



MATHS

BOOKS - CENGAGE

MATRICES

Test Yourself Level 1

1. From newspapers or magazines write some examples of information in form



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2. State the order of the following matrices

$$\begin{pmatrix} 1 & 2 & 3 \\ -4 & 6 & 7 \end{pmatrix}$$



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3. State the order of the following matrices

$$\begin{pmatrix} 7 \\ 8 \end{pmatrix}$$



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4. State the order of the following matrices

$$(3 \ 7 \ 8 \ 9)$$



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5. State the order of the following matrices

$$\begin{pmatrix} 1 & 2 \\ 3 & 4 \\ 5 & 6 \\ 7 & 9 \end{pmatrix}$$



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6. State the order of the following matrices

$$\begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{pmatrix}$$



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7. State the order of the following matrices

$$\begin{pmatrix} 0 & 1 & 0 & 1 \\ 1 & 0 & 1 & 1 \\ 1 & 0 & 0 & 1 \\ 0 & 0 & 0 & 1 \end{pmatrix}$$





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8. Which of the matrices in Q. 2 may be called row vectors or column vectors ?



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9. Show o a diagram, vectors which may be represented by the following matrices :

$$\begin{pmatrix} 0 & 0 \end{pmatrix}$$



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10. Show o a diagram, vectors which may be represented by the following matrices :

$$\begin{pmatrix} 1 \\ \sqrt{3} \end{pmatrix}$$



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11. Show o a diagram, vectors which may be represented by the following matrices :

$$(1 \ 1 \ 1)$$



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12. Show o a diagram, vectors which may be represented by the following matrices :

$$\begin{pmatrix} 2 \\ 3 \\ 4 \end{pmatrix}$$



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13. Show o a diagram, vectors which may be represented by the following matrices :

$$\begin{pmatrix} 2 \\ -2 \\ -2 \end{pmatrix}$$



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14. The basic addition facts in the tens number system are given below :

+	0	1	2	3	4	5	6	7	8	9
0	0	1	2	3	4	5	6	7	8	9
1	1	2	3	4	5	6	7	8	9	10
2	2	3	4	5	6	7	8	9	10	11
3	3	4	5	6	7	8	9	10	11	12
4	4	5	6	7	8	9	10	11	12	13
5	5	6	7	8	9	10	11	12	13	14
6	6	7	8	9	10	11	12	13	14	15
7	7	8	9	10	11	12	13	14	15	16
8	8	9	10	11	12	13	14	15	16	17
9	9	10	11	12	13	14	15	16	17	18

What is the order of the matrix by addition results ?



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15. The basic addition facts in the tens number system are given below :

+	0	1	2	3	4	5	6	7	8	9
0	0	1	2	3	4	5	6	7	8	9
1	1	2	3	4	5	6	7	8	9	10
2	2	3	4	5	6	7	8	9	10	11
3	3	4	5	6	7	8	9	10	11	12
4	4	5	6	7	8	9	10	11	12	13
5	5	6	7	8	9	10	11	12	13	14
6	6	7	8	9	10	11	12	13	14	15
7	7	8	9	10	11	12	13	14	15	16
8	8	9	10	11	12	13	14	15	16	17
9	9	10	11	12	13	14	15	16	17	18

State entries in the leading diagonal



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16. The basic addition facts in the tens number system are given below :

+	0	1	2	3	4	5	6	7	8	9
0	0	1	2	3	4	5	6	7	8	9
1	1	2	3	4	5	6	7	8	9	10
2	2	3	4	5	6	7	8	9	10	11
3	3	4	5	6	7	8	9	10	11	12
4	4	5	6	7	8	9	10	11	12	13
5	5	6	7	8	9	10	11	12	13	14
6	6	7	8	9	10	11	12	13	14	15
7	7	8	9	10	11	12	13	14	15	16
8	8	9	10	11	12	13	14	15	16	17
9	9	10	11	12	13	14	15	16	17	18

Is the matrix symmetric ?



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17. The basic addition facts in the tens number system are given below :

+	0	1	2	3	4	5	6	7	8	9
0	0	1	2	3	4	5	6	7	8	9
1	1	2	3	4	5	6	7	8	9	10
2	2	3	4	5	6	7	8	9	10	11
3	3	4	5	6	7	8	9	10	11	12
4	4	5	6	7	8	9	10	11	12	13
5	5	6	7	8	9	10	11	12	13	14
6	6	7	8	9	10	11	12	13	14	15
7	7	8	9	10	11	12	13	14	15	16
8	8	9	10	11	12	13	14	15	16	17
9	9	10	11	12	13	14	15	16	17	18

If the typical element is denoted by a_{ij} , what are the following

$a_{1,6}$, $a_{3,7}$, $a_{5,5}$, $a_{6,1}$, $a_{10,8}$



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18. Write the following in matrix form :

$$2x + 3y = 5$$

$$4x + 8y = 9$$



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19. Write the following in matrix form :

$$3x - 4y + 3z = 25$$

$$7x + 2y - 6z = 11$$

$$2x - 7y + 8z = 25$$



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20. Write the following in matrix form :

$$x + y + z = 7$$

$$-y + z = 3$$

$$-x + 0y + z = 5$$



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Test Yourself Level 2

1. If $A = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$, and $B = \begin{pmatrix} 5 & 6 \\ 4 & 3 \end{pmatrix}$, find the following

$A + B$

Are the answer to (b) and (c) the same



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2. If $A = \begin{pmatrix} 1 & 0 \\ -3 & 4 \end{pmatrix}$, find the following

A^2



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3. If $A = \begin{pmatrix} 1 & 0 \\ -3 & 4 \end{pmatrix}$, find the following

A^3



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4. If $A = \begin{pmatrix} 1 & 0 \\ -3 & 4 \end{pmatrix}$, find the following

$$A + A^2$$



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5. If $A = \begin{pmatrix} 1 & 0 \\ -3 & 4 \end{pmatrix}$, find the following

$$A + A^2 + A^3$$



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Test Yourself Level 3

1. If $A = \begin{bmatrix} 4 & 5 \\ 1 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 0 & 6 \\ 1 & 3 \end{bmatrix}$, find the $3A - 2B$



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2. If $A + B = \begin{bmatrix} 12 & 8 \\ 8 & 4 \end{bmatrix}$ and $A - B = \begin{bmatrix} 4 & 6 \\ 6 & 2 \end{bmatrix}$ find the matrices

A and B



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3. A warehouse deals with five items A, B, C, D, and E each of which being delivered in cartons of different sizes. The following matrix shows the number of cartons delivered by three vans in a day

	A	B	C	D	E
Van I	4	6	2	8	8
Van II	10	12	0	2	4
Van III	3	4	5	10	1

If the weight of one carton of each type is

$A \rightarrow 2kg, B \rightarrow 3.5kg, C \rightarrow 1kg, D \rightarrow 1.5kg$ and $E \rightarrow 0.75kg$

find the weight of cartons in each van . Also If the volume in cc

of one carton of each type

$A \rightarrow 20, B \rightarrow 30, C \rightarrow 15, D \rightarrow 20,$ and $E \rightarrow 45$, find the

total volume of goods delivered by all the vans put together .



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Test Yourself Level 3 Multiple Choice Questions

1. Which of the following matrices can be represented by the notation $B = [b_{ij}]_{3 \times 3}$?

A. $\begin{bmatrix} b_{11} & b_{12} & b_{13} \\ b_{21} & b_{22} & b_{23} \\ b_{31} & b_{32} & b_{33} \end{bmatrix}$

B. $\begin{bmatrix} b_{11} & b_{12} \\ b_{21} & b_{22} \\ b_{31} & b_{32} \end{bmatrix}$

C. $\begin{bmatrix} b_{11} & b_{12} & b_{13} \\ b_{21} & b_{22} & b_{23} \end{bmatrix}$

D. None of these

Answer: C



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2. The short notation of the matrix $B = \begin{bmatrix} b_{11} & b_{12} & b_{13} \\ b_{21} & b_{22} & b_{23} \\ b_{31} & b_{32} & b_{33} \end{bmatrix}$ is

A. $B = [b_{ij}]_{3 \times 2}$

B. $B = [b_{ij}]_{2 \times 2}$

C. $B = [b_{ij}]_{3 \times 3}$

D. None of these

Answer: A



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3. Which of the following is an upper triangular matrix ?

A.
$$\begin{bmatrix} 2 & 3 & 4 \\ 0 & 4 & 6 \\ 0 & 0 & 7 \end{bmatrix}$$

B.
$$\begin{bmatrix} 2 & 0 & 0 \\ 3 & 5 & 0 \\ 5 & 6 & 7 \end{bmatrix}$$

C.
$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 3 & 4 \end{bmatrix}$$

D. None of these

Answer: A



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4. Which of the following is a diagonal matrix ?

A. $\begin{bmatrix} 2 & 3 & 4 \\ 5 & 0 & 0 \\ 0 & 6 & 7 \end{bmatrix}$

B. $\begin{bmatrix} 0 & 2 & 3 \\ 4 & 0 & 3 \\ 6 & 7 & 0 \end{bmatrix}$

C. $\begin{bmatrix} 2 & 0 & 0 \\ 0 & 4 & 0 \\ 0 & 0 & 8 \end{bmatrix}$

D. None of these

Answer: C



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5. What is the value of trace of the following matrix ?

$$A = \begin{bmatrix} 2 & 3 & 4 \\ 7 & 8 & 10 \\ 0 & 0 & 3 \end{bmatrix}$$

A. 10

B. 8

C. 3

D. 13

Answer: D



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6. $A_{2 \times 3}$ matrix $A = [a_{ij}]$, whose elements are given by

$$a_{ij} = \frac{(1 + 2j)^2}{2} \text{ is}$$

A. $\begin{bmatrix} 2 & 4 & 5 \\ 7 & 8 & 9 \end{bmatrix}$

B. $\begin{bmatrix} \frac{9}{2} & \frac{25}{2} & \frac{49}{2} \\ 8 & 18 & 32 \end{bmatrix}$

C. $\begin{bmatrix} \frac{9}{2} & 8 \\ \frac{25}{2} & 18 \\ \frac{49}{2} & 32 \end{bmatrix}$

D. None of these

Answer: B



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7. Which of the following is represented by $c = \text{diag} (3,5,7)$?

A. $c = [3 \ 5 \ 7]$

B. $c = \begin{bmatrix} 3 & 0 & 0 \\ 0 & 5 & 0 \\ 0 & 0 & 7 \end{bmatrix}$

$$C. c = \begin{bmatrix} 3 \\ 5 \\ 7 \end{bmatrix}$$

D. None of these

Answer: B



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8. Transpose of the matrix $A = \begin{bmatrix} 2 & 3 & 4 \\ 5 & 6 & 7 \end{bmatrix}_{2 \times 3}$ is

A. $\begin{bmatrix} 2 & 3 \\ 4 & 5 \\ 6 & 7 \end{bmatrix}_{3 \times 2}$

B. $\begin{bmatrix} 2 & 5 \\ 3 & 6 \\ 4 & 7 \end{bmatrix}_{3 \times 2}$

C. $\begin{bmatrix} 2 & 3 \\ 5 & 6 \end{bmatrix}_{2 \times 2}$

D. $\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}_{2 \times 2}$

Answer: B



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9. if $\begin{bmatrix} 2\alpha + 1 & 3\beta \\ 0 & \beta^2 - 5\beta \end{bmatrix} = \begin{bmatrix} \alpha + 3 & \beta^2 + 2 \\ 0 & -6 \end{bmatrix}$ then the values of α and β are

A. $\alpha = 2, \beta = 3$

B. $\alpha = 2, \beta = 2$

C. $\alpha = 3, \beta = 3$

D. None of these

Answer: C



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10.

Given

$$= A \begin{bmatrix} 1 & 3 & 5 \\ -2 & 0 & -2 \\ 0 & 4 & -3 \end{bmatrix} B = \begin{bmatrix} 0 & 3 \\ -2 & 0 \\ 0 & 4 \end{bmatrix} C = \begin{bmatrix} 4 & 1 & -2 \\ 3 & 2 & 1 \\ 2 & -1 & 7 \end{bmatrix}$$

Which of the following is defined ?

A. $A + B$

B. $B + C$

C. $A + C$

D. None of these

Answer: C



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11. If $A = \begin{bmatrix} 0 & 2 \\ 3 & -4 \end{bmatrix}$ and $kA = \begin{bmatrix} 0 & 3a \\ 2b & 24 \end{bmatrix}$ then find the value of $b - a - k$

A. 2

B. 3

C. 1

D. 4

Answer: C



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12. Given $A = \begin{bmatrix} 1 & 2 & -3 \\ 5 & 0 & 2 \\ 1 & -1 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & -1 & 2 \\ 4 & 2 & 5 \\ 2 & 0 & 3 \end{bmatrix}$. The

matrix C such that $A + 2C = B$ is

A. $\begin{bmatrix} 1 & \frac{3}{2} & 1 \\ -\frac{1}{2} & \frac{7}{2} & \frac{3}{2} \\ \frac{1}{2} & \frac{8}{2} & 8 \end{bmatrix}$

