(١)

1-

(C) 1260 — (1)

2-

(a) $56C_4$ — (1)

3-

(a) M (1; -2; 0) ; $r = \sqrt{5}$ units — (1)

4-

(A) $z = \frac{8}{1+\sqrt{3}i} \times \frac{1-\sqrt{3}i}{1-\sqrt{3}i} = 2 - 2\sqrt{3}i$

$\therefore |z| = \sqrt{4+12} = 4$ (½)

, $\theta = \tan^{-1}(-\sqrt{3}) = -\frac{\pi}{3}$ (½)

$\therefore z = 4\left[\cos\left(-\frac{\pi}{3}\right) + i\sin\left(-\frac{\pi}{3}\right)\right]$ (½)

$\therefore z^{\frac{1}{2}} = 2\left[\cos\frac{-\frac{\pi}{3}+2m\pi}{2} + i\sin\frac{-\frac{\pi}{3}+2m\pi}{2}\right]$ (½)

$= 2\left[\cos\frac{-\pi+6m\pi}{6} + i\sin\frac{-\pi+6m\pi}{6}\right]$, $m = 0; 1$

en $m = 0$

$\therefore z^{\frac{1}{2}} = 2\left[\cos\left(-\frac{\pi}{6}\right) + i\sin\left(-\frac{\pi}{6}\right)\right] = 2e^{-\frac{\pi}{6}i}$ (½)

en $m = 1$

$\therefore z^{\frac{1}{2}} = 2\left[\cos\frac{5\pi}{6} + i\sin\frac{5\pi}{6}\right] = 2e^{\frac{5\pi}{6}i}$ (½)

(3)

(B) $\because (x-1)^6 - 9(x-1)^3 + 8 = 0$

$\therefore [(x-1)^3 - 1][(x-1)^3 - 8] = 0$

$\therefore (x-1)^3 = 1$ ou $(x-1)^3 = 8$

$\therefore x-1 = 1$ $\quad \therefore x-1 = 2$

$\therefore x = 2$ $\left(\frac{1}{2}\right)$ $\quad \therefore x = 3$ $\left(\frac{1}{2}\right)$

ou $x-1 = w$ $\quad$ ou $x-1 = 2w$

$\therefore x = 1+w = -w^2$ $\left(\frac{1}{2}\right)$ $\quad \therefore x = 1+2w$ $\left(\frac{1}{2}\right)$

ou $x-1 = w^2$ $\quad$ ou $x-1 = 2w^2$

$\therefore x = 1+w^2 = -w$ $\left(\frac{1}{2}\right)$ $\quad \therefore x = 1+2w^2$ $\left(\frac{1}{2}\right)$

(3)

(تراعى الحلول الأخرى)

5-

(a) 1010 (1)

6-

(a) 13 (1)

7-

(b) $(-4;0;4)$ (1)

8-

(A) $\overrightarrow{AB} = \overrightarrow{B} - \overrightarrow{A} = (1;0;0) - (0;0;1)$

$= (1;0;1)$

$\overrightarrow{BC} = \overrightarrow{C} - \overrightarrow{B} = (0;1;0) - (1;0;0)$

$= (-1;1;0)$ } $\frac{1}{2}$

$\therefore \overrightarrow{AB} \times \overrightarrow{BC} = \begin{vmatrix} \vec{i} & \vec{j} & \vec{k} \\ 1 & 0 & -1 \\ -1 & 1 & 0 \end{vmatrix}$

$= \vec{i} + \vec{j} + \vec{k}$ $\frac{1}{2}$

$\therefore \vec{u} = \frac{\overrightarrow{AB} \times \overrightarrow{BC}}{\| \overrightarrow{AB} \times \overrightarrow{BC} \|}$

$= \pm \frac{(1;1;1)}{\sqrt{3}}$ $\frac{1}{2}$

$= \pm \left(\frac{1}{\sqrt{3}}; \frac{1}{\sqrt{3}}; \frac{1}{\sqrt{3}}\right)$ $\frac{1}{2}$ (2)

(B) $M_1(-1;4;K)$, $r_1 = 5$
$M_2(3;0;3)$, $r_2 = 4$ } $\frac{1}{2}$

$\therefore M_1M_2 = \sqrt{16+16+(K-3)^2} = 9$ $\frac{1}{2}$

$\therefore (K-3)^2 = 49$

$\therefore K-3 = 7$ ou $K-3 = -7$

$\therefore K = 10$ $\frac{1}{2}$ ou $K = -4$ $\frac{1}{2}$

2

(تراعى الحلول الأخرى)

9-

(a) 1 (١)

10-

(d) 2 (١)

11-

(c) 6 (١)

12-

$T_{r+1} = C_{15}^{r} \left(\frac{1}{x}\right)^{15-r} (x^2)^r$ (1/2)

$= C_{15}^{r} \, x^{3r-15}$

on met $3r - 15 = 0 \Rightarrow r = 5$ (1/2)

$\therefore t_6$ est le terme constant

$\therefore t_6 = C_{15}^{5}$ (1/2)

t_8 et t_9 sont deux termes médiums

$\therefore \frac{T_9}{T_8} = 1 \Rightarrow \frac{15-8+1}{8} \cdot x^3 = 1$ (1)

$\therefore x = 1$ (1/2)

3

(تراعى الحلول الأخرى)

13-

(d) π (1)

14-

(d) $-\frac{1}{2}$ (1)

15-

$$\therefore \begin{vmatrix} 1 & x & x \\ x & 1 & x \\ x & x & 1 \end{vmatrix} = 0 \qquad C_1 \to C_1 + C_2 + C_3$$

$$\therefore \begin{vmatrix} 2x+1 & x & x \\ 2x+1 & 1 & x \\ 2x+1 & x & 1 \end{vmatrix} = 0$$

$$\therefore (2x+1) \begin{vmatrix} 1 & x & x \\ 1 & 1 & x \\ 1 & x & 1 \end{vmatrix} = 0 \qquad L_3 \to L_3 - L_1 \quad L_2 \to L_2 - L_1 \quad (\tfrac{1}{2})$$

$$\therefore (2x+1) \begin{vmatrix} 1 & x & x \\ 0 & 1-x & 0 \\ 0 & 0 & 1-x \end{vmatrix} = 0 \quad (\tfrac{1}{2})$$

$$\therefore (2x+1)(1-x)^2 = 0 \quad (\tfrac{1}{2})$$

$$\therefore x = -\frac{1}{2} \text{ ou } x = 1 \quad (\tfrac{1}{2}) \quad (3)$$

16-

$\because \frac{4}{1} \neq \frac{1}{-1} \neq \frac{3}{2}$ (1/2)

$\therefore$ les deux droites ne sont pas parallèles.

au point d'intersection

$\vec{r_1} = \vec{r_2}$

$\therefore 3 + 4k_1 = k_2 \Rightarrow 4k_1 - k_2 = -3 \quad (1)$

$-1 + k_1 = 4 - k_2 \Rightarrow k_1 + k_2 = 5 \quad (2)$

$2 + 3k_1 = -1 + 2k_2 \Rightarrow 3k_1 - 2k_2 = -3 \quad (3)$ (1/2)

de (1) et (2) $k_1 = \frac{2}{5}$, $k_2 = \frac{23}{5}$ (1/2)

par substitution dans (3)

$\therefore 3 \times \frac{2}{5} - 2 \times \frac{23}{5} = -8 \neq -3$

$\therefore$ les valeurs ne vérifient pas équation (3)

$\therefore$ les deux droites sont non Coplanaires (1/2)

(2)

(تراعى الحلول الأخرى)

17-

(b) 0 (1)

18-

$\because \frac{x}{1} + \frac{y}{2} + \frac{z}{3} = 1$ (1/2)

$\therefore 6x + 3y + 2z - 6 = 0$ (Forme générale) (1/2)

$\because$ Le plan passe par le point $(1;0;0)$

$\therefore (6;3;2) \cdot \vec{r} = (6;3;2) \cdot (1;0;0)$

$\therefore (6;3;2) \cdot \vec{r} = 6$ (Forme vectorielle) (1/2)

$6(x-1) + 3y + 2z = 0$ (Forme standard) (1/2)

(2)

19-

$$A = \begin{pmatrix} 2 & -4 & -9 \\ -1 & 2 & 3 \\ -3 & 6 & 9 \end{pmatrix}$$

$\therefore |A| = 2(0) + 4(0) + 9(0) = 0$ ½

$\because \begin{vmatrix} -4 & -9 \\ 2 & 3 \end{vmatrix} = 6 \neq 0$ ½

$\therefore Rg(A) = 2$ ½

$\because A^* = \left(\begin{array}{ccc|c} 2 & -4 & -9 & 1 \\ -1 & 2 & 3 & 0 \\ -3 & 6 & 9 & -1 \end{array}\right)$

$\because \begin{vmatrix} -4 & -9 & 1 \\ 2 & 3 & 0 \\ 6 & 9 & -1 \end{vmatrix}$

$= -4(-3) + 9(-2) + 1(0)$
$= -6 \neq 0$ ½

$\therefore Rg(A^*) = 3$ ½

$\because Rg(A) \neq Rg(A^*)$
$\therefore$ le système d'équation n'admet pas de solution ½

3

(تراعى الحلول الأخرى)

(انتهت الإجابة وتراعى الحلول الأخرى)