1

$$x - ay + 3z = -4$$
$$(a-2)x + y - 3z = a - 9$$
$$-ax - y + 4z = 3$$

$$D_S = \begin{vmatrix} 1 & -a & 3 \\ a-2 & 1 & -3 \\ -a & -1 & 4 \end{vmatrix} \begin{matrix} 1 & -a \\ a-2 & 1 \\ -a & -1 \end{matrix}$$

$$= 4 - 3a^2 - 3(a-2) + 3a - 3 + 4a(a-2)$$
$$= 4 - 3a^2 - \cancel{3a} + 6 + \cancel{3a} - 3 + 4a^2 - 8a$$
$$= a^2 - 8a + 7$$

$$a_{1,2} = \frac{8 \pm \sqrt{64-28}}{2} = \frac{8 \pm 6}{2}$$

$$a_1 = 7 \qquad a_2 = 1$$

I $D_S \neq 0$ ZA $a \neq 7$ i $a \neq 1$ $\Rightarrow$ ODREĐEN SIS.

II $D_S = 0$ ZA $a = 7$ i $a = 1$ $\Rightarrow$ NEODREĐEN ILI NEMOGUĆ

DALJE NE MOŽE KRAMER MORA GAUS

$\underbrace{\text{KRAMER}}$ PREKO DETERMINANTI

$\boxed{a = 7}$

$$x - 7y + 3z = -4$$
$$5x + y - 3z = -2$$
$$-7x - y + 4z = 3$$

$$x - 7y + 3z = -4$$
$$36y - 18z = 18 \quad /:18$$
$$-50y + 25z = -25 \quad /:25$$

$$x - 7y + 3z = -4$$
$$2y - z = 1$$
$$-2y + z = -1$$

$$x - 7y + 3z = -4$$
$$2y - z = 1$$
$$0 = 0 \checkmark$$

$$x - 7y = -4 - 3z$$
$$2y = 1 + z$$

1 x neodređen sistem

$\boxed{z = t}$, $t \in \mathbb{R}$

$\boxed{y = \frac{1+t}{2}}$

$$x = -4 - 3t + 7\frac{1+t}{2}$$

$$\boxed{x = -\frac{1}{2} + \frac{1}{2}t}$$

$R_S = \{(-\frac{1}{2} + \frac{1}{2}t, \frac{1}{2} + \frac{1}{2}t, t) \mid t \in \mathbb{R}\}$

$\boxed{a=1}$

$$x-y+3z=4$$
$$-x+y-3z=-8$$
$$-x-y+4z=3$$

$$x-y+3z=-4$$
$$0=-12$$

$\lightning$ NEMOGUĆ

$R_S=\emptyset$

$$r(x) = \frac{x^4-4x^3+9x^2-6x+12}{(x-2)(x^2-2x+5)} = x + \boxed{\frac{4x+12}{(x-2)(x^2-2x+5)}}$$

$$(x^4-4x^3+9x^2-6x+12):(x^3-4x^2+9x-10) = \underline{x}$$
$$-(x^4-4x^3+9x^2-10x)$$
$$\underline{4x+12}$$

$$x_{1,2} = \frac{2\pm\sqrt{4-20}}{2} \notin \mathbb{R}$$
$$= \frac{2\pm 4i}{2} = 1 \pm 2i$$

$$(x-2)(x^2-2x+5) = x^3-2x^2+5x-2x^2+4x-10$$
$$= \underline{x^3-4x^2+9x-10}$$

NAPOMENA: $k \mid (-10) \Rightarrow k \in \{\pm1, \pm2, \pm5, \pm10\}$

$m \mid 1 \Rightarrow m \in \{1\}$

$\frac{k}{m} \in \{\pm1, \pm2, \pm5, \pm10\}$

	1	-4	9	-10
~~1~~	~~1~~	~~-3~~	~~6~~	~~-4~~
~~-1~~	~~1~~	~~-5~~	~~14~~	~~-24~~
2	1	-2	5	$\boxed{0}$