B. $\begin{bmatrix} \frac{5}{2} & \frac{3}{2} & 1 \\ -\frac{1}{2} & \frac{7}{2} & \frac{9}{2} \\ \frac{11}{2} & \frac{9}{2} & 8 \end{bmatrix}$

C. $\begin{bmatrix} 1 & 2 & 4 \\ \frac{3}{2} & \frac{11}{2} & \frac{13}{14} \\ 4 & \frac{9}{2} & \frac{7}{2} \end{bmatrix}$

D. None of these

Answer: D



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13. The value of x and y for the equation

$$2x - y = \begin{bmatrix} 3 & -3 & 0 \\ 3 & 3 & 2 \end{bmatrix} \text{ and } 2y + x = \begin{bmatrix} 4 & 1 & 5 \\ -1 & 4 & -4 \end{bmatrix} \text{ are}$$

A. $x = \begin{bmatrix} 2 & -1 & 1 \\ 1 & 2 & 0 \end{bmatrix}, y = \begin{bmatrix} 1 & 1 & 2 \\ -1 & 1 & -2 \end{bmatrix}$

B. $x = \begin{bmatrix} 1 & 1 & 2 \\ -1 & 1 & -2 \end{bmatrix}, y = \begin{bmatrix} 2 & -1 & 1 \\ 1 & 2 & 0 \end{bmatrix}$

C. $\begin{bmatrix} 1/2 & 1/2 & 1 \\ -1/2 & 1/2 & -1 \end{bmatrix}, y = \begin{bmatrix} 1 & -1/2 & 1/2 \\ 1/2 & 1 & 0 \end{bmatrix}$

D. None of these

Answer: A



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14. If $A = \begin{bmatrix} 0 & 1 & 2 \\ 1 & 2 & 3 \\ 2 & 3 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & -2 \\ -1 & 0 \\ 2 & -1 \end{bmatrix}$ then which of the following is defined ?

A. AB

B. BA

C. both (A) and (B)

D. None of these

Answer: A



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15. If $A = \begin{bmatrix} 0 & 1 & 12 \\ 1 & 2 & 3 \\ 2 & 3 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & -2 \\ -1 & 0 \\ 2 & -1 \end{bmatrix}$, then AB is

A. $\begin{bmatrix} 3 & -2 \\ 5 & -5 \\ 7 & -8 \end{bmatrix}$

B. $\begin{bmatrix} 3 & 5 & 7 \\ -2 & -5 & -8 \end{bmatrix}$

C. $\begin{bmatrix} 1 & 2 \\ 3 & 4 \\ 5 & 6 \end{bmatrix}$

D. None

Answer: A

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16. If $A = \begin{bmatrix} 1 & 2 \\ -2 & 3 \end{bmatrix}$, $B = \begin{bmatrix} 2 & 1 \\ 2 & 3 \end{bmatrix}$ $C = \begin{bmatrix} -3 & 1 \\ 2 & 0 \end{bmatrix}$, then

which of the following is true ?

A. $AB = BC$

B. $(AB)C = A(BC)$

C. $BA = AB$

D. None of these

Answer: B

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17. If $A = \begin{bmatrix} \alpha & 2 \\ 2 & \alpha \end{bmatrix}$ and $\det(A) = 0$ then the value of α is

A. 2,-2

B. 0

C. $-2, -2$

D. 2,2

Answer: A



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18.

If

$$A = \begin{bmatrix} 1 & -1 \\ 2 & -1 \end{bmatrix}, B = \begin{bmatrix} a & 1 \\ b & -1 \end{bmatrix} \text{ and } (A + B)^2 = A^2 + B^2,$$

then the value of $a + b$ is

A. 4

B. 5

C. 6

D. 2

Answer: B



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19. If $A = \begin{bmatrix} 1 & 2 \\ 2 & 3 \end{bmatrix}$ and $A^2 + \lambda A - I_2 = 0$ then λ is equal to

A. -4

B. -2

C. 2

D. 4

Answer: A



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20. If $A \begin{bmatrix} \cos \theta & \sin \theta \\ -\sin \theta & \cos \theta \end{bmatrix}$, then $A^2 = I$ is true for

A. $\theta = 0$

B. $\theta = \frac{\pi}{4}$

C. $\theta = \frac{\pi}{2}$

D. $\theta = \frac{\pi}{2}$

Answer: A



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21. If a, b, b, c and c, a are the roots of

