$\boxed{\text{Que}}$ Find number of solution of the system of equation

$x+2y+3z=5$, $(\lambda+1)x+(3\lambda+1)y+(\lambda+5)z=2\lambda+1$,

$(\lambda+2)x+(\lambda+5)y+(2\lambda+7)z=\lambda+14$.

Sol^n

$$x+2y+3z=5$$
$$(\lambda+1)x+(3\lambda+1)y+(\lambda+5)z=2\lambda+1$$
$$(\lambda+2)x+(\lambda+5)y+(2\lambda+7)z=\lambda+14$$

$$|A| = \begin{vmatrix} 1 & 2 & 3 \\ \lambda+1 & 3\lambda+1 & \lambda+5 \\ \lambda+2 & \lambda+5 & 2\lambda+7 \end{vmatrix}$$

$$\Rightarrow \begin{vmatrix} 1 & 0 & 0 \\ \lambda+1 & \lambda-1 & -2\lambda+2 \\ \lambda+2 & -\lambda+1 & -\lambda+1 \end{vmatrix} = 0 \Rightarrow (\lambda-1)(1-\lambda)-2(\lambda-1)(\lambda-1)$$

$$= 0.$$

$$3(\lambda-1)^2 = 0 \Rightarrow \lambda = 1$$

C-1 If $\lambda \neq 1$ then

No. of solution $= \boxed{1}$

C-2: If $\lambda = 1$ then System of equation will become

$$x+2y+3z=5$$
$$2x+4y+6z=3$$
$$3x+6y+9z=15$$
$$x+2y+3z=3/2$$

No. of sol^n $= \boxed{0}$

One

Let M be a 3 × 3 matrix satisfying

$$M\begin{bmatrix}0\\1\\0\end{bmatrix}=\begin{bmatrix}-1\\2\\3\end{bmatrix},\ M\begin{bmatrix}1\\-1\\0\end{bmatrix}=\begin{bmatrix}1\\1\\-1\end{bmatrix},\ \text{and } M\begin{bmatrix}1\\1\\1\end{bmatrix}=\begin{bmatrix}0\\0\\12\end{bmatrix}$$

. Then the sum of the diagonal entries of M is

$$M\begin{bmatrix}0\\1\\0\end{bmatrix}=\begin{bmatrix}-1\\2\\3\end{bmatrix}$$

$$M\begin{bmatrix}1\\-1\\0\end{bmatrix}=\begin{bmatrix}1\\1\\-1\end{bmatrix}$$

$$M\begin{bmatrix}1\\1\\1\end{bmatrix}=\begin{bmatrix}0\\0\\12\end{bmatrix}$$

$$M\cdot\begin{bmatrix}1&0&1\\-1&1&1\\0&0&1\end{bmatrix}=\begin{bmatrix}1&-1&0\\1&2&0\\-1&3&12\end{bmatrix}$$

$$M=\begin{bmatrix}1&-1&0\\1&2&0\\-1&3&12\end{bmatrix}\begin{bmatrix}1&0&-1\\1&1&-2\\0&0&1\end{bmatrix}$$

$$\left[\begin{array}{ccc|ccc}1&0&1&1&0&0\\-1&1&1&0&1&0\\0&0&1&0&0&1\end{array}\right]$$

$$\left[\begin{array}{ccc|ccc}1&0&0&1&0&-1\\-1&1&0&0&1&-1\\0&0&1&0&0&1\end{array}\right]$$

$$\left[\begin{array}{ccc|ccc}1&0&0&1&0&-1\\0&1&0&1&1&-2\\0&0&1&0&0&1\end{array}\right]$$

$$[A \,\vdots\, I]$$

$$\left[\begin{array}{ccc|ccc}1&2&1&1&0&0\\3&5&1&0&1&0\\7&1&\boxed{2}&0&0&1\end{array}\right]$$

$$\downarrow$$

$$I$$

$$tr(M)=0+\underline{2+(1}-6+12)=\boxed{9}$$

Ans

Qn

$A = \begin{bmatrix} 1 & 0 & 0 \\ 2 & 1 & 0 \\ 3 & 2 & 1 \end{bmatrix}$, if U_1, U_2, and U_3 are columns matrices satisfying $AU_1 = \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}$, $AU_2 = \begin{bmatrix} 2 \\ 3 \\ 0 \end{bmatrix}$ and

$AU_3 = \begin{bmatrix} 2 \\ 3 \\ 1 \end{bmatrix}$. If U is 3 × 3 matrix whose columns are U_1, U_2, U_3 then answer the following questions

The value of |U| is

(A) 3 (B) –3 (C) 3/2 (D) 2

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

A

$$AU_1 = \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}, \quad AU_2 = \begin{bmatrix} 2 \\ 3 \\ 0 \end{bmatrix}, \quad AU_3 = \begin{bmatrix} 2 \\ 3 \\ 1 \end{bmatrix} \Rightarrow AU = \begin{bmatrix} 1 & 2 & 2 \\ 0 & 3 & 3 \\ 0 & 0 & 1 \end{bmatrix}$$

$$|A| \cdot |U| = |R.H.S.|$$

$$1 \cdot |U| = 3 \Rightarrow |U| = 3$$

Que

Let p be an odd prime number and T_p be the following set of 2 × 2 matrices :

$$T_p = \left\{ A = \begin{bmatrix} a & b \\ c & a \end{bmatrix} : a, b, c \in \{0, 1, 2, \ldots, p-1\} \right\}$$

The number of A in T_p such that A is either symmetric or skew-symmetric or both, and det (A) divisible by p is

(A) $(p-1)^2$ (B) $2(p-1)$ (C) $(p-1)^2 + 1$ (D) $2p-1$

$p \rightarrow$ odd prime

$$T_p \equiv \left\{ A = \begin{bmatrix} a & b \\ c & a \end{bmatrix} ; a, b, c \in \{0, 1, 2, \ldots, p-1\} \right\}$$

$A \rightarrow$ symt., skew sym both.

$|A|$ is div. by 'p' $\rightarrow$ $|A| = a^2 - b^2 = (a-b)(a+b)$

for symt. matrix

$$A = \begin{bmatrix} a & b \\ b & a \end{bmatrix}$$

$\boxed{C-1}$ If $a = b$ then $p \mid |A| \Rightarrow$ No. of matrices $= p$.

C-2 If $p \mid a+b$ then

$a + b = p$ (leave '0' as it is covered in C-1)

$\hookrightarrow$ No. of soln $= p - 1$

Total no. of matrices $= p + p - 1 = 2p - 1$

(D)

Qu

Let p be an odd prime number and T_p be the following set of 2×2 matrices :

$$T_p = \left\{ A = \begin{bmatrix} a & b \\ c & a \end{bmatrix} : a, b, c \in \{0, 1, 2, \ldots\ldots, p-1\} \right\}$$

The number of A in T_p such that the trace of A is not divisible by p but det (A) is divisible by p is

(A) $(p-1)(p^2-p+1)$

(B) $p^3-(p-1)^2$

(C) $(p-1)^2$

(D) $(p-1)(p^2-2)$

Sol

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

$p \nmid tr(A) \Rightarrow p \nmid 2a$

$\Rightarrow a \neq 0.$

$p \mid |A| \Rightarrow p \mid a^2 - bc$

$a^2 \to kp + r_1$, $bc \to k_1 p + r_1$

$\Rightarrow 1, 2, 3, \ldots, (p-1)$

$a^2 = kp + \boxed{r_1}$

$(1, 2, \ldots, p-1)$

$1.b, 2.b, 3.b, \ldots, (p-1).b$

2 3 1 4 $p-1$ . . .

ib, jb

$ib - jb = \boxed{(i-j).b} \neq$

a	b	c
$\downarrow$	$\downarrow$	$\downarrow$
$(p-1)$	$(p-1)$	1.

$(p-1)^2$.

C

Let p be an odd prime number and T_p be the following set of 2 × 2 matrices :

$$T_p = \left\{ A = \begin{bmatrix} a & b \\ c & a \end{bmatrix} : a, b, c \in \{0, 1, 2, \ldots, p-1\} \right\}$$

The number of A in T_p such that det (A) is not divisible by p is

(A) $2p^2$ (B) $p^3 - 5p$ (C) $p^3 - 3p$ (D) $p^3 - p^2$

$|A| = a^2 - bc$ is not div. by p.

$a = 0$, $b, c \neq 0$

$1 \cdot (p-1) \cdot (p-1)$

$\underline{\underline{L\ (p-1)^2}}$

$a \neq 0$

$(p-1) \cdot (p \cdot p) - \underline{(p-1)^2}$

$+$

$R\ Ans = p^2(p-1) = \underline{\underline{p^3 - p^2}}$

D

Que Let $\Delta = \begin{vmatrix} 1+a^2-b^2 & 2ab & -2b \\ 2ab & 1-a^2+b^2 & 2a \\ 2b & -2a & 1-a^2-b^2 \end{vmatrix}$, Then find the minimum value of Δ if ab is constant.

Sol

$$\Delta = \begin{vmatrix} 1+a^2-b^2 & 2ab & -2b \\ 2ab & 1-a^2+b^2 & 2a \\ 2b & -2a & 1-a^2-b^2 \end{vmatrix}$$

$C_1 \to C_1 - bC_3$

&

$C_2 \to C_2 + aC_3$

$$= \begin{vmatrix} 1+a^2+b^2 & 0 & -2b \\ 0 & 1+a^2+b^2 & 2a \\ b(\underbrace{2-1+a^2+b^2}_{1+a^2+b^2}) & a(\underbrace{-2+1-a^2-b^2}_{-(1+a^2+b^2)}) & 1-a^2-b^2 \end{vmatrix}$$

$$= (1+a^2+b^2)^2 \begin{vmatrix} 1 & 0 & -2b \\ 0 & 1 & 2a \\ b & -a & 1-a^2-b^2 \end{vmatrix}$$

$R_3 \to R_3 - bR_1$

$$= (1+a^2+b^2)^2 \begin{vmatrix} 1 & 0 & -2b \\ 0 & 1 & 2a \\ 0 & -a & 1-a^2+b^2 \end{vmatrix}$$

$$= (1+a^2+b^2)^2 \left(1-a^2+b^2+2a^2\right)$$

$$= (1+a^2+b^2)^3 \geq \boxed{27a^2b^2}$$

Ans

$$\frac{1+a^2+b^2}{3} \geq \sqrt[3]{1\cdot a^2\cdot b^2}$$

$$1+a^2+b^2 \geq 3\cdot(|ab|)^{2/3}$$

$$(1+a^2+b^2)^3 \geq 27|ab|^2$$

$\boxed{\text{Que}}$ Let $m, p \in N$ such that $m \geq p+2$, Now let

$$\Delta(m,p) = \begin{vmatrix} {}^{m}C_{p} & {}^{m}C_{p+1} & {}^{m}C_{p+2} \\ {}^{m+1}C_{p} & {}^{m+1}C_{p+1} & {}^{m+1}C_{p+2} \\ {}^{m+2}C_{p} & {}^{m+2}C_{p+1} & {}^{m+2}C_{p+2} \end{vmatrix}$$

find 'λ' if $\dfrac{\Delta(m,p)}{\Delta(m-1,p-1)} = \lambda$

and hence find $\Delta(m,p)$.

$C_1 \to p \cdot C_1$, $C_2 \to (p+1) C_2$ & $C_3 \to (p+2) C_3$

$$r \cdot {}^{n}C_{r} = n \cdot {}^{n-1}C_{r-1}$$

Sol

$$\Delta(m,p) = \frac{1}{p \cdot (p+1)(p+2)} \begin{vmatrix} m \, {}^{m-1}C_{p-1} & m \cdot {}^{m-1}C_{p} & m \, {}^{m-1}C_{p+1} \\ (m+1) \, {}^{m}C_{p-1} & (m+1) \cdot {}^{m}C_{p} & (m+1) \, {}^{m}C_{p+1} \\ (m+2) \cdot {}^{m+1}C_{p-1} & (m+2) \, {}^{m+1}C_{p} & (m+2) \, {}^{m+1}C_{p+1} \end{vmatrix}$$

$$= \frac{m(m+1)(m+2)}{p(p+1)(p+2)} \cdot \Delta(m-1, p-1) = \frac{{}^{m+2}C_{3}}{{}^{p+2}C_{3}} \cdot \Delta(m-1, p-1).$$

$$\Delta(m, p) = \frac{{}^{m+2}C_3}{{}^{p+2}C_3} \, \Delta(m-1, p-1).$$

$$= \frac{{}^{m+2}C_3}{{}^{p+2}C_3} \cdot \frac{{}^{m+1}C_3}{{}^{p+1}C_3} \cdot \Delta(m-2, p-2).$$

$$\vdots$$

$$= \frac{{}^{m+2}C_3 \cdot {}^{m+1}C_3 \cdot {}^{m}C_3 \cdot {}^{m-1}C_3 \cdots\cdots {}^{m-p+3}C_3}{{}^{p+2}C_3 \cdot {}^{p+1}C_3 \cdot {}^{p}C_3 \cdots\cdots {}^{3}C_3} \cdot \Delta(m-p, 0)$$

$$\Delta(m-p, 0) = \begin{vmatrix} {}^{m-p}C_0 & {}^{m-p}C_1 & {}^{m-p}C_2 \\ {}^{m-p+1}C_0 & {}^{m-p+1}C_1 & {}^{m-p+1}C_2 \\ {}^{m-p+2}C_0 & {}^{m-p+2}C_1 & {}^{m-p+2}C_2 \end{vmatrix}$$

Que

For a unique value of p and q, the system of equations given by

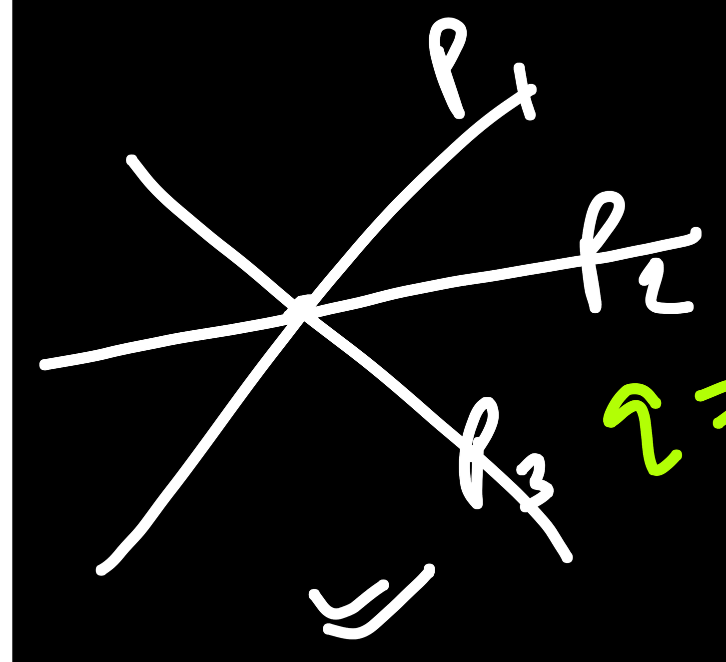
$x+y+z=6$

$x+2y+3z=14$

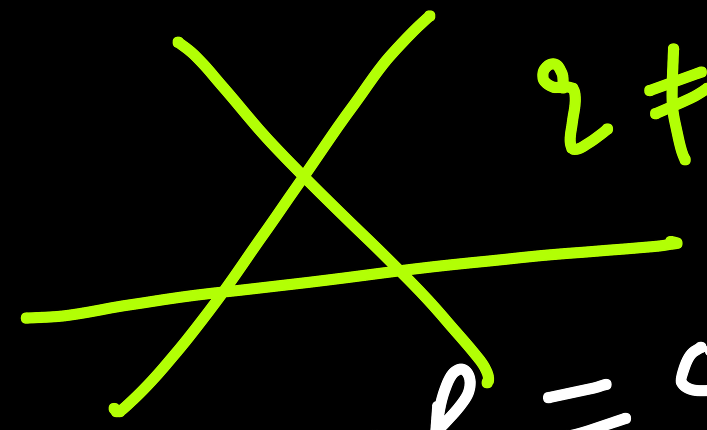
$2x+5y+pz=q$

has infinitely many solutions, then the value of $(p+q)$ is equal to

(A) 14 (B) 24 (C) 34 (D) 44



$q=36$



$q \neq 36$

$p=8$

Sol

$$x+y+z=6$$
$$x+2y+3z=14$$
$$2x+5y+pz=q$$

$$\Delta = 0 = \begin{vmatrix} 1 & 1 & 1 \\ 1 & 2 & 3 \\ 2 & 5 & p \end{vmatrix} = \begin{vmatrix} 1 & 0 & 0 \\ 1 & 1 & 2 \\ 2 & 3 & p-2 \end{vmatrix}$$

$$= p-2-6 \Rightarrow \boxed{p=8}$$

$x+y+z=6 \rightarrow P_1$

$x+2y+3z=14 \rightarrow P_2$

$2x+5y+8z=q \rightarrow P_3$

$P_3 = \lambda P_1 + \mu P_2 = 0.$

$\lambda+\mu=2$

$\lambda+2\mu=5$

$\mu=3$

$\lambda=-1$

$q = 14 \times 3 - 6.$

$= 42 - 6 = 36$

$q=36$

$p+q = 8+36 = 44$

D

Que Consider a system of equation $ax_1+x_2+x_3=1$, $x_1+ax_2+x_3=1$ and $x_1+x_2+ax_3=1$ then

(A) if a = 2, then the system has unique solution. ✓

(B) if a = 1, then the system has infinite solutions. ✓

(C) if a = −2, then the system has no solution. ✗

(D) if a = 2, then the system has infinite solutions. ✗

$$\begin{vmatrix} a & b & c \\ d & e & f \\ g & h & i \end{vmatrix}$$

$aei + dhc + b \cdot f \cdot g - (gec + hfa + ibd)$

Sol

$ax_1+x_2+x_3=1$

$x_1+ax_2+x_3=1$

$x_1+x_2+ax_3=1$

$$\Delta = \begin{vmatrix} a & 1 & 1 \\ 1 & a & 1 \\ 1 & 1 & a \end{vmatrix} = a^3+2-(3a)$$

a^3-3a+2

$= (a-1)(a^2+a-2)$

$= (a-1)^2(a+2)$

$a=1$

$x_1+x_2+x_3=1 \Rightarrow$ Infinite Sol

$a=-2$

$-2x_1+x_2+x_3=1$

$x_1-2x_2+x_3=1$

$x_1+x_2-2x_3=1$

$\lambda P_1+\mu P_2=P_3$

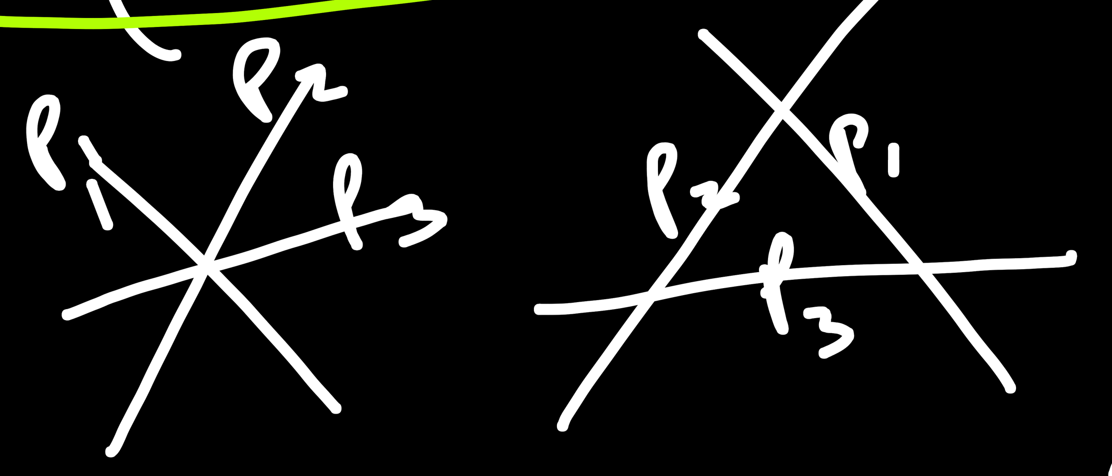
$-2\lambda+\mu=1$

$\lambda-2\mu=1$

$\longrightarrow -3\lambda=3$

$\lambda=-1$

$\mu=-1$



No Sol

Que

Let a > 0, d > 0. Find the value of the determinant

$$\begin{vmatrix} \frac{1}{a} & \frac{1}{a(a+d)} & \frac{1}{(a+d)(a+2d)} \\ \frac{1}{(a+d)} & \frac{1}{(a+d)(a+2d)} & \frac{1}{(a+2d)(a+3d)} \\ \frac{1}{(a+2d)} & \frac{1}{(a+2d)(a+3d)} & \frac{1}{(a+3d)(a+4d)} \end{vmatrix}$$

$$\Delta = \begin{vmatrix} \frac{1}{a} & \frac{1}{a(a+d)} & \frac{1}{(a+d)(a+2d)} \\ \frac{1}{a+d} & \frac{1}{(a+d)(a+2d)} & \frac{1}{(a+2d)(a+3d)} \\ \frac{1}{a+2d} & \frac{1}{(a+2d)(a+3d)} & \frac{1}{(a+3d)(a+4d)} \end{vmatrix}$$

$$= \frac{1}{a(a+d)^2(a+2d)^3(a+3d)^2(a+4d)} \begin{vmatrix} (a+d)(a+2d) & a+2d & a \\ (a+2d)(a+3d) & a+3d & a+d \\ (a+3d)(a+4d) & a+4d & a+2d \end{vmatrix}$$

$$= \frac{2d}{(\ )} \begin{vmatrix} (a+d)(a+2d) & 1 & a \\ (a+2d)(a+3d) & 1 & a+d \\ (a+3d)(a+4d) & 1 & a+2d \end{vmatrix}$$

$$= \frac{2d}{(\ )} \begin{vmatrix} (a+d)(a+2d) & 1 & a \\ (a+2d)\,2d & 0 & d \\ (a+3d)\,2d & 0 & d \end{vmatrix}$$

$$= \frac{2d^3 \cdot 2 \quad d}{(\ )} = \frac{4 \cdot d^4}{a \cdot (a+d)^2 (a+2d)^3 \cdot (a+3d)^2 (a+4d)}$$

Que

If α, β and γ are such that $\alpha + \beta + \gamma = 0$, then prove that

$$\begin{vmatrix} 1 & \cos\gamma & \cos\beta \\ \cos\gamma & 1 & \cos\alpha \\ \cos\beta & \cos\alpha & 1 \end{vmatrix} = 0.$$

Sol

$$\begin{vmatrix} s^2(\alpha)+c^2(\alpha) & \cos(\alpha+\beta) & \cos(\alpha+\gamma) \\ \cos(\alpha+\beta) & s^2(\beta)+c^2(\beta) & \cos(\beta+\gamma) \\ \cos(\alpha+\gamma) & \cos(\beta+\gamma) & c^2(\gamma)+s^2(\gamma) \end{vmatrix}$$

$$= \begin{vmatrix} s(\alpha) & c(\alpha) & 0 \\ s(\beta) & c(\beta) & 0 \\ s(\gamma) & c(\gamma) & 0 \end{vmatrix} \cdot \begin{vmatrix} s(\alpha) & c(\alpha) & 0 \\ s(\beta) & c(\beta) & 0 \\ s(\gamma) & c(\gamma) & 0 \end{vmatrix}$$

$$= 0.$$

Que In a ΔABC, Evaluate $\begin{vmatrix} \sin(2A) & \sin(C) & \sin(B) \\ \sin(C) & \sin(2B) & \sin(A) \\ \sin(B) & \sin(A) & \sin(2C) \end{vmatrix}$

Sol

$$\begin{vmatrix} 2S(A)C(A) & \sin(A+B) & \sin(A+C) \\ \sin(A+B) & - & - \\ \sin(A+C) & - & - \end{vmatrix}$$

$$= \begin{vmatrix} S(A) & C(A) & 0 \\ S(B) & C(B) & 0 \\ S(C) & C(C) & 0 \end{vmatrix} \cdot \begin{vmatrix} C(A) & S(A) & 0 \\ C(B) & S(B) & 0 \\ C(C) & S(C) & 0 \end{vmatrix} = \boxed{0}$$

$\boxed{\text{Que}}$ Find the maximum possible value of a 3×3 determinant, whose all elements are either 1 or −1.

→ Δ must be a multiple of '4'.

Sol

$$\Delta = \begin{vmatrix} a & b & c \\ d & e & f \\ g & h & i \end{vmatrix} = \underset{1}{\overset{\pm 1}{aei}} + \underset{1}{\overset{\pm 1}{dhc}} + \underset{1}{\overset{\pm 1}{gbf}} - \underset{-1}{\overset{\pm 1}{gec}} - \underset{-1}{\overset{\pm 1}{hfa}} - \underset{1}{\overset{\pm 1}{dbi}}$$

