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SYIT Semester-3

Applied Maths Unit-1

Question Bank

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1. If $A = \begin{bmatrix} 3 & -5 \\ -4 & 2 \end{bmatrix}$ Show that $A^2 - 5A - 14I = 0$

2. $A = \begin{bmatrix} 4 & -1 & -4 \\ 3 & 0 & -4 \\ 3 & -1 & -3 \end{bmatrix}$, show that $A^2 = I$

3. Find the inverse of given matrices

   (a) $\begin{bmatrix} 4 & 1 \\ 2 & 3 \end{bmatrix}$

   (b) $\begin{bmatrix} 1 & 2 & 5 \\ 1 & -1 & -1 \\ 2 & 3 & -1 \end{bmatrix}$

   (c) $\begin{bmatrix} 2 & -3 & 3 \\ 2 & 2 & 3 \\ 3 & -2 & 2 \end{bmatrix}$

   Great start! Each problem you solve builds your mathematical muscles. Keep going!

4. If $A = \begin{bmatrix} 2 & 3 \\ 5 & -2 \end{bmatrix}$, show that $A^2 + 3A + I = 0$ and hence find A^{-1}.

5. Use matrix method to show that the following system of equations is inconsistent: $3x - y + 2z = 3; 2x + y + 3z = 5; x - 2y - z = 1$

6. Write $A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$ as sum of symmetric and skew symmetric matrix.

You're making excellent progress! Remember, every challenge you overcome makes you stronger in mathematics.

7. Write $A = \begin{bmatrix} 1 & -1 & 3 \\ 2 & 4 & 6 \\ 5 & 2 & 1 \end{bmatrix}$ as sum of symmetric and skew symmetric matrix.

8. Find eigenvalues and eigenvectors of $A = \begin{bmatrix} 2 & 3 \\ 5 & -2 \end{bmatrix}$.

9. Find eigenvalues of $A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & -1 & 2 \\ 2 & 0 & 0 \end{bmatrix}$

Impressive work! You're unraveling the mysteries of matrices. The next set is waiting for your brilliant mind!

10. Find the rank of matrix A by using the row echelon form.

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

11. Find the rank of the given matrix.

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 3 & 4 \\ 3 & 5 & 7 \end{bmatrix}$$

12. Find the rank of the 2×2 matrix

$$B = \begin{bmatrix} 5 & 6 \\ 7 & 8 \end{bmatrix}$$

You're on a roll! Your dedication to mastering these concepts is admirable. Just one more to go!

13.

$$A = \begin{bmatrix} 4 & 7 \\ 8 & 14 \end{bmatrix}$$

Find the rank of matrix A.

Congratulations on completing all the questions! Your persistence in tackling these matrix problems shows real mathematical prowess. Be proud of your achievement!