$x^2 - 4x + 3 = 0, x^2 - 8x + 15 = 0$ and $x^2 - 6x + 5 = 0$

respectively, then the value of $\begin{bmatrix} a^2 + c^2 & a^2 + b^2 \\ b^2 + c^2 & a^2 + c^2 \end{bmatrix}$ is

A. $\begin{bmatrix} 10 & 22 \\ 21 & 25 \end{bmatrix}$

B. $\begin{bmatrix} 0 & 7 \\ 8 & 9 \end{bmatrix}$

C. $\begin{bmatrix} 26 & 10 \\ 34 & 26 \end{bmatrix}$

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

Answer: C



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22. If $a = \begin{bmatrix} \cos \theta & -\sin \theta \\ \sin \theta & \cos \theta \end{bmatrix}$, what is the value of θ satisfying the equation $A^T + A = I_2$?

A. $\frac{\pi}{2}$

B. $\frac{\pi}{2}$

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

D. π

Answer: B



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23. Which of the following matrices is non - singular ?

A. $\begin{bmatrix} 3 & 1 \\ 9 & 3 \end{bmatrix}$

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

C. $\begin{bmatrix} 2 & 3 \\ 4 & 5 \end{bmatrix}$

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

Answer: C



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24. 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



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25. The number of values of x for which the matrix

$A = \begin{bmatrix} 3 - x & 2 & 2 \\ 2 & 4 - x & 1 \\ -2 & -4 & -1 - x \end{bmatrix}$ is singular, is

A. 0

B. 1

C. 2

D. 3

Answer: C



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26. If matrix $A = \begin{bmatrix} 2 & 3 \\ 4 & 5 \end{bmatrix}$ and matrix $B = \begin{bmatrix} 0 & 2 \\ 3 & 4 \end{bmatrix}$ then the value of $3A - 2B$ is

A. $\begin{bmatrix} 6 & 6 \\ 6 & 6 \end{bmatrix}$

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

C. $\begin{bmatrix} 6 & 6 \\ 5 & 7 \end{bmatrix}$

D. $\begin{bmatrix} 5 & 7 \\ 6 & 6 \end{bmatrix}$

Answer: B



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27. If $A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$ and $B = \begin{bmatrix} 9 & 8 & 7 \\ 6 & 5 & 4 \\ 3 & 2 & 1 \end{bmatrix}$ then the value of $\frac{1}{2}(A + B)$ is

A. $\begin{bmatrix} 4 & 6 & 7 \\ 8 & 6 & 5 \\ 4 & 4 & 4 \end{bmatrix}$

B. $\begin{bmatrix} 5 & 5 & 5 \\ 5 & 5 & 5 \\ 5 & 5 & 5 \end{bmatrix}$

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

D. None of these

Answer: B



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28. Consider the system of following equations

$$2x + 3y = 8$$

$$7x + 8y = 24$$

This can be written in matrix form as

A. $\begin{bmatrix} 2 & 3 \\ 7 & 8 \end{bmatrix} \begin{bmatrix} y \\ x \end{bmatrix} = \begin{bmatrix} 8 \\ 24 \end{bmatrix}$

B. $\begin{bmatrix} 2 & 3 \\ 7 & 8 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 8 \\ 24 \end{bmatrix}$

C. $\begin{bmatrix} 2 & 8 \\ 7 & 24 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 3 \\ 8 \end{bmatrix}$

D. None of these

Answer: B



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29. Consider the system of following equations

$$2x + 3y + 4z = 0$$

$$5x + 7y + 8z = 5$$

$$10x + 11y + 12z = 12$$

This can be written in matrix form as

$$\text{A. } \begin{bmatrix} 2 & 3 & 4 \\ 5 & 7 & 8 \\ 10 & 11 & 12 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 0 \\ 5 \\ 12 \end{bmatrix}$$

$$\text{B. } \begin{bmatrix} 2 & 3 & 0 \\ 5 & 7 & 9 \\ 10 & 11 & 12 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 4 \\ 8 \\ 12 \end{bmatrix}$$

$$\text{C. } \begin{bmatrix} 2 & 3 & 4 \\ 5 & 7 & 8 \\ 10 & 11 & 12 \end{bmatrix} \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix} = \begin{bmatrix} 0 \\ 5 \\ 12 \end{bmatrix}$$

D. None of these

Answer: A



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30. If $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 0 & 1 \\ 2 & 2 \end{bmatrix}$ then which of following is correct ?

