10-mavzu: Darsda yechiladigan misollar

1-masala. d_1 va d_2 to'g'ri chiziqlar

d_1: $x + 7y - 5 = 0$,

d_2: $3x - 4y + 20 = 0$.

tenglamalari bilan berilgan, ular orasidagi burchakni toping.

Yechish d_1 to'g'ri chiziqning burchak koeffitsienti $k_1 = -\frac{1}{7}$, d_2 to'g'ri chiziqning burchak koeffitsienti $k_2 = -\frac{3}{4}$, (25.6) formulaga ko'ra

$$tg\varphi = \frac{\frac{3}{4} - \left(-\frac{1}{7}\right)}{1 + \frac{3}{4}\left(-\frac{1}{7}\right)} = \frac{\frac{3}{4} + \frac{1}{7}}{1 - \frac{3}{28}} = 1$$

Demak, $\varphi = 45°$.

2-masala. Koordinatalar boshidan $3x-4y-2=0$ to'g'ri chiziqqacha bo'lgan masofani toping.

(10.21) formuladan

$$p(M_0, d) = \frac{|3 \cdot 0 - 4 \cdot 0 - 2|}{\sqrt{9+16}} = \frac{|-2|}{5} = \frac{2}{5}$$

1.Tomonlari

$18x + 6y - 17 = 0,\ \ 14x - 7y + 15 = 0,\ \ 5x + 10y - 9 = 0$

tenglamalar bilan berilgan uchburchakning burchaklarini toping.

2.Quyidagi to'g'ri chiziqlarning kesishish nuqtasini toping:

1) $8x - 3y - 1 = 0,\ \ 4x + y - 13 = 0$

2) $3x + 7y - 15 = 0,\ 9x + 21y - 32 = 0$

3) $5x - 2y + 13 = 0,\ \ x + 3y - 11 = 0$

3.Quyidagi uchta to'g'ri chiziqlar bir nuqtadan o'tadimi?

1) $3x - y - 1 = 0\ ,2x - y + 3 = 0, x - y + 7 = 0$

2) $x + 3y - 1 = 0\ ,5x + y - 10 = 0, 3x - 5y - 8 = 0$

3) $3x - y + 6 = 0, 4x - 3y - 5 = 0, 2x - y + 5 = 0.$

4.Uchburchak tomonlari

$x + 2y + 3 = 0\ ