The equations $2x + 3y + 4 = 0$; $3x + 4y + 6 = 0$ and $4x + 5y + 8 = 0$ are

(a) consistent with unique solution

(b) inconsistent

(c) consistent with infinitely many solutions

(d) None of the above

Ques:

$$\begin{bmatrix} 2x + 3y + 4z = 0 \\ 3x + 4y + 6z = 0 \\ 4x + 5y + 8z = 0 \end{bmatrix}$$

$$\Rightarrow A = \begin{bmatrix} 2 & 3 & 4 \\ 3 & 4 & 6 \\ 4 & 5 & 8 \end{bmatrix} \Rightarrow \boxed{|A| \to 0}$$

$C_1 \leftrightarrow C_3 \to$ ratio same

If $\Delta = \begin{vmatrix} 3 & 5 & 6 \\ 7 & 8 & 9 \\ 10 & x & 5 \end{vmatrix}$, then $\begin{vmatrix} x & 10 & 5 \\ 5 & 3 & 6 \\ 8 & 7 & 9 \end{vmatrix}$ equal to:

(a) Δ (b) $-\Delta$

(c) Δx (d) 0

Sol^n:-

① $\Delta = R_3 \leftrightarrow R_1 \rightarrow -ive$

② $\Delta = R_2 \leftrightarrow R_3 \rightarrow +ive$ $\begin{bmatrix} 10 & x & 5 \\ 3 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix} = \Delta$

$C_1 \leftrightarrow C_2$

$- \begin{bmatrix} x & 10 & 5 \\ 5 & 3 & 6 \\ 8 & 7 & 9 \end{bmatrix}$

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$A_{11} = a^2$, $A_{22} = a^2$

If $A = \begin{bmatrix} a & 0 & 0 \\ 0 & a & 0 \\ 0 & 0 & a \end{bmatrix}$, then the value of $A_{33} = a^2$

$|\text{adj } A|$ is

$\text{adj } A = \begin{bmatrix} A_{11} & A_{12} & A_{13} \\ A_{21} & A_{22} & A_{23} \\ A_{31} & A_{32} & A_{33} \end{bmatrix}'$

(a) a^{27} (b) a^9

(c) a^6 (d) a^2

$\Rightarrow \text{adj } A = \begin{bmatrix} a^2 & 0 & 0 \\ 0 & a^2 & 0 \\ 0 & 0 & a^2 \end{bmatrix} \Rightarrow |\text{adj } A| =$

$a^2[a^4 - 0] = a^6$

If area of triangle is 4 sq units with vertices (–2, 0), (0, 4) and (0, k), then k is equal to

(a) 0, –8

(b) 8

(c) – 8

(d) 0, 8

$= \pm 4$

$\Rightarrow \Delta = \frac{1}{2}\begin{vmatrix} -2 & 0 & 1 \\ 0 & 4 & 1 \\ 0 & k & 1 \end{vmatrix} = \pm 4$

$\Rightarrow -2[4-k] = \pm 8 \Rightarrow -8+2k = \pm 8$

$+ \quad -8+2k = 8$

$k = 8$

$- \longrightarrow -\cancel{8}+2k = \cancel{8}$

$k = 0$

If $A = \begin{bmatrix} \alpha & 2 \\ 2 & \alpha \end{bmatrix}$ and $|A^3| = 125$, then the value of α is

(a) ± 1 (b) ± 2

(c) ± 3 (d) ± 5

Solⁿ:- $|A| = \begin{vmatrix} \alpha & 2 \\ 2 & \alpha \end{vmatrix} = \boxed{\alpha^2 - 4} \rightarrow |A|$

$\therefore |A^3| = 125 = 5^3$

$5 = \alpha^2 - 4 \Leftarrow \boxed{5^3 = (\alpha^2 - 4)^3} \leftarrow |A^3|$

$\alpha^2 = 9 \Rightarrow \alpha = \pm 3$

If the matrix $\begin{bmatrix} 1 & 3 & \lambda+2 \\ 2 & 4 & 8 \\ 3 & 5 & 10 \end{bmatrix}$ is singular, then $\lambda =$ $\rightarrow$ $\boxed{|A| = 0}$