$\underbrace{1 \quad -2 \quad 5}_{x^2-2x+5}$

NEMA REALNE NULE

$$x^3-4x^2+9x-10 = (x-2)(\underline{x^2-2x+5})$$

NULE
$2, \; 1+2i$
$1-2i$

$$p(x) = (x-2)(x-(1+2i))(x-(1-2i))$$

mod $\mathbb{C}$

$$\frac{4x+12}{(x-2)(x^2-2x+5)} = \frac{A}{x-2} + \frac{Bx+C}{x^2-2x+5} \quad / (x-2)(x^2-2x+5)$$

$$4x+12 = A(x^2-2x+5) + (Bx+C)(x-2)$$

$$4x+12 = \underline{Ax^2} - 2\underline{A}x + 5A + \underline{Bx^2} - 2\underline{B}x + \underline{C}x - 2C$$

$$4x+12 = (\underline{A+B})x^2 + (-2A-2B+C)x + 5A - 2C$$

$$A+B = 0$$

$$-2A-2B+C = 4$$

$$5A-2C = 12$$

$\rightarrow A, B, C$

$$r(x) = x + \frac{A}{x-2} + \frac{Bx+C}{x^2-2x+5}$$

$$\frac{1}{(x+1)^2(x^2+3)^3} = \frac{A}{x+1} + \frac{B}{(x+1)^2} + \frac{Cx+D}{x^2+3} + \frac{Ex+F}{(x^2+3)^2} + \frac{Mx+N}{(x^2+3)^3}$$

$$\frac{1}{(x+1)(x^2+3)x^2} = \frac{A}{x+1} + \frac{Bx+C}{x^2+3} + \frac{D}{x} + \frac{E}{x^2}$$

$$\uparrow$$

$$(x-0)^2$$

$$\frac{1}{x^2} = \frac{A}{x} + \frac{B}{x^2}$$

(*)

$\vec{a} = \vec{m} + \vec{n}$

$\vec{b} = 2\vec{m} - 3\vec{n}$

$|\vec{m}| = 5$

$|\vec{n}| = 7$

$\sphericalangle(\vec{m}, \vec{n}) = \frac{2\pi}{3}$

$P_{\square} = |\vec{a} \times \vec{b}|$

$\underline{\vec{a} \times \vec{b}} = (\vec{m} + \vec{n}) \times (2\vec{m} - 3\vec{n})$

$= \cancel{2\,\vec{m} \times \vec{m}}^{\,0} - 3\,\vec{m} \times \vec{n} + 2\,\vec{n} \times \vec{m} - \cancel{3\,\vec{n} \times \vec{n}}^{\,0}$

$= -3\,\vec{m} \times \vec{n} - 2\,\vec{m} \times \vec{n}$

$= \underline{-5\;\vec{m} \times \vec{n}}$

apsolutna vr.

$P_{\square} = |\vec{a} \times \vec{b}| = |-5\;\vec{m} \times \vec{n}| = |-5|\;|\vec{m} \times \vec{n}|$

$= 5\;|\vec{m}|\,|\vec{n}|\sin\sphericalangle(\vec{m}, \vec{n}) = 5 \cdot 5 \cdot 7 \cdot \sin\frac{2\pi}{3}$

