MATHS

BOOKS - DEEPTI MATHS (TELUGU ENGLISH)

MATRICES

Solved Example

1. If $A = \begin{bmatrix} 0 & -i \\ -i & 0 \end{bmatrix}$ then $A^2 =$

A. $\begin{bmatrix} 14 & 10 \\ -5 & -1 \end{bmatrix}$

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

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

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

Answer: B

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2. If $A = \begin{bmatrix} 2 & 3 & 0 \\ 1 & -1 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & -2 & 3 \\ -1 & 0 & 2 \end{bmatrix}$, then $(BA')' =$

A. $\begin{bmatrix} -4 & -2 \\ 18 & 9 \end{bmatrix}$

B. $\begin{bmatrix} -4 & -2 \\ 18 & -9 \end{bmatrix}$

C. $\begin{bmatrix} 2 & -6 & 0 \\ -1 & 0 & 10 \end{bmatrix}$

D. $\begin{bmatrix} 1 & 2 & 3 \\ 0 & 5 & 6 \\ -4 & 0 & 2 \end{bmatrix}$

Answer: A

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3. If the matrix $\begin{bmatrix} 1 & 2 & x \\ 5 & 7 & 9 \\ 1 & 2 & 3 \end{bmatrix}$ is singular then $x =$

A. 1

B. 2

C. 3

D. 4

Answer: C

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4. If $\begin{bmatrix} x+1 & -3 & 4 \\ -5 & x+2 & 2 \\ 4 & 1 & x-6 \end{bmatrix} = 0$ then $x =$

A. 1

B. 0

C. -6

D. 6

Answer: B

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5. If $\Delta_r = \begin{vmatrix} r-1 & n & 6 \\ (r-1)^2 & 2n^2 & 4n-2 \\ (r-1)^3 & 3n^3 & 3n^2-3n \end{vmatrix}$ then $\sum_{r=1}^{n} \Delta_r =$

A. 0

B. n^2

C. 2^n

D. $2^n - n^2$

Answer: A

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6. The inverse of $\begin{bmatrix} -\cot\theta & \cos ec\theta \\ \cos ec\theta & -\cot\theta \end{bmatrix}$ is

A. $\begin{bmatrix} -\cot\theta & \cos ec\theta \\ \cos ec\theta & -\cot\theta \end{bmatrix}$

B. $\begin{bmatrix} \cot\theta & \cos ec\theta \\ \cos ec\theta & \cot\theta \end{bmatrix}$

C. $\begin{bmatrix} -\cot\theta & -\cos ec\theta \\ -\cos ec\theta & -\cot\theta \end{bmatrix}$

D. none

Answer: B

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7. If $A = \begin{bmatrix} 2 & 2 & 1 \\ -1 & 0 & 2 \\ 4 & 1 & 0 \end{bmatrix}$ then tra(A)

A. 1

B. 3

C. 0`

D. 2

Answer: D

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8. Solve the equations $3x+4y+5z=18, 2x-y+8z=13, 5x-2y+7z=20$ by Gauss-Jordan method.

A. $x=3, y=1, z=1$

B. $x=4, y=-3, z=1$

C. $x=1, y=1, z=1$

D. $x=7, y=-10, z=4$

Answer: A

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9. The rank of $\begin{bmatrix} 1 & 0 & 2 \\ 0 & 1 & -2 \\ 1 & -1 & 4 \\ 2 & 2 & 8 \end{bmatrix}$ is

A. 0

B. 1

C. 2

D. 3

Answer: D

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10. Find the number of possible orders of the martrix A which contains 2013 elements.

A. 2013

B. 8

C. 16

D. 4

Answer: B

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11. If $A + 2B = \begin{bmatrix} 1 & 2 & 0 \\ 6 & -3 & 3 \\ -5 & 3 & 1 \end{bmatrix}$ and $2A - B = \begin{bmatrix} 2 & -1 & 5 \\ 2 & -1 & 6 \\ 0 & 1 & 2 \end{bmatrix}$ then $tr(A) - tr(B) =$

A. 1

B. 2

C. 3

D. 4

Answer: B

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12. If the matrix M_r is given by $M_r = \begin{bmatrix} r & r - 1 \\ r - 1 & r \end{bmatrix}, r = 1, 2, 3, \text{.........}$ then the value of $\det M_1 + \det M_2 + \ldots\ldots\ldots\ldots + \det M_{2013}$ is ....

A. 2013

B. 2012

C. 2013^2

D. 2012^2

Answer: C

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13. If $f(x)=\begin{vmatrix} x^3 & \cos^2 x & 2^{x^4} \\ \tan^5 x & 1 & \sec 2x \\ \sin^3 x & x^4 & 5 \end{vmatrix}$, then $\int_{-\pi}^{\pi} f(x)dx =$

A. 2

B. -2

C. 5

D. 0

Answer: D

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14. Consider three matrices $A=\begin{bmatrix} 3 & 1 \\ 6 & 1 \end{bmatrix}$, $B=\begin{bmatrix} 3 & 4 \\ 2 & 3 \end{bmatrix}$ and $C=\begin{bmatrix} 3 & -4 \\ -2 & 3 \end{bmatrix}$

then the value of $tr(A)+tr\left(\frac{ABC}{2}\right)+tr\left(\frac{A(BC)^2}{4}\right)+tr\left(\frac{A(BC)^3}{8}\right)+$

....

A. 8

B. 16

C. 128

D. 256

Answer: A

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15. If $\det A = 7$, where $A = \begin{bmatrix} a & b & c \\ d & e & f \\ g & h & i \end{bmatrix}$ then $\det(2A)^{-1} =$

A. $\frac{1}{14}$

B. $\frac{1}{49}$

C. $\frac{1}{56}$

D. $\frac{7}{2}$

Answer: C

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16. Given $f(x) = \log_{10}x$ and $g(x) = e^{\pi i x}$, if

$$\theta(x) = \begin{vmatrix} f(x)g(x) & [f(x)]^{g(x)} & 1 \\ f(x^2)g(x^2) & [f(x^2)]^{g(x^2)} & 0 \\ f(x^3)g(x^3) & [f(x^3)]^{g(x^3)} & 1 \end{vmatrix}$$, then the value of $\theta(10)$ is

A. 1

B. 2

C. 0

D. -1

Answer: C

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17. If A is involutary matrix given by $A = \begin{bmatrix} 0 & 1 & -1 \\ 4 & -3 & 4 \\ 3 & -3 & 4 \end{bmatrix}$ then inverse of $\frac{A}{2}$ will be

A. $2A$

B. A^2

C. $\frac{A^{-1}}{2}$

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

Answer:

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Exercise 1 A Mcq Algebra Of Matrices

1. $\begin{bmatrix} i & 0 & 1 \\ -1 & i & 0 \\ -i & 2 & 1 \end{bmatrix} + \begin{bmatrix} 2 & i & 0 \\ 0 & 2 & 1 \\ 1 & 0 & -1 \end{bmatrix} =$

A. $\begin{bmatrix} i+2 & i & 1 \\ -i & i+2 & 1 \\ -i+1 & 2 & 0 \end{bmatrix}$

B. $\begin{bmatrix} i+2 & i & 1 \\ -1 & i+2 & 1 \\ i+1 & 2 & 0 \end{bmatrix}$

C. $\begin{bmatrix} i-2 & i & 1 \\ 1 & i+2 & 1 \\ -i+1 & 2 & 0 \end{bmatrix}$

D. $\begin{bmatrix} i+2 & i & 1 \\ -1 & i+2 & 1 \\ i-1 & 2 & 0 \end{bmatrix}$

Answer: A

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

$A + B + C =$

A. $\begin{bmatrix} 2 & -3 & 10 \\ 2 & 1 & 8 \\ 5 & 1 & 1 \end{bmatrix}$

B. $\begin{bmatrix} -2 & 3 & 10 \\ 2 & 1 & 8 \\ 5 & 1 & 1 \end{bmatrix}$

C. $\begin{bmatrix} 2 & -3 & 10 \\ 2 & 1 & 8 \\ 5 & 1 & 1 \end{bmatrix}$

D. $\begin{bmatrix} -2 & -3 & 10 \\ 2 & 1 & 8 \\ 5 & 1 & 1 \end{bmatrix}$

Answer: D

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

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

B. $\begin{bmatrix} 8 & 1 & 6 \\ -9 & -2 & 5 \end{bmatrix}$

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

D. $\begin{bmatrix} -8 & 1 & 6 \\ 9 & -2 & 5 \end{bmatrix}$

Answer: A

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

A. $\begin{bmatrix} 1 & 8 & 12 \\ 8 & 3 & -4 \\ 3 & 8 & -14 \end{bmatrix}$

B. $\begin{bmatrix} -1 & 6 & 9 \\ 6 & 4 & -3 \\ 4 & 6 & -14 \end{bmatrix}$

C. $\begin{bmatrix} 1 & -6 & 9 \\ 6 & 4 & 3 \\ 4 & 6 & -14 \end{bmatrix}$

D. $\begin{bmatrix} -1 & 6 & 9 \\ 6 & 4 & -3 \\ 4 & 6 & 14 \end{bmatrix}$

Answer: A

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5. The additive inverse of $\begin{bmatrix} 1 & 4 & -7 \\ -3 & 2 & 5 \\ 2 & 3 & -1 \end{bmatrix}$ is

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

B. $\begin{bmatrix} -1 & -4 & 7 \\ 3 & -2 & -5 \\ -2 & -3 & 1 \end{bmatrix}$

C. $\begin{bmatrix} -1 & -4 & 7 \\ 3 & 2 & -5 \\ -2 & -3 & 1 \end{bmatrix}$

D. $\begin{bmatrix} 1 & -4 & 7 \\ 3 & -2 & 5 \\ -2 & -3 & 1 \end{bmatrix}$

Answer: B

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

A. $2A - B$

B. $A - 2B$

C. $2A - 3B$

D. $3A - 2B$

Answer: C

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7. If $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} = J\begin{bmatrix} 0 & 1 \\ -1 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix}$ then $B =$

A. $I\cos\theta + j\sin\theta$

B. $I\sin\theta + J\cos\theta$

C. $I\cos\theta - J\sin\theta$

D. $-I\cos\theta + J\sin\theta$

Answer: A

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8. If $A = \begin{bmatrix} 2 & 1 & 3 & -1 \\ 1 & -2 & 2 & -3 \end{bmatrix}$, $B = \begin{bmatrix} 2 & 1 & 0 & 3 \\ 1 & -1 & 2 & 3 \end{bmatrix}$ and $2A + 3B - 5C = O$ then $C =$

A. $\begin{bmatrix} 2 & 1 & 6/5 & 7/5 \\ 1 & 7/5 & 2 & 3/5 \end{bmatrix}$

B. $\begin{bmatrix} -2 & 1 & 6/5 & 7/5 \\ 1 & -7/5 & 2 & 3/5 \end{bmatrix}$

C. $\begin{bmatrix} -2 & 1 & 6/5 & 7/5 \\ 1 & 7/5 & 2 & 3/5 \end{bmatrix}$

D. $\begin{bmatrix} 2 & 1 & 6/5 & 7/5 \\ 1 & -7/5 & 2 & 3/5 \end{bmatrix}$

Answer: D

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9. If $A = \begin{bmatrix} 3 & 2 & -1 \\ 1 & 5 & 4 \\ -2 & 3 & 7 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 2 & 1 \\ 2 & 1 & 2 \\ 1 & 2 & 1 \end{bmatrix}$ and $3A + 2X = 5B$ then $X =$

A. $\begin{bmatrix} 4/5 & 1 \\ 9/5 & -2/5 \\ -4/5 & -3/5 \end{bmatrix}$

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

C. $\begin{bmatrix} -2 & 2 & 4 \\ 7/2 & -5 & -1 \\ 11/2 & 1/2 & -8 \end{bmatrix}$

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

Answer: C

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10. If $\begin{bmatrix} 1 & 2 & 3 \\ 3 & 2 & 1 \end{bmatrix} + X = \begin{bmatrix} 4 & 4 & 4 \\ 4 & 4 & 4 \end{bmatrix}$ then $X =$

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

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

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

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

Answer: D

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11. If $A + B = \begin{bmatrix} 2 & 3 & 1 \\ 6 & -1 & 5 \end{bmatrix}, A - B = \begin{bmatrix} 2 & 1 & -1 \\ 0 & -1 & 3 \end{bmatrix}$ then $B =$

A. $\begin{bmatrix} 0 & 1 & 1 \\ 3 & 0 & 1 \end{bmatrix}$

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

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

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

Answer: A

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

A. $\begin{bmatrix} -5 & 7 \\ -5 & 1 \end{bmatrix}$

B. $\begin{bmatrix} 5 & 7 \\ -5 & 1 \end{bmatrix}$

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

D. $\begin{bmatrix} -5 & -7 \\ -5 & 1 \end{bmatrix}$

Answer: C

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13. If $\begin{bmatrix} 4 & 9 \\ 3 & 0 \end{bmatrix} = \begin{bmatrix} x & y^2 \\ 3 & 0 \end{bmatrix}$ then $(x, y) =$

A. $(4, \pm 3)$

B. $(2, 4)$

C. $(-2, -4)$

D. $(0, 0)$

Answer: A

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14. If $\begin{bmatrix} x-3 & 2y-8 \\ z+2 & 6 \end{bmatrix} = \begin{bmatrix} 5 & 2 \\ -2 & a-4 \end{bmatrix}$ then find x,y,z & a.

A. 2,2,2,5,5

B. $-3, 2, 4, -1$

C. 8,5,-4,10

D. 3,-2,4,-3

Answer: C

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15. If $A = \begin{bmatrix} 0 & 2 \\ 3 & -4 \end{bmatrix}, kA = \begin{bmatrix} 0 & 3a \\ 2b & 24 \end{bmatrix}$ then the values of k,a,b are respectively.

A. $-6, -12, -18$

B. $-6, 4, 9$

C. $-6, -4, -9$

D. $-6, 12, 18$

Answer: C

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16. If $\begin{bmatrix} x-1 & 2 & 5-y \\ 0 & z-1 & 7 \\ 1 & 0 & a-5 \end{bmatrix} = \begin{bmatrix} 1 & 2 & 3 \\ 0 & 4 & 7 \\ 1 & 0 & 0 \end{bmatrix}$ then find the values of x , y z and a .

A. 2,2,5,5

B. $-3, 2, 4, -1$

C. 8,5,-4,10

D. 3,-2,4,-3

Answer: A

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17. The order of the matrix A is 3×5 and that of B is 2×3. The order of the matrix BA is

A. 2×3

B. 3×2

C. 2×5

D. 5×2

Answer: C

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18. If $\begin{bmatrix} 1 & 2 & 3 \end{bmatrix} B = \begin{bmatrix} 3 & 4 \end{bmatrix}$ then the order of the matrix B is

A. 3×1

B. 1×3

C. 2×3

D. 3×2

Answer: D

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19. $m\begin{bmatrix} -3 & 4 \end{bmatrix} + n\begin{bmatrix} 4 & -3 \end{bmatrix} = \begin{bmatrix} 10 & -11 \end{bmatrix} \Rightarrow 3m + 7n =$

A. 3

B. 5

C. 10

D. 1

Answer: D

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20. If $A = \begin{bmatrix} 4 & 2 \\ -1 & 1 \end{bmatrix}$ then $A^2 =$

A. $\begin{bmatrix} 14 & 10 \\ -5 & -1 \end{bmatrix}$

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

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

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

Answer: A

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21. If $A = \begin{bmatrix} ab & b^2 \\ -a^2 & -ab \end{bmatrix}$ then $A^2 =$

A. $\begin{bmatrix} 14 & 10 \\ -5 & -1 \end{bmatrix}$

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

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

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

Answer: C

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22. If $A = \begin{bmatrix} 1 & -3 & -4 \\ -1 & 3 & 4 \\ 1 & -3 & -4 \end{bmatrix}$ then $A^2 =$

A. $\begin{bmatrix} 14 & 10 \\ -5 & -1 \end{bmatrix}$

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

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

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

Answer: D

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23. If $A = \begin{bmatrix} a^2 & ab & ac \\ ab & b^2 & bc \\ ac & bc & c^2 \end{bmatrix}$ and $a^2 + b^2 + c^2 = 1$, then $A^2 =$

A. $2A$

B. A

C. A^{-1}

D. none

Answer: B

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24. If $A = \begin{bmatrix} 2 & 3 \\ 4 & -1 \end{bmatrix}$, $B = \begin{bmatrix} 1 & -2 \\ -1 & 3 \end{bmatrix}$ then $A^2 - B^2 =$

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

B. $\begin{bmatrix} 13 & 11 \\ 8 & 2 \end{bmatrix}$

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

D. none

Answer: B

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25. $A = \begin{bmatrix} -1 & 0 \\ 0 & 2 \end{bmatrix} \Rightarrow A^3 - A^2 =$

A. $2A$

B. $2I$

C. A

D. I

Answer: A

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26. $A = \begin{bmatrix} i & -i \\ -i & i \end{bmatrix}, B = \begin{bmatrix} 1 & -1 \\ -1 & 1 \end{bmatrix} \Rightarrow A^8 =$

A. $4B$

B. $8B$

C. $64B$

D. $128B$

Answer: D

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27. 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. $\alpha = a^2 + b^2, \beta = a^2 - b^2$

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

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

Answer: A

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28. If $A = \begin{bmatrix} 2 & 1 \\ 1 & 3 \end{bmatrix}, B = \begin{bmatrix} 3 & 2 & 0 \\ 1 & 0 & 4 \end{bmatrix}$ then $AB =$

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

B. $\begin{bmatrix} 2 & 1 & 5 \\ 0 & 1 & 7 \end{bmatrix}$

C. $\begin{bmatrix} -5 & 2 & 5 \\ 1 & 2 & 11 \end{bmatrix}$

D. $\begin{bmatrix} 7 & 4 & 4 \\ 6 & 2 & 12 \end{bmatrix}$

Answer: D

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29. If $A = \begin{bmatrix} 1 & -1 \\ 3 & 4 \\ -1 & 5 \end{bmatrix}$, $B = \begin{bmatrix} -1 & 2 \\ 3 & 1 \end{bmatrix}$ then $AB =$

A. $\begin{bmatrix} -4 & 1 \\ 9 & 10 \\ 16 & 3 \end{bmatrix}$

B. $\begin{bmatrix} 21 & 2 \\ 4 & 18 \\ 8 & 10 \end{bmatrix}$

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

D. $\begin{bmatrix} 21 & 1 \\ 2 & 15 \\ 4 & 5 \end{bmatrix}$

Answer: A

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

A. $\begin{bmatrix} 5 & 3 & 11 \\ 1 & 2 & 2 \\ 1 & 3 & 5 \end{bmatrix}$

B. $\begin{bmatrix} 5 & 9 & 13 \\ -1 & 2 & 4 \\ -2 & 2 & 4 \end{bmatrix}$

C. $\begin{bmatrix} 5 & 8 & 11 \\ 1 & 2 & 3 \\ 2 & 2 & -3 \end{bmatrix}$

D. None

Answer: B

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31. If $A = \begin{bmatrix} a^2 & ab & ac \\ ab & b^2 & bc \\ ac & bc & c^2 \end{bmatrix}$, $B = \begin{bmatrix} 0 & c & -b \\ -c & 0 & a \\ b & -a & 0 \end{bmatrix}$ then $AB =$

A. $\begin{bmatrix} a & b & c \\ b & c & a \\ c & a & b \end{bmatrix}$

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

C. $\begin{bmatrix} a & 0 & 0 \\ 0 & b & 0 \\ 0 & 0 & c \end{bmatrix}$

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

Answer: B

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32. If $A = \begin{bmatrix} 1 & 0 & 1 \end{bmatrix}, B = \begin{bmatrix} 2 & 1 \\ 1 & 0 \\ 3 & 2 \end{bmatrix}$ then$AB =$

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

B. $[30]$

C. $\begin{bmatrix} -1 & 3 & 2 \\ -2 & 6 & 4 \\ -3 & 9 & 6 \end{bmatrix}$

D. $\begin{bmatrix} 10 \\ -4 \end{bmatrix}$

Answer: A

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33. If $A = \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}, \; = \begin{bmatrix} -1 & 3 & 2 \end{bmatrix}$ then $AB =$

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

B. [(30)]

C. $\begin{bmatrix} -1 & 3 & 2 \\ -2 & 6 & 4 \\ -3 & 9 & 6 \end{bmatrix}$

D. $\begin{bmatrix} 10 \\ -4 \end{bmatrix}$

Answer: C

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

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

B. [(30)]

C. $\begin{bmatrix} -1 & 3 & 2 \\ -2 & 6 & 4 \\ -3 & 9 & 6 \end{bmatrix}$

D. $\begin{bmatrix} 10 \\ -4 \end{bmatrix}$

Answer: D

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

A. AB, BA exist and equal

B. AB, BA exist and not equal

C. AB exists and BA does not exist

D. AB does not exist and BA exists.

Answer: B

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36. If A and B are two square matrices of order n , and A and B commute, then for any real number k

A. $A - kI, B - kI$ commute

B. A-kI,B-kI are equal

C. A-kI,B-kI are not commute

D. none

Answer: A

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37. If $A = \begin{bmatrix} 1 & 4 \\ 2 & 9 \end{bmatrix}, B = \begin{bmatrix} 9 & -4 \\ -2 & 1 \end{bmatrix}$ then

A. $AB = BA$

B. $AB \neq BA$

C. none

D. not determined

Answer: A

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

A. $AB = BA$

B. $AB \neq BA$

C. none

D. not determined

Answer: B

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39. If $A = \begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}, B = \begin{bmatrix} 0 & i \\ i & 0 \end{bmatrix}$ then

A. $A^2 = B^2 = I$

B. $A^2 = B^2 = -I$

C. $A^2 = I, B^2 = -I$

D. $A^2 = -I, B^2 = I$

Answer: B

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40. If $A = \begin{bmatrix} 2 & 0 \\ 3 & 0 \end{bmatrix}, B = \begin{bmatrix} 0 & 0 \\ 1 & 2 \end{bmatrix}, C = \begin{bmatrix} 0 & 0 \\ 3 & 4 \end{bmatrix}$ then

A. $AB = AC = O$

B. $AB = O, AC \neq O$

C. $AB \neq O, AC = O$

D. $AB \neq O, AC \neq O$

Answer: A

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41. If $A = \begin{bmatrix} i & 0 \\ 0 & -i \end{bmatrix}, B = \begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}, C = \begin{bmatrix} 0 & i \\ i & 0 \end{bmatrix}$ then

A. $A^2 = B^2 = C^2 = -I$

B. $A^2 = B^2 = C^2 = O$

C. $A^2 = B^2 = C^2 = I$

D. none

Answer: A

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42. If $A = \begin{bmatrix} i & 0 \\ 0 & -i \end{bmatrix}, B = \begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}, C = \begin{bmatrix} 0 & i \\ i & 0 \end{bmatrix}$ then

A. $AB = -BA = -I$

B. $AB = -BA = O$

C. $AB = -BA = I$

D. none

Answer: D

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43. If $AB = A, BA = B$ then $A^2 + B^2 =$

A. $A + B$

B. $A - B$

C. AB

D. O

Answer: A

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44. If A and B are two matrices such that AB and $A + B$ are both defined, then A and B are

A. square matrices of same order

B. square matrices of different order

C. rectangular matrices of same order

D. rectangular matrices of different orders.

Answer: A

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45. Let $\begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$ and $B = \begin{pmatrix} a & 0 \\ 0 & b \end{pmatrix}$, $a, b\varepsilon N$. Then

A. there exists exactly one B such that $AB = BA$

B. there exist infinitely many B's such that $AB = BA$

C. there cannot exist any B such that $AB = BA$

D. there exist more tan one but finite number of B's such that

$AB = BA$

Answer: B

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46. If $A = \begin{pmatrix} 1 & -2 \\ 4 & 5 \end{pmatrix}$ and $f(t) = t^2 - 3t + 7$ then $f(A) + \begin{pmatrix} 3 & 6 \\ -12 & -9 \end{pmatrix} =$

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

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

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

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

Answer: B

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47. If $A = \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$ then $A^4 =$

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

Answer: A

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48. If the matrix $A = \begin{bmatrix} 1 & -1 \\ -1 & 1 \end{bmatrix}$ then $A^{n+1} =$

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

B. $n\begin{bmatrix} 1 & -1 \\ -1 & 1 \end{bmatrix}$

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

D. $2^{n+1}\begin{bmatrix} 1 & -1 \\ -1 & 1 \end{bmatrix}$

Answer: C

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49. If $A = \begin{bmatrix} 3 & -4 \\ 1 & -1 \end{bmatrix}$ then $A^{T} =$

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

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

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

D. $\begin{bmatrix} 3 & 1 \\ -4 & -1 \end{bmatrix}$

Answer: D

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50. $\begin{bmatrix} 2 & -1 \\ 3 & -2 \end{bmatrix}^n = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ if n is

A. even

B. odd

C. any natural number

D. none

Answer: A

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51. If $A^2 = 2A - I$ then for $n \geq 2, A^n =$

A. $nA - (n - 1)I$

B. $nA - I$

C. $2^{n-1}A - (n - 1)I$

D. $2^{n-1}A - I$

Answer: A

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52. fi $A = \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$ then $A^3 =$

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53. If $A = \begin{bmatrix} 1 & 0 \\ 1 & 1 \end{bmatrix}$ and $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ then which one of the following holds for all $n \geq 1$, by the principle of mathematical induction.

A. $A^n = nA - (n - 1)I$

B. $A^n = 2^{n-1}A = (n - 1)I$

C. $A^n = nA + (n - 1)I$

D. $A^n = 2^{n-1}A + (n - 1)I$

Answer: A

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54. Find the rank of the matrix $A = \begin{bmatrix} 1 & 4 \\ 0 & 1 \end{bmatrix}$,

A. 1

B. 2

C. 3

D. 0

Answer: B

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55. If $A = \begin{bmatrix} 1 & 0 & 0 \\ 1 & 0 & 1 \\ 0 & 1 & 0 \end{bmatrix}$ Then tra(A)

A. 1

B. 2

C. 3

D. 0

Answer: A

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56. If $A = \begin{bmatrix} 1 & 1 & 0 \\ 0 & 1 & 1 \\ 0 & 0 & 1 \end{bmatrix}$ then $A^2 =$

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57. if n is a positive integer and $A = \begin{bmatrix} a & 0 & 0 \\ 0 & b & 0 \\ 0 & 0 & c \end{bmatrix}$ then A^n is

A. $\begin{bmatrix} a^n & 0 & 0 \\ 0 & b^n & 0 \\ 0 & 0 & c^n \end{bmatrix}$

B. $\begin{bmatrix} 0 & 0 & 0 \\ 0 & b^n & 0 \\ a^n & 0 & c^n \end{bmatrix}$

C. $\begin{bmatrix} a^n & 0 & c^n \\ 0 & b^n & 0 \\ 0 & 0 & 0 \end{bmatrix}$

D. $\begin{bmatrix} 0 & 0 & c^n \\ 0 & b^n & 0 \\ a^n & 0 & 0 \end{bmatrix}$

Answer: A

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58. If $A = \begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix}$ then show that for all the positive integers n,

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

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

B. $\begin{bmatrix} \cos^n\theta & \sin^n\theta \\ (-1)^n \sin^n\theta & \cos^n\theta \end{bmatrix}$

C. $\begin{bmatrix} n\cos\theta & n\sin\theta \\ -n\sin\theta & n\cos\theta \end{bmatrix}$

D. none

Answer: A

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59. If $A = \begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix}$ then $\lim n \rightarrow \infty \frac{1}{n} A^n$ is

A. a null matrix

B. an identity matrix

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

D. none of these

Answer: A

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60. If $A = \begin{bmatrix} -\cos\theta & \sin\theta \\ \sin\theta & \cos\theta \end{bmatrix}$ then IAI=

A. 0

B. 1

C. -1

D. none

Answer:

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61. If $A = \begin{bmatrix} \cos^2\alpha & \cos\alpha\sin\alpha \\ \cos\alpha\sin\alpha & \sin^2\alpha \end{bmatrix}$ and $B = \begin{bmatrix} \cos^2\beta & \cos\beta\sin\beta \\ \cos\beta\sin\beta & \sin^2\beta \end{bmatrix}$ are two matrices such that the product AB is the null matrix then α - β is

A. 0

B. multiple π

C. an odd multiple of $\pi/2$

D. none

Answer: C

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62. If $\alpha - \beta = (2n+1)\frac{\pi}{2}, n \varepsilon Z$ then

$$\begin{bmatrix} \cos^2\alpha & \cos\alpha\sin\alpha \\ \cos\alpha\sin\alpha & \sin^2\alpha \end{bmatrix}\begin{bmatrix} \cos^2\beta & \cos\beta\sin\beta \\ \cos\beta\sin\beta & \sin^2\beta \end{bmatrix} =$$

A. O

B. I

C. 2I

D. none

Answer: A

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63. If $A(\alpha) = \begin{bmatrix} \cos\alpha & \sin\alpha \\ -\sin\alpha & \cos\alpha \end{bmatrix}$, then $A(\alpha)A(\beta) =$

A. $A(\alpha) - A(\beta)$

B. $A(\alpha) + A(\beta)$

C. $A(\alpha - \beta)$

D. $A(\alpha + \beta)$

Answer: D

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64. If $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}, I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ then $A^2 - (a + d)A =$

A. O

B. I

C. $(bc - ad)I$

D. $(ad - bc)I$

Answer: C

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65. If $A = \begin{bmatrix} 0 & c & -b \\ -c & 0 & a \\ b & -a & 0 \end{bmatrix}$ then $A^3 =$

A. O

B. I

C. $\left(a^2 + b^2 = c^2\right)A$

D. $-\left(a^2 + b^2 + c^2\right)A$

Answer: D

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66. If $A = \begin{bmatrix} 1 & 1 & 3 \\ 5 & 2 & 6 \\ -2 & -1 & -3 \end{bmatrix}$ then $A^3 =$

A. O

B. 2A

C. I

D. A

Answer: A

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67. If $A = \begin{bmatrix} 1 & 1 & -2 \\ 0 & 1 & 4 \\ 2 & 3 & 1 \end{bmatrix}$ then $A^3 - 3A^2 - 5A =$

A. $-I$

B. $2I$

C. I

D. O

Answer: C

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68. $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$, then $A^3 - 4A^2 - 6A$ is equal to

A. 0

B. A

C. $-A$

D. I

Answer: C

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69. If $A = \begin{bmatrix} 4 & 2 \\ -1 & 1 \end{bmatrix}$ then $(A - 21)(A - 3I) =$

A. O

B. 2A

C. I

D. A

Answer: A

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70. If $A = \begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}$ then $A(A - 3I)(A - 15I) =$

A. 2A

B. 3A

C. I

D. O

Answer: D

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71. If $A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 2 & 1 \\ 1 & 0 & 3 \end{bmatrix}$ then $(A - I)(A - 2I)(A - 3I) =$

A. 2I

B. odd

C. I

D. A

Answer: B

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72. If $A = \begin{bmatrix} 1 & 3 \\ 3 & 4 \end{bmatrix}$ and $A^2 - kA - 5I_2 = O$ then $k =$

A. 3

B. 5

C. 7

D. -7

Answer: B

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73. If $A = \begin{bmatrix} -8 & 5 \\ 2 & 4 \end{bmatrix}$ satisfies the equation $f(x) = x^2 + 4x - p = 0$ then $p =$

A. 64

B. 42

C. 36

D. 24

Answer: B

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74. If $\begin{pmatrix} 3 & -2 \\ -1 & 2 \end{pmatrix}\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 11 \\ -5 \end{pmatrix}$, then $3x + 7y =$

A. 0

B. 11

C. 2

D. 1

Answer: C

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75. If $\begin{bmatrix} 1 & -\tan\theta \\ \tan\theta & 1 \end{bmatrix}\begin{bmatrix} 1 & \tan\theta \\ -\tan\theta & 1 \end{bmatrix}^{-1} = \begin{bmatrix} a & -b \\ b & a \end{bmatrix}$ then

A. $a = 1, b = 1$

B. $a = \cos 2\theta, b = \sin 2\theta$

C. $a = \sin 2\theta, b = \cos 2\theta$

D. none of these

Answer: B

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76. $\begin{bmatrix} x & y & z \end{bmatrix}\begin{bmatrix} a & h & g \\ h & b & f \\ g & f & c \end{bmatrix}\begin{bmatrix} x \\ y \\ z \end{bmatrix} =$

A. $\left[ax^2 + by^2 + cz^2 + 2hxy + 2gxz + 2fyz\right]$

B. $\left[ax^2 + by^2 + cz^2 + hxy + gxz + fyz\right]$

C. $\left[2ax^2 + 2by^2 + 2cz^2 + hxy + gxz + fyz\right]$

D. $\left[2ax^2 + 2by^2 + 2cz^2 + 2hxy + 2gxz + 2fyz\right]$

Answer: A

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77. If $A = \begin{bmatrix} 2 \\ 0 \\ 1 \end{bmatrix}, B - \begin{bmatrix} 4 & -2 & 5 \end{bmatrix}, C = \begin{bmatrix} 0 & 1 \\ 1 & 0 \\ -1 & 1 \end{bmatrix}$ then $ABC =$

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

B. $\begin{bmatrix} 2 & 1 \\ -3 & 0 \\ -1 & 3 \end{bmatrix}$

C. $\begin{bmatrix} -14 & 18 \\ 0 & 0 \\ -7 & 9 \end{bmatrix}$

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

Answer: C

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78. If $\begin{bmatrix} x & 4 & -1 \end{bmatrix} \begin{bmatrix} 2 & 1 & 0 \\ 1 & 0 & 2 \\ 0 & 2 & 4 \end{bmatrix} \begin{bmatrix} x \\ 4 \\ -1 \end{bmatrix} = 0$ then $x =$

A. $-1 \pm \sqrt{6}$

B. $3 \pm \sqrt{5}$

C. $-2 \pm \sqrt{10}$

D. $3 \pm \sqrt{6}$

Answer: C

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79. If $A = \begin{bmatrix} x & 1 \\ 1 & 0 \end{bmatrix}$ and $A^2 = I$ then $x =$

A. 0

B. 1

C. -1

D. 2

Answer: A

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80. If $A = \begin{bmatrix} 1 & -1 \\ 2 & -1 \end{bmatrix}, B = \begin{bmatrix} x & 1 \\ y & -1 \end{bmatrix}$ and $(A + B)^2 = A^2 + B^2$ then $(x, y) =$

A. $(1, 4)$

B. $(2, 1)$

C. $(3, 3)$

D. $(0, 1)$

Answer: A

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81. If $A = \begin{bmatrix} 4 & 1 & 0 \\ 1 & -2 & 2 \end{bmatrix}, B = \begin{bmatrix} 2 & 0 & -1 \\ 3 & 1 & 4 \end{bmatrix}, C = \begin{bmatrix} 1 \\ 2 \\ -1 \end{bmatrix}$ and

$(3B - 2A)C + 2X = O$ then $X =$

A. $\begin{bmatrix} 11/2 \\ -11/3 \end{bmatrix}$

B. $\begin{bmatrix} -3/2 \\ 13/2 \end{bmatrix}$

C. $\begin{bmatrix} 3/2 \\ -13/2 \end{bmatrix}$

D. $\begin{bmatrix} -11/2 \\ 11/3 \end{bmatrix}$

Answer: C

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82. If A,b are two square matrices such that $AB = A, BA = B$ then A,B are

A. idempotent matrices

B. diagonal matries

C. scaslar matrices

D. nilpotent matices

Answer: A

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83. If A,B are two idempotent matrices and $AB = BA = O$ then $A + B$ is

A. scalar matrix

B. diagonal matrix

C. nilpotent matrix

D. idempotent matrix

Answer: D

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84. If A and B are square matrices of size $n \times n$ such that $A^2 - B^2 = (A - B)(A + B)$, then which of the following will be always true?

A. either of A or B is a zero matrix

B. either of A or B is an identity matrix

C. $A = B$

D. $AB = BA$

Answer: D

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85. If $a = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 5 \\ x & 5 & 6 \end{bmatrix}$ and $A^T = A$ then $x =$

A. 0

B. 1

C. 2

D. 3

Answer: D

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86. If $A = \begin{bmatrix} x & 1 & 4 \\ -1 & 0 & 7 \\ -4 & -7 & 0 \end{bmatrix}$ such that $A' = -A$ then $x =$

A. 0

B. 1

C. 4

D. -1

Answer: A

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87. If $A = \begin{bmatrix} 0 & 1 & -2 \\ -1 & 0 & 3 \\ 2 & -3 & 0 \end{bmatrix}$ then $A + A^T =$

A. $\begin{bmatrix} 4 & 0 \\ 0 & -2 \end{bmatrix}$

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

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

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

Answer: B

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88. If $A = \begin{bmatrix} 1 & -1 & 2 \\ 2 & 1 & -3 \\ -2 & 1 & 2 \end{bmatrix}, B = \begin{bmatrix} 2 & 1 & 0 \\ 2 & -3 & 1 \\ 1 & 1 & -1 \end{bmatrix}$ then $(A + B)^T =$

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

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

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

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

Answer: B

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89. If $A = \begin{bmatrix} 1 & 2 & 3 \end{bmatrix}, B = \begin{bmatrix} 2 \\ 3 \\ -1 \end{bmatrix}$ then $\left(A + B^T\right)^T =$

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

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

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

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

Answer: A

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90. If $A = \begin{bmatrix} 1 \\ 0 \\ -1 \end{bmatrix}$, $B = \begin{bmatrix} 2 & 3 & 2 \end{bmatrix}$ then $\left(A + B^T\right)^T =$

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

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

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

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

Answer: B

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91. If $A = \begin{bmatrix} 1 & -2 & 3 \\ -4 & 2 & 5 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 3 \\ -1 & 0 \\ 2 & 4 \end{bmatrix}$ then $2A + 3B' =$

A. $\begin{bmatrix} 5 & -7 & 12 \\ 1 & 4 & 22 \end{bmatrix}$

B. $\begin{bmatrix} 1 & -17 \\ 1 & -4 \\ 0 & 2 \end{bmatrix}$

C. $\begin{bmatrix} 19 & -25 \\ -15 & 64 \end{bmatrix}$

D. $\begin{bmatrix} 0 & 2 \\ 1 & 0 \end{bmatrix}$

Answer: A

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92. If $A = \begin{bmatrix} 1 & 5 & 3 \\ 2 & 4 & 0 \\ 3 & -1 & -5 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & -1 & 0 \\ 0 & -2 & 5 \\ 1 & 2 & 0 \end{bmatrix}$ then $3A - 5B^T =$

A. $\begin{bmatrix} -7 & 15 & 4 \\ 11 & 22 & -10 \\ 9 & -28 & -15 \end{bmatrix}$

B. $\begin{bmatrix} 5 & 19 & 9 \\ 6 & 20 & -20 \\ 5 & -11 & -15 \end{bmatrix}$

C. $\begin{bmatrix} -5 & 19 & 9 \\ 6 & 20 & -20 \\ 5 & -11 & 15 \end{bmatrix}$

D. $\begin{bmatrix} 5 & 19 & 9 \\ 6 & -20 & -20 \\ 5 & -11 & 15 \end{bmatrix}$

Answer: A

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93. If $A + 2B = \begin{bmatrix} 2 & -4 \\ 1 & 6 \end{bmatrix}, B^T = \begin{bmatrix} 1 & 2 \\ 0 & -1 \end{bmatrix}$ then $A =$

A. $\begin{bmatrix} 0 & -4 \\ -3 & 8 \end{bmatrix}$

B. $\begin{bmatrix} 1 & -4 \\ -1 & 7 \end{bmatrix}$

C. $\begin{bmatrix} 0 & -4 \\ 3 & 8 \end{bmatrix}$

D. $\begin{bmatrix} 1 & 4 \\ 1 & -7 \end{bmatrix}$

Answer: A

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94. If $3A + 4B' = \begin{bmatrix} 7 & -10 & 17 \\ 0 & 6 & 31 \end{bmatrix}$, $2B - 3A' = \begin{bmatrix} -1 & 18 \\ 4 & -6 \\ -5 & -7 \end{bmatrix}$ then $B =$

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

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

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

D. $\begin{bmatrix} 1 & -4 \\ -2 & 2 \\ 3 & 5 \end{bmatrix}$

Answer: B

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95. If $A = \begin{bmatrix} i & 0 \\ 0 & -i \end{bmatrix}$, then $AA' =$

A. $\begin{pmatrix} -1 & 0 \\ 0 & 1 \end{pmatrix}$

B. $\begin{pmatrix} -1 & 0 \\ 1 & 0 \end{pmatrix}$

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

D. $\begin{pmatrix} -1 & 0 \\ 0 & -1 \end{pmatrix}$

Answer: D

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96. If $A = \begin{bmatrix} 0 & i \\ -i & 0 \end{bmatrix}$ then $AA^T =$

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

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

C. $\begin{bmatrix} 5 & 0 & -2 \\ 0 & 6 & 0 \\ -2 & 6 & 2 \end{bmatrix}$

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

Answer: B

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97. If $A = \begin{bmatrix} \cos\alpha & \sin\alpha \\ -\sin\alpha & \cos\alpha \end{bmatrix}$ then $AA^T =$

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

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

C. $\begin{bmatrix} 5 & 0 & -2 \\ 0 & 6 & 0 \\ -2 & 6 & 2 \end{bmatrix}$

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

Answer: A

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98. If $A = \begin{bmatrix} \cos\alpha & \sin\alpha \\ -\sin\alpha & \cos\alpha \end{bmatrix}$, then $(2A)\left(\frac{1}{4}A'\right) =$

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

B. $\begin{bmatrix} 1/2 & 0 \\ 0 & 1/2 \end{bmatrix}$

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

D. $\frac{1}{4}\begin{bmatrix} 1 & 0 \\ 0 & 0 \end{bmatrix}$

Answer: B

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99. If $A = \begin{bmatrix} 2 & 0 & -1 \\ 1 & 1 & 2 \\ -1 & 1 & 0 \end{bmatrix}$ then $AA^T =$

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

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

C. $\begin{bmatrix} 5 & 0 & -2 \\ 0 & 6 & 0 \\ -2 & 0 & 2 \end{bmatrix}$

D. $[(0, 0, 0]$

Answer: C

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100. If $A = \begin{bmatrix} 2 & 3 \\ 5 & -7 \end{bmatrix}$ then $(A')^2 =$

A. $\begin{bmatrix} 5 & -7 & 12 \\ 1 & 4 & 22 \end{bmatrix}$

B. $\begin{bmatrix} 1 & 17 \\ 1 & -4 \\ 0 & 2 \end{bmatrix}$

C. $\begin{bmatrix} 19 & -25 \\ -15 & 64 \end{bmatrix}$

D. $\begin{bmatrix} 0 & 2 \\ 1 & 0 \end{bmatrix}$

Answer: C

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101. If $A = \begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}$ then

A. $AA^T = A^TA = I$

B. $AA^T = A^TA = O$

C. $AA^T = A^TA = -I$

D. none

Answer: A

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102. If $A = \begin{bmatrix} \cos\theta & \sin\theta & 0 \\ -\sin\theta & \cos\theta & 0 \\ 0 & 0 & 1 \end{bmatrix}$ then

A. $AA^T = A^TA = I$

B. $AA^T = A^TA = O$

C. $AA^T = A^T = -I$

D. none

Answer: A

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

A. $AA^T = A^TA = I$

B. $AA^T = A^TA = O$

C. $AA^T = A^TA = -I$

D. none of these

Answer: A

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104. If $A = \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}, B = \begin{bmatrix} 2 & 0 \\ 0 & 1 \end{bmatrix}$ then $(AB)^T =$

A. $\begin{bmatrix} 5 & -7 & 12 \\ 1 & 4 & 22 \end{bmatrix}$

B. $\begin{bmatrix} 1 & 17 \\ 1 & -4 \\ 0 & 2 \end{bmatrix}$

C. $\begin{bmatrix} 19 & -25 \\ -15 & 64 \end{bmatrix}$

D. $\begin{bmatrix} 0 & 2 \\ 1 & 0 \end{bmatrix}$

Answer: D

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105. If $A = \begin{bmatrix} 3 & 0 \\ -4 & -1 \end{bmatrix}, B = \begin{bmatrix} 3 & 5 & -7 \\ 0 & -1 & 8 \end{bmatrix}, C = \begin{bmatrix} 6 \\ -1 \\ 0 \end{bmatrix}$ then $C'B'A' =$

A. $\begin{bmatrix} 39 \\ -53 \end{bmatrix}$

B. $\begin{bmatrix} -39 \\ 53 \end{bmatrix}$

C. $\begin{bmatrix} 39 & -53 \end{bmatrix}$

D. $\begin{bmatrix} -39 & 53 \end{bmatrix}$

Answer: C

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106. If $5A = \begin{bmatrix} 3 & -4 \\ 4 & x \end{bmatrix}$ and $AA^T = A^TA = I$ then $x =$

A. 2

B. 1

C. 3

D. 5

Answer: C

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107. If A is a square matrix then AA is

A. diagonal matrix

B. scalar matrix

C. symmetric matrix

D. idempotent matrix

Answer: C

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108. A and B are two matrices each of order $n \times n$. Then which of the following is not true

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

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

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

D. $(ABC)' = C' B' A'$

Answer: C

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109. If A and B are two symmetric matrix of same order, then show that $(AB - BA)$ is skew symmetric matrix.

A. a symmetric matrix

B. a skew- symmetric matrix

C. a null matrix

D. the identity matrix

Answer: B

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110. If A is a symmetric matrix and $n \varepsilon N$, then A^n is

A. symmetric

B. skew-symmetric

C. a diagonasl matrix

D. none

Answer: A

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111. If A is a skew symmetric matrix and n is a positive integer then A^n is

A. a symmetric matrix

B. skew-symmetric matrix

C. diagonal matrix

D. none

Answer: D

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

A. a symmetric matrix

B. skew-symmetric matrix

C. diagonal matrix

D. none

Answer: B

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113. If A is a skew symmetric matrix and n is an even positive integer then A^n is

A. a symmetric matrix

B. skew symmetric matrix

C. diagonal matrix

D. none

Answer: A

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114. A is a symmetric matrix or skew symmetric matrix. Then $A^2$is

A. an orthogonal matrix

B. a symmetric matrix

C. a unit matrix

D. a diagonal matrix

Answer: B

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115. Let A be a square matrix. Then $A + A^T$ will be

A. diagonal matrix

B. symmetric

C. the identity matrix

D. skew symmetric matrix

Answer: B

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116. A square matrix $\left(a_{ij}\right)$ where $a_{ij} = 0$ for $i \neq j$ and $a_{ij} = k$ (constant) for $i = j$ is called

A. Unit matrix

B. Scalar matrix

C. Null matrix

D. Diagonal matrix

Answer: B

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117. If $A = \begin{bmatrix} -1 & 2 & 3 \\ 2 & 5 & 6 \\ 3 & x & 7 \end{bmatrix}$ is symmetric, find value of x.

A. 2

B. 3

C. 5

D. 6

Answer: D

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118. If $\begin{bmatrix} 0 & 4 & -2 \\ -4 & 0 & 8 \\ 2 & -8 & x \end{bmatrix}$ is a skew symmetric matrix then find the value of x.

A. 0

B. 1

C. 2

D. 4

Answer: A

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119. If $\begin{bmatrix} 0 & 2 & 1 \\ -2 & 0 & -2 \\ -1 & x & 0 \end{bmatrix}$ is a skew symmetric matrix then find the value of x.

A. 2

B. 3

C. 5

D. 6

Answer: A

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120. Express $A = \begin{bmatrix} 2 & 0 & -3 \\ 4 & 3 & 1 \\ -5 & 7 & 2 \end{bmatrix}$ as a sum of a symmetric and a skew symmetric matrix

A. $\begin{bmatrix} 2 & 2 & -4 \\ 2 & 3 & 4 \\ -4 & 4 & 2 \end{bmatrix} + \begin{bmatrix} 0 & -2 & 1 \\ 2 & 0 & -3 \\ -1 & 3 & 0 \end{bmatrix}$

B. $\begin{bmatrix} 1 & 0 & -1 \\ 2 & 1 & 1 \\ -3 & 5 & 1 \end{bmatrix} + \begin{bmatrix} 1 & 0 & -2 \\ 2 & 2 & 0 \\ -2 & 2 & 1 \end{bmatrix}$

C. $\begin{bmatrix} 0 & 0 & -3 \\ 4 & 0 & 1 \\ -5 & 7 & 0 \end{bmatrix} + \begin{bmatrix} 2 & 0 & 0 \\ 0 & 3 & 0 \\ 0 & 0 & 2 \end{bmatrix}$

D. None

Answer: A

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121. Find the trace of $\begin{bmatrix} 1 & 3 & -5 \\ 2 & -1 & 5 \\ 2 & 0 & 1 \end{bmatrix}$

A. 0

B. 1

C. 2

D. 4

Answer: B

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122. If the trace of a matrix A is 3 then the trace of 5A is

A. 0

B. 3

C. 8

D. 15

Answer: D

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123. If the trace of A is 20 and the trace of B is 5 then the trace of $A - B$ is

A. 5

B. 15

C. 25

D. 35

Answer: B

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124. If the trace of AB is 25 then the trace of BA is

A. 0

B. 1

C. 5

D. 25

Answer: D

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125. If the traces of A,B are 20 and -8 then the trace of $A + B$ is

A. 12

B. -12

C. 28

D. -28

Answer: A

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126. If A is a skew symmetric matrix, then trace of A is

A. 1

B. -1

C. 0

D. None

Answer: C

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127. If $A = \left[a_{ij}\right]$ is a scalar matrix, then trace of A is

A. $\frac{\Sigma}{I}\frac{\Sigma}{j}a_{ij}$

B. $\frac{\Sigma}{i}a_{ij}$

C. $\frac{\Sigma}{j}a_{ij}$

D. $\frac{\Sigma}{i}a_{ii}$

Answer: D

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128. If $A = [a_{ij}]$ is a scalar matrix of order $n \times n$ such that $a_{ii} = k$ for all I then trace of $a =$

A. nk

B. $n + k$

C. n/k

D. none

Answer: A

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129. The matrix $\begin{bmatrix} 3 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ is

A. diagonal matrix

B. scalar matrix

C. nilpotent matrix

D. idempotent matrix

Answer: A

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130. The matrix $\begin{bmatrix} a & 0 & 0 \\ 0 & b & 0 \\ 0 & 0 & c \end{bmatrix}$ is

A. diagonal matrix

B. scalar matrix

C. nilpotent matrix

D. symmetric matrix

Answer: D

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131. The matrix $\begin{bmatrix} 1 & -3 & -4 \\ -1 & 3 & 4 \\ 1 & -3 & -4 \end{bmatrix}$ is

A. diagonal matrix

B. scalar matrix

C. nilpotent matrix

D. idempotent matrix

Answer: C

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132. If $A = \begin{bmatrix} 1 & 1 & 3 \\ 5 & 2 & 6 \\ -2 & -1 & -3 \end{bmatrix}$ then A is

A. idempotent matrices

B. involutory matrix

C. nilpotent matrix

D. scalar matrix

Answer: C

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133. If $A = \begin{bmatrix} ab & b^2 \\ -a^2 & -ab \end{bmatrix}$ then A is

A. idempotent matrix

B. involutory matrix

C. nipotent matrix of index 2

D. nilpotent matrix of index 3

Answer: C

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134. If $A = \begin{bmatrix} 2 & -2 & -4 \\ -1 & 3 & 4 \\ 1 & -2 & -3 \end{bmatrix}$ then A is

A. idempotent matrix

B. involutory matrix

C. nilpoten matrix of index2

D. nilpotent matrix of index 3

Answer: A

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135. If A and B are two skew symmetric matrices of order n then

A. AB is skew symmetric matrix

B. AB is a symmetric matrix

C. AB is a symmetric matrix if A and B commute

D. none of these

Answer: C

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Exercise 1 B Mcq Determinants

1. $\begin{vmatrix} 4 & 3 \\ -1 & 2 \end{vmatrix} =$

A. 1

B. 11

C. 0

D. 2

Answer: B

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2. $\begin{vmatrix} \sin\alpha & \cos\alpha \\ \cos\alpha & -\sin\alpha \end{vmatrix} =$

A. 1

B. -1

C. 0

D. 2

Answer: B

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3. $\begin{vmatrix} 4\sin^2\theta & \cos^2\theta \\ 3\sec^2\theta & cosec^2\theta \end{vmatrix} =$

A. $8\sin^2\theta\cos^2\theta$

B. $4\sin2\theta\cos2\theta$

C. 1

D. $4\cos^3\theta$ - $3\cos\theta$

Answer: C

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4. $\begin{vmatrix} i & 0 \\ 0 & i \end{vmatrix} =$

A. 1

B. 11

C. -1

D. 2

Answer: C

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5. The real part of $\begin{vmatrix} \cos\alpha + i\sin\alpha & \cos\beta + i\sin\beta \\ \sin\beta + i\cos\beta & \sin\alpha + i\cos\alpha \end{vmatrix}$ is

A. $2\cos\alpha$

B. $2\sin\beta$

C. 0

D. 1

Answer: C

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6. If $A = \begin{bmatrix} 1 & 3 \\ 2 & 1 \end{bmatrix}$ then the determinant of $A^2 - 2A$ is

A. 5

B. 25

C. -5

D. -25

Answer: B

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7. The minors of 1 and -1 in the matrix $\begin{bmatrix} 1 & 4 & 2 \\ 2 & -1 & 4 \\ -3 & 7 & -6 \end{bmatrix}$ are

A. $-22, 0$

B. $0, 9$

C. $0, \ -9$

D. $-1, \ -1$

Answer: A

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8. The cofactor of 7 and 5 in the matrix $\begin{bmatrix} 1 & 2 & 3 \\ 4 & -1 & 7 \\ 2 & 4 & 5 \end{bmatrix}$ are

A. $-22, 0$

B. $0, 9$

C. $0, \ -9$

D. $-1, \ -1$

Answer: C

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9. The product of the cofactors of 3 and -2 in $\begin{bmatrix} 1 & 0 & -2 \\ 3 & -1 & 2 \\ 4 & 5 & 6 \end{bmatrix}$ is

A. -190

B. -6

C. 1

D. 19

Answer: A

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10. $\begin{vmatrix} 1 & 4 & 2 \\ 2 & -1 & 4 \\ -3 & 7 & -6 \end{vmatrix} =$

A. 0

B. 1

C. 2

D. -6

Answer: A

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11. $\begin{vmatrix} 0 & 1 & 1 \\ 1 & 0 & 1 \\ 1 & 1 & 0 \end{vmatrix} =$

A. 2

B. -7

C. 0

D. 49

Answer: A

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12. $\begin{vmatrix} a & p & q \\ 0 & b & r \\ 0 & 0 & c \end{vmatrix}$

A. 0

B. abc

C. pqr

D. 1

Answer: B

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13. $\begin{vmatrix} a & h & g \\ h & b & f \\ g & f & c \end{vmatrix} =$

A. 0

B. 1

C. $abc + 2fgh - af^2 - bg^2 - ch^2$

D. $af^2 + bg^2 + ch^2 + abc + 2fgh$

Answer: C

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14. $\begin{vmatrix} a & b & c \\ b & c & a \\ c & a & b \end{vmatrix} =$

A. 0

B. 1

C. $a^3 + b^3 + c^3.3abc$

D. $3abc - a^3 - b^3 - c^3$

Answer: D

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15. If a,b,c are positive and not all equal then $\begin{vmatrix} a & b & c \\ b & c & a \\ c & a & b \end{vmatrix}$

A. < 0

B. < 0

C. > 0

D. ≥ 0

Answer: B

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16. The matrix $\begin{bmatrix} 3 & 2 \\ 5 & 1 \end{bmatrix}$ is

A. non singular

B. singular

C. skew symmetric

D. symmetric

Answer: A

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17. The matrix $\begin{vmatrix} 1 & 0 & 0 \\ 2 & 1 & 0 \\ 3 & 1 & 1 \end{vmatrix}$ is

A. non singular

B. singular

C. skew symmetric

D. symmertic

Answer: B

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18. Find the determinant of the matrix $\begin{bmatrix} 1^2 & 2^2 & 3^2 \\ 2^2 & 3^2 & 4^2 \\ 3^2 & 4^2 & 5^2 \end{bmatrix}$

A. 0

B. 1

C. 5

D. -8

Answer: D

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19. $\begin{vmatrix} 43 & 1 & 6 \\ 35 & 7 & 4 \\ 17 & 3 & 2 \end{vmatrix} =$

A. 0

B. -7

C. 1

D. 4

Answer: A

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20. $\begin{vmatrix} 24 & 25 & 26 \\ 25 & 26 & 27 \\ 26 & 27 & 27 \end{vmatrix} =$

A. 0

B. -1

C. 1

D. 2

Answer: C

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21. $\begin{vmatrix} 1990 & 1991 & 1992 \\ 1991 & 1992 & 1993 \\ 1992 & 1993 & 1994 \end{vmatrix} =$

A. 1992

B. 1993

C. 1994

D. 0

Answer: D

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22. $\left|\left(\log e, \log e^2, \log e^3\right), \left(\log e^2, \log e^3, \log e^4\right), \left(\log e^3, \log e^4, \log e^5\right)\right| =$

A. 0

B. 1

C. $4\log e$

D. $5\log e$

Answer: A

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23. find determinant of $\begin{vmatrix} 1 & \omega & \omega^2 \\ \omega & \omega^2 & 1 \\ \omega^2 & 1 & \omega \end{vmatrix} =$

A. 0

B. 1

C. ω

D. ω^2

Answer: A

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24. If $1, \omega, \omega^2$ are the cube roots of unity then $\Delta = \begin{vmatrix} 1 & \omega^n & \omega^{2n} \\ \omega^n & \omega^{2n} & 1 \\ \omega^{2n} & 1 & \omega^n \end{vmatrix} =$

A. 1

B. ω

C. ω^2

D. 0

Answer: D

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25. $\begin{vmatrix} a-b & b-c & c-a \\ b-c & c-a & a-b \\ c-a & a-b & b-c \end{vmatrix} =$

A. 0

B. 1

C. abc

D. $a+b+c$

Answer: A

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26. $\begin{vmatrix} a-b & p-q & x-y \\ b-c & q-r & y-z \\ c-a & r-p & z-x \end{vmatrix} =$

A. 0

B. 1

C. abc

D. none

Answer: A

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27. $\begin{vmatrix} 0 & p-q & p-r \\ q-p & 0 & q-r \\ r-p & r-q & 0 \end{vmatrix} =$

A. 0

B. $(p-q)(q-r)(r-p)$

C. pqr

D. $p+q+r$

Answer: A

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28. $\begin{vmatrix} 0 & b & -c \\ -b & 0 & a \\ c & -a & 0 \end{vmatrix} =$

A. 0

B. 1

C. 2

D. -1

Answer: A

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29. $\begin{vmatrix} b+c & a & 1 \\ c+a & b & 1 \\ a+b & c & 1 \end{vmatrix} =$

A. 0

B. 1

C. abc

D. $a+b+c$

Answer: A

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30. $\begin{vmatrix} x & 1 & y+z \\ y & 1 & z+x \\ z & 1 & x+y \end{vmatrix} =$

A. $1+x+y+z$

B. $x+y+z$

C. 0

D. none

Answer: C

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31. $\begin{vmatrix} 1 & bc & a(b+c) \\ 1 & ca & b(c+a) \\ 1 & ab & c(a+b) \end{vmatrix} =$

A. 1

B. abc

C. $abc(a+b+c)$

D. 0

Answer: D

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32. $\begin{vmatrix} 1/a & a^2 & bc \\ 1/b & b^2 & ca \\ 1/c & c^2 & ab \end{vmatrix} =$

A. 0

B. 1

C. abc

D. $(a - b)(b - c)(c - a)$

Answer: A

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33. $\begin{vmatrix} 1 & bc & bc(b+c) \\ 1 & ca & ca(c+a) \\ 1 & ab & ab(a+b) \end{vmatrix} =$

A. abc

B. $2abc$

C. $3abc(a + b + c)$

D. 0

Answer: D

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34. $\begin{vmatrix} 1 & \log_x y & \log_x z \\ \log_y x & 1 & \log_y z \\ \log_z x & \log_z y & 1 \end{vmatrix} =$

A. $\log xyz$

B. 1

C. 0

D. none

Answer: C

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35. $\begin{vmatrix} -a^2 & ab & ac \\ ab & -b^2 & bc \\ ac & bc & -c^2 \end{vmatrix} =$

A. $a^2b^2c^2$

B. $2a^2b^2c^2$

C. $3a^2b^2c^2$

D. $4a^2b^2c^2$

Answer: D

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36. $\begin{vmatrix} 0 & ab^2 & ac^2 \\ a^2b & 0 & bc^2 \\ a^2c & b^2c & 0 \end{vmatrix} =$

A. $a^3b^3c^3$

B. $2a^3b^3c^3$

C. $3a^3b^3c^3$

D. $4a^3b^3c^3$

Answer: B

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37. $\begin{vmatrix} ax & by & cz \\ x^2 & y^2 & z^2 \\ 1 & 1 & 1 \end{vmatrix} =$

A. $\begin{vmatrix} a & b & c \\ x & y & z \\ yz & zx & xy \end{vmatrix}$

B. $\begin{vmatrix} a & b & c \\ x & y & z \\ y & z & x \end{vmatrix}$

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

D. $\begin{vmatrix} a & b & c \\ 1 & 1 & 1 \\ yz & zx & xy \end{vmatrix}$

Answer: A

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38. $\begin{vmatrix} b+c & a+b & a \\ c+a & b+c & b \\ a+b & c+a & c \end{vmatrix} =$

A. $a^3 + b^3 + c^3 - 3abc$

B. $3abc - a^3 - b^3 - c^3$

C. $2\left(a^3 + b^3 + c^3 - 3abc\right)$

D. $2\left(3abc - a^3 - b^3 - c^3\right)$

Answer: A

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39. If $\begin{vmatrix} a+b & b+c & c+a \\ b+c & c+a & a+b \\ c+a & a+b & b+c \end{vmatrix} = k\begin{vmatrix} a & b & c \\ b & c & a \\ c & a & b \end{vmatrix}$ then $k =$

A. 1

B. 2

C. 4

D. 8

Answer: B

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40. $\begin{vmatrix} b+c & c+a & a+b \\ c+a & a+b & b+c \\ a+b & b+c & c+a \end{vmatrix} =$

A. $2\left(3abc - a^3 - b^3 - c^3\right)$

B. $a^3 + b^3 + c^3$

C. $a^3 - b^3 - c^3 - 2ab$

D. $a^2 + b^2 + c^2$

Answer: A

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41. $\begin{vmatrix} a & b & c \\ a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \end{vmatrix} = k \begin{vmatrix} b+c & c+a & a+b \\ b_1+c_1 & c_1+a_1 & a_1+b_1 \\ b_2+c_2 & c_2+a_2 & a_2+b_2 \end{vmatrix}$ then $k =$

A. 1

B. $1/2$

C. 4

D. 2

Answer: B

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42. If $\begin{vmatrix} x & y & z \\ -x & y & z \\ x & -y & z \end{vmatrix} = kxyz$, then $k =$

A. 1

B. 3

C. 4

D. 5

Answer: C

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43. If $D = \begin{vmatrix} 1 & 1 & 1 \\ 1 & 1+x & 1 \\ 1 & 1 & 1+y \end{vmatrix}$ for $x \neq 0, y \neq 0$ then D is

A. divisible by neither x nor y

B. divisible by both x and y

C. divisible by x but not y

D. divisible by y but not x

Answer: B

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44. $\begin{vmatrix} x & a & a \\ a & x & a \\ a & a & x \end{vmatrix} =$

