ŪЗБЕКИСТОН РЕСПУБЛИКАСИ
ОЛИЙ ВА ЎРТА МАХСУС ТАЪЛИМ ВАЗИРЛИГИ

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Ishning nomi: Dekart kordinatasida to'g'ri chiziqli tenglamalar va ularni integratsiyasi.

Ishdan maqsad: Dekart kordinatasida to'g'ri chiziqli tenglamalarni yechish usullarini o'rganish va ularni integratsiyasi bilan tanishish.

Topshiriqlar

1- ish. To'g'ri chiziq tenglamalari mavzusiga doir topshiriqlar.

1. Dekart koordinatalar sistemasida quyidagi nuqtalarni aniklang: *A(2;3), B(–5; 1), C(–2; –3), D(0; 3)*

2. *A(0;0), B(3; –4), C(–3; 4), D(–2; 2), E(10; –3)* nuqtalar berilgan bo'lsa,
1) *A* va *B;* 2) *B* va *C;* 3) *A* va *C;* 4) C va *D;* 5) *A* va *D;* 6) *D* va E nuqtalar orasidagi masofani aniqlang.

3. *A(1;2)* va *B(4; – 4)* nuqtalarni tutashtirishdan hosil bo'lgan kesmani
1) $\lambda = \frac{1}{2}$ nisbatda; 2) $\lambda = \frac{2}{3}$; 3) $\lambda = \frac{1}{1} = 1$ nisbatda bo'luvchi nuqtaning koordinatalarini toping.

4. *M₁(3;1), M₂ (2; 3), M₃ (6; 3), M₄ (–3; 3), M₅ (3; –1)* nuqtalarning $2x - 3y - 3 = 0$ to'g'ri chiziqda yotish yoki yotmasligini aniqlang.

5. To'g'ri chiziqlarning burchak koeffisientlari hamda *Oy* o'qidan ajratgan kesmalariga ko'ra ularning tenglamalarini toping.

1) $k = 3, \; b = 0$ 2) $k = \frac{2}{3}, \; b = 3$

3) $k = 0, \; b = -2$ 4) $k = -\frac{3}{4}, \; b = 3$

2- ish. Matrisalar mavzusiga doir.

1. Ushbu matrisalar berilgan:

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

b) $A = \begin{bmatrix} 1 & -2 & 3 \\ 4 & -3 & -1 \end{bmatrix};$ $B = \begin{bmatrix} -2 & 6 & 3 \\ 3 & 3 & -1 \end{bmatrix};$

v) $A = \begin{bmatrix} 3 & 0 \\ -2 & 5 \\ 1 & -4 \end{bmatrix};$ $B = \begin{bmatrix} -2 & 6 & 3 \\ 3 & 3 & -1 \end{bmatrix};$

Quyidagi matrisalarni toping:
1) $2 \cdot A$ 2) $-3 \cdot B$ 3) $3 \cdot A + 2 \cdot B$

2. Ushbu matrisalar berilgan:

a) $A = \begin{pmatrix} -3 & 1 \\ 4 & -5 \end{pmatrix}$ $B = \begin{pmatrix} 0 & 2 \\ -2 & -3 \end{pmatrix}$

b) $A = \begin{bmatrix} 5 & 0 \\ 6 & 4 \\ -1 & -3 \end{bmatrix}$ $B = \begin{bmatrix} -2 & 3 & -3 \\ 2 & 7 & 1 \end{bmatrix}$

v) $A = \begin{bmatrix} 3 & 2 & 4 \\ 1 & 1 & 3 \\ 2 & -2 & -5 \end{bmatrix};$ $B = \begin{bmatrix} -2 & 0 & -3 \\ 3 & 1 & 4 \\ 2 & 1 & 3 \end{bmatrix}$

Quyidagi matrisalarni toping:
1) $A \cdot B$ 2) $B \cdot A$ 3) A^2 4) B^3

3- ish. Determinantlar mavzusiga doir.

1. 2–tartibli determinantlarni hisoblang.

1) $\begin{vmatrix} -1 & 4 \\ -5 & 2 \end{vmatrix}$ 2) $\begin{vmatrix} 3 & -4 \\ 1 & 2 \end{vmatrix}$ 3) $\begin{vmatrix} 5 & 3 \\ 6 & 4 \end{vmatrix}$ 4) $\begin{vmatrix} a+b & a-b \\ a-b & a+b \end{vmatrix}$

5) $\begin{vmatrix} a & 1 \\ a^2 & a \end{vmatrix}$ 6) $\begin{vmatrix} 3 & -4 \\ 1 & 2 \end{vmatrix}$ 7) $\begin{vmatrix} \cos\alpha & -\sin\alpha \\ \sin\alpha & \cos\alpha \end{vmatrix}$ 8) $\begin{vmatrix} \cos\alpha & \sin\alpha \\ \sin\beta & \cos\beta \end{vmatrix}$

2. 3– tartibli determinantlarni hisoblang.

1) $\begin{vmatrix} 3 & -2 & 1 \\ -2 & 1 & 3 \\ 2 & 0 & -2 \end{vmatrix}$ 2) $\begin{vmatrix} 1 & 2 & 0 \\ 0 & 1 & 3 \\ 5 & 0 & 1 \end{vmatrix}$ 3) $\begin{vmatrix} 1 & 2 & 0 \\ 0 & 1 & 3 \\ 5 & 0 & 1 \end{vmatrix}$

4) $\begin{vmatrix} 3 & -2 & 1 \\ -2 & 1 & 3 \\ 2 & 0 & -2 \end{vmatrix}$ 5) $\begin{vmatrix} 0 & a & 0 \\ a & 1 & a \\ 0 & a & 0 \end{vmatrix}$ 6) $\begin{vmatrix} 0 & a & a \\ a & 0 & a \\ a & a & 0 \end{vmatrix}$

3. Determinantning xossalaridan foydalanib hisoblang.

1) $\begin{vmatrix} 1 & 1 & -1 \\ 1 & -1 & 1 \\ -1 & 1 & 1 \end{vmatrix}$ 2) $\begin{vmatrix} 3 & -2 & 1 \\ -2 & 1 & 3 \\ 2 & 0 & -2 \end{vmatrix}$ 3) $\begin{vmatrix} 2 & 0 & 5 \\ 1 & 3 & 16 \\ 0 & -1 & 10 \end{vmatrix}$ 4) $\begin{vmatrix} 1 & 1 & 1 \\ x & y & z \\ x^2 & y^2 & z^2 \end{vmatrix}$

4- ish. Matrisalar mavzusiga doir.

1. Ushbu matrisalarga teskari matrisalarni toping.

a) $\begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$ $\begin{pmatrix} 3 & 4 \\ 5 & 7 \end{pmatrix}$ $\begin{pmatrix} 3 & 3 \\ 4 & 4 \end{pmatrix}$ $\begin{pmatrix} -5 & 1 \\ 3 & 2 \end{pmatrix}$

b) $A = \begin{pmatrix} a & b \\ c & d \end{pmatrix}$ $B = \begin{pmatrix} \cos\alpha & -\sin\alpha \\ \sin\alpha & \cos\alpha \end{pmatrix}$;

2. Ushbu matrisalar berilgan.

v) $A = \begin{bmatrix} 2 & 5 & 7 \\ 6 & 3 & 4 \\ 5 & -2 & -3 \end{bmatrix}$; $B = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & -2 \\ 2 & -2 & 1 \end{bmatrix}$

Quyidagilarni toping:

1) A^{-1} 2) $A \cdot A^{-1}$ 3) $A^{-1} \cdot A$

4) B^{-1} 5) $B \cdot B^{-1}$ 6) $B^{-1} \cdot B$

2. Ushbu matrisalarning rangini toping.

a) $A = \begin{pmatrix} -3 & 1 \\ 4 & -5 \end{pmatrix}$ $B = \begin{pmatrix} 0 & 2 \\ -2 & -3 \end{pmatrix}$

b) $A = \begin{bmatrix} 5 & 0 \\ 6 & 4 \\ -1 & -3 \end{bmatrix}$; $B = \begin{bmatrix} -2 & 3 & -3 \\ 2 & 7 & 1 \end{bmatrix}$;

v) $A = \begin{bmatrix} 3 & 2 & 4 \\ 1 & 1 & 3 \\ 2 & -2 & -5 \end{bmatrix}$; $B = \begin{bmatrix} -2 & 0 & -3 \\ 3 & 1 & 4 \\ 2 & 1 & 3 \end{bmatrix}$

5- ish. Ehtimolliklarni hisoblashga doir.

№ 1. Kuyidagi tenglamalar sistemasini Kramer usuli yordamida yeching.

$$1) \begin{cases} 2x_1 + x_2 - x_3 = 0 \\ 3x_2 + 4x_3 = -6 \\ x_1 + x_3 = 1 \end{cases} \qquad 2) \begin{cases} x_1 - 2x_2 - x_3 = -2 \\ 2x_1 - x_2 = -1 \\ x_2 + x_3 = -2 \end{cases}$$

№ 2. Kuyidagi tenglamalar sistemasinit teskari matrisa usuli yordamida yeching.

$$1) \begin{cases} 2x_1 - x_2 = -1 \\ x_1 + 2\,x_2 - x_3 = -2 \\ x_2 + x_3 = -2 \end{cases} \qquad 2) \begin{cases} 4x_1 + 2x_2 - x_3 = 0 \\ x_1 + 2x_2 + x_3 = 1 \\ x_2 - x_3 = -3 \end{cases}$$

6- ish. Integralni hisoblashga doir.

1. Quyidagi funksiyalarning aniqlanish sohasini toping.

a) $y = \dfrac{1}{\sqrt{x^2 - 3x + 2}}$ 　　　　b) $y = \arcsin \dfrac{x - 2}{2}$

d) $y = \dfrac{1}{\lg(4 - x^2)}$ 　　　　e) $y = \sqrt{25 - x^2} + \lg \sin x$

2. Limitlarni hisoblang

$$\lim_{x \to \infty} \frac{3x^4 + 4x^3 - 1}{2x^3 + 3x^2 + 5} \qquad\qquad \lim_{x \to \infty}\left(\sqrt{x^2 + 8x + 3} - \sqrt{x^2 + 4x + 3}\right)$$

$$\lim_{x \to \infty} \frac{x^3 - 3x^2 + 3}{x^2 - 1}$$

3. Quyidagi funksiyalarning hosilalarini differensiallash qoidalari va formulalarini qo'llab toping:

a) $y = x^2\sqrt{1 - x^2}$ 　　b) $y = \sin^4 x + \cos^4 x$ 　　d) $y = \dfrac{\sin^2 x}{\cos x}$

4. Aniqmas integralni toping, integrallash natijalarini differensiallash bilan tekshiring:

a) $\displaystyle\int\left(4x^5 - 2\sqrt[3]{x^2} + \frac{3}{\sqrt[4]{x^3}} - \frac{5}{x^e}\right)dx$ 　　　　b) $\displaystyle\int (tgx + ctgx)^2 dx$

d) $\displaystyle\int \frac{(1 + x^2)}{x(1 + x^2)}dx$

5. Integralni hisoblang:

a) $\displaystyle\int_0^1 \left(\sqrt{x} + \sqrt[3]{x^2}\right)dx$ 　　　b) $\displaystyle\int_1^2 \frac{dx}{x(1 + \ln^2 x)}$ 　　　d) $\displaystyle\int_1^2 \frac{dx}{2x - 1}$

6. Berilgan chiziqlar bilan chegaralangan figuralar yuzlarini hisoblang:

a) $y = 4x - x^2$ va Ox o'q bilan

b) $y = (x - 1)^2$ va $x^2 - \dfrac{y^2}{2} = 1$

d) $y = x^2 + 4x$ va $y = x + 4$

<center>Adabiyotlar</center>

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