$1.1.1 \quad 1.1.1 \quad -1.-1.1 \quad -1.1.1 \quad \cancel{1.1.1} \quad \cancel{1.1.1}$

max. value = $\underline{4}$. $\quad$ 4

$$= a \cdot \begin{vmatrix} 1 & b & c \\ \frac{d}{a} & e & f \\ \frac{g}{a} & h & i \end{vmatrix}$$

$$= a \begin{vmatrix} 1 & b & c \\ 0 & e-\frac{bd}{a} & f-\frac{cd}{a} \\ 0 & h-\frac{bg}{a} & i-c.\frac{g}{a} \end{vmatrix} = a\left(\underbrace{\underbrace{\left(e-\frac{bd}{a}\right)}_{0,2,-2}\underbrace{\left(i-\frac{cg}{a}\right)}_{0,2,-2}}_{0,4,-4} - \underbrace{\left(f-\frac{cd}{a}\right)\left(h-\frac{bg}{a}\right)}_{0,4,-4} \right)$$

$\pm 1 \quad \pm 1 \quad \pm 1 \quad \pm 1$

Que

If

$ax_1^2+by_1^2+cz_1^2=ax_2^2+by_2^2+cz_2^2=ax_3^2+by_3^2+cz_3^2=\lambda$

and $ax_1x_2+by_1y_2+cz_1z_2=$

$ax_2x_3+by_2y_3+cz_2z_3=ax_3x_1+by_3y_1+cz_3z_1$

$$=\mu \ \& \ \begin{vmatrix} x_1 & y_1 & z_1 \\ x_2 & y_2 & z_2 \\ x_3 & y_3 & z_3 \end{vmatrix}=(\lambda-\mu)\left(\frac{\lambda+\theta\mu}{abc}\right)^{\frac{1}{\beta}}$$

then the value of $\theta+\beta$ **is**

A) 4 B) 3 C) 2 D) 1

$$ax_1^2+by_1^2+cz_1^2=ax_2^2+by_2^2+cz_2^2$$
$$=ax_3^2+by_3^2+cz_3^2=\lambda.$$

$$ax_1x_2+by_1y_2+cz_1z_2= \_\_\_\_$$
$$= \_\_\_\_$$
$$=\mu$$

$$\begin{vmatrix} x_1 & y_1 & z_1 \\ x_2 & y_2 & y_2 \\ x_3 & y_3 & z_3 \end{vmatrix}^2=\frac{1}{abc}\begin{vmatrix} x_1 & y_1 & z_1 \\ x_2 & y_2 & z_2 \\ x_3 & y_3 & z_3 \end{vmatrix}\begin{vmatrix} ax_1 & by_1 & cz_1 \\ ax_2 & by_2 & cz_2 \\ ax_3 & by_3 & cz_3 \end{vmatrix}$$

$$=\frac{1}{abc}\begin{vmatrix} \lambda & \mu & \mu \\ \mu & \lambda & \mu \\ \mu & \mu & \lambda \end{vmatrix}$$

$$=\frac{1}{abc}\left(\lambda^3+2\mu^3-3\lambda\mu^2\right)$$

$$\frac{1}{abc}(\lambda-\mu)(\lambda^2-2\mu^2+\lambda\mu).$$

$$=\frac{1}{abc}(\lambda-\mu)(\lambda-\mu)(\lambda+2\mu)$$

$$=\frac{(\lambda-\mu)^2\cdot(\lambda+2\mu)}{abc.}$$

A

Qn

The determinant

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

is divisible by

A) x B) x^2 C) x^3 D) x^4

Sol

$$\Delta = \frac{1}{abc}\begin{vmatrix} a(a^2+x^2) & a^2 b & a^2 c \\ a b^2 & b(b^2+x^2) & b^2 c \\ a c^2 & b c^2 & c(c^2+x^2) \end{vmatrix}$$

$$= \begin{vmatrix} a^2+x^2 & a^2 & a^2 \\ b^2 & b^2+x^2 & b^2 \\ c^2 & c^2 & c^2+x^2 \end{vmatrix} = (a^2+b^2+c^2+x^2)\begin{vmatrix} 1 & 1 & 1 \\ b^2 & b^2+x^2 & b^2 \\ c^2 & c^2 & c^2+x^2 \end{vmatrix}$$

$$= (a^2+b^2+c^2+x^2)\begin{vmatrix} 1 & 0 & 0 \\ b^2 & x^2 & 0 \\ c^2 & 0 & x^2 \end{vmatrix}$$

$$= (\Sigma a^2 + x^2)\cdot \underline{\underline{x^4}}$$

A, B, C, D

A