

$$(3-2t-3)z$$

$$2x_p + 2y_p + z_p - 13 = 0$$

$$-6 - 4t + 2 - 4t + 4 - t - 13 = 0$$

$$9t = -13$$

$$t = -\frac{13}{9}$$

$$x_p = -3 + \frac{26}{9} \quad y_p = 2 + \frac{26}{9} \quad z_p = 4 + \frac{13}{9}$$

$$\vec{Q} = \left\{ -6 + \frac{26}{9}; -3 + \frac{26}{9}; 8 + \frac{13}{9} \right\}$$

$$\begin{aligned} \text{D. 9} \\ \text{e) } \sqrt[4]{\frac{-2+3i}{2+i}} &= \sqrt[4]{\frac{(5i-2)(2-i)}{(2+i)(2-i)}} = \sqrt[4]{\frac{6i-2+3+i}{4+1}} = \sqrt[4]{\frac{7i-1}{5}} \\ &= \sqrt[4]{\frac{1+7i}{5}} = \sqrt[4]{\frac{8}{5} + \frac{7}{5}i} = \sqrt[4]{\frac{1}{5} \sqrt{2} \left(\frac{1}{\sqrt{2}} + \frac{7}{\sqrt{2}}i \right)} \\ &= \sqrt[4]{\frac{1}{5} \sqrt{2}} \left(\cos \frac{\varphi}{4} + i \sin \frac{\varphi}{4} \right) \\ \varphi &= \arccos \frac{1}{5\sqrt{2}} \\ \text{für } k=0,1,2,3. \end{aligned}$$

$$\begin{aligned} \sqrt[4]{\frac{1}{5} \sqrt{2}} (\cos \varphi + i \sin \varphi) &= [k=0] = \\ &= \sqrt[4]{2} \left(\cos \frac{\arccos \frac{1}{5\sqrt{2}}}{4} + i \sin \frac{\arccos \frac{1}{5\sqrt{2}}}{4} \right) \approx \\ &\approx 1,02 + i \cdot 0,38 \\ \text{Orber: } 1,02; 0,38. \end{aligned}$$

$$\text{a) } \begin{bmatrix} 1 & -2 & 2 & -2 & 5 \\ -2 & 3 & -3 & 2 & -7 \\ 0 & 0 & 1 & 0 & 2 \\ 0 & 1 & -3 & 1 & -4 \\ 3 & -9 & 10 & -6 & 22 \end{bmatrix} \sim \begin{bmatrix} 1 & -2 & 2 & -2 & 5 \\ 0 & 1 & -1 & 1 & -2 \\ 0 & 0 & 1 & 0 & 2 \\ 0 & 0 & 0 & 1 & -1 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

$$\sim \begin{bmatrix} -2 & -1 & 3 \\ 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 2 \\ 0 & 1 & 0 & 1 & -1 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix} \quad \begin{cases} \sum^1 = 0 \\ \sum^2 = 0 \\ \sum^3 = 0 \\ \sum^4 = 0 \end{cases}$$

$$\begin{cases} \sum^1 = 2, \sum^2 = 0: \underline{X}_1 = (0 \ 0 \ 2 \ 0 \ -2)^T \\ \sum^3 = 0, \sum^4 = 2: \underline{X}_2 = (0 \ 2 \ 0 \ -1 \ 0)^T \end{cases}$$

$$\text{c) } \begin{bmatrix} 1 & 0 & 0 & 1 & 1 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 1 \\ 0 & 1 & 0 & 1 & -1 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix} \sim \begin{bmatrix} 1 & 0 & 0 & 1 & 1 \\ 0 & 1 & 0 & 1 & -1 \\ 0 & 0 & 1 & 0 & 1 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix} \quad \begin{cases} \sum^1 = -\sum^4 - \sum^5 \\ \sum^2 = -\sum^4 + \sum^5 \\ \sum^3 = -\sum^5 \end{cases}$$

$$\begin{cases} \sum^4 = 0, \sum^5 = 1: \underline{X}_1 = (-1 \ 1 \ -1 \ 0 \ 1)^T \\ \sum^4 = 1, \sum^5 = 0: \underline{X}_2 = (-1 \ -1 \ 0 \ 1 \ 0)^T \end{cases}$$

Orber ↑

$$\begin{aligned} \text{d) } z &= -3 + 3i = \sqrt[3]{27} \left(-\frac{3}{2} + \frac{3}{2}i \right) = \\ &= 3\sqrt[3]{2} \left(\cos \frac{3\pi}{4} + i \sin \frac{3\pi}{4} \right) = 3\sqrt[3]{2} \left(\cos \frac{3\pi}{4} + i \sin \frac{3\pi}{4} \right) \end{aligned}$$

$$\begin{aligned}
 (4) \quad & \begin{bmatrix} 1 & -1 & -1 & 0 & 0 \\ 0 & 1 & -1 & 1 & 0 \\ 0 & 1 & 0 & 1 & -1 \\ -2 & -1 & 2 & -3 & 2 \\ 1 & 2 & -3 & 3 & -1 \end{bmatrix} \sim \begin{bmatrix} 1 & -1 & 0 & 0 & 0 \\ 0 & 0 & -2 & 2 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & -3 & 0 & 0 & 2 \\ 0 & 3 & 0 & 0 & -1 \end{bmatrix} \sim \begin{bmatrix} 1 & -1 & 0 & 0 & 0 \\ 0 & -3 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 2 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix}
 \end{aligned}$$

$$\begin{cases} \sum^3 = \sum^4 = \sum^5 = 0 \\ \sum^1 = \sum^2 = 0 \end{cases}$$

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

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

$$\begin{cases} \sum^1 + \sum^2 + \sum^3 = 0 \\ \sum^1 + \sum^2 + \sum^3 = 0 \\ \sum^3 - \sum^5 = 0 \\ \sum^4 - 2\sum^5 = 0 \end{cases}$$

$$\sum^5 = 1: \quad (0 \ -1 \ 1 \ 2 \ 1)^T$$

$$(5) \quad \begin{bmatrix} 1 & 1 & 0 & 1 & -1 \\ -2 & -2 & 0 & -2 & 2 \\ 2 & 2 & 0 & 2 & -2 \\ 3 & 3 & 0 & 3 & -3 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 0 & 1 & -1 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

$$\sum^1 + \sum^2 + \sum^4 - \sum^5 = 0$$

$$\begin{aligned}
 1) & \quad (-1 \ 1 \ 0 \ 0 \ 0)^T \\
 2) & \quad (0 \ 0 \ 1 \ 0 \ 0)^T \\
 3) & \quad (-1 \ 0 \ 0 \ 1 \ 0)^T \\
 4) & \quad (1 \ 0 \ 0 \ 0 \ 1)^T
 \end{aligned}$$

$$(6) \quad \begin{bmatrix} 1 & -2 & -1 & 2 & -4 \\ 1 & 1 & -1 & 2 \\ 1 & -2 & 0 & 1 & -1 \\ 0 & -2 & -1 & 2 & -3 \\ 0 & -3 & -1 & 2 & -1 \end{bmatrix} \sim \begin{bmatrix} 1 & 0 & 1 & 0 & 0 \\ 0 & 1 & 1 & -1 & 2 \\ 0 & 0 & -1 & 3 \\ 0 & 0 & 1 & 0 & 1 \\ 0 & 0 & 2 & -1 & 5 \end{bmatrix}$$

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

Order

④

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

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

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

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

$$g^1 = \sum^2 + \sum^3$$

$$\begin{aligned} \sum^1 &= \sum^2 + \sum^3 \\ \sum^2 &= \sum^4 + \sum^5 \\ \sum^3 &= \sum^5 \end{aligned}$$

]

$$\sum^4 = 0, \sum^5 = 1:$$

$$(2 \ 1 \ 1 \ 0 \ 1)$$

]

$$\sum^4 = 1, \sum^5 = 0:$$

$$(-1 \ -1 \ 0 \ 1 \ 0)$$