Quyidagi matritsa tenglamasidan x y

$$\begin{pmatrix} 3 & 2-y \\ x+y & 1 \end{pmatrix} = \begin{pmatrix} 3 & y \\ 2 & 1 \end{pmatrix}$$

$2-y=y$ $x+y=2$

$y=1$ $x=1$

Berilgan

17.

$$A = \begin{bmatrix} 2 & 1 & -3 \\ 4 & 0 & -4 \end{bmatrix}$$ va

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

matritsalar. Hisoblang $B \cdot A$

$$B \cdot A = \begin{pmatrix} 10 & 1 & -11 \\ -2 & -3 & 5 \\ 8 & 0 & -8 \end{pmatrix}$$

Determinant uchun algebraik A_{32} to'ldiruvchini toping : $A_{32} = (-1)^{3+2} \cdot M_{32}$

17.

$$\begin{vmatrix} \dot{2} & \boxed{1} & \dot{-4} \\ \dot{1} & \boxed{3} & \dot{5} \\ \boxed{3} & \boxed{2} & -1 \end{vmatrix}$$

$$= -1 \cdot \begin{vmatrix} 2 & -4 \\ 1 & 5 \end{vmatrix} = -14$$

Tenglamani yeching:

11.
$$\begin{vmatrix} \sin 2x & -\cos 2x \\ \sin 3x & \cos 3x \end{vmatrix} = 0$$

$\sin 2x \cdot \cos 3x - (-\cos 2x) \cdot \sin 3x = 0$
$\sin 2x \cos 3x + \sin 3x \cos 2x = 0$
$\sin(3x + 2x) = 0$
$\sin 5x = 0$
$x = \dfrac{\pi k}{5}$ $k \in \mathbb{Z}$

3. Hisoblang: $\begin{vmatrix} 2 & 2 & -1 \\ 7 & 0 & 3 \\ 3 & 4 & 0 \end{vmatrix}$ $\delta = 2\cdot0\cdot0 + 2\cdot3\cdot3 + (-1)\cdot7\cdot4 - (-1)\cdot0\cdot3 - 2\cdot3\cdot4 - 7\cdot2\cdot0 = -34$

Berilgan matritsa:

33. $A = \begin{pmatrix} 2 & -4 & 3 & 1 & 0 \\ 1 & -2 & 1 & -4 & 2 \\ 0 & 1 & -1 & 3 & 1 \\ 4 & -7 & 4 & -4 & 5 \end{pmatrix}$

$rang\left(A^{T}\right) = ?$

rank(A^{T}) = rank(A) = 3

Matritsaning rangini toping:

32.
$$A = \begin{pmatrix} 2 & -4 & 3 & 1 & 0 \\ 1 & -2 & 1 & -4 & 2 \\ 0 & 1 & -1 & 3 & 1 \\ 4 & -7 & 4 & -4 & 5 \end{pmatrix} \times 2 = \begin{pmatrix} 2 & -4 & 3 & 1 & 0 \\ 2 & -4 & 2 & -8 & 4 \\ 0 & 1 & -1 & 3 & 1 \\ 4 & -7 & 4 & -4 & 5 \end{pmatrix} \begin{matrix} + \\ + \end{matrix} = \begin{pmatrix} 2 & -4 & 3 & 1 & 0 \\ 2 & -4 & 2 & -8 & 4 \\ \cancel{4} & \cancel{-7} & \cancel{4} & \cancel{4} & \cancel{5} \\ 4 & -7 & 4 & -4 & 5 \end{pmatrix} = \begin{pmatrix} 2 & -4 & 3 & 1 & 0 \\ 1 & -2 & 1 & -4 & 2 \\ 4 & -7 & 4 & -4 & 5 \end{pmatrix}$$

rank = 3

10.	**Matrisalar uchun $2A + 3B$ yig'indini toping** $A = \begin{pmatrix} 5 & 1 \\ 3 & 2 \end{pmatrix}$ u $B = \begin{pmatrix} 3 & 1 \\ 2 & 4 \end{pmatrix}$.

$$2A + 3B = \begin{pmatrix} 10 & 2 \\ 6 & 4 \end{pmatrix} + \begin{pmatrix} 9 & 3 \\ 6 & 12 \end{pmatrix} = \begin{pmatrix} 19 & 5 \\ 12 & 16 \end{pmatrix}$$