A. $(x + 2a)(x - a)$

B. $(x + 2a)^2(x - a)$

C. $(x + 2a)(x - a)^2$

D. $(x + 2a)^2(x - a)^2$

Answer: C

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45. $\begin{vmatrix} 1 + a & b & c \\ a & 1 + b & c \\ a & b & 1 + c \end{vmatrix} =$

A. 0

B. 1

C. $1 + a + b + c$

D. $abc + ab + bc + ca$

Answer: C

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46. If $\begin{vmatrix} 1 + a_1 & a_2 & a_3 \\ a_1 & 1 + a_2 & a_3 \\ a_1 & a_2 & 1 + a_3 \end{vmatrix} = 0$ then $a_1 + a_2 + a_3 =$

A. -1

B. 0

C. 1

D. 3

Answer: A

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47. $\begin{vmatrix} 1+a & b & c \\ a & 1+b & c \\ a & b & 1+c \end{vmatrix} =$

A. 0

B. 1

C. $abc(1+a+b+c)$

D. $abc+ab+bc+ca$

Answer: D

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48. If $\frac{1}{a}+\frac{1}{b}+\frac{1}{c}=0$ then $\begin{vmatrix} 1+a & 1 & 1 \\ 1 & 1+b & 1 \\ 1 & 1 & 1+c \end{vmatrix} =$

A. 0

B. abc

C. -abc

D. none of these

Answer: B

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49. $\begin{vmatrix} a^2+1 & ab & ac \\ ab & b^2+1 & bc \\ ac & bc & c^2+1 \end{vmatrix} =$

A. $1 + a + b + c$

B. $1 + a^2 + b^2 + c^2$

C. $abc + ab + bc + ca$

D. none

Answer: B

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50. Show that $\begin{vmatrix} a - b - c & 2a & 2a \\ 2b & b - c - a & 2b \\ 2c & 2c & c - a - b \end{vmatrix} = (a + b + c)^3$

A. $(a + b + c)^2$

B. $(a + b + c)^4$

C. $(a + b + c)^3$

D. $(a + b + c)$

Answer: C

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51. Show that $\begin{vmatrix} a + b + 2c & a & b \\ c & b + c + 2a & b \\ c & a & c + a + 2b \end{vmatrix} = 2(a + b + c)^3$

A. $(a+b+c)^3$

B. $2(a+b+c)^3$

C. $3(a+b+c)^3$

D. $(a+b+c)^3$

Answer: B

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52. $A = \begin{bmatrix} 1 & 5 & 6 \\ 2 & 3 & 4 \\ 1 & 1 & 1 \end{bmatrix}$ find rank of A

A. 0

B. 1

C. 2

D. 3`

Answer: D

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53. $\begin{vmatrix} a & b-c & c+b \\ a+c & b & c-a \\ a-b & b+a & c \end{vmatrix} =$

A. $abc(a+b+c)$

B. $(a+b+c)\left(a^3+b^3+c^3\right)$

C. $(a+b+c)\left(a^2+b^2+c^2\right)$

D. $abc\left(a^2+b^2+c^2\right)$

Answer: C

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54. $\begin{vmatrix} a^2+x & ab & ac \\ ab & b^2+x & bc \\ ac & bc & c^2+x \end{vmatrix}$

A. $a^2 + b^2 + c^2 + x$

B. $\left(a^2 + b^2 + c^2 + x\right)x^3$

C. $\left(a^2 + b^2 + c^2 + x\right)x^3$

D. none

Answer: C

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55. $\begin{vmatrix} a^2+2a & 2a+1 & 1 \\ 2a+1 & a+2 & 1 \\ 3 & 3 & 1 \end{vmatrix}$

A. $(a - 1)^2$

B. $(a - 1)^3$

C. $(a - 1)^4$

D. $2(a - 1)$

Answer: B

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56. $\begin{vmatrix} \sin^2 x & \cos^2 x & 1 \\ \cos^2 x & \sin^2 x & 1 \\ -10 & 12 & 2 \end{vmatrix} =$

A. 0

B. $12\cos^2 x - 10\sin^2 2$

C. $12\sin^2 x - 10\cos^2 x - 2$

D. $10\sin 2x$

Answer: A

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57. If $A = [a_{ij}]$ is a scalar matrix of order $n \times n$ such that $a_{ij} = k$ for all i then $|A| =$

A. nk

B. $n + k$

C. n^k

D. k^n

Answer: D

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58. If $A = [a_{ij}]$ is a square matrix of order $n \times n$ and k is a scalar then $|kA| =$

A. $k^n|A|$

B. $k|A|$

C. $k^{n-1}|A|$

D. none

Answer: A

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59. $\begin{vmatrix} x & p & q \\ p & x & q \\ p & q & x \end{vmatrix} =$

A. $(x - p)(x - q)(x - p - q)$

B. $(x + p)(x - q)(x + p + q)$

C. $(x + p)(x + q)(x - p - q)$

D. $(x - p)(x - q)(x + p + q)$

Answer: D

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60. Prove that $\begin{vmatrix} y+z & x & x \\ y & z+x & y \\ z & z & x+y \end{vmatrix} = 4xyz$

A. xyz

B. $2xyz$

C. $3xyz$

D. $4xyz$

Answer: D

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61. $\begin{vmatrix} a+b & c & c \\ b & a+c & b \\ a & a & b+c \end{vmatrix} =$

A. $4abc$

B. $2abc$

C. $a^2b^2c^2$

D. $4a^2bc$

Answer: A

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62. $\begin{vmatrix} b^3+c^2 & ab & ac \\ ab & c^2+a^2 & bc \\ ca & bc & a^3+b^2 \end{vmatrix} =$

A. $2a^3b^2c^2$

B. $4a^2b^2c^2$

C. $\left(a^3 + b^3\right)^2$

D. $-\left(a^3 + b^3\right)^2$

Answer: B

View Text Solution

63. If $\begin{vmatrix} \left(a^2 + b^2\right)/c & c & c \\ a & \left(b^2 + c^2\right)/a & a \\ b & b & \left(c^2 + a^2\right)/b \end{vmatrix} = k(abc)$ then $k =$

A. 4

B. 3

C. 2

D. 0.01

Answer: A

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64. $\begin{vmatrix} (b+c)^2 & a^2 & a^2 \\ b^2 & (c+a)^2 & b^2 \\ c^2 & c^2 & (a+b)^2 \end{vmatrix} =$

A. $(a + b + c)(c - a)$

B. $abc(a + b + c)^3$

C. $(a - b)(c - c)(c - a)(a + b + c)^2$

D. $2abc(a + b + c)^3$

Answer: D

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65. $\begin{vmatrix} (a+b)^2 & ca & bc \\ ca & (b+c)^2 & ab \\ bc & ab & (c+a)^2 \end{vmatrix} =$

A. $(ab+bc+ca)^3$

B. $abc(a+b+c)^3$

C. $2abc(a+b+c)^3$

D. $2(ab+bc+ca)^3$

Answer: C

View Text Solution

66. If $A = \begin{bmatrix} 1 & -2 & 0 \\ 5 & 2 & 3 \\ 1 & 1 & x \end{bmatrix}$ and det(A)=3 Find x=

A. 0

B. 4

C. 2

D. 1

Answer: D

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67. If $\begin{vmatrix} a^2 & bc & ac+c^2 \\ a^2+ab & b^2 & ac \\ ab & b^2+bc & c^2 \end{vmatrix} = k$ then $k =$

A. $(2abc)^2$

B. 4

C. $2abc$

D. 2

Answer: A

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68. Prove that

$$\begin{vmatrix} 1+a^2-b^2 & 2ab & -2b \\ 2ab & 1-a^2+b^2 & 2a \\ 2b & -2a & 1-a^2-b^2 \end{vmatrix} = \left(1+a^2+b^2\right)^3$$

A. $\left(1+a^2+b^2\right)^3$

B. $\left(1-a^2-b^2\right)$

C. $1+a+b$

D. $(1+a+b)^2$

Answer: A

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69. $\begin{vmatrix} 1 & a & a^2 \\ 1 & b & b^2 \\ 1 & c & c^2 \end{vmatrix} =$

A. $(a - b)(b - c)(c - a)$

B. $(a - b)(b - c)(c - a)(a + b + c)$

C. $(a - b)(b - c)(c - a)abc$

D. $(a - b)(b - c)(c - a)(ab + bc + ca)$

Answer: A

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70. $\begin{vmatrix} 1 & 1 & 1 \\ a & b & c \\ bc & ca & ab \end{vmatrix} =$

A. $(a - b)(b - c)(c - a)$

B. $(a - b)(b - c)(c - a)(a + b + c)$

C. $(a - b)(b - c)(c - a)abc$

D. $(a - b)(b - c)(c - a)(ab + bc + ca)$

Answer: A

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71. $\begin{vmatrix} 1 & 1 & 1 \\ a & b & c \\ a^3 & b^3 & c^3 \end{vmatrix} =$

A. $(a - b)(b - c)(c - a)$

B. $(a - b)(b - c)(c - a)(a + b + c)$

C. $(a - b)(b - c)(c - a)abc$

D. $(a - b)(b - c)(c - a)(ab + bc + ca)$

Answer: B

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72. $\begin{vmatrix} 1 & 1 & 1 \\ a^2 & b^2 & c^2 \\ bc & ca & ab \end{vmatrix} =$

A. $(a - b)(b - c)(c - a)$

B. $(a - b)(b - c)(c - a)(a + b + c)$

C. $(a - b)(b - c)(c - a)abc$

D. $(a - b)(b - c)(c - a)(ab + bc + ca)$

Answer: B

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73. $\begin{vmatrix} 1 & 1 & 1 \\ a^2 & b^2 & c^2 \\ a^3 & b^3 & c^3 \end{vmatrix} =$

A. $(a - b)(b - c)(c - a)$

B. $(a - b)(b - c)(c - a)(a + b + c)$

C. $(a - b)(b - c)(c - a)abc$

D. $(a - b)(b - c)(c - a)(ab + bc + ca)$

Answer: D

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74. $\begin{vmatrix} a & b & c \\ a^2 & b^2 & c^2 \\ bc & ca & ab \end{vmatrix} =$

A. $(a - b)(b - c)(c - a)$

B. $(a - b)(b - c)(c - a)(a + b + c)$

C. $(a - b)(b - c)(c - a)abc$

D. $(a - b)(b - c)(c - a)(ab + bc + ca)$

Answer: D

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75. $\begin{vmatrix} a & b & c \\ a-b & b-c & c-a \\ b+c & c+a & a+b \end{vmatrix} =$

A. $a^3 + b^3 + c^3$

B. $a^3 + b^3 + c^3 - 3abc$

C. $a^2 + b^2 + c^2$

D. $a - b - c + 3abc$

Answer: B

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76. If a,b,c are sides of a triangle and $\begin{vmatrix} a^2 & b^2 & c^2 \\ (a+1)^2 & (b+1)^2 & (c+1)^2 \\ (a-1)^2 & (b-1)^2 & (c-1)^2 \end{vmatrix} = 0$

then

A. $(a-b)(b-c)(c-a)$

B. $2(a-b)(b-c)(c-a)$

C. $3(a-b)(b-c)(c-a)$

D. $-4(a-b)(b-c)(c-a)$

Answer: D

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77. If $A(x) = \begin{vmatrix} 1 & 1 & 1 \\ \left(e^x + e^{-x}\right)^2 & \left(\pi^x + \pi^{-x}\right)^2 & 2 \\ \left(e^x - e^{-x}\right)^2 & \left(\pi^x - \pi^{-x}\right)^2 & -2 \end{vmatrix}$ then A(x) =

A. x^2

B. $x^2 - 1$

C. $e^{x^2} - \pi^{x^2}$

D. '0'

Answer: D

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78. If a,b,c are sides of a triangle and $\begin{vmatrix} a^2 & b^2 & c^2 \\ (a+1)^2 & (b+1)^2 & (c+1)^2 \\ (a-1)^2 & (b-1)^2 & (c-1)^2 \end{vmatrix} = 0$

then

A. ΔAB is equilateral

B. ΔAB is right angled isosceles

C. ΔABC is isosceles

D. none

Answer: C

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79. $\begin{vmatrix} b^2 - ab & b - c & bc - ac \\ ab - a^2 & a - b & b^2 - ab \\ bc - ac & c - a & ab - a^2 \end{vmatrix} =$

A. 0

B. abc

C. $a + b + c$

D. $ab + bc + ca$

Answer: A

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80. $\begin{vmatrix} a & b+c & a^2 \\ b & c+a & b^2 \\ c & a+b & c^2 \end{vmatrix} =$

A. $(a - b)(b - c)(c - a)(a + b + c)$

B. $(a - b)(b - c)(a - c)(a + b + c)$

C. $(a - b)(b - c)(c - a)(ab + bc + ca)$

D. $(a - b)(b - c)(a - c)(ab + bc + ca)$

Answer: B

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81. $\begin{vmatrix} (b+c)^2 & a^2 & bc \\ (c+a)^2 & b^2 & ca \\ (a+b)^2 & c^2 & ab \end{vmatrix} =$

A. $(a - b)(b - c)(c - a)abc$

B. $(a - b)(b - c)(c - a)(a + b + c)$

C. $(a - b)(b - c)(c - a)(abc)\left(a^2 + b^2 + c^2\right)$

D. $(a - b)(b - c)(c - a)(a + b + c)\left(a^2 + b^2 + c^2\right)$

Answer: D

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82. If $A = \begin{vmatrix} b^2c^2 & bc & b + c \\ c^2a^2 & ca & c + a \\ a^2b^2 & ab & a + b \end{vmatrix}$ then $|A| =$

A. abc

B. $abc - 1$

C. $abc + 1$

D. 0

Answer: D

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83. The determinant $\Delta = \begin{vmatrix} a & a+b & a+2b \\ a+2b & a & a+b \\ a+b & a+2b & a \end{vmatrix} =$

A. $9b^2(a+b)$

B. $9a^2(a+b)$

C. $9(a+b)^3$

D. $9ab(a+b)$

Answer: A

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84. If ω is a cube root of unit, then $\Delta = \begin{vmatrix} x+1 & \omega & \omega^2 \\ \omega & x+\omega^2 & 1 \\ \omega^2 & 1 & x+\omega \end{vmatrix} =$

A. $x^3 + 1$

B. $x^3 + \omega$

C. $x^3 + \omega^2$

D. x^3

Answer: D

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85. $\begin{vmatrix} 1 & 1 & 1 \\ a & b & c \\ a^2 - bc & b^2 - ca & c^2 - ab \end{vmatrix} =$

A. 0

B. 1

C. abc

D. $(a - b)(b - c)(c - a)$

Answer: A

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86. $\begin{vmatrix} x & x^2 & 1+x^3 \\ y & y^2 & 1+y^3 \\ z & z^2 & 1+z^2 \end{vmatrix} = 0, x \neq y \neq z \Rightarrow 1 + xyz =$

A. 0

B. -1

C. 1

D. 2

Answer: A

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87. If $\begin{vmatrix} a & a^2 & 1+a^3 \\ b & b^2 & 1+b^3 \\ c & c^2 & 1+c^3 \end{vmatrix} = 0$ and vectors $\left(1, a, a^2\right), \left(1, b, b^2\right)$ and $\left(1, c, c^2\right)$ are non coplanar then the product $abc =$

A. -1

B. 1

C. 0

D. 2

Answer: A

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88. If a,b,c are all different and $\begin{vmatrix} a & a^3 & a^4 - 1 \\ b & b^3 & b^4 - 1 \\ c & c^3 & c^4 - 1 \end{vmatrix} = 0$ then

$abc(ab + bc + ca) =$

A. 0

B. 1

C. -1

D. $a + b + c$

Answer: D

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89. If a,b,c are different and $\begin{vmatrix} a & a^2 & a^3 - 1 \\ b & b^2 & b^3 - 1 \\ c & c^2 & c^3 - 1 \end{vmatrix} = 0$ then

A. $a + b + c = 0$

B. $abc = 1$

C. $a + b + c = 1$

D. $ab + bc + ca = 0$

Answer: B

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90. If a,b,c are all different and $\begin{vmatrix} 1 + a^2 & 1 + b^2 & 1 + c^2 \\ a & b & c \\ a^3 & b^3 & c^3 \end{vmatrix} = 0$ then $a + b + c =$

A. 0

B. abc

C. 1

D. $ab + bc + ca$

Answer: B

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91. If $p + q + r = 0$ and $\begin{vmatrix} pa & qb & rc \\ qc & ra & pb \\ rb & pc & qa \end{vmatrix} = k \begin{vmatrix} a & b & c \\ c & a & b \\ b & c & a \end{vmatrix}$ then $k =$

A. 0

B. abc

C. pqr

D. $a + b + c$

Answer: C

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92. If $\Delta = \begin{vmatrix} 1 & a & a^2 \\ 1 & b & b^2 \\ 1 & c & c^2 \end{vmatrix} = k(a - b)(b - c)(c - a)$ then $k =$

A. abc

B. 0

C. 1

D. -1

Answer: C

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93. If $abc \neq 0$ and if $\begin{vmatrix} a & b & c \\ b & c & a \\ c & a & b \end{vmatrix} = 0$ then $\dfrac{a^3 + b^3 + c^3}{abc} =$

A. 2

B. 3

C. 1

D. -3

Answer: B

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94. $\begin{vmatrix} 1 & 1 & 1 \\ a & b & c \\ a^3 & b^3 & c^3 \end{vmatrix} =$

A. $x = \frac{1}{3}(a + b + c)$

B. $x = \frac{2}{3}(a + b + c)$

C. $x = a + b + c$

D. none of these

Answer: A

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95. Let $A = \begin{bmatrix} 5 & 5\alpha & \alpha \\ 0 & \alpha & 5\alpha \\ 0 & 0 & 5 \end{bmatrix}$ If $|A|^2 = 25$ then $|\alpha|$ equals

A. 5^2

B. 1

C. $1/5$

D. 5

Answer: C

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96. If $k > 1$, and the determinant of the matrix A^2, where

$A = \begin{bmatrix} k & k\alpha & \alpha \\ 0 & \alpha & k\alpha \\ 0 & 0 & k \end{bmatrix}$ is k^2 then $|\alpha| =$

A. k

B. k^2

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

D. $\frac{1}{k^2}$

Answer: C

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97. If $a \neq 6, b, c$ satisfy $\begin{vmatrix} a & 2b & 2c \\ 3 & b & c \\ 4 & a & b \end{vmatrix} = 0$ then abc

A. $a + b + c$

B. 0

C. b^3

D. $ab + bc$

Answer: C

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98. If $a \neq 6, b, c$ satisfy $\begin{vmatrix} a & 2b & 2c \\ 3 & b & c \\ 4 & a & b \end{vmatrix} = 0$ then abc

A. $a+b+c$

B. b

C. b^2

D. b^3

Answer:

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99. If $f(x) = \begin{vmatrix} a & -1 & 0 \\ ax & a & -1 \\ ax^2 & ax & a \end{vmatrix}$ then $f(3x) - f(2x) =$

A. -1

B. a

C. $x^2(a + x)$

D. none of these

Answer: D

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100. If $\Delta = \begin{vmatrix} a & 1 & 1 \\ 1 & b & 1 \\ 1 & 1 & c \end{vmatrix} > 0$, then

A. $abg > 1$

B. $abg > -8$

C. $abg < -8$

D. $abc > -2$

Answer: B

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101. If A is a 3×3 matrix and $\det(3A) = k(\det A)$ then $k =$

A. 9

B. 6

C. 1

D. 27

Answer: D

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102. If the matrix $\begin{bmatrix} x & 4 \\ 2 & 8 \end{bmatrix}$ is singular, then $x =$

A. 1

B. -3

C. a,b

D. 0

Answer: A

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103. If the matrix $\begin{bmatrix} x & b & b \\ 1 & 1 & 1 \\ 0 & x & a \end{bmatrix}$ is singular, then $x =$

A. 1

B. -3

C. a,b

D. 0

Answer: C

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104. If the matrix $A = \begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & \lambda \end{bmatrix}$ is singular one, then λ is

A. 3

B. 4

C. 2

D. 5

Answer: A

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105. If $\begin{pmatrix} 1 & 2 & x \\ 4 & -1 & 7 \\ 2 & 4 & -6 \end{pmatrix}$ is a singular matrix, then $x =$

A. 0

B. 1

C. -3

D. 3

Answer: C

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106. If the matrix $\begin{bmatrix} \cos\theta & \sin\theta & 0 \\ \sin\theta & \cos\theta & 0 \\ 0 & 0 & 1 \end{bmatrix}$ is singular then $\theta =$

A. π

B. $\pi/2$

C. $\pi/3$

D. $\pi/4$

Answer: D

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107. If $\Delta = \begin{vmatrix} 1 & \sin\theta & 1 \\ -\sin\theta & 1 & \sin\theta \\ -1 & -\sin\theta & 1 \end{vmatrix}$ then Δ lies in the interval

A. $|2, 3|$

B. $[3, 4]$

C. $[2, 4]$

D. $(2, 4)$

Answer: C

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108. If $\begin{vmatrix} 3x-8 & 3 & 3 \\ 3 & 3x-8 & 3 \\ 3 & 3 & 3x-8 \end{vmatrix} = 0$ then $x = 0$

A. $2/3, 11/3$

B. $3/2, 5/3$

C. $3/2, 3/11$

D. $3/2, 5/11$

Answer: A

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109. If $\begin{vmatrix} x & 2 & 7 \\ 5 & 0 & 2 \\ 3 & -4 & 6 \end{vmatrix} = -180$ then $x =$