(a) -2 (b) 4

(c) 2 (d) -4

$$\begin{vmatrix} 1 & 3 & \lambda+2 \\ 2 & 4 & 8 \\ 3 & 5 & 10 \end{vmatrix} = 1[\cancel{40} - \cancel{40}] - 3[20-24] + (\lambda+2)[10-12] = 0$$

$$\Rightarrow +12 - 2\lambda - 4 = 0$$

$$\Rightarrow 2\lambda = 8 \Rightarrow \lambda = 4$$

If each of third order determinant of value Δ is multiplied by 4, then value of the new determinant is:

(a) Δ

(b) 21Δ

(c) 64Δ

(d) 128Δ

$$\begin{bmatrix} 4 & 4 & 4 \\ & & \\ & & \end{bmatrix}_{\underline{3\times 3}} \Rightarrow \underline{4\times 4\times 4} = 64\Delta$$

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If $A = \begin{bmatrix} 1 & 0 & 3 \\ 2 & 1 & 1 \\ 0 & 0 & 2 \end{bmatrix}$, then the value of |adj (adj A)| is

(a) 14

(b) 16

(c) 15

(d) 12

$\Rightarrow |A| \Rightarrow 4[4-0] = 16$

$\Rightarrow |\mathrm{adj}(\mathrm{adj}\,A)| \rightarrow \mathrm{adj}\,B$

$\mathrm{adj}(A) = \begin{bmatrix} 2 & -4 & 0 \\ 0 & 2 & 0 \\ 3 & +5 & 1 \end{bmatrix} = \begin{bmatrix} 2 & 0 & 3 \\ -4 & 2 & 5 \\ 0 & 0 & 1 \end{bmatrix} \rightarrow B$

$\mathrm{adj}\,B = \begin{bmatrix} 2 & 4 & 0 \\ 0 & 2 & 0 \\ -6 & -22 & 4 \end{bmatrix} = \begin{bmatrix} 2 & 0 & -6 \\ 4 & 2 & -22 \\ 0 & 0 & 4 \end{bmatrix} \rightarrow \begin{vmatrix} 2 & 0 & -6 \\ 4 & 2 & -22 \\ 0 & 0 & 4 \end{vmatrix}$

$\Rightarrow 4$

If p, q, r are in A.P., then the value of $\begin{vmatrix} x+4 & x+9 & x+p \\ x+5 & x+10 & x+q \\ x+6 & x+11 & x+r \end{vmatrix}$ is

(a) $x+15$

(b) $x+20$

(c) $x+p+q+r$

(d) None of these

1 3 5

A.P. → a, b, c

⇒ $\boxed{a+c=2b}$

p, q, r → AP

$\boxed{p+r=2q}$

$(R_1+R_3-2R_2) \to R_1$

$\Delta = \begin{vmatrix} 0 & 0 & 0 \\ - & - & - \\ - & - & - \end{vmatrix} \to R_1 \Rightarrow 0 \to \Delta = 0$

(d)

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The determinant Δ $\begin{vmatrix} x & \sin\theta & \cos\theta \\ -\sin\theta & -x & 1 \\ \cos\theta & 1 & x \end{vmatrix}$ $\Rightarrow$ Value

is

(a) independent of θ only

(b) independent of x only

(c) independent of both θ and x

(d) None of the above

$\Delta = x[-x^2-1] - \sin\theta[x\cdot\sin\theta - \cos\theta] + \cos\theta[-\sin\theta + x\cos\theta]$

$\Rightarrow -x^3 - x + x\cdot\sin^2\theta + \cancel{\sin\theta\cos\theta} - \cancel{\sin\theta\cos\theta} + x\cdot\cos^2\theta$

$\Rightarrow -x^3 - x + x(1) \Rightarrow -x^3 - \cancel{x} + \cancel{x} \Rightarrow -x^3$

1	2	3	4	5	6	7	8	9	10
A	B	C	D	C	D	C	B	D	A