$\vec{p} \times \vec{p} = 0$

$\vec{p} \cdot \vec{p} = |\vec{p}|^2$

$$\vec{a} = 2\vec{i} + 3\vec{j} - \vec{k} = (2, 3, -1)$$

$$\vec{b} = -3\vec{i} + 4\vec{k} = (-3, 0, 4)$$

$$P_{\square} = |\vec{a} \times \vec{b}|$$

$$\vec{a} \times \vec{b} = \begin{vmatrix} \vec{i} & \vec{j} & \vec{k} \\ 2 & 3 & -1 \\ -3 & 0 & 4 \end{vmatrix} = \vec{i} \begin{vmatrix} 3 & -1 \\ 0 & 4 \end{vmatrix} \overset{!}{-} \vec{j} \begin{vmatrix} 2 & -1 \\ -3 & 4 \end{vmatrix}$$

$$+ \vec{k} \begin{vmatrix} 2 & 3 \\ -3 & 0 \end{vmatrix} = 12\vec{i} - 5\vec{j} + 9\vec{k}$$

$$= (12, -5, 9)$$

$$P_{\square} = |(12, -5, 9)| = \sqrt{12^2 + (-5)^2 + 9^2}$$

$\vec{a} = 2\vec{i} + 3\vec{j} - 5\vec{k} = (2,3,-5)$

$\vec{b} = 3\vec{i} + 3\vec{j} = (3,3,0)$

-100 BODOVA

$2\vec{a} - 6\vec{b} = 2(2,3,-5) - 6(3,3,0) = (4,6,-10) + (-18,-18,0)$
$= (-14,-12,-10)$

$(6,9,0) = \vec{a} \cdot \vec{b} = (2,3,-5)\cdot(3,3,0) = 2\cdot 3 + 3\cdot 3 + (-5)\cdot 0 = 6+9 = 15$

$|\vec{b}| = \sqrt{3^2+3^2+0^2} = \sqrt{18} = 2\sqrt{3}$ $\qquad |\vec{a}| = \sqrt{4+9+25} = \sqrt{38}$

$\cos\angle(\vec{a},\vec{b}) = \dfrac{\vec{a}\cdot\vec{b}}{|\vec{a}||\vec{b}|} = \dfrac{15}{\sqrt{38}\cdot 2\sqrt{3}}$

$$\vec{a}\times\vec{b} = \begin{vmatrix} \vec{i} & \vec{j} & \vec{k} \\ 2 & 3 & -5 \\ 3 & 3 & 0 \end{vmatrix}$$

$$= \vec{i}\begin{vmatrix} 3 & -5 \\ 3 & 0 \end{vmatrix} - \vec{j}\begin{vmatrix} 2 & -5 \\ 3 & 0 \end{vmatrix} + \vec{k}\begin{vmatrix} 2 & 3 \\ 3 & 3 \end{vmatrix} = 15\vec{i} - 15\vec{j} - 3\vec{k}$$

$= (15,-15,-3) = -3(-5,5,1)$

$$\begin{bmatrix} 2 & 3 & 4 \\ -2 & 0 & -1 \end{bmatrix}_{2 \times 3} \begin{bmatrix} 1 & 2 \\ 0 & -1 \end{bmatrix}_{2 \times 2} =$$

$$\begin{bmatrix} 1 & 2 \\ 0 & -1 \end{bmatrix}_{2 \times 2} \begin{bmatrix} 2 & 3 & 4 \\ -2 & 0 & -1 \end{bmatrix}_{2 \times 3} =$$

$$= \begin{bmatrix} 1 \cdot 2 + 2 \cdot (-2) & 1 \cdot 3 + 2 \cdot 0 & 1 \cdot 4 + 2 \cdot (-1) \\ 0 \cdot 2 + (-1)(-2) & 0 \cdot 3 + (-1) \cdot 0 & 0 \cdot 4 + (-1)(-1) \end{bmatrix}_{2 \times 3}$$

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

$$A^{-1} = \frac{1}{\det(A)} \operatorname{adj}(A) = \frac{1}{1} \begin{bmatrix} 1 & -2 \\ 0 & 1 \end{bmatrix}$$

$$\det(A) = \begin{vmatrix} 1 & 2 \\ 0 & 1 \end{vmatrix} = 1$$

$$\operatorname{adj}(A) = \begin{bmatrix} 1 & -2 \\ 0 & 1 \end{bmatrix}$$