A. 1

B. 0

C. -6

D. 6

Answer: A

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110. If one of the roots of $\begin{vmatrix} 3 & 5 & x \\ 7 & x & 7 \\ x & 5 & 3 \end{vmatrix} = 0$ is -10, then the other roots are:

A. 3,7

B. 4,7

C. 3,9

D. 3,4

Answer: A

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111. If $x \neq 0$ and $\begin{vmatrix} 1 & x & 2x \\ 1 & 3x & 5x \\ 1 & 3 & 4 \end{vmatrix} = 0$ then x=

A. 1

B. -1

C. 2

D. -2

Answer: B

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112. $\begin{vmatrix} x+2 & x+3 & x+5 \\ x+4 & x+6 & x+9 \\ x+8 & x+11 & x+15 \end{vmatrix} =$

A. $3x^2 + 4x + 5$

B. $x^3 + 8x + 2$

C. 0

D. -2

Answer: D

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113. If `|(x+1,x+2,x+4),(x+3,x+5,x+8),(x+7,x+10,x+14)|=

A. 0

B. 1

C. -2

D. any real number

Answer: c

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114. If $\begin{vmatrix} 1+x & 1-x & 1-x \\ 1-x & 1+x & 1-x \\ 1-x & 1-x & 1+x \end{vmatrix} = 0$ then $x =$

A. 3

B. 2

C. -2

D. -1

Answer: A

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115. If $\begin{vmatrix} x & x+y & x+y+z \\ 2x & 3x+2y & 4x+3y+2z \\ 3x & 6x+3y & 10x+6y+3z \end{vmatrix} = 64$ then $x =$

A. 0

B. 1

C. 4

D. -1

Answer: C

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116. If $\begin{vmatrix} a & a & x \\ m & m & m \\ b & x & b \end{vmatrix} = 0$ then $x =$

A. 0

B. a

C. b

D. a or b

Answer: D

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117. If $\begin{vmatrix} a & b & 0 \\ 0 & a & b \\ b & 0 & a \end{vmatrix} = 0$ then

A. a is a cube root of 1

B. b is a cube root of

C. $\frac{a}{b}$ is a cube root of

D. $\frac{a}{b}$ is a cube root of -1

Answer: D

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118. If a,b,c are different and $\begin{vmatrix} 0 & x-a & x-b \\ x+a & 0 & x-c \\ x+b & x+c & 0 \end{vmatrix} = 0$ then $x =$

A. a

B. b

C. c

D. 0

Answer: D

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119. If $\begin{vmatrix} a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \\ a_3 & b_3 & c_3 \end{vmatrix} \neq 0 \begin{vmatrix} a_1 + b_1x & a_1x + b_1 & c_1 \\ a_2 + b_2x & a_2x + b_2 & c_2 \\ a_3 + b_3x & a_3x + b_3 & c_3 \end{vmatrix} = 0$ then $x =$

A. 0

B. 1

C. -1

D. ± 1

Answer: D

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120. If $(b - c)^2 \neq (a - b)(c - a)$ and $\begin{vmatrix} a+x & b+x & c+x \\ b+x & c+x & a+x \\ c+x & a+x & b+x \end{vmatrix} = 0$ then $x =$

A. $a + b + c$

B. $-\frac{1}{2}(a + b + c)$

C. $\frac{1}{2}(a + b + c)$

D. $-\frac{1}{3}(a + b + c)$

Answer: D

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121. If $a+b+c=0$ and $\begin{vmatrix} a-x & c & b \\ c & b-x & a \\ b & a & c-x \end{vmatrix}=0$ then $x=$

A. 0

B. $\sqrt{\frac{3}{2}\left(a^2+b^2+c^2\right)}$

C. $-\sqrt{\frac{3}{2}\left(a^2+b^2+c^2\right)}$

D. $0, \ \pm\sqrt{\frac{3}{2}\left(a^2+b^2+c^2\right)}$

Answer: D

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122. If $x=-9$ is a root of $\begin{vmatrix} x & 3 & 7 \\ 2 & x & 2 \\ 7 & 6 & x \end{vmatrix}=0$, then the other two roots are

A. $-2, -7$

B. $-2, 7$

C. $2, -7$

D. $2, 7$

Answer: D

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123. If α, β, γ are the roots of $x^3 + px + q = 0$ then $\begin{vmatrix} \alpha & \beta & \gamma \\ \beta & \gamma & \alpha \\ \gamma & \alpha & \beta \end{vmatrix} =$

A. 0

B. purely imaginary

C. q

D. $p^2 - 2q$

Answer: A

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124. If $a \neq p, b \neq q, c \neq r$ and $\begin{vmatrix} p & b & c \\ a & q & c \\ a & b & r \end{vmatrix} = 0$ then the value of

$$\frac{P}{p - a} + \frac{q}{q - b} + \frac{r}{r - c}$$

A. 0

B. 1

C. 2

D. 3

Answer: C

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125. If a,b,c, are in A.P. then $\begin{vmatrix} x+1 & x+2 & x+a \\ x+2 & x+3 & x+b \\ x+3 & x+4 & x+c \end{vmatrix} =$

A. 0

B. 1

C. -1

D. 2

Answer: A

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126. $\begin{vmatrix} a & b & ax+by \\ b & c & bx+cy \\ ax+by & bx+cy & 0 \end{vmatrix} =$

A. $b^2 - ac$

B. $(b^2 - ac)(ax^2 + 2bxy + cy^2)$

C. $ac - b^2$

D. $\left(ac - b^2\right)\left(ax^2 + 2bxy + cy^2\right)$

Answer: B

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127. If $\begin{vmatrix} a & b & a\alpha + b \\ b & c & b\alpha + c \\ a\alpha + b & b\alpha + c & 0 \end{vmatrix} = 0$ then

A. a,b,c are in A.P

B. a,b,c aare in G.P.

C. a,b,c are in H.P

D. a,c,b are in A.P

Answer: B

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128. $\begin{vmatrix} 1+i & 1-i & 1 \\ 1-i & 1 & 1+i \\ 1 & 1+i & 1-i \end{vmatrix} =$

A. an integer

B. a real number

C. an imaginary number

D. none

Answer: A

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129. If $\begin{vmatrix} x^n & x^{n+2} & x^{n+3} \\ y^n & y^{n+2} & y^{n+3} \\ z^n & z^{n+2} & z^{n+3} \end{vmatrix} = (x-y)(y-z)(z-x)\left(\frac{1}{x}+\frac{1}{y}+\frac{1}{z}\right)$ then value of n is

A. -1

B. -2

C. 1

D. 2

Answer: A

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130. If $D_r = \begin{vmatrix} r & x & n(n+1)/2 \\ 2r-1 & y & n^2 \\ 3r-1 & z & n(3n+1)/2 \end{vmatrix}$ then $\sum_{r=1}^{n} D_r =$

A. 0

B. 1

C. n

D. none

Answer: A

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131. If $D_r = \begin{vmatrix} 2^{r-1} & 2\left(3^{r-1}\right) & 4\left(5^{4-1}\right) \\ x & y & z \\ 2^n - 1 & 3^n - 1 & 5^n - 1 \end{vmatrix}$ then $\sum_{r=1}^{n} D_r =$

A. 0

B. 1

C. -1

D. n

Answer: A

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132. Find the rank of the matrix $A = \begin{bmatrix} 1 & 3 \\ 0 & 1 \end{bmatrix}$

A. 0

B. 1

C. 3

D. 2

Answer: D

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133. $\begin{vmatrix} .^{x}C_{r} & .^{x}C_{r+1} & .^{y}C_{r+2} \\ .^{y}C_{r} & .^{x}C_{r+1} & .^{y}C_{r+2} \\ .^{z}C_{r} & .^{z}C_{r+1} & .^{z}C_{r+2} \end{vmatrix} + \begin{vmatrix} .^{x}C_{4} & .^{x+1}C_{r+1} & .^{x+2}C_{r+2} \\ .^{y}C_{4} & .^{y+1}C_{r+1} & .^{y+2}C_{r+2} \\ .^{z}C_{4} & .^{z+1}C_{r+1} & .^{z+2}C_{r+2} \end{vmatrix} =$

A. 0

B. 2^n

C. $.^{x+y+z}C_r$

D. $.^{x+y+z}C_{r+2}$

Answer: A

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134. If n is a positive integer, $then$|(n!,(n+1)!,(n+2)!)),((n+1)!,(n+2)!,(n+3)!)),((n+2)!,(n+3)!,(n+4)!))|=`

A. $2n!(n+1)!$

B. $2n!(n+1!(n+2)!$

C. $2n!(n+3)!$

D. $2(n+1)!(n+2)!(n+3)!$

Answer: B

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135. If in is a positive inteter $D = \begin{vmatrix} n! & (n+1)! & (n+2)! \\ (n+1)! & (n+2)! & (n+3)! \\ (n+2)! & (n+3)! & (n+4)! \end{vmatrix}$ then $\frac{D}{(n!)^3}$ - 4 is divisible by

A. n

B. $n+1$

C. $n+2$

D. $n+3$

Answer: A

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136. If $\Delta_1 = \begin{vmatrix} 1 & a & bc \\ 1 & b & ca \\ 1 & c & ab \end{vmatrix}, \Delta_2 = \begin{vmatrix} 1 & a & a^2 \\ 1 & b & b^2 \\ 1 & c & c^2 \end{vmatrix}$ then

A. $\Delta_1 = \Delta_2$

B. $\Delta_1 = 2\Delta_2$

C. $2\Delta_1 = \Delta_2$

D. $\Delta_1 = \Delta_2^2$

Answer: A

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137. If $\begin{vmatrix} a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \\ a_3 & b_3 & c_3 \end{vmatrix} = \Delta$, then $\begin{vmatrix} A_1 & B_1 & C_1 \\ A_2 & B_2 & C_2 \\ A_3 & B_3 & C_3 \end{vmatrix} =$

A. 0

B. Δ

C. Δ^2

D. Δ^3

Answer: C

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138. If $\Delta_1 = \begin{vmatrix} x & b & b \\ a & x & b \\ a & a & x \end{vmatrix}, \Delta_2 = \begin{vmatrix} x & b \\ a & x \end{vmatrix}$ then

A. $\Delta_1 = 3\Delta_2^2$

B. $d\Delta_1 / dx = 3\Delta_2$

C. $d\Delta_1 / dx = 3\Delta_2^2$

D. $\Delta_1 = 3\Delta_3^{3/2}$

Answer: B

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139. If $D_1 = \begin{vmatrix} a & b & c \\ d & e & f \\ g & h & k \end{vmatrix}, D_2 = \begin{vmatrix} a & g & x \\ b & h & y \\ c & k & z \end{vmatrix}$ and $d = tx, e = ty, f = tz$ then

A. $D_1 = tD_2$

B. $tD_1 = D_2$

C. $D_1 = -tD_2$

D. $D_2 = -tD_1$

Answer: C

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140. If $\begin{vmatrix} x_1 & y_1 & 1 \\ x_2 & y_2 & 1 \\ x_3 & y_3 & 1 \end{vmatrix} = \begin{vmatrix} a_1 & b_1 & 1 \\ a_2 & b_2 & 1 \\ a_3 & b_3 & 1 \end{vmatrix}$, then the two triangles with vertices $(x_1, y_1), (x_2, y_2), (x_3, y_3)$ and $(a_1, b_1), (a_2, b_2), (a_3, b_3)$ must be

A. congruent

B. both equilateral

C. equal in area

D. none

Answer: C

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141. A and B be 3×3 martrices. Then $AB = 0$ implies

A. $A = O$ and $B = O$

B. $|A| = 0$ and $|B| = 0$

C. either $|A| = 0$ or $|B| = 0$

D. $A = O$ or $B = O$

Answer: C

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142. Which of the following statement is not true?

A. The sign of a determinant changes when its ros and columns are intercanged

B. If two rows of a determinant are identical, then the value of the determinant is 0

C. If the elements of one columnof a determinant are k times the corresponding elements of another column of the determinant, then the value of the determinant is 0

D. If the elements of kth row of a determinant are the sums of the corresponding elements of ith and jth rows of the determinant, then the valueof the determinant is 0.

Answer: A

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143. P.T the determinant of skew symmetric matrix of order 3 is zero.

A. 0

B. 1

C. 2

D. 3

Answer: A

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144. Which of the following is not tre? A is a square matrix. Then

A. $|A| = |A'|$

B. $A = I \Rightarrow |A| = 0$

C. $A = 0 \Rightarrow |A| = 0$

D. A is skew symmetric matrix $\Rightarrow |A| = 0$

Answer: D

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145. A and B are square matrices of order 3×3, A is on orthogonal matrix and B is a skew symmetric matrix,. Which of the following statements is not true

A. $|A| = \pm 1$

B. $|B| = 0$

C. $|AB| = 1$

D. $|AB| = 0$

Answer: C

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146. If $a = \cos\frac{4\pi}{3} + I\sin\frac{4\pi}{3}$,then $\begin{vmatrix} 1 & 1 & 1 \\ 1 & a & a^2 \\ 1 & a^2 & a \end{vmatrix}$ is

A. purely real

B. purely imaginary

C. a complex number

D. none

Answer: B

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147. If x,y,z are all positive and are the pth, qth and rth terms of a geometric progression respectively, then the value of the determinant

$$\begin{vmatrix} \log x & p & 1 \\ \log y & q & 1 \\ \log z & r & 1 \end{vmatrix} =$$

A. $\log xyz$

B. $(p - 1)(q - 1)(r - 1)$

C. pqr

D. 0

Answer: D

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148. If $a_1, a_2......$ form G.P and $a_i > 0, \forall i \geq 1,$ then

$$\begin{vmatrix} \log a_m, \log a_{m+1}, \log a_{m+2} \\ \log a_{m+3}, \log a_{m+4}, \log a_{m+5} \\ \log a_{m+6}, \log a_{m+7}, \log a_{m+8} \end{vmatrix} =$$

A. $\log a_{m+8}$ - $\log a_m$

B. $\log a_m$

C. $\log a_{m+4}$

D. none

Answer: D

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149. If $a_1, a_2, \ldots\ldots\ldots\ldots, a_n,$ .... are in G.P and $a_i > 0$ for each i then

the value of $\begin{vmatrix} \log a_n, \log a_{n+2}, \log a_{n+4} \\ \log a_{n+6}, \log a_{n+8}, \log a_{n+10} \\ \log a_{n+12}, \log a_{n+14}, \log a_{n+16} \end{vmatrix} =$

A. 0

B. $\log a_{n+16}$

C. $\log a_n$

D. $\log a_{n+16}$ - $\log a_n$

Answer: A

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150. If a,b,c are pth, qth rth terms respectivelyy of a G.P then

$\begin{vmatrix} \log a & p & 1 \\ \log b & q & 1 \\ \log c & r & 1 \end{vmatrix} =$

A. 0

B. 1

C. abc

D. pqr

Answer: A

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151. If a,b, c are pth, qt, rth terms of a H.P then $\begin{vmatrix} bc & ca & ab \\ p & q & r \\ 1 & 1 & 1 \end{vmatrix} =$

A. 0

B. abc

C. pqr

D. $\frac{abc}{pqr}+\frac{1}{p}+\frac{1}{q}+\frac{1}{r}$

Answer: A

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152. If $= \sin px$ and y_n is the nth derivative of y then $\begin{vmatrix} y & y_1 & y_2 \\ y_3 & y_4 & y_5 \\ y_6 & y_7 & y_8 \end{vmatrix} =$

A. 0

B. 1

C. y

D. $-y$

Answer: A

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153. If $F(\alpha) = \begin{vmatrix} \cos\alpha & -\sin\alpha & 0 \\ \sin\alpha & \cos\alpha & 0 \\ 0 & 0 & 1 \end{vmatrix}$ then $\det F(\alpha) =$

A. 0\`

B. 1

C. 2

D. 3

Answer:

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154. $f(x) = \begin{vmatrix} 1 & x & x+1 \\ 2x & x(x-1) & x(x+1) \\ 3x(x-1) & x(x-1)(x-2) & (x-1)x(x+1) \end{vmatrix} \Rightarrow f(2012) =$

A. 0

B. 1

C. -500

D. 500

Answer: A

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155. Let a,b, c be such that $b(a+c) \neq 0$. If

$$\begin{vmatrix} a & a+1 & a-1 \\ -b & b+1 & b-1 \\ c & c-1 & c+1 \end{vmatrix} + \begin{vmatrix} a+1 & b+1 & c-1 \\ a-1 & b-1 & c+1 \\ (-1)^{n+2}a & (-1)^{n+1}b & (-1)^{n}c \end{vmatrix} = 0$$ then the value of n is

A. any even integer

B. any odd integer

C. any integer

D. zero

Answer: B

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156. If $\alpha, \beta \neq 0$ and $f(n) = a^n + \beta^n$ and

$$\begin{vmatrix} 3 & 1+f(1) & 1+f(2) \\ 1+f(1) & 1+f(2) & 1+f(3) \\ 1+f(2) & 1+f(3) & 1+f(4) \end{vmatrix} = K(1-\alpha)^2(1-\beta)^2(\alpha-\beta)^2$$, then K is equal to:

A. 1

B. -1

C. $\alpha\beta$

D. $\frac{1}{\alpha\beta}$

Answer: A

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157. $\begin{vmatrix} 2bc - a^2 & c^2 & b^2 \\ c^2 & 2ca - b^2 & a^2 \\ b^2 & a^2 & 2abc - c^2 \end{vmatrix} =$

A. $a^3 + b^3 + c^3 - 3abc$

B. $3abc - a^3 - b^3 - c^3$

C. $\left(a^3 + b^3 + c^3 - 3abc\right)^2$

D. none

Answer: C

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158. $\begin{vmatrix} 0 & c & b \\ -c & 0 & a \\ b & a & 0 \end{vmatrix} - \begin{vmatrix} b^2 + c^2 & ab & ac \\ ab & c^2 + a^2 & bc \\ ac & bc & a^2 + b^2 \end{vmatrix} =$

A. 0

B. 1

C. abc

D. 4abc

Answer: A

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159. Show that

$$\begin{vmatrix} a & b & c \\ b & c & a \\ c & a & b \end{vmatrix}^2 = \begin{vmatrix} 2bc - a^2 & c^2 & b^2 \\ c^2 & 2ac - b^2 & a^2 \\ b^2 & a^2 & 2ab - c^2 \end{vmatrix} = \left(a^3 + b^3 + c^3 - 3abc\right)^2$$

A. 1

B. 2

C. 3

D. 0

Answer: B

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160. Prove that

$$\begin{vmatrix} (1+ax)^2 & (1+ay)^2 & (a+az)^2 \\ (1+bx)^2 & (1+by)^2 & (1+bz)^2 \\ (1+cx)^2 & (1+cy)^2 & (1+cz)^2 \end{vmatrix} = 2(a-b)(b-c)(c-a)(x-y)(y-z)(z-x).$$

A. $(a-b)(b-c)(c-a)$

B. $(x-y)(y-z)(z-x)(a-b)(b-c)(c-a)$

C. $(x-y)(y-z)(z-x)$

D. $2(a-b)(b-c)(c-a)(x-h)(y-z)(z-x)$

Answer: D

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161. A factor o $\begin{vmatrix} (a-x)^2 & (b-x)^2 & (c-x)^2 \\ (a-y)^2 & (b-y)^2 & (c-y)^2 \\ (a-z)^2 & (b-z)^2 & (c-z)^2 \end{vmatrix}$ is

A. $a+b$

B. $x+y$

C. $x-y$

D. none

Answer: C

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162. $\begin{vmatrix} \cos(\alpha+\beta) & -\sin(\alpha+\beta) & \cos 2\beta \\ \sin\alpha & \cos\alpha & \sin\beta \\ -\cos\alpha & \sin\alpha & \cos\beta \end{vmatrix}$ is independent of

A. β

B. α

C. α and β

D. neigher β nor α

Answer: B

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163. $\begin{vmatrix} \sin\alpha & \cos\alpha & \sin(\alpha+\delta) \\ \sin\beta & \cos\beta & \sin(\beta+\delta) \\ \sin\gamma & \cos\gamma & \sin(\gamma+\delta) \end{vmatrix} =$

A. 0

B. 1

C. $\cos\alpha\cos\beta\cos\gamma$

D. $\sin\alpha\sin\beta\sin\gamma$

Answer: A

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164. $\begin{vmatrix} \cos\alpha & \sin\alpha & \cos(\alpha+\beta) \\ -\sin\alpha & \cos\alpha & -\sin(\alpha+\beta) \\ 1 & 1 & 1 \end{vmatrix} =$

A. $1 + \sin\alpha + \cos\alpha$

B. $1 + \sin\beta + \cos\beta$

C. $1 + \sin\alpha - \cos\alpha$

D. $1 + \sin\beta - \cos\beta$

Answer: D

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165. $\begin{vmatrix} 0 & \sin\alpha & \sin\beta \\ \sin\alpha & 0 & \sin\gamma \\ \sin\beta & \sin\gamma & 0 \end{vmatrix} = \begin{vmatrix} 1 & \sin\alpha & \sin\beta \\ \sin\alpha & 1 & \sin\gamma \\ \sin\beta & \sin\gamma & 1 \end{vmatrix}$, then

A. $\sin\alpha . \sin\beta . \sin\gamma = 1$

B. $\sin\alpha + \sin\beta + \sin\gamma = 1$

C. $\sin^2\alpha + \sin^2\beta + \sin^2\gamma = 1$

D. 0

Answer: C

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166. $A = \begin{bmatrix} 1 & \cos(\beta - \alpha) & \cos(\gamma - \alpha) \\ \cos(\alpha - \beta) & 1 & \cos(\gamma - \beta) \\ \cos(\alpha - \gamma) & \cos(\beta - \gamma) & 1 \end{bmatrix} =$

A. symmetric

B. skew symmetric

C. orthogonal

D. none

Answer: A

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167. If $A + B + C = \pi$ then $\begin{vmatrix} \sin^2 A & \cot A & 1 \\ \sin^2 B & \cot B & 1 \\ \sin^2 C & \cot C & 1 \end{vmatrix} =$

A. 1

B. 2

C. 0

D. $\sin^2 A$

Answer: C

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168. If A,B,C are th angle of a equilateral ΔABC, then

$$\begin{vmatrix} \sin 2A & \sin C & \sin B \\ \sin C & \sin 2B & \sin A \\ \sin B & \sin A & \sin 2C \end{vmatrix} =$$

A. -1

B. 1

C. 0

D. $\sin 2A + \sin 2B + \sin 2C$

Answer: C

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169. For all values of A, B, C and P, Q, R

$$\begin{vmatrix} \cos(A - P) & \cos(A - Q) & \cos(A - R) \\ \cos(B - P) & \cos(B - Q) & \cos(B - R) \\ \cos(C - P) & \cos(C - Q) & \cos(C - R) \end{vmatrix} =$$

A. $\cos A \cos B \cos C$

B. $\cos P \cos Q \cos R$

C. 0

D. 1

Answer: C

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170. $\begin{vmatrix} x^3 + x & x + 1 & x - 2 \\ 2x^3 + 3x - 1 & 3x & 3x - 3 \\ x^3 + 2x + 3 & 2x - 1 & 2x - 1 \end{vmatrix} = xA + B$ there $A =$

A. $\begin{vmatrix} 1 & 1 & 1 \\ -4 & 0 & 0 \\ 3 & -3 & 3 \end{vmatrix}$

B. $\begin{vmatrix} 0 & 1 & -2 \\ -4 & 0 & 0 \\ 3 & -3 & 3 \end{vmatrix}$

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

D. $\begin{vmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{vmatrix}$

Answer: A

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171. If $\begin{vmatrix} \lambda^2 + 3\lambda & \lambda - 1 & \lambda + 3 \\ \lambda + 1 & 2 - \lambda & \lambda - 4 \\ \lambda - 3 & \lambda + 4 & 3\lambda \end{vmatrix} = p\lambda^4 + q\lambda^3 + r\lambda^3 + s\lambda + t$,then $t =$

A. 22

B. 21

C. 32

D. 33

Answer: B

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172. If $\begin{vmatrix} \lambda^2 + 3\lambda & \lambda - 1 & \lambda + 3 \\ \lambda + 1 & 2 - \lambda & \lambda - 4 \\ \lambda - 3 & \lambda + 4 & 3\lambda \end{vmatrix} = p\lambda^4 + q\lambda^3 + r\lambda^3 + s\lambda + t$,then $t =$

A. 16

B. 17

C. 18

D. 19

Answer: C

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173. If $a^2+b^2+c^2=-2$ and $f(x)=\begin{vmatrix} 1+a^2x & (1+b^2)x & (1+c^2)x \\ (1+a^2)x & 1+b^2x & (1+c^2)x \\ (1+a^2)x & (1+b^2)x & 1+c^2x \end{vmatrix}$

then $f(x)$ is a polynomials.

A. 1

B. 0

C. 3

D. 2

Answer: D

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174. If $f_r(x), g_r(x), h_r(x), r = 1, 2, 3$ are polynomials in x such that

$f_r(a) = g_r(a) = h_r(a), r = 1, 2, 3$ and $F(x) = \begin{vmatrix} f_1(x) & f_2(x) & f_3(x) \\ g_1(x) & g_2(x) & g_3(x) \\ h_x & h_2(x) & h_3(x) \end{vmatrix}$, then

$F'(x)$ at $x = a$ is

A. 0

B. a

C. $-a$

D. none

Answer: A

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175. If α be a repeated root of a quadratic equation f(x) = 0 and

A(x),B(x) , C(x) be polynomials of degree 3,4,5 respectively , then

$$F(x) = \begin{vmatrix} A(x) & B(x) & C(x) \\ A(\alpha) & B(\alpha) & C(\alpha) \\ A^1(\alpha) & B^1(\alpha) & C^1(\alpha) \end{vmatrix}$$

A. $f(x)$

B. $\alpha f(x)$

C. $xf(x)$

D. none

Answer: A

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176. Let the three digit number A28, 3B9,62C, where A,B,C are integers between 0 and 9., be divisible by a fixed integer k. $\begin{vmatrix} A & 3 & 6 \\ 8 & 9 & C \\ 2 & B & 2 \end{vmatrix}$ is divisible

A. k

B. k^2

C. $2k$

D. $k(k+1)$

Answer: A

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177. If $\begin{vmatrix} 1+\sin^2\theta & \cos^2\theta & 4\sin 4\theta \\ \sin^2\theta & 1+\cos^2\theta & 4\sin 4\theta \\ \sin^2\theta & \cos^2\theta & 1+4\sin 4\theta \end{vmatrix} = 0$, then the value of θ is

A. $\frac{5\pi}{24}, \frac{7\pi}{24}$

B. $\frac{7\pi}{24}, \frac{11\pi}{24}$

C. $\frac{5\pi}{24}, \frac{11\pi}{24}$

D. none

Answer: B

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178. With the usual notation in ΔABC det $\begin{vmatrix} 1 & 1 & 1 \\ \sin A & \sin B & \sin C \\ \sin^2 A & \sin^2 B & \sin^2 C \end{vmatrix}$

assumes the value

A. $\frac{1}{8R^3}(a - b)(c - a)(b - c)$

B. $8R^3$

C. $(a - b)(b - c)(c - a)$

D. $\frac{1}{8R}(a - b)(a - c)(b - c)$

Answer: A

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179. If A,B,C are the angles of a triangles then

$$\Delta = \begin{vmatrix} -1 & \cos C & \cos B \\ \cos C & -1 & \cos A \\ \cos B & \cos A & -1 \end{vmatrix} =$$

A. 0

B. -1

C. $2\cos A\cos B\cos C$

D. none of these

Answer: A

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180. If $A + B + C = \pi$ then the value of

$$\begin{vmatrix} \sin(A + B + C) & \sin B & \cos C \\ -\sin B & 0 & \tan A \\ \cos(A + B) & -\tan A & 0 \end{vmatrix} =$$

A. 0

B. 1

C. $2\sin B\tan A\cos C$

D. none of these

Answer: A

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181. If $f(x)=\begin{vmatrix}2\cos x & 1 & 0\\ x-\pi/2 & 2\cos x & 1\\ 0 & 1 & 2\cos x\end{vmatrix}$ then $\frac{df}{dx}$ at $x=\frac{\pi}{2}$ is

A. 2

B. $\pi/2$

C. 1

D. 8

Answer: A

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182. $f(x) = \begin{vmatrix} 2\cos x & 1 & 0 \\ x - \frac{\pi}{2} & 2\cos x & 1 \\ 0 & 1 & 2\cos x \end{vmatrix} \Rightarrow f'(\pi) =$

A. 0

B. 2

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

D. $\pi - 6$

Answer: B

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183. If $f(x) = \begin{vmatrix} x^n & \sin x & \cos x \\ n! & \sin(n\pi/2) & \cos(n\pi/2) \\ a & a^2 & a^2 \end{vmatrix}$, then $\frac{d^n}{dx^n}\{f(x)\}$ at $x = 0$ is

A. -1

B. 0

C. 1

D. none

Answer: B

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184. If $f(x) = \begin{vmatrix} \sec^2 x & 1 & 1 \\ \cos^2 x & \cos^2 x & cosec^2 x \\ 1 & \cos^2 x & \cot^2 x \end{vmatrix}$, then $\int_0^{\pi/4} f(x)dx =$

A. $\frac{3\pi + 8}{32}$

B. $\frac{3\pi + 8}{16}$

C. $\frac{3\pi + 8}{8}$

D. $\frac{\pi + 8}{4}$

Answer: A

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185. If $f(x) = \begin{vmatrix} \sec x & \cos x & \sec^2 x + \cot x \operatorname{cosec} x \\ \cos^2 x & \cos^2 x & \operatorname{cosec}^2 x \\ 1 & \cos^2 x & \cos^2 x \end{vmatrix}$ then $\int_0^{\pi/2} f(x)dx =$

A. $\frac{8}{15} + \frac{\pi}{4}$

B. $-\left(\frac{8}{15} + \frac{\pi}{4}\right)$

C. $\frac{8}{17} + \frac{\pi}{4}$

D. none

Answer: B

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186. If $f(x) = \begin{vmatrix} \cos x & x & 1 \\ 2\sin x & x^2 & 2x \\ \tan x & x & 1 \end{vmatrix}$ then $Lt_{x \to 0} \frac{f'(x)}{x} =$

A. 0

B. -1

C. -2

D. 2

Answer: C

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187. If $f(x) = \begin{vmatrix} 2\cos^2 x & \sin 2x & -\sin x \\ \sin 2x & 2\sin^2 x & \cos x \\ \sin x & -\cos x & 0 \end{vmatrix}$ then $\int_0^{\pi/2} [f(x) + f'(x)]dx =$

A. 0

B. 1

C. $\pi/2$

D. π

Answer: D

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188. If $f(x) = \begin{vmatrix} 1 + \sin^2 x & \cos^2 x & 4\sin 2x \\ \sin^2 x & 1 + \cos^2 x & 4\sin 2x \\ \sin^2 x & \cos^2 x & 1 + 4\sin 2x \end{vmatrix}$ then the maximum value of $f(x)$ is

A. 2

B. 4

C. 6

D. 8

Answer: C

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189. If $f(\theta) = \begin{vmatrix} \cos^2\theta & \cos\theta\sin\theta & -\sin\theta \\ \cos\theta\sin\theta & \sin^2\theta & \cos\theta \\ \sin\theta & -\cos\theta & 0 \end{vmatrix}$ then $f\left(\frac{\pi}{12}\right) =$

A. 0

B. 1

C. -1

D. 2

Answer: B

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Exercise 1 C Mcq Inverse Matrix

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

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

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

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

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

Answer: A

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

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

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

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

D. $\begin{bmatrix} -5 & -2 \\ -1 & -3 \end{bmatrix}$

Answer: B

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3. $\begin{bmatrix} 1 & 3 \\ 3 & 10 \end{bmatrix}^{-1}$

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

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

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

D. $\begin{bmatrix} -1 & -3 \\ -3 & 10 \end{bmatrix}$

Answer: B

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4. The inverse of the matrix $\begin{bmatrix} 1 & 2 \\ 2 & 3 \end{bmatrix}$ is

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

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

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

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

Answer: A

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5. The inverse of the matrix $\begin{bmatrix} 2 & 1 \\ 1 & 3 \end{bmatrix}$ is

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

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

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

D. $\frac{1}{5}\begin{bmatrix} -3 & 1 \\ 1 & 2 \end{bmatrix}$

Answer: B

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6. The inverse of $A = \begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix}$ is

A. A

B. $-A$

C. A^T

D. $-A^T$

Answer: C

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7. The inverse of $\begin{bmatrix} \sec\theta & -\tan\theta \\ -\tan\theta & \sec\theta \end{bmatrix}$ is

A. $\begin{bmatrix} 1 & -\sin\theta \\ -\sin\theta & 1 \end{bmatrix}$

B. $\begin{bmatrix} \cos\theta & -\sin\theta \\ -\sin\theta & \cos thet \end{bmatrix}$

C. $\begin{bmatrix} \sec\theta & \tan\theta \\ \tan\theta & \sec\theta \end{bmatrix}$

D. none

Answer: C

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8. $A = \begin{bmatrix} 2 & 3 \\ 2 & -1 \end{bmatrix} \Rightarrow 8A^{-1} =$

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

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

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

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

Answer: D

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9. If $A = \begin{bmatrix} 3 & 4 \\ 7 & 9 \end{bmatrix}$ and $AB = I$ then $B =$

A. $\begin{bmatrix} -9 & 4 \\ 7 & 3 \end{bmatrix}$

B. $\begin{bmatrix} 9 & -4 \\ -7 & -3 \end{bmatrix}$

C. $\begin{bmatrix} -9 & 4 \\ 7 & -3 \end{bmatrix}$

D. $\begin{bmatrix} -9 & 4 \\ -7 & 3 \end{bmatrix}$

Answer: C

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10. If $\begin{bmatrix} a & b \\ c & d \end{bmatrix}$ is invertible then

A. $ad - bc = 0$

B. $ad + bc = 0$

C. $ad - bc \neq 0$

D. $ad + bc \neq 0$

Answer: C

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11. If $\begin{bmatrix} x & y^3 \\ 2 & 0 \end{bmatrix} = \begin{bmatrix} 1 & 8 \\ 2 & 0 \end{bmatrix}$ then $\begin{bmatrix} x & y \\ 2 & 0 \end{bmatrix}^{-1} =$

A. $\begin{bmatrix} 0 & -2 \\ -2 & 1 \end{bmatrix}$

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

C. $\begin{bmatrix} 0 & -8 \\ -2 & 1 \end{bmatrix}$

D. $\begin{bmatrix} 0 & 1/2 \\ 1/2 & -1/4 \end{bmatrix}$

Answer: D

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12. If the matrix A is such that $A\begin{bmatrix} -1 & 2 \\ 3 & 1 \end{bmatrix} = \begin{bmatrix} -4 & 1 \\ 7 & 7 \end{bmatrix}$ then $A =$

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

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

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

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

Answer: C

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13. The matrix A satisfying the equation $\begin{bmatrix} 1 & 3 \\ 0 & 1 \end{bmatrix} A = \begin{bmatrix} 1 & 1 \\ 0 & 1 \end{bmatrix}$ is

A. $\begin{bmatrix} 1 & 4 \\ -1 & 0 \end{bmatrix}$

B. $\begin{bmatrix} 1 & -4 \\ 1 & 0 \end{bmatrix}$

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

D. none

Answer: C

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14. 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 the matrix A=

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

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

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

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

Answer: A

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15. If A is a matrix such that $\begin{pmatrix} 2 & 1 \\ 3 & 2 \end{pmatrix} A \begin{pmatrix} 1 & 1 \end{pmatrix} = \begin{pmatrix} 1 & 1 \\ 0 & 0 \end{pmatrix}$ then $A =$

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

B. $(2, 1)$

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

D. $\begin{pmatrix} 2 \\ -3 \end{pmatrix}$

Answer: D

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16. If A $\begin{bmatrix} 2 & 2 \\ -3 & 2 \end{bmatrix}$, $B = \begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}$ then $\left(B^{-1}A^{-1}\right)^{-1} =$

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

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

C. $\frac{1}{10}\begin{bmatrix} 2 & 2 \\ -2 & 3 \end{bmatrix}$

D. $\frac{1}{10}\begin{bmatrix} 3 & 2 \\ -2 & 2 \end{bmatrix}$

Answer: A

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

A. $\begin{bmatrix} 3 & -4 & -5 \\ -9 & 1 & -4 \\ -5 & -3 & 1 \end{bmatrix}$

B. $\begin{bmatrix} 3 & 4 & 5 \\ -9 & 1 & -4 \\ 5 & -3 & 1 \end{bmatrix}$

C. $\begin{bmatrix} 3 & -4 & -5 \\ -9 & 1 & 4 \\ -5 & 3 & 1 \end{bmatrix}$

D. $\begin{bmatrix} 3 & -9 & -5 \\ -4 & 1 & 3 \\ -5 & 4 & 1 \end{bmatrix}$

Answer: C

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18. If $A = \begin{bmatrix} -1 & -2 & -2 \\ 2 & 1 & -2 \\ 2 & -2 & 1 \end{bmatrix}$ then $adjA =$

A. A

B. A^T

C. $2A^T$

D. $3A^T$

Answer: D

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19. If $A = \begin{bmatrix} -1 & -2 & -2 \\ 2 & 1 & -2 \\ 2 & -2 & 1 \end{bmatrix}$, then A^T

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20. $Adj \begin{bmatrix} 1 & 0 & 2 \\ -1 & 1 & -2 \\ 0 & 2 & 1 \end{bmatrix} = \begin{bmatrix} 5 & a & -2 \\ 1 & 1 & 0 \\ -2 & -2 & b \end{bmatrix} \Rightarrow \begin{bmatrix} a & b \end{bmatrix} =$

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

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

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

D. $\begin{bmatrix} 4 & -1 \end{bmatrix}$

Answer: C

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21. The inverse of the matrix $\begin{bmatrix} 0 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 0 & 0 \end{bmatrix}$ is

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

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

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

D. $\begin{bmatrix} 1 & 3 & 3 \\ 1 & 4 & 3 \\ 1 & 3 & 4 \end{bmatrix}$

Answer: A

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22. The inverse of $\begin{bmatrix} 0 & 1 & 0 \\ 1 & 0 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ is

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

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

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

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

Answer: A

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23. The matrix having the same matrix as its inverse is

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

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

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

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

Answer: B

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24. The inverse of $\begin{bmatrix} 3 & 5 & 7 \\ 2 & -3 & 1 \\ 1 & 1 & 2 \end{bmatrix}$ is

A. $\begin{bmatrix} 7 & 3 & -5 \\ 3 & 1 & -2 \\ -25 & -11 & 19 \end{bmatrix}$

B. $\begin{bmatrix} 7 & 3 & -26 \\ 3 & 1 & -11 \\ -5 & -2 & 19 \end{bmatrix}$

C. $\begin{bmatrix} 3 & 2 & 1 \\ 7 & 1 & 2 \end{bmatrix}$

D. none

Answer: B

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25. The inverse of $\begin{bmatrix} 1 & 3 & 3 \\ 1 & 4 & 3 \\ 1 & 3 & 4 \end{bmatrix}$ is

A. $\begin{bmatrix} 7 & -3 & -3 \\ -1 & 1 & 0 \\ -1 & 0 & 1 \end{bmatrix}$

B. $\begin{bmatrix} 7 & 3 & -3 \\ 1 & 1 & 0 \\ -1 & 0 & -1 \end{bmatrix}$

C. $\begin{bmatrix} -7 & 3 & -3 \\ -1 & -1 & 0 \\ -1 & 0 & 1 \end{bmatrix}$

D. $\begin{bmatrix} 7 & -3 & -3 \\ 1 & 1 & 0 \\ 1 & 0 & 1 \end{bmatrix}$

Answer: A

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26. The inverse of $\begin{bmatrix} 1 & 2 & -3 \\ 0 & 1 & 2 \\ 0 & 0 & 1 \end{bmatrix}$ is

A. $\begin{bmatrix} 1 & -2 & 7 \\ 0 & 1 & -2 \\ 0 & 0 & 1 \end{bmatrix}$

B. $\begin{bmatrix} 1 & -2 & 3 \\ 0 & 1 & -2 \\ 0 & 0 & 1 \end{bmatrix}$

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

D. $\begin{bmatrix} 1 & 0 & 0 \\ -2 & 1 & 0 \\ 3 & -2 & 1 \end{bmatrix}$

Answer: A

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27. The inverse of the matrix $\begin{bmatrix} 7 & -3 & 3 \\ -1 & 1 & 0 \\ -1 & 0 & -1 \end{bmatrix}$ is

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28. The inverse of $\begin{bmatrix} \cos\theta & -\sin\theta & 0 \\ \sin\theta & \cos\theta & 0 \\ 0 & 0 & 1 \end{bmatrix}$ is

A. $\begin{bmatrix} \cos\theta & -\sin\theta & 0 \\ \sin\theta & \cos\theta & 0 \\ 0 & 0 & 1 \end{bmatrix}$

B. $\begin{bmatrix} \cos\theta & \sin\theta & 0 \\ -\sin\theta & \cos\theta & 0 \\ 0 & 0 & 1 \end{bmatrix}$

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

D. $\begin{bmatrix} \cos\theta & \sin\theta & 0 \\ \sin\theta & \cos\theta & 0 \\ 0 & 0 & 1 \end{bmatrix}$

Answer: B

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29. If $A = \begin{bmatrix} 1 & 0 & 2 \\ 2 & 1 & 0 \\ 3 & 2 & 1 \end{bmatrix}$ then $3A^{-1} =$

A. $\begin{bmatrix} 1 & 4 & -2 \\ -2 & -5 & 4 \\ 1 & -2 & 1 \end{bmatrix}$

B. $\begin{bmatrix} 1 & 4 & -2 \\ -2 & -5 & 4 \\ 1 & -2 & 1 \end{bmatrix}$

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

D. $\begin{bmatrix} 1 & 4 & -2 \\ -2 & 5 & -4 \\ 1 & 2 & -1 \end{bmatrix}$

Answer: A

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

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

A. A^T

B. $2A^T$

C. $3A^T$

D. A^3

Answer: D

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32. $A = \begin{pmatrix} 1 & 0 & 1 \\ 0 & 1 & 1 \\ 0 & 1 & 0 \end{pmatrix} \Rightarrow A^2 - 2A =$

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33. If $A = \begin{bmatrix} \cos x & \sin x & 0 \\ -\sin x & \cos x & 0 \\ 0 & 0 & 1 \end{bmatrix} = f(x)$ then $A^T =$

