PARISHRAM 2026
MATHS
MATRICES

DPP: 5

Q1 1. If $A = \begin{bmatrix} 1 & 2 \\ 2 & 3 \end{bmatrix}$, then matrix A is:
(A) Skew-Symmetric
(B) Symmetric
(C) Identity Matrix
(D) Diagonal Matrix

Q2 Which of the following is always true for any square matrix A?
(A) A + A^T is symmetric
(B) A - A^T is symmetric
(C) A + A^T is skew-symmetric
(D) A = A^T

Q3 A skew-symmetric matrix has all diagonal elements equal to:
(A) 1
(B) 0
(C) Any real number
(D) Equal to each other

Q4 Let A be a square matrix. Then A - A^T is always:
(A) Symmetric (B) Skew-Symmetric
(C) Diagonal (D) Scalar

Q5 Let $A = \begin{bmatrix} 0 & 2 & -3 \\ -2 & 0 & 4 \\ 3 & -4 & 0 \end{bmatrix}$. Then A is:
(A) Skew-symmetric (B) Symmetric
(C) Identity (D) None

Q6 Let $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$.Find symmetric matrix S such that $S = \frac{1}{2}\left(A + A^T\right)$
(A) $\begin{bmatrix} 1 & 2.5 \\ 2.5 & 4 \end{bmatrix}$ (B) $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$
(C) $\begin{bmatrix} 1 & 1 \\ 1 & 4 \end{bmatrix}$ (D) $\begin{bmatrix} 2 & 2.5 \\ 2.5 & 2 \end{bmatrix}$

Q7 If A is symmetric and B is skew-symmetric of same order, then A + B is:
(A) Symmetric
(B) Skew-symmetric
(C) Not symmetric nor skew-symmetric
(D) Diagonal

Q8 If $A = \begin{bmatrix} -1 & 7 \\ 2 & 3 \end{bmatrix}$, then skew-symmetric part of A is -
(A) $\begin{bmatrix} -1 & 9/2 \\ -9/2 & 3 \end{bmatrix}$ (B) $\begin{bmatrix} 0 & -5/2 \\ 5/2 & 0 \end{bmatrix}$
(C) $\begin{bmatrix} -1 & -9/2 \\ 9/2 & 3 \end{bmatrix}$ (D) $\begin{bmatrix} 0 & 5/2 \\ -5/2 & 0 \end{bmatrix}$

Q9 Let A be a symmetric matrix. Then which of the following is always true?
(A) A^2 is skew-symmetric
(B) A^2 is symmetric
(C) A^2 is diagonal
(D) A^2 = 0

Q10 If A is any square matrix, define $S = \frac{1}{2}\left(A + A^T\right),\ K = \frac{1}{2}\left(A - A^T\right)$.
Then:
(A) A = S × K
(B) A = S - K
(C) A = S + K
(D) A = SK

Answer Key

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

Hints & Solutions

Note: scan the QR code to watch video solution

Q1 Text Solution:

A matrix is symmetric if $A^T = A$.

Here,

$$A^T = \begin{bmatrix} 1 & 2 \\ 2 & 3 \end{bmatrix} = A$$

Hence, A is symmetric.

Video Solution:

Q2 Text Solution:

$A + A^T$ is symmetric

Solution:

Let $B = A + A^T$. Then

$$B^T = \left(A + A^T\right)^T = A^T + \left(A^T\right)^T = A^T + A = B$$

So, B is symmetric.

Video Solution:

Q3 Text Solution:

In skew-symmetric matrix, $A^T = -A$

So $a_{ii} = -a_{ii} \Rightarrow 2a_{ii} = 0 \Rightarrow a_{ii} = 0$

Video Solution:

Q4 Text Solution:

$$\left(A - A^T\right)^T = A^T - A = -\left(A - A^T\right)$$

So it is skew-symmetric.

Video Solution:

Q5 Text Solution:

$A^T = -A$, and diagonals are 0.

Video Solution:

Q6 Text Solution:

$$A^T = \begin{bmatrix} 1 & 3 \\ 2 & 4 \end{bmatrix}$$

Add: $A + A^T = \begin{bmatrix} 2 & 5 \\ 5 & 8 \end{bmatrix}$

Divide by 2: $\begin{bmatrix} 1 & 2.5 \\ 2.5 & 4 \end{bmatrix}$

Video Solution:

Q7 Text Solution:

In general,

$$(A + B)^T = A^T + B^T = A - B \neq A + B$$

Video Solution:

Q8 **Text Solution:**

Let $A = B + C, where\ B = \frac{1}{2}\left(A + A^{\top}\right)\ and\ C = \frac{1}{2}\left(A - A^{\top}\right)$ are respectively symmetric and skewsymmetric parts of A.

$$\text{Now } C = \frac{1}{2}\left\{\begin{bmatrix} -1 & 7 \\ 2 & 3 \end{bmatrix} - \begin{bmatrix} -1 & 2 \\ 7 & 3 \end{bmatrix}\right\}$$

$$= \frac{1}{2}\begin{bmatrix} 0 & 5 \\ -5 & 0 \end{bmatrix} = \begin{bmatrix} 0 & 5/2 \\ -5/2 & 0 \end{bmatrix}$$

Video Solution:

Q9 **Text Solution:**

If A = A^T, then

$$\left(A^2\right)^T = \left(A \cdot A\right)^T = A^T \cdot A^T = A \cdot A$$

$$= A^2$$

So A^2 is also symmetric.

Video Solution:

Q10 **Text Solution:**

This is the standard decomposition:

Any square matrix = symmetric part + skew-symmetric part.

Video Solution: