatrix}$

Watch Video Solution

13. If $A = \begin{bmatrix} 2 & -3 \\ -1 & 2 \end{bmatrix}$ then $A^{-1} =$

A. $\begin{bmatrix} 2 & -3 \\ -1 & 2 \end{bmatrix}$

B. $\begin{bmatrix} 2 & 3 \\ 1 & 2 \end{bmatrix}$

C. $\begin{bmatrix} -1 & 2 \\ 2 & -3 \end{bmatrix}$

D. $\begin{bmatrix} 1 & 2 \\ 2 & 3 \end{bmatrix}$

Answer: B

Watch Video Solution

14. $\begin{bmatrix} 2 & 1 \\ 4 & 2 \end{bmatrix}$ find the inverse of matrix

Watch Video Solution

15. Using elementary transformations find the inverse of the following matrices $\begin{bmatrix} 2 & -3 & 3 \\ 2 & 2 & 3 \\ 3 & -2 & 2 \end{bmatrix}$

Watch Video Solution

16. Using elementary transformations, find the inverse of the matrix

$(13 - 2 - 30 - 1210)$

Watch Video Solution

17. Using elementary transformations, find the inverse of the matrices

$$A = \begin{bmatrix} 2 & 0 & -1 \\ 5 & 1 & 0 \\ 0 & 1 & 3 \end{bmatrix} A^{-1} = ?$$

Watch Video Solution

18. Matrices A and B will be inverse of each other only if

A. AB=BA

B. AB=BA=O

C. AB=O,BA=I

D. AB+BA=I

Answer: A

Watch Video Solution

Miscellaneous Exerice

1. Let $A = [0100]$show that $(aI + bA)^n = a^n I + na^{n-1}bA$, where I is the identitymatrix of order 2 and $n \in N$.

Watch Video Solution

2. If $A = [111111111]$, then prove that $A^n = \left[3^{n-1}3^{n-1}3^{n-1}3^{n-1}3^{n-1}3^{n-1}3^{n-1}3^{n-1}3^{n-1}\right]$ for every positive integer n.

Watch Video Solution

3. If A= $\begin{bmatrix} 3 & -4 \\ 1 & -1 \end{bmatrix}$, then prove that $A^n = \begin{bmatrix} 1+2n & -4n \\ n & 1-2n \end{bmatrix}$, where n is any positive integer.

Watch Video Solution

4. If A and B are symmetric matrices, prove that AB BA is a skew symmetric matrix.

Watch Video Solution

5. Show that the matrix $B^T AB$ is symmetric or skew-symmetric according as A is symmetric or skew-symmetric.

Watch Video Solution

6. Find the values of x, y, z if the matrix $A = [02yzxy - zx - yz]$ satisfy the equation $A'A = I$.

Watch Video Solution

7. for what values of x:

$$\begin{bmatrix} 1 & 2 & 1 \end{bmatrix} \begin{bmatrix} 1 & 2 & 0 \\ 2 & 0 & 1 \\ 1 & 0 & 2 \end{bmatrix} \begin{bmatrix} 0 \\ 2 \\ x \end{bmatrix} = 0?$$

Watch Video Solution

8. If $A = [3112]$, show that $A^2 - 5A + 71 = 0$. Hence find A^{-1}.

Watch Video Solution

9. find x, if

$$\begin{bmatrix} x & -5 & -1 \end{bmatrix} \begin{bmatrix} 1 & 0 & 2 \\ 0 & 2 & 1 \\ 2 & 0 & 3 \end{bmatrix} \begin{bmatrix} x \\ 4 \\ 1 \end{bmatrix} = 0$$

Watch Video Solution

10. A manufacturer produces three products x, y, z which he sells in two markets. Annual sales are indicated below: Market Products I 10.000 2.000 18.000 II 6.000 20.000 8.000 (a) If unit sale prices of x, y and z are Rs 2.50, Rs 1.50 and Rs 1.0

Watch Video Solution

11. Find the matrix X so that $X\begin{bmatrix}1 & 2 & 3\\4 & 5 & 6\end{bmatrix}=\begin{bmatrix}-7 & -8 & -9\\2 & 4 & 6\end{bmatrix}$

Watch Video Solution

12. If A and B are square matrices of the same order such that $AB=BA$, then prove by induction that $AB^n=B^nA$. Further prove that $(AB)^n=A^nB^n$ for all $n\in N$.

Watch Video Solution

13. If $A = \begin{bmatrix} \alpha & \beta \\ \gamma & \alpha \end{bmatrix}$ is such that $A^2 = I$, then $1 + \alpha^2 + \beta\gamma = 0$ (b) $1 - \alpha^2 + \beta\gamma = 0$ (c) $1 - \alpha^2 - \beta\gamma = 0$ (d) $1 + \alpha^2 - \beta\gamma = 0$

A. $1 + \alpha^2 + \beta\gamma = 0$

B. $1 - \alpha^2 + \beta\gamma = 0$

C. $1 - \alpha^2 - \beta\gamma = 0$

D. $1 + \alpha^2 - \beta\gamma = 0$

Answer: A

Watch Video Solution

14. A matrix which is both symmetric as well as skew-symmetric is

A. A is a diagonal matrix

B. A is a zero matrix

C. A is a square matrix

D. None of the above

Answer: B

Watch Video Solution

15. If A is a square matrix such that $A^2 = A$, then $(I + A)^3 - 7A$ is equal to

A. A

B. I-A

C. I

D. 3A

Answer: A

Watch Video Solution