A. $f(-x)$

B. $f(x)$

C. $-f(x)$

D. $-f(-x)$

Answer: A

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34. $A(\alpha, \beta) = \begin{pmatrix} \cos\alpha & \sin\alpha & 0 \\ -\sin\alpha & \cos\alpha & 0 \\ 0 & 0 & e^{\beta} \end{pmatrix} = [A(\alpha, \beta)]^{-1} =$

A. $A(-\alpha, \beta)$

B. $A(-\alpha, -\beta)$

C. $A(\alpha, -\beta)$

D. $A(\alpha, \beta)$

Answer: B

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35. If $F(x) = \begin{bmatrix} \cos x & -\sin x & 0 \\ \sin x & \cos x & 0 \\ 0 & 0 & 1 \end{bmatrix}$ and $G(x) = \begin{bmatrix} \cos x & 0 & \sin x \\ 0 & 1 & 0 \\ -\sin x & 0 & \cos x \end{bmatrix}$ then

$[F(x)G(x)]^{-1}=$

A. $F(-x)G(-x)$

B. $F\left(x^{-1}\right)G\left(x^{-1}\right)$

C. $G(-x)F(-x)$

D. $G\left(x^{-1}\right)F\left(x^{-1}\right)$

Answer: C

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36. If $\begin{vmatrix} 1 & -1 & x \\ 1 & x & 1 \\ x & -1 & 1 \end{vmatrix}$ has no inverse, then the real value of x is

A. 2

B. 3

C. 0

D. 1

Answer: D

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37. If $A = \begin{bmatrix} 1 & 4 & 2 \\ 2 & -1 & 4 \\ -3 & 7 & -6 \end{bmatrix}$ then A has

A. unique inverse

B. no inverse

C. two inverses

D. infinitely may inverses

Answer: B

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38. If $A = \begin{bmatrix} 1 & 3 & 3 \\ 1 & 3 & 4 \\ 1 & 4 & 3 \end{bmatrix}$ then A has

A. unique inverse

B. no inverse

C. two inverses

D. infinitely may inverses

Answer: A

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39. Let $A = \begin{pmatrix} 1 & 0 & 0 \\ 2 & 1 & 0 \\ 3 & 2 & 1 \end{pmatrix}$. If u_1 and u_2 are column matrices such that

$Au_1 = \begin{pmatrix} 1 \\ 0 \\ 0 \end{pmatrix}$ and $Au_2 = \begin{pmatrix} 0 \\ 1 \\ 0 \end{pmatrix}$ then $u_1 + u_2$` is equal to

A. $\begin{pmatrix} -1 \\ -1 \\ 0 \end{pmatrix}$

B. $\begin{pmatrix} 1 \\ -1 \\ -1 \end{pmatrix}$

C. $\begin{pmatrix} -1 \\ 1 \\ 0 \end{pmatrix}$

D. $\begin{pmatrix} -1 \\ 1 \\ -1 \end{pmatrix}$

Answer: B

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40. Let P and Q be two 2×2 matrices. Consider the statements

(i)$PQ = O \Rightarrow O$ or $Q = O$ or both

(ii) $PQ = I_2 \Rightarrow P = Q^{-1}$

(iii) $(P + Q)^2 = P^2 + 2PQ + Q^2$. Then

A. I and ii are false while iii is true

B. I and iii are false while ii is true

C. ii and iii are false while I is true

D. none

Answer: B

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41. Let P and Q be 3×3 matrices with $P \neq Q$. If $P^3 = Q^3$ and $P^2Q = Q^2P$, then determinant of $\left(P^2 + Q^2\right)$ is equal to

A. 0

B. -1

C. -2

D. 1

Answer: A

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42. Let A be a square matrix all of whose entries are integers. Then which one of the following is true?

A. If $\det A = ! + 1$, then A^{-1} exists and all its entries are no integers.

B. If $\det A = \pm 1$, then A^{-1} exists and all its entries are integers

C. If $\det A = +11$, then A^{-1} need not exist.

D. If $\det A = \pm 1$, then A^{-1} exists but all its entries are not necessarily integers.

Answer: B

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43. Let $A = \begin{pmatrix} 0 & 0 & -1 \\ 0 & -1 & 0 \\ -1 & 0 & 0 \end{pmatrix}$. The only correct statement about the matrix A is

A. A is a zero matrix

B. $A^2 = I$

C. A^{-1} does not exist

D. $A = (-1)I$, where I is a unit matrix

Answer: B

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44. $\begin{bmatrix} 1 & 2 & 3 \\ 2 & 5 & 7 \\ -2 & -4 & -5 \end{bmatrix}$ is the inverse of

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

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

C. $\begin{bmatrix} 1 & 2 & 3 \\ 2 & 5 & 7 \\ -2 & -4 & -5 \end{bmatrix}$

D. $\begin{bmatrix} 1 & 2 & -2 \\ 2 & 5 & -4 \\ 3 & 7 & -5 \end{bmatrix}$

Answer: A

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45. If $A = \begin{bmatrix} 1 & -2 & 3 \\ 0 & -1 & 4 \\ -2 & 2 & 1 \end{bmatrix}$ then $\left(A^T\right) =$

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

B. $\begin{bmatrix} -9 & -8 & -2 \\ 8 & 7 & 2 \\ -5 & -4 & -1 \end{bmatrix}$

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

D. none

Answer: C

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46. If $\begin{bmatrix} 1 & 0 & 0 \\ -1 & 1 & 0 \\ -1 & 0 & 1 \end{bmatrix}$ is the inverse of $\begin{bmatrix} 1 & 0 & 0 \\ 1 & 1 & 0 \\ 1 & 0 & k \end{bmatrix}$ then $k =$

A. 0

B. 1

C. -1

D. none

Answer: B

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47. If $A = \begin{bmatrix} 0 & 1 & 2 \\ 1 & 2 & 3 \\ 3 & 1 & 1 \end{bmatrix}$ and $A^{-1} = \begin{bmatrix} 1/2 & -1/2 & 1/2 \\ -4 & 3 & x \\ 5/2 & -3/2 & 1/2 \end{bmatrix}$ then

A. $x = 1$

B. $x = -1$

C. $x = 2$

D. $x = 1/2$

Answer: B

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48. Let $A = \begin{pmatrix} 1 & -1 & 1 \\ 2 & 1 & -3 \\ 1 & 1 & 1 \end{pmatrix}$ and $(10)B = \begin{pmatrix} 4 & 2 & 2 \\ -5 & 0 & \alpha \\ 1 & -2 & 3 \end{pmatrix}$. If B is the inverse of matrix A, then α is

A. -2

B. 5

C. 2

D. -1

Answer: B

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49. If $A = \begin{bmatrix} 0 & 1 & -1 \\ 2 & 1 & 3 \\ 3 & 2 & 1 \end{bmatrix}$ then $\left[A(adjA)A^{-1}\right]A =$

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

B. $\begin{bmatrix} -6 & 0 & 0 \\ 0 & -6 & 0 \\ 0 & 0 & -6 \end{bmatrix}$

C. $\begin{bmatrix} 0 & 1/6 & -1/6 \\ 1/3 & 1/6 & 1/2 \\ 1/2 & 1/3 & 1/6 \end{bmatrix}$

D. none

Answer: A

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50. If $A = \begin{bmatrix} \cos\alpha & -\sin\alpha & 0 \\ \sin\alpha & \cos\alpha & 0 \\ 0 & 0 & 1 \end{bmatrix}$ then $(AdjA)^T =$

A. $\begin{bmatrix} \cos\alpha & -\sin\alpha & 0 \\ \sin\alpha & \cos\alpha & 0 \\ 0 & 0 & 1 \end{bmatrix}$

B. $\begin{bmatrix} -\cos\alpha & -\sin\alpha & 0 \\ \sin\alpha & -\cos\alpha & 0 \\ 0 & 0 & 1 \end{bmatrix}$

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

D. $\begin{bmatrix} 1 & 0 & 0 \\ 0 & \cos\alpha & -\sin\alpha \\ 0 & \sin\alpha & \cos\alpha \end{bmatrix}$

Answer: A

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51. If $A = \begin{bmatrix} 1 & 1 & 1 \\ 2 & 4 & 1 \\ 2 & 3 & 1 \end{bmatrix}, B = \begin{bmatrix} 2 & 3 \\ 3 & 4 \end{bmatrix}$ then the matrix BA is

A. $\begin{bmatrix} 4 & -7 & 7 \\ -3 & 5 & -5 \end{bmatrix}$

B. $\begin{bmatrix} 4 & -3 \\ -7 & 5 \\ 7 & -5 \end{bmatrix}$

C. $\begin{bmatrix} -4 & 7 & -7 \\ 3 & -5 & 5 \end{bmatrix}$

D. none

Answer: D

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52. If $S = \begin{bmatrix} 0 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 0 \end{bmatrix}$, then det of s

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53. If $A = I$ is 2x2 matrix then $\det(I + A) =$

A. 4

B. 1

C. 2

D. none

Answer: A

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54. If A is a nonzero square matrix of order n with $\det(I + A) \neq 0$ and $A^3 = O$ where I, O are unit and null matrices of order $n \times n$ respectively then $(I + A)^{-1} =$

A. $I - A + A^2$

B. $I + A + A^2$

C. $I + A^{-1}$

D. $I + A$

Answer: A

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55. If $A \neq I$ is an idempotent matrix, then A is a

A. non singular matrix

B. singular matrix

C. square matrix

D. none

Answer: B

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56. If A is a singular matrix then adj A is

A. singular

B. nonsingular

C. symmetric

D. not defined

Answer: A

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57. If A is an invertible matrix of order n, then the determinant of adj A is equal to

A. $|A|^n$

B. $|A|^{n+1}$

C. $|A|^{n-1}$

D. $|A|^{n+2}$

Answer: C

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58. If A is a nonsingular matrix of type n $Adj(AdjA) = kA$, then $k =$

A. 0

B. detA

C. $(\det A)^n$

D. $(\det A)^{n-2}$

Answer: D

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59. If is a nonsingular matrix of type n then $Adj(AdjA) =$

A. $(\det A)^{n-2}A$

B. $\det A$

C. $\frac{1}{\det A}$

D. $(Adj)A$

Answer: A

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60. If A is a 3×3 matrix and det $A = 5$ then det $(AdjA) =$

A. 100

B. 25

C. 10

D. 0

Answer: B

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61. If A is a 4×4 matrix and $\det A = -2$ then det $(AdjA) =$

A. 100

B. 25

C. -8

D. 8

Answer: C

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62. If A is a 3×3 matrix and $\det(AdjA) = 4$then $\det A =$

A. ± 2

B. 25

C. 10

D. 0

Answer: A

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63. If A is a 4×4 matrix and det $(AdjA) = -27$ then $\det A =$

A. ± 2

B. 3

C. -3

D. 0

Answer: C

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64. If A is a nonsingular matrix, then $\det A^{-1} =$

A. $(\det A)^{n-2}A$

B. $\det A$

C. $\dfrac{1}{\det A}$

D. $(Adj)A$

Answer: C

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65. If A is a nonsingular matrix and B is a matrix, then $\det B =$

A. $(\det)A)^{n-2}A$

B. $\det A$

C. $\dfrac{1}{\det A}$

D. $\det\left(A^{-1}BA\right)$

Answer: D

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66. If A is a square matrix such that $A(AdjA) = \begin{pmatrix} 4 & 0 & 0 \\ 0 & 4 & 0 \\ 0 & 0 & 4 \end{pmatrix}$ then det $(AdjA) =$

A. 4

B. 16

C. 64

D. 256

Answer: B

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67. If $P = \begin{bmatrix} 1 & \alpha & 3 \\ 1 & 3 & 3 \\ 2 & 4 & 4 \end{bmatrix}$ is the adjoint of a 3×3 matrix A and $|A| = 4$, then α is equal to

A. 5

B. 0

C. 4

D. 11

Answer: D

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68. If A is a square matrix of order $n \times n$ and k is a scalar, then $adj(kA) =$

A. k adj A

B. $k^n adjA$

C. $k^{n-1} adj. A$

D. $k^{n+1} adjA$

Answer: C

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69. If $A = \begin{bmatrix} \cos x & \sin x \\ -\sin x & \cos x \end{bmatrix}$ and $AdjA = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ then the value of k is

A. $\sin x \cos x$

B. 1

C. 2

D. 3

Answer: B

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70. If a is a square matrix, then $adjA^T - (adjA)^T =$

A. $2|A|$

B. $2|A|I$

C. null matrix

D. unit matrix

Answer: C

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71. If A, B are two invertible matrices of same type then $(AB)^{-1} =$

A. $A^{-1}B^{-1}$

B. $B^{-1}A^{-1}$

C. $A^{-1}B$

D. AB^{-1}

Answer: B

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72. Which of the following statements is false:

A. if $|A| = 0$ then $|adjA| = 0$

B. adjoint of a diagonal matrix of order 2×2 is a diagonal matrix

C. product of two upper trianglular matrices is an upper triangular matrix

D. adj $(AB) = adj(A)adj(B)$

Answer: D

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73. If A and B are two square matrices such that $B = -A^{-1}BA$ then $(A+B)^2 =$

A. O

B. $A^2 + B^2$

C. $A^2 + 2AB + B^2$

D. $A + B$

Answer: B

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74. If the matrix $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ then $I + A + A^2 + \ldots\ldots\ldots\ldots$ up to infinitey

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

B. $\begin{bmatrix} 1/2 & 1/3 \\ -1/2 & 0 \end{bmatrix}$

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

D. $\begin{bmatrix} 1/2 & -1/3 \\ -1/2 & 0 \end{bmatrix}$

Answer: D

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75. If the product of the matrix $B = \begin{bmatrix} 2 & 6 & 4 \\ 1 & 0 & 1 \\ -1 & 1 & -1 \end{bmatrix}$ with a matrix A has inverset $C = \begin{bmatrix} -1 & 0 & 1 \\ 1 & 1 & 3 \\ 2 & 0 & 2 \end{bmatrix}$, then $A^{-1} =$

A. $\begin{bmatrix} -3 & -5 & 5 \\ 0 & 9 & 14 \\ 2 & 2 & 6 \end{bmatrix}$

B. $\begin{bmatrix} -3 & 5 & 5 \\ 0 & 0 & 9 \\ 2 & 14 & 16 \end{bmatrix}$

C. $\begin{bmatrix} -3 & -5 & -5 \\ 0 & 9 & 2 \\ 2 & 14 & 6 \end{bmatrix}$

D. $\begin{bmatrix} -3 & -3 & -5 \\ 0 & 9 & 2 \\ 2 & 14 & 6 \end{bmatrix}$

Answer: C

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76. A square nonsingular matrix satisfies $A^2 - A + 2I = 0$ then $A^{-1} =$

A. $I - A$

B. $(I - A)/2$

C. $I + A$

D. $(I + A)/2$

Answer: B

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77. A is a square matrix satisfying the equation $A^2 - 4A - 5I = O$. Then $A^{-1} =$

A. $A - 4I$

B. $\frac{1}{3}(A - 4i)$

C. $\frac{1}{4}(A - 4I)$

D. $\frac{1}{5}(A - 4I)$

Answer: D

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78. If for a matrix $A, A^2 + I = O$ where I is the indentity matrix, then $A =$

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

B. $\begin{bmatrix} -i & 0 \\ 0 & -i \end{bmatrix}$

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

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

Answer: B

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79. If $A = \begin{bmatrix} a & b \\ 0 & c \end{bmatrix}$ then $A^{-1} + (A - aI)(A - cI) =$

A. $\frac{1}{bc}\begin{bmatrix} c & b \\ 0 & -ab \end{bmatrix}$

B. $\frac{1}{ac}\begin{bmatrix} c & -b \\ 0 & a \end{bmatrix}$

C. $\frac{1}{ac}\begin{bmatrix} a & -b \\ 0 & c \end{bmatrix}$

D. $\frac{1}{ab}\begin{bmatrix} c & -b \\ 0 & -c \end{bmatrix}$

Answer: B

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

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

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82. Let A and B be two invertible matrices of order 3×3. If det $\left(ABA^T\right) = 8 \det\left(AB^{-1}\right) = 8$, then $\det\left(BA^{-1}B^T\right)$ is equal to

A. 16

B. 1/16

C. 1/4

D. 1

Answer: A

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83. If $A = \begin{bmatrix} a + ib & c + id \\ -c + id & a - ib \end{bmatrix}$, $a^2 + b^2 + c^2 + d^2 = 1$, then find inverse of A.

A. $\begin{bmatrix} a + I & c + id \\ c + id & a - ib \end{bmatrix}$

B. $\begin{bmatrix} a + ib & c - id \\ c - id & a - ib \end{bmatrix}$

C. $\begin{bmatrix} a - ib & -c + id \\ c - id & a + ib \end{bmatrix}$

D. $\begin{bmatrix} a - ib & -c - id \\ c - id & a + ib \end{bmatrix}$

Answer: D

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84. If A and B are square matrices of order 3 such that $\det A = -1$, $\det B = 3$ then the determinant of 3AB is equal to

A. -9

B. -27

C. -81

D. 81

Answer: C

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85. The inverse of a symmetric (if it exists) is

A. a symmetric matrix

B. a skew symmetric matrix

C. a diagonal matrix

D. none of these

Answer: A

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86. The inverse of a skew symmetric matrix. (if it exists) is

A. a symmetric matrix

B. a skew symmetric matrix

C. a diagonal matrix

D. none of these

Answer: B

Watch Video Solution

87. The inverse of a skew symmetric matrix of odd order is

A. a symmetric matrix

B. a skew symmetric matrix

C. diagonal matrix

D. does not exist

Answer: D

Watch Video Solution

88. If A is an orthogonal matrix then $|A|$ is

A. 1

B. -1

C. ± 1

D. 0

Answer: C

Watch Video Solution

Exercise 1 D Mcq Linear Equations

1. The rank of $\begin{bmatrix} 1 & 0 \\ 0 & 0 \end{bmatrix}$ is

A. 0

B. 1

C. 2

D. 3

Answer: B

Watch Video Solution

2. The rank of $\begin{bmatrix} 1 & 0 \\ 1 & 1 \end{bmatrix}$ is

A. 0

B. 1

C. 2

D. 3

Answer: C

Watch Video Solution

3. The rank of $\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$ is

A. 0

B. 1

C. 2

D. 3

Answer: A

Watch Video Solution

4. The rank of $\begin{bmatrix} 1 & 0 & -4 \\ 2 & -1 & -3 \end{bmatrix}$ is

A. 0

B. 1

C. 2

D. 3

Answer: C

Watch Video Solution

5. The rank of $\begin{bmatrix} -1 & 2 \\ -2 & 4 \\ 3 & 6 \end{bmatrix}$ is

A. 0

B. 1

C. 2

D. 3

Answer: C

Watch Video Solution

6. The rank of $\begin{bmatrix} 1 & 4 \\ 3 & 3 \\ 5 & 2 \end{bmatrix}$ is

A. 0

B. 1

C. 2

D. 3

Answer: C

Watch Video Solution

7. The rank of $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ is

A. 0

B. 1

C. 2

D. 3

Answer: D

Watch Video Solution

8. The rank of $\begin{bmatrix} 1 & 4 & -1 \\ 2 & 3 & 1 \\ 1 & 1 & 2 \end{bmatrix}$ is

A. 0

B. 1

C. 2

D. 3

Answer: D

Watch Video Solution

9. The rank of $\begin{bmatrix} 1 & 1 & 1 \\ -1 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix}$ is

A. 0

B. 1

C. 2

D. 3

Answer: C

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10. The rank of $\begin{bmatrix} 1 & -1 & 1 \\ 1 & 1 & -1 \\ -1 & 1 & 1 \end{bmatrix}$ is

A. 0

B. 1

C. 2

D. 3

Answer: D

Watch Video Solution

11. The rank of $\begin{bmatrix}1 & 2 & 3 & 1\\ 2 & 4 & 6 & 2\\ 1 & 2 & 3 & 2\end{bmatrix}$ is

Watch Video Solution

12. The rank of $\begin{bmatrix}1 & 2 & -1\\ 4 & 1 & 2\\ 3 & -1 & 1\\ 1 & 2 & 0\end{bmatrix}$ is

Watch Video Solution

13. If the matrix $A = \begin{bmatrix}1 & 2 & 3 & 0\\ 2 & 4 & 3 & 2\\ 3 & 2 & 1 & 3\\ 6 & 8 & 7 & a\end{bmatrix}$ is of rank 3, then $a =$

A. 5

B. 4

C. 1

D. -5

Answer: A

Watch Video Solution

14. The matrix form of the system of equations $2x - y + 8z = 13, 3x + 4y + 5z = 18$, 3x-2y-4z=-13` is

A. $\begin{bmatrix} 2 & -1 & 8 \\ 3 & 4 & 5 \\ 3 & -2 & -4 \end{bmatrix}\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 13 \\ 18 \\ -13 \end{bmatrix}$

B. $\begin{bmatrix} 2 & -1 & 8 \\ 3 & 4 & 5 \\ 3 & -2 & -4 \end{bmatrix}\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 13 \\ 18 \\ 13 \end{bmatrix}$

C. $\begin{bmatrix} 2 & -1 & 8 \\ 3 & 4 & 5 \\ 3 & -2 & -4 \end{bmatrix}\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 13 \\ -18 \\ 13 \end{bmatrix}$