A. $(A + B)^2 = A^2 + B^2 + 2AB$

B. $(A + B)' = A' + B'$

C. $(A + B)(A - B) = A^2 - B^2$

D. None of these

Answer: D



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31. If $A = \begin{bmatrix} 1 & 1 \\ 0 & 1 \end{bmatrix}$ then $A^n =$

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

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

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

D. $\begin{bmatrix} 1 & 1 \\ 0 & n \end{bmatrix}$

Answer: A



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32. If $A = \begin{bmatrix} ab & b^2 \\ -a^2 & -ab \end{bmatrix}$ and $A^n = O$ then the minimum value of n is

A. 2

B. 3

C. 4

D. 5

Answer: A



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33. If $A = \begin{bmatrix} 2 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 2 \end{bmatrix}$ then $A^5 =$

A. $5A$

B. $10A$

C. $16A$

D. $32A$

Answer: C



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34. If $A = \begin{bmatrix} 0 & 5 \\ 0 & 0 \end{bmatrix}$ and $f(x) = 1 + x + x^2 + \dots + x^{16}$

then $f(a)$ is equal to

A. 0

B. $\begin{bmatrix} 1 & 5 \\ 0 & 1 \end{bmatrix}$

C. $\begin{bmatrix} 1 & 5 \\ 0 & 0 \end{bmatrix}$

D. $\begin{bmatrix} 0 & 5 \\ 1 & 1 \end{bmatrix}$

Answer: B



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35. Let $A = \begin{bmatrix} 0 & 2y & z \\ x & y & -z \\ x & -y & z \end{bmatrix}$ and $A' \cdot A = I$. Then the value

of $x^2 + y^2 + z^2$ is

A. 1

B. 2

C. $\frac{1}{2}$

D. None of these

Answer: A



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36. If $2A + 3B = \begin{bmatrix} 2 & -1 & 4 \\ 3 & 2 & 5 \end{bmatrix}$ and $A + 2B = \begin{bmatrix} 5 & 0 & 3 \\ 1 & 6 & 2 \end{bmatrix}$

then B =

A. $\begin{bmatrix} 8 & -1 & 2 \\ -1 & 10 & -1 \end{bmatrix}$

B. $\begin{bmatrix} 8 & 1 & 2 \\ -1 & 10 & -1 \end{bmatrix}$

C. $\begin{bmatrix} 8 & 1 & -2 \\ -1 & 10 & -1 \end{bmatrix}$

D. $\begin{bmatrix} 8 & 1 & 2 \\ 1 & 10 & 1 \end{bmatrix}$

Answer: B



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37. If $A_\alpha = \begin{bmatrix} \cos \alpha & \sin \alpha \\ -\sin \alpha & \cos \alpha \end{bmatrix}$ then $A_\alpha A_\beta$ is equal to

A. $A_{\alpha\beta}$

B. $A_{\alpha+\beta}$

C. $A_{\alpha-\beta}$

D. None of these

Answer: B



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38. The equation , $[1 \ x \ y] \begin{bmatrix} 1 & 3 & 1 \\ 0 & 2 & -1 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 1 \\ x \\ y \end{bmatrix} = [0]$ has for

- (i) $y = 0$ (p) rational roots
(ii) $y = -1$ (q) irrational roots
 (r) integral roots

then which of these is a correct match ?

- A. (i) (ii)
 (p) (r)
- B. (i) (ii)
 (q) (p)
- C. (i) (ii)
 (p) (q)
- D. (i) (ii)
 (r) (p)

Answer: C



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39. Consider a matrix $A = [a_{ij}]$ of order 3×3 such that

$$a_{ij} = (k)^{1+j} \text{ where } k \in I$$

Match Column I with Column II.

Column I		Column II	
(p)	All values of k if A is singular if	(1)	$k \in \{0\}$
(q)	A is null matrix if	(2)	$k \in \phi$
(r)	A is skew-symmetric which is not null matrix if	(3)	$k \in I$
(s)	$A^2 = 3A$, if	(4)	$k \in \{-1, 0, 1\}$

Now, choose the correct option from amongst the given codes

:

- A. (p) (q) (r) (s)
 (3) (1) (4) (2)
- B. (p) (q) (r) (s)
 (4) (1) (2) (3)
- C. (p) (q) (r) (s)
 (3) (1) (2) (4)
- D. (p) (q) (r) (s)
 (2) (1) (3) (4)

Answer: C



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40. The minimum number of zeros in a upper triangular matrix of order n is

A. $\frac{n(n-1)}{2}$

B. $\frac{n(n+1)}{2}$

C. $\frac{2n(n-1)}{2}$

D. None of these

Answer: A



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