PARISHRAM 2026

Mathematics

Matrices

DPP: 3

Q1 If $A = \begin{bmatrix} 1 & 2 & 3 \\ 9 & 10 & 11 \end{bmatrix}$ and $B = \begin{bmatrix} 0 & 5 & 0 \\ 5 & 0 & 5 \end{bmatrix}$, then find A + B.

(A) $A + B = \begin{bmatrix} 1 & 7 & 3 \\ 11 & 10 & 16 \end{bmatrix}$
(B) $A + B = \begin{bmatrix} 1 & 7 & 3 \\ 14 & 11 & 13 \end{bmatrix}$
(C) $A + B = \begin{bmatrix} 1 & 7 & 3 \\ 14 & 10 & 16 \end{bmatrix}$
(D) $A + B = \begin{bmatrix} 1 & 5 & 3 \\ 14 & 10 & 16 \end{bmatrix}$

Q2 If $A + B = \begin{bmatrix} 6 & 7 \\ 5 & 0 \end{bmatrix}$ and $A = \begin{bmatrix} 2 & 5 \\ 1 & -1 \end{bmatrix}$. Find the matrix B.

(A) $B = \begin{bmatrix} 4 & 1 \\ 2 & 4 \end{bmatrix}$
(B) $B = \begin{bmatrix} 4 & 2 \\ 4 & 1 \end{bmatrix}$
(C) $B = \begin{bmatrix} 4 & 1 \\ 4 & 2 \end{bmatrix}$
(D) $B = \begin{bmatrix} 4 & 4 \\ 4 & 2 \end{bmatrix}$

Q3 Find AB if $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 5 \\ 3 & 2 \end{bmatrix}$

(A) $AB = \begin{bmatrix} 15 & 23 \\ 9 & 7 \end{bmatrix}$
(B) $AB = \begin{bmatrix} 9 & 7 \\ 23 & 15 \end{bmatrix}$
(C) $AB = \begin{bmatrix} 7 & 9 \\ 15 & 23 \end{bmatrix}$
(D) $AB = \begin{bmatrix} 7 & 9 \\ 23 & 15 \end{bmatrix}$

Q4 If A and B are matrices such that AB is defined, which of the following must be true?

(A) Number of columns in A = number of rows in B
(B) Number of rows in A = number of rows in B
(C) Number of columns in B = number of rows in A
(D) Number of rows in A = number of columns in B

Q5 If $A = \begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix}$, then what is A^3 equal to?

(A) $\begin{bmatrix} \cos 3\theta & \sin 3\theta \\ -\sin 3\theta & \cos 3\theta \end{bmatrix}$
(B) $\begin{bmatrix} \cos^3\theta & \sin^3\theta \\ -\sin^3\theta & \cos^3\theta \end{bmatrix}$
(C) $\begin{bmatrix} \cos 3\theta & -\sin 3\theta \\ \sin 3\theta & \cos 3\theta \end{bmatrix}$
(D) $\begin{bmatrix} \cos^3\theta & -\sin^3\theta \\ \sin^3\theta & \cos^3\theta \end{bmatrix}$

Q6 If $A = \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$, then the value of A^4 is

(A) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$
(B) $\begin{bmatrix} 1 & 1 \\ 0 & 0 \end{bmatrix}$
(C) $\begin{bmatrix} 0 & 0 \\ 1 & 1 \end{bmatrix}$
(D) $\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$

Q7 Consider the following in respect of the matrix $A = \begin{pmatrix} -1 & 1 \\ 1 & -1 \end{pmatrix}$:

1. $A^2 = -A$
2. $A^3 = 4A$

Which of the above is/are correct?

(A) 1 only
(B) 2 only
(C) Both 1 and 2
(D) Neither 1 or 2

Q8 If $X = \begin{bmatrix} 3 & -4 \\ 1 & -1 \end{bmatrix}, B = \begin{bmatrix} 5 & 2 \\ -2 & 1 \end{bmatrix}$ and $A = \begin{bmatrix} p & q \\ r & s \end{bmatrix}$ satisfy the equation AX = B, then the matrix A is equal to

(A) $\begin{bmatrix} -7 & 26 \\ 1 & -5 \end{bmatrix}$
(B) $\begin{bmatrix} 7 & 26 \\ 4 & 17 \end{bmatrix}$

(C) $\begin{bmatrix} -7 & -4 \\ 26 & 13 \end{bmatrix}$

(D) $\begin{bmatrix} -7 & 26 \\ -6 & 23 \end{bmatrix}$

Q9 $A = \begin{bmatrix} x+y & y \\ 2x & x-y \end{bmatrix}, B = \begin{bmatrix} 2 \\ -1 \end{bmatrix}$ and

$C = \begin{bmatrix} 3 \\ 2 \end{bmatrix}$

If AB = C, then what is A^2 equal to?