D. $\begin{bmatrix} 2 & -1 & 8 \\ 3 & 4 & 5 \\ 3 & -2 & -4 \end{bmatrix}\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} -13 \\ -18 \\ 13 \end{bmatrix}$

Answer: A

Watch Video Solution

15. The augmented matrix of $x + y + z = 6, 2x - y + z = 3, 2y - z + x = 2$ is

A. $\begin{bmatrix} 1 & 1 & 1 & 6 \\ 2 & -1 & 1 & 3 \\ 2 & -1 & 1 & 2 \end{bmatrix}$

B. $\begin{bmatrix} 1 & 1 & 1 & -6 \\ 2 & -1 & 1 & -3 \\ 2 & -1 & 1 & -2 \end{bmatrix}$

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

D. $\begin{bmatrix} 1 & 1 & 1 & 6 \\ 2 & -1 & 1 & 3 \\ 1 & 2 & -1 & 2 \end{bmatrix}$

Answer: D

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16. The solution of $3x + 4y = 1, 2x + 5y = 3$ is

A. $x = -1, y = 1$

B. $x = 1, y = 2$

C. $x = -1, y = 4$

D. $x = 1, y = 1$

Answer: A

Watch Video Solution

Watch Video Solution

17. The solution of

$7x + 5y - 13z + 4 = 0, 9x + 2y + 11z = 37, 3x - y + z = 2$ is

A. $x = 1, y = 2, z = 3$

B. $x = 2, y = 3, z = 1$

C. $x = 1, y = 3, z = 2$

D. $x = 2, y = 1, z = 2$

Answer: C

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18. The solutioni of $x + y + z = 7, x + 2y + 3z = 16, x + 3y + 4z = 22$ is

A. $x = 1, y = -3, z = 2$

B. $x = 1, y = 2, z = 3$

C. $x = 1, y = 3, z = 3$

D. $x = -1, y = 4, z = 4$

Answer: C

Watch Video Solution

19. find rank of $\begin{bmatrix} 1 & 1 & 1 \\ 1 & 2 & 3 \\ 3 & 1 & -5 \end{bmatrix}$ is

A. 0

B. 1

C. 2

D. 3

Answer:

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20. The equation $2x + y - 4z = 0, x - 2y + 3z = 0, x - y + z = 0$ have

A. unique solution

B. no solution

C. infinitely many solutions

D. none

Answer: C

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21. The number of nontrivial solutions of the system: $x - y + z = 0, x + 2y = 0, 2x + y + 3z = 0$ is

A. 0

B. 1

C. 2

D. 4

Answer: A

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22. For the equations $x + 2y + 3z = 1, 2x + y + 3z = 2, 5x + 5y + 9z = 4$

A. There is only one solution

B. There exists infinitely many solutions

C. There is no solution

D. none

Answer: A

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23. Consider the system of linear equations $x_1 + 2x_2 + x_3 = 3, 2x_1 + 3x_2 + x_3 = 3, 3x_1 + 5x_2 + 2x_3 = 1$ The system has

A. infinite number of solutions

B. exactly 3 solutions

C. a uniqe solution

D. non solution

Answer: D

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24. The equations $x + 2y - z = 3, 3x - y + 2z = 1, 2x - 2y + 3z = 2$ have

A. no solution

B. unique solution

C. infinitely many solutions

D. none

Answer: B

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25. The equation $x - y + 2z = 4, 3x + y + 4z = 6, x + y + z = 1$ have

A. no solution

B. unique solution

C. infinitely many solutions

D. none

Answer: C

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26. If the system of equation $3x - 2y + z = 0, \lambda - 14y = 15z = 0, x + 2y + 3z = 0$ has non trivial solutioin, then $\lambda =$

A. 12

B. 19

C. 24

D. 29

Answer: D

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27. The system of linear equations $x + y + z = 2, 2x + y - z = 3, 3x + 2y + kz = 4$ has a unique solution if

A. $k \neq 0$

B. $-1 < k < 1$

C. $-2 < k < 2$

D. $k = 0$

Answer: A

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28. If the system of equations $x + y + z = 6, x + 2y + \lambda z = 0, x + 2y + 3z = 10$ has no solution then $\lambda =$

A. 2

B. 3

C. 4

D. 5

Answer: B

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29. The system of equations $\alpha x + y + z = \alpha - 1, x + \alpha y + z = \alpha - 1, x + y + \alpha z = \alpha - 1$ has no solution if α is

A. -2

B. either -2 or 1

C. not -2

D. 1

Answer: A

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30. The number of values of k for which the system of equations:

$(k + 1)x + 8y = 4k, kx + (k + 3)y = 3k - 1$ has no solution is

A. 2

B. 3

C. infinite

D. 1

Answer: D

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31. The system of equations $3x + 2y + z = 6, 3x + 4y + 3z = 14, 6x + 10y + 8z = a$ has infinite number of solutions if a=

A. 8

B. 12

C. 24

D. 36

Answer: D

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32. If the system of equations $x + 2y + 3z = 13, 3x + y + 2z = 12, 2x + 3y + 6z = 0$ has`

A. unique sloution

B. no solution

C. infinitely many sloution

D. none

Answer: A

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33. The number of values of k for which the linear equations $4x + ky + 2z = 0, kx + 4 + z = 0, 2x + 2y + z = 0$ posses a non zero solution is

A. 1

B. zero

C. 3

D. 2

Answer: D

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34. If the system of equations $2x - 3y + 4z = 0, 5x - 2y - z = 0$ and $21x - 8y + \lambda z = 0$ has non trival solution λ is

A. -1

B. 0

C. 1

D. -5

Answer: D

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35. The values of λ for which the system of equations $x + y - 3 = 0, (1 + \lambda)x + (2 + \lambda)y - 8 = 0, x - (1 + \lambda)y + (2 + \lambda) = 0$ is consistent are

A. $-5/3, 1$

B. $2/3, -3$

C. $-1/3, -3$

D. 0,0,1

Answer: A

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36. If the system of equations $(k+1)^3x+(k+2)^3y=(k+3)^2, (k+1)x+(k+2)y+k+3, x+y=1$ is consistent then the value of k is

A. 2

B. -2

C. -1

D. 1

Answer: B

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37. If the system of equations $3x-2y+z=0, \lambda x-14y+15z=0, x+2y-3z=0$ have non zero solution zero $\lambda =$

A. 1

B. 3

C. 5

D. 0

Answer: C

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38. The equation $x + y + z = 6, x + 2y + 3z = 10, x + 2y + \lambda z = \mu$ have unique solution if

A. $\lambda = 3, \mu = 10$

B. $\lambda = 3, \mu \neq 10$

C. $\lambda \neq 3$

D. none

Answer: C

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39. The system of equations $x+y+z=6, x+2y+3z=10, x+2y+\lambda z=\mu$ is inconsistent if

A. $\lambda=3, \mu=10$

B. $\lambda\neq 3, \mu=10$

C. $\lambda=3, \mu\neq 10$

D. $\lambda\neq 3, \mu\neq 10$

Answer: c

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40. The system of equations $x + ky + 3z = 0, 3x + ky - 2z = 0, 2x + 3y - 4z = 0$ has a non trivial solution when $k =$

A. 33

B. $33/2$

C. 9

D. -33

Answer: B

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41. The system of linear equations $x + y + z = 2, 2x + y - z = 3, 3x + 2y + kz = 4$ has a unique solution if

A. $k \neq 0$

B. $-1 < k < 1$

C. $-2 < k < 2$

D. $k = 0$

Answer: A

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42. If the system of equation $x + y = 6, x + 2y + \lambda z = 0, x + 2y + 3z = 0$ has no solution then $\lambda =$

A. 2

B. 3

C. 4

D. 5

Answer: B

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43. If the system of equations $x + 2y + z = 12, 3x + y + 2z = 5, 2x + \lambda y + 2z = 18$ has nontrivial solution then $\lambda =$

A. 4

B. 6

C. 18

D. 16

Answer: A

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44. The system of equations $3x - y + 4z = 3, x + 2y - 3z = -2, 6x + 5y + \lambda z = -3$ has non trival solution then

A. $\lambda = -5$

B. $\lambda = 3$

C. $\lambda = 5$

D. $\lambda = 6$

Answer: A

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45. If the system of equation $ax + y + z = 0, x + by + z = 0, x + y + cz = 0, (a, b, c \neq 1)$ has non trivial solution (non -zero solution) then $\frac{1}{1-a} + \frac{1}{1-b} + \frac{1}{1-c} =$

A. 1

B. -1

C. 0

D. none

Answer: A

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46. If the system of linear equations $x+2ay+az=0, x+3by+bz=0, x+4ch+cz=0$ has a non zero solution then a,b,c

A. are in G.P.

B. are in H.P.

C. satisfy $a+2b+3c=0$

D. are in A.P

Answer: B

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47. The number of real values of t such that the system of homogeneous equations

$tx + (t + 1)y + (t - 1)z = 0, (t + 1)x + ty + (t + 2)z = 0, (t - 1)x + (t - 2)y + tz = 0$

has non trivial solutions is

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48. Given that $a\alpha^2 + 2b\alpha + c \neq 0$ and that the system of equations

$(a\alpha = b)x + ay + bz = 0, (b\alpha + c)x + by + cz = 0, (a\alpha + b)y + (b\alpha + c)z = 0$

has a non -trivial solution, then a,b,c lie in

A. Arithmetic progression

B. Geometric progression

C. Harmonic progression

D. Arithmetic geometric progression

Answer: B

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49. If a,b,c are all different and the equations $ax + a^2y + (a^3 + 1)z = 0, bx + b^2y + (b^3 + 1)z = 0, cx + c^2y + (c^3 + 1)z = 0$ have a nonzero solution , then

A. $abc + 1 = 0$

B. $abc - 1 = 0$

C. $a^2 + b^2 + c^2 = ab + bc + ca$

D. $a^3 + b^3 + c^3 + 3abc = 0$

Answer: A

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50. The system of equations $(\sin 3\theta)x - y + z = 0, (\cos 2\theta)x + 4y + 3z = 0, 2x + 7y + 7z = 0$ has non trivial solutions if

A. $\sin 3\theta + 2\cos 2\theta = 2$

B. $\sin 3\theta - 2\cos\theta = 2$

C. $\sin 3\theta - 2\cos 2\theta = 1$

D. $\sin 3\theta + 2\cos 2\theta = 1$

Answer: A

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51. The System of equation $-2x - y + z = a, x - 2y + z = b, x + y - 2z = c$ is inconsistent if

A. $a + b + c = 0$

B. $a + b + c \leq 0$

C. $a + b + c \neq 0$

D. $a + b + c \geq 0$

Answer: C

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52. The system of equations $-2x + y + z = a, x - 2y + z = b, x + y - 2z = c$ is consistent if

A. $a + b + c = 0$

B. $a + b + c \leq 0$

C. $a + b + c \neq 0$

D. $a + b + c \geq 0$

Answer: A

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53. If the system of equations $ax + y + z = 0, x + by + z = 0, x + y + cz = 0$ has a nontrivial solution. Where $a \neq 1, b \neq 1, c \neq 1$, then $a + b + c - abc =$

A. 0

B. 1

C. 2

D. 3

Answer: C

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Exercise 2 Mcq Special Types Questions Set 1

1. I: If $A = \begin{bmatrix} 0 & 1 & 2 \\ 2 & 3 & 4 \\ 4 & 5 & -6 \end{bmatrix}, B = \begin{bmatrix} -1 & 2 & 3 \\ 0 & 1 & 0 \\ 0 & 0 & -1 \end{bmatrix}$ then

$4A - 5B = \begin{bmatrix} 5 & -6 & -7 \\ 8 & 7 & 16 \\ 16 & 20 & -19 \end{bmatrix}$

II:If $A = \begin{bmatrix} 1 & 2 & 3 \\ 3 & 2 & 1 \end{bmatrix} B = \begin{bmatrix} 3 & 2 & 1 \\ 1 & 2 & 3 \end{bmatrix}$ then $3B - 2A = \begin{bmatrix} 7 & 2 & -3 \\ -3 & 2 & 7 \end{bmatrix}$

A. only I is true

B. only Ii is true

C. both I and II are true

D. neither I nor II true

Answer: C

Watch Video Solution

2. If $A = \begin{bmatrix} 1 & 2 & 1 \\ 0 & 1 & -1 \\ 3 & -1 & 1 \end{bmatrix}$ then $A^3 - 3A^2 - A + 9I =$

A. 0

B. 1

C. 2

D. 3

Answer: A

Watch Video Solution

3. I: If $A = \begin{bmatrix} -2 & 1 & 0 \\ 3 & 4 & -5 \end{bmatrix}, B = \begin{bmatrix} 1 & 2 \\ 4 & 3 \\ -1 & 5 \end{bmatrix}$ then $A + B^T = \begin{bmatrix} -1 & 5 & -1 \\ 5 & 7 & 0 \end{bmatrix}$

II: If $A = \begin{bmatrix} 2 & -1 & 2 \\ 1 & 3 & -1 \end{bmatrix}, B = \begin{bmatrix} 3 & -2 & 1 \\ 2 & 0 & -1 \end{bmatrix}$ then $\left(AB^T\right)^T = \begin{bmatrix} 10 & 2 \\ -4 & 3 \end{bmatrix}$

A. only I is true

B. only Ii is true

C. both I and II are true

D. neither I nor II true

Answer: A

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4. I: $\begin{vmatrix} -a^2 & ab & ac \\ ab & -b^2 & bc \\ ac & bc & -c^2 \end{vmatrix} = 2a^2b^2c^2$

II: $\begin{vmatrix} 0 & ab^2 & ac^2 \\ a^2b & 0 & bc^2 \\ a^2c & b^2c & 0 \end{vmatrix} = 2a^3b^3c^3$

A. only I is true

B. only Ii is true

C. both I and II are true

D. neither I nor II true

Answer: B

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5. If $\begin{vmatrix} a & a^2 & 1+a^3 \\ b & b^2 & 1+b^3 \\ c & c^2 & 1+c^3 \end{vmatrix} = 0$ and vectors $(1, a, a^2)$, $(1, b, b^2)$ and $(1, c, c^2)$

are non coplanar then the product $abc =$

A. only I is true

B. only Ii is true

C. both I and II are true

D. neither I nor II true

Answer: C

Watch Video Solution

6. I: If the matrix A = $\begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & \lambda \end{bmatrix}$ is singular one, then $\lambda = 3$

II: If the matrix $\begin{bmatrix} \cos\theta & \sin\theta & 0 \\ \sin\theta & \cos\theta & 0 \\ 0 & 0 & 1 \end{bmatrix}$ is singular then $\theta = \pi/2$

A. only I is true

B. only Ii is true

C. both I and II are true

D. neither I nor II true

Answer: A

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7. I: If $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ then $A^{-1} = \begin{bmatrix} 4 & -2 \\ -3 & 1 \end{bmatrix}$

II: If $A = \begin{bmatrix} 3 & 4 \\ 2 & 1 \end{bmatrix}$ then $A^{-1} = \frac{1}{5}\begin{bmatrix} -1 & 4 \\ 2 & -3 \end{bmatrix}$

A. only I is true

B. only Ii is true

C. both I and II are true

D. neither I nor II true

Answer: B

Watch Video Solution

8. The rank of $\begin{bmatrix} 1 & 0 & 2 \\ 2 & 1 & 0 \\ 3 & 2 & 1 \end{bmatrix}$

A. 0

B. 1

C. 2

D. 3

Answer: D

Watch Video Solution

9. I: The system of equations $x + y + z = 6, x - y + z = 2, 2x - y + 3z = 9$ has unique solution.

II: The system of equations $x + y + z = 3, 2x + 2y - z = 3, x + y - z = 1$ has infinitely many solutions

A. only I is true

B. only Ii is true

C. both I and II are true

D. neither I nor II true

Answer: C

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Exercise 2 Mcq Special Types Questions Set 2

1. If $\begin{bmatrix} x+3 & 2y+x \\ z-1 & 4a-6 \end{bmatrix} = \begin{bmatrix} 0 & -7 \\ 3 & 2a \end{bmatrix}$ then the ascending order of x,y,z a is

A. x, y, z, a

B. x, y, a, z

C. a, x, y, z

D. a, z, y, x

Answer: B

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2. If $A = \begin{bmatrix} 1 & 2 & 3 \end{bmatrix}, B = \begin{bmatrix} 2 \\ 3 \\ -1 \end{bmatrix}$ and $\left(A + B^T\right)^T = \begin{bmatrix} a \\ b \\ c \end{bmatrix}$ then the descending order of a,b,c is

A. a,b,c

B. b,a,c

C. c,a,b

D. c,b,a

Answer: B

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3. If A,B,C are the values of the determinants $\begin{vmatrix} 0 & 1 & 1 \\ 1 & 0 & 1 \\ 1 & 1 & 0 \end{vmatrix}, \begin{vmatrix} 1 & 4 & 2 \\ 2 & -1 & 4 \\ -3 & 7 & 6 \end{vmatrix}, \begin{vmatrix} 2 & -1 & 4 \\ 4 & -3 & 1 \\ 1 & 2 & 1 \end{vmatrix}$ then the ascending order of A,B,C is

A. A,B,C

B. B,C,A

C. A,C,B

D. B,A,C

Answer: D

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4. If A,B,C are the cofactors of 2,3,-5 in the matrix $\begin{bmatrix} -1 & 0 & 5 \\ 1 & 2 & -2 \\ -4 & -5 & 3 \end{bmatrix}$ then the ascending order of A,B,C is

A. A,B,C

B. B,C,A

C. A,C,B

D. B,A,C

Answer: B

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5. If the inverse of the matrix $\begin{bmatrix} 1 & 2 \\ 3 & -5 \end{bmatrix}$ is $\frac{1}{11}\begin{bmatrix} a & b \\ c & d \end{bmatrix}$ then the ascending order of a,b,c,d is

A. a,b,c,d

B. d,b,c,a

C. c,a,b,d

D. b,a,c,d

Answer: B

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6. If the inverse of the matrix $\begin{bmatrix} 2 & 1 & 2 \\ 1 & 0 & 1 \\ 2 & 2 & 1 \end{bmatrix}$ is $\begin{bmatrix} -2 & c & 1 \\ a & d & 0 \\ b & -2 & -1 \end{bmatrix}$ then the descending order of a,b,c,d is

A. a,b,c,d

B. b,c,a,d

C. c,b,a,d

D. b,a,c,d

Answer: C

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7. If a,b,c are the ranks of $\begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}\begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix}\begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 7 \\ 3 & 5 & 10 \end{bmatrix}$ respectively then the ascending order of a,b,c is

A. a,b,c

B. b,c,a

C. c,a,b

D. a,c,b

Answer: A

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Exercise 2 Mcq Special Types Questions Set 3

1. Let $A = \begin{bmatrix} -1 & -2 & -3 \\ 3 & 4 & 5 \\ 4 & 5 & 6 \end{bmatrix}, B = \begin{bmatrix} 1 & -2 \\ -1 & 2 \end{bmatrix}$ and $C = \begin{bmatrix} 2 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 2 \end{bmatrix}$ If a,b, and c respectively denote the ranks of A,B and C then correct order of these numbers is

A. $a < b < c$

B. $c < b < a$

C. $b < a < c$

D. $a < c < b$

Answer: C

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Exercise 2 Mcq Special Types Questions Set 4

1. A: The trace of $\begin{bmatrix} 2 & -1 \\ 1 & 6 \end{bmatrix}$ is 8

R: The trace of a square matrix is the sum of elements in the principal diagonal.

A. Both A and R are ture and R is the correct explanation of A

B. Both A and R are true but R is not correct explanation of A

C. A is true but R is false

D. A is false but R is true

Answer: A

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2. A: If $\begin{bmatrix} 2 & 4 \\ -1 & k \end{bmatrix}$ is a nilpotent matrix of index 2 then $k = -2$

R: If A is a nilpotent matrix of index 2 then $A^2 = O$

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3. Let A and B be two symmetric matrices of order 3.

Statement: 1: $A(BA)$ and $(AB)A$ are symmetric matrices.

Statement: AB is symmetric if matrix multiplication of A with B is commutative.

A. Statement -1 is true, Statement-2 is false

B. Statement 1 is false, Statement -2 is true.

C. Statement -1 is true , Statement -2 is true, Statement -2 is a correct explanation for statement-1.

D. Statement -1 is true , Statement -2 is true, Statement 2 is not a correct explanation for Statement -1.

Answer: D

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4. Let A be 2×2 matrix with non zero entries and let $A^2 = I$ where I is 2×2 identity matrix. Define $Tr(A) =$ sum of diagonal elements of A and $|A| =$ determinant of matrix A

Statement-1 $Tr(A) = 0$

Statement -2 $|A| = 1$

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5. Let A be 2×2 matrix. Statement : $adj(adjA) = A$ Statement -2: $|adjA| = |A|$

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6. Let A be 2×2 matrix with non zero entries and let $A^2 = I$ where I is 2×2 identity matrix. Define $Tr(A) =$ sum of diagonal elements of A and $|A| =$ determinant of matrix A

Statement-1 $Tr(A) = 0$

Statement -2 $|A| = 1$

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7. the system of equations $x + y + z = 4, 2x + 5y - 2z = 3, x + 7y - 7z = 5$ has no solution.

A. ture

B. false

C. cannot defined

D. none

Answer: A

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8. The system of equations $x + y + z = 6, x + 2y + 3z = 14, x + 4y = 7z = 30$ has

A. infinitely many solutions

B. unique solution

C. no solution

D. none

Answer: A

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