14. Determinant uchun M_{23} minorini toping:

$$\Delta = \begin{vmatrix} 2 & -4 & 1 & 5 \\ 1 & -3 & 2 & 5 \\ 2 & 2 & 0 & -3 \\ 3 & -1 & 1 & 2 \end{vmatrix}$$

$A_{23} = 2$

$$M_{23} = \begin{vmatrix} 2 & -4 & 5 \\ 2 & 2 & -3 \\ 3 & -1 & 2 \end{vmatrix} = 14$$
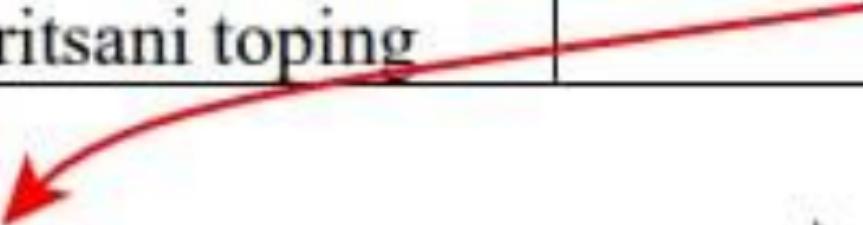
23. Hisoblang:
$$\begin{vmatrix} 1 & 9 & 18 & 2 \\ -2 & 11 & 22 & 4 \\ 3 & 6 & 12 & 6 \\ -4 & 12 & 24 & 8 \end{vmatrix} = \begin{vmatrix} 1 & 18 & 18 & 2 \\ -2 & 22 & 22 & 4 \\ 3 & 12 & 12 & 6 \\ -4 & 24 & 24 & 8 \end{vmatrix} = 0$$

×2

№	Savol	A	B	C	D
	$A = \begin{pmatrix} -1 & 0 \\ 1 & 2 \end{pmatrix}$ A matritsaga teskari matritsani toping	$A^{-1} = \begin{pmatrix} -1 & 0 \\ 0,5 & 0,5 \end{pmatrix}$	$A^{-1} = \begin{pmatrix} -1 & 1 \\ 0,5 & 0,5 \end{pmatrix}$	$A^{-1} = \begin{pmatrix} -1 & 0 \\ 0,5 & 1 \end{pmatrix}$	$A^{-1} = \begin{pmatrix} -1 & 0,5 \\ 0,5 & 0,5 \end{pmatrix}$

$\begin{pmatrix} -1 & 0 \\ 0,5 & 0,5 \end{pmatrix} \cdot \begin{pmatrix} -1 & 0 \\ 1 & 2 \end{pmatrix} = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$ =>Birlik matritsa (Diagonali 1 qolgani 0 bo'lgan matritsa)   => Demak ✓

18.	berilgan kamyob bo'lmagan matritsa uchun quyidagi nisbatlardan qaysi biri to'g'ri	$\left\| A^{-1} \right\| = \dfrac{1}{\|A\|}$
19.	berilgan kamyob bo'lmagan matritsa uchun quyidagi nisbatlardan qaysi biri to'g'ri	$\left(A^m\right)^{-1} = \left(A^{-1}\right)^m$
20.	berilgan kamyob bo'lmagan matritsa uchun quyidagi nisbatlardan qaysi biri to'g'ri	$\left(A^{-1}\right)^{-1} = A$
21.	berilgan kamyob bo'lmagan matritsa uchun quyidagi nisbatlardan qaysi biri to'g'ri	$\left(A^{-1}\right)^T = \left(A^T\right)^{-1}$
22.	berilgan kamyob bo'lmagan matritsa uchun quyidagi nisbatlardan qaysi biri to'g'ri	$\left(A \cdot B\right)^{-1} = B^{-1} \cdot A^{-1}$

	Chiziqli tenglamalar sistemasini bo'g'in qilish uchun:	Uning asosiy matritsasi darajasi uzatilgan matritsaning darajasiga A teng bo'lishi zarur A $(A \mid B)$ yetarlidir .
2.	Quyidagi gaplarning qaysi biri chiziqli tenglamalar sistemasi uchun to'g'ri:	Agar $rangA \neq rang(A \mid B)$ sistemai hamkori
3.	Quyidagi gaplarning qaysi biri chiziqli tenglamalar sistemasi uchun to'g'ri:	$rangA = rangB = r = n$ Agar tizim yagona yechimga ega bo'lsa
4.	Quyidagi gaplarning qaysi biri chiziqli tenglamalar sistemasi uchun to'g'ri:	U $rangA = rang\ B = r < n$ holda sistema cheksiz sonli yechimlarga ega bo'lsa
5.	Quyidagi gaplarning qaysi biri chiziqli tenglamalar sistemasi uchun to'g'ri	Agar $rangA < rang(A \mid B)$ u holda tizimning echimlari №

8.
$$\begin{cases} 2x_1 + x_2 - x_3 = 2, \\ 2x_1 + 2x_2 - 3x_3 = -3, \\ x_1 + 2x_2 - 2x_3 = -5. \end{cases} \longrightarrow \Delta = \begin{vmatrix} 2 & 1 & -1 \\ 2 & 2 & -3 \\ 1 & 2 & -2 \end{vmatrix} = 3$$

$$x_1 = ?$$

x_1 ni so'ragani uchun x_1 ni oldidagi koeffitsientlar o'rniga javobdagi sonlarni qo'yamiz:

$$\Delta_{x_1} = \begin{vmatrix} 2 & 1 & -1 \\ -3 & 2 & -3 \\ -5 & 2 & -2 \end{vmatrix} = 9 \longrightarrow x_1 = \frac{\Delta_{x_1}}{\Delta} = 3$$

17. $\begin{cases} 2x + y - 3z = 7, \\ 2x + 4y - 3z = -2, \\ x + 5y - 3z = -9. \end{cases}$

Δ_z.

$$\Delta_z = \begin{vmatrix} 2 & 1 & 7 \\ 2 & 4 & -2 \\ 1 & 5 & -9 \end{vmatrix} = 6$$

Δ_z ni so'ragani uchun z ning koeffitsientlari o'rniga javobdagi sonlarni qo'yamiz

2.

Tenglamalar sistemasini
yeching

$$\begin{cases} x_1 - x_2 + 2x_3 + 2x_4 = 2, \\ -x_2 - x_3 + 2x_4 = 7, \\ -x_1 + 2x_2 - 2x_4 = -7, \\ x_1 + 2x_2 - 2x_3 - x_4 = 1. \end{cases}$$

$$X = \begin{pmatrix} 1 \\ -1 \\ -2 \\ 2 \end{pmatrix}$$

$$X = \begin{pmatrix} 3 \\ -1 \\ -2 \\ 2 \end{pmatrix}$$

$$X = \begin{pmatrix} 1 \\ -4 \\ -2 \\ 2 \end{pmatrix}$$

$$X = \begin{pmatrix} 1 \\ -3 \\ -5 \\ 2 \end{pmatrix}$$

Javoblarni qo'yib ko'ramiz, agar tenglikni qanoatlantirsa, shu javob to'g'ri A ✓

Tizim nechta yechimga

ega?

$$\begin{cases} x - y - z = 2, \\ -2x + y + 7z = -1, \\ -3x + 2y + 8z = -3 \end{cases}$$

$$A = \begin{pmatrix} 1 & -1 & -1 \\ -2 & 1 & 7 \\ -3 & 2 & 8 \end{pmatrix} \quad \bar{A} = \begin{pmatrix} 1 & -1 & -1 \\ -2 & 1 & 7 \\ -2 & 1 & 7 \end{pmatrix} \longrightarrow \text{rank}(A) = 2$$

Agar rank(A) < n , demak cheksiz ko'p yechim
(n - nomalumlar soni)

| 2. | Vektorning boshlanish $\vec{a} = \begin{pmatrix} 7 \\ 6 \end{pmatrix}$ nuqtasiga vektorning boshlanish nuqtasiga ko'chirilsa $A(-2,3)$, u holda qaysi nuqtada uning oxiri o'tadi . | **Sharti:** $\vec{a}(7, 6)$ vektorning boshi $A(-2 ,3)$ bo'lsa, oxirini toping.

$\vec{a}(7, 6) = B(x, y) - A(-2, 3)$
$B = (7, 6) + (-2, 3)$
$B = (5, 9)$
Javob: B(5, 9) |

4.

Tenglamalar sistemasini yeching

$$\begin{cases} 2x_1 + x_2 - x_3 + x_4 = 1, \\ 3x_1 - 2x_2 + 2x_3 - 3x_4 = 2, \\ 5x_1 + x_2 - x_3 + 2x_4 = -1, \\ 4x_1 + 2x_2 - 2x_3 + 2x_4 = 4. \end{cases}$$

Sistema birgalikda emas

$$X = \begin{pmatrix} 3 \\ -1 \\ -2 \\ 2 \end{pmatrix}$$

$$X = \begin{pmatrix} 1 \\ -4 \\ -2 \\ 2 \end{pmatrix}$$

$$X = \begin{pmatrix} 1 \\ -3 \\ -5 \\ 2 \end{pmatrix}$$

Agar javoblar orasida "so'z" li javoblar bo'lsa tekshiring!!!

Bu yerda 1 va 4 - tenglamalarning chap tarafi PROPORSIONAL ammo o'ng tarafi PROPORSIONAL EMAS , demak sistema birgalikda emas

14. Tenglamalar sistemasining yechimlari yig'indisini toping

$$\begin{cases} x_1 + 7x_2 + 2x_3 = 26, \\ x_1 + x_2 - 4x_3 = 14, \\ 4x_1 - 2x_2 + x_3 = -2. \end{cases}$$

$$\Delta = \begin{vmatrix} 1 & 7 & 2 \\ 1 & 1 & -4 \\ 4 & -2 & 1 \end{vmatrix} = -138$$

$$\Delta_{x_1} = \begin{vmatrix} 26 & 7 & 2 \\ 14 & 1 & -4 \\ -2 & -2 & 1 \end{vmatrix} = -276$$

$$\Delta_{x_2} = \begin{vmatrix} 1 & 26 & 2 \\ 1 & 14 & -4 \\ 4 & -2 & 1 \end{vmatrix} = -552$$

$$\Delta_{x_3} = \begin{vmatrix} 1 & 7 & 26 \\ 1 & 1 & 14 \\ 4 & -2 & -2 \end{vmatrix} = 276$$

$$x_1 = 2$$
$$x_2 = 4$$
$$x_3 = -2$$

Demak 2 + 4 - 2 = 4

| 5. | Agar vektorning boshi vektorning $\vec{b} = \begin{pmatrix} 2 \\ -1 \end{pmatrix}$ oxiriga ko'ra nuqtaga ko'chirilsa $A(3,2)$, u holda qaysi nuqtada vektorning boshi ko'chadi | Ya'ni $\vec{b}(2, -1)$ vektorning oxiri $A(3, 2)$ nuqta bo'lsa, boshini toping

$\vec{b}$ = A(uchi) - B(Boshi)
B = b - A
B = (3, 2) - (2, -1)
B = (1, 3) |

7. **Vektorlar**
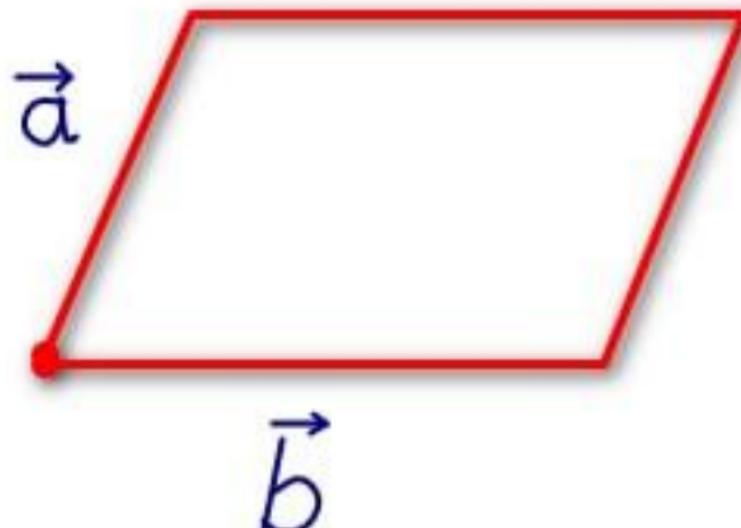
$\vec{a} = 2\vec{i} + 3\vec{j} - 2\vec{k}$ A tomonidan hosil bo'lgan parallelogrammaning maydonini toping

$\vec{b} = \vec{i} - 3\vec{j} + \vec{k}$

$\vec{a}$

$\vec{b}$

$$\vec{c} = \begin{vmatrix} i & j & k \\ 2 & 3 & -2 \\ 1 & -3 & 1 \end{vmatrix} =$$

$$= -3i - 4j - 9k$$

$$S = |\vec{c}| = \sqrt{9 + 16 + 81} = \sqrt{106}$$

6.	Agar vektorlar qanday bog'liqlikda bo'ladi $$\vec{a},\vec{b},\vec{c} \begin{vmatrix} x_1 & y_1 & z_1 \\ x_2 & y_2 & z_2 \\ x_3 & y_3 & z_3 \end{vmatrix} = 0$$	Koplanar
8.	$\vec{a},\vec{b},\vec{c}$ Agarda vektorlar qanday bog'liqlikda bo'ladi $$\begin{vmatrix} x_1 & y_1 & z_1 \\ x_2 & y_2 & z_2 \\ x_3 & y_3 & z_3 \end{vmatrix} \neq 0 ?$$	komplanar bo'lmagan

11.

Qoyil $A(2;0;4)$, ,,
$B(6;3;5)$, . $C(2;4;5)$
$D(-5;6;3)$ Vektorni
toping $\vec{a} = \overrightarrow{AB} + \overrightarrow{CD}$.

$\overrightarrow{AB} = B - A;$
$\overrightarrow{CD} = D - C;$
$\vec{a} = B - A + D - C = (6, 3, 5)+(-5, 6, 3)-$
$-(2, 0, 4)-(2, 4, 5) = (-3, 5, -1)$

Javob: $\vec{a}(-3, 5, -1)$

9.

n vektorlar qaysi qiymatda
$\vec{a} = (n; 5; 4)$ Behuda
$\vec{b} = (1; 2; -2)$
orthogonal?

Tarjimada xato ketgan!!!

Sharti: n ning qanday qiymatida $\vec{a}$ va $\vec{b}$ vektorlar ortogonal?

Yechim:

Qachinki skalyar ko'paytma 0 bo'lganda!

1·n + 5·2 - 4·2 = 0

n = -2

17. Vektorlarning skalyar mahsulini toping

$$\vec{a} = 3\vec{i} + 8\vec{i} + \vec{k};$$

$$\vec{b} = 6\vec{i} - 3\vec{j} + 3\vec{k}$$

a·b = 3·6 + 8·(-3) + 1·3 = -3

7.

A Kosmosdagi chiziqli operator R^3 matritsaga ega bo'lsin

$$A = \begin{pmatrix} 2 & -2 & 4 \\ 1 & 5 & 1 \\ 1 & 3 & 2 \end{pmatrix}$$

asosda $\{e_1, e_2, e_n\}$ A

$x = 4\vec{e_1} - 3\vec{e_2} + \vec{e_3}$.

$y = A(x)$

Sharti(Sinonim sharti): R fazodagi A* operator matritsasi quyidagicha bo'lsa, x(4, -6, 1) vektorning y = A(x) aksini toping.

$$\begin{pmatrix} 2 & -2 & 4 \\ 1 & 5 & 1 \\ 1 & 3 & 2 \end{pmatrix} \cdot \begin{pmatrix} 4 \\ -3 \\ 1 \end{pmatrix} = \begin{pmatrix} 18 \\ -10 \\ -3 \end{pmatrix} = 18\bar{e}_1 - 10\bar{e}_2 - 3\bar{e}_3$$

20.

Vektorlarning vektorli

mahsulini toping

$\vec{a} = 2\vec{i} + 3\vec{j} + \vec{k}$;

$\vec{b} = 4\vec{i} - 3\vec{j} + 3\vec{k}$

$$\overline{c} = [\overline{a}, \overline{b}] = \begin{vmatrix} \vec{i} & \vec{j} & \vec{k} \\ 2 & 3 & 1 \\ 4 & -3 & 3 \end{vmatrix} = 12\vec{i} - 2\vec{j} - 18\vec{k}$$