(A) $\begin{bmatrix} 6 & -10 \\ 4 & 26 \end{bmatrix}$

(B) $\begin{bmatrix} -10 & 5 \\ 4 & 24 \end{bmatrix}$

(C) $\begin{bmatrix} -5 & -6 \\ -4 & -20 \end{bmatrix}$

(D) $\begin{bmatrix} -5 & -7 \\ -5 & 20 \end{bmatrix}$

Q10 If $A = \begin{pmatrix} 4 & x+2 \\ 2x-3 & x+1 \end{pmatrix}$ is symmetric, then what is x equal to?

(A) 2 (B) 3

(C) –1 (D) 5

Answer Key

Q1	C
Q2	B
Q3	C
Q4	A
Q5	A
Q6	A
Q7	B
Q8	A
Q9	A
Q10	D

Hints & Solutions

Note: scan the QR code to watch video solution

Q1 Text Solution:

Given that, $A = \begin{bmatrix} 1 & 2 & 3 \\ 9 & 10 & 11 \end{bmatrix}$ and

$B = \begin{bmatrix} 0 & 5 & 0 \\ 5 & 0 & 5 \end{bmatrix}$

Then $A + B = \begin{bmatrix} 1+0 & 2+5 & 3+0 \\ 9+5 & 10+0 & 11+5 \end{bmatrix}$.

$= \begin{bmatrix} 1 & 7 & 3 \\ 14 & 10 & 16 \end{bmatrix}$

Video Solution:

Q2 Text Solution:

Given that, $A + B = \begin{bmatrix} 6 & 7 \\ 5 & 0 \end{bmatrix}$ and

$A = \begin{bmatrix} 2 & 5 \\ 1 & -1 \end{bmatrix}$

$\Rightarrow B = \left(A + B\right) - A = \begin{bmatrix} 6 & 7 \\ 5 & 0 \end{bmatrix}$

$- \begin{bmatrix} 2 & 5 \\ 1 & -1 \end{bmatrix}$

$B = \begin{bmatrix} 4 & 2 \\ 4 & 1 \end{bmatrix}$

Video Solution:

Q3 Text Solution:

Given that, $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 5 \\ 3 & 2 \end{bmatrix}$

Then, $AB = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} \begin{bmatrix} 1 & 5 \\ 3 & 2 \end{bmatrix}$

$= \begin{bmatrix} 1 \times 1 + 2 \times 3 & 1 \times 5 + 2 \times 2 \\ 3 \times 1 + 4 \times 3 & 3 \times 5 + 4 \times 2 \end{bmatrix}$

$= \begin{bmatrix} 7 & 9 \\ 15 & 23 \end{bmatrix}$

Video Solution:

Q4 Text Solution:

Matrix multiplication AB is defined only when the number of columns of A = number of rows of B.

Video Solution:

Q5 Text Solution:

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

We know, $A^n = \begin{bmatrix} \cos n\theta & \sin n\theta \\ -\sin n\theta & \cos n\theta \end{bmatrix}$

$\therefore A^3 = \begin{bmatrix} \cos 3\theta & \sin 3\theta \\ -\sin 3\theta & \cos 3\theta \end{bmatrix}$

Video Solution:

Q6 Text Solution:

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

$$A^4 = A^2 \cdot A^2$$

$$= \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix} \cdot \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$$

$$= \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} \cdot \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

$$= \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

Video Solution:

Q7 Text Solution:

$$A = \begin{bmatrix} -1 & 1 \\ 1 & -1 \end{bmatrix}$$

$$A \cdot A = \begin{bmatrix} -1 & 1 \\ 1 & -1 \end{bmatrix}\begin{bmatrix} -1 & 1 \\ 1 & -1 \end{bmatrix}$$

$$= \begin{bmatrix} 2 & -2 \\ -2 & 2 \end{bmatrix} = -2\begin{bmatrix} -1 & 1 \\ 1 & -1 \end{bmatrix}$$

$$A^2 = -2A$$

$$A^2, A = -2\begin{bmatrix} -1 & 1 \\ 1 & -1 \end{bmatrix}\begin{bmatrix} -1 & 1 \\ 1 & -1 \end{bmatrix}$$

$$= -2\begin{bmatrix} 2 & -2 \\ -2 & 2 \end{bmatrix} = 4\begin{bmatrix} -1 & 1 \\ 1 & -1 \end{bmatrix}$$

$$A^3 = 4A$$

Hence $A^2 \neq -A, A^3 = 4A$

Video Solution:

Q8 Text Solution:

$$X = \begin{bmatrix} 3 & -4 \\ 1 & -1 \end{bmatrix}, B = \begin{bmatrix} 5 & 2 \\ -2 & 1 \end{bmatrix}$$ and

$$A = \begin{bmatrix} p & q \\ r & s \end{bmatrix}$$

Now, AX = B

$$\begin{bmatrix} p & q \\ r & s \end{bmatrix}\begin{bmatrix} 3 & -4 \\ 1 & -1 \end{bmatrix} = \begin{bmatrix} 5 & 2 \\ -2 & 1 \end{bmatrix}$$

$$\Rightarrow \begin{bmatrix} 3p + q & -4p - q \\ 3r + s & -4r - s \end{bmatrix} = \begin{bmatrix} 5 & 2 \\ -2 & 1 \end{bmatrix}$$

3p + q = 5 ....(i)

–4p – q = 2 ....(ii)

3r + s = –2 ....(iii)

–4r – s = 1 ....(iv)

From equations (i) and (ii), we get –p = 7

∴ p = –7

⇒ q = 5 – 3(–7)

q = 26

From

(iii) and (iv),

-r = –1

∴ r = 1

⇒ s = –2 – 3 = –5

∴ s = –5

Hence, $A = \begin{bmatrix} p & q \\ r & s \end{bmatrix} = \begin{bmatrix} -7 & 26 \\ 1 & -5 \end{bmatrix}$

∴ Option (A) is correct

Video Solution:

Q9 Text Solution:

$$A = \begin{bmatrix} x + y & y \\ 2x & x - y \end{bmatrix}$$

$$B = \begin{bmatrix} 2 \\ -1 \end{bmatrix} \text{ and } C = \begin{bmatrix} 3 \\ 2 \end{bmatrix}$$

Here AB = C

$$\therefore \begin{bmatrix} x + y & y \\ 2x & x - y \end{bmatrix}\begin{bmatrix} 2 \\ -1 \end{bmatrix} = \begin{bmatrix} 3 \\ 2 \end{bmatrix}$$

$$\Rightarrow \begin{bmatrix} 2(x+y) & -y \\ 4x & -x+y \end{bmatrix} = \begin{bmatrix} 3 \\ 2 \end{bmatrix}$$

2x + y = 3 ....(i)

3x + y = 2 ....(ii)

From equations (i) and (ii), we get x = –1 and y = 5

$$\therefore A = \begin{bmatrix} 4 & 5 \\ -2 & -6 \end{bmatrix}$$

Now, $A^2 = \begin{bmatrix} 4 & 5 \\ -2 & -6 \end{bmatrix} \begin{bmatrix} 4 & 5 \\ -2 & -6 \end{bmatrix}$

$$= \begin{bmatrix} 16-10 & 20-30 \\ -8+12 & -10+36 \end{bmatrix} = \begin{bmatrix} 6 & -10 \\ 4 & 26 \end{bmatrix}$$

$\therefore$ Option (A) is correct.

Video Solution:

Q10 Text Solution:

$$\because A = A'$$

$$\Rightarrow \begin{pmatrix} 4 & x+2 \\ 2x-3 & x+1 \end{pmatrix} = \begin{pmatrix} 4 & 2x-3 \\ x+2 & x+1 \end{pmatrix}$$

$$\Rightarrow 2x-3 = x+2$$

$$\therefore x = 5$$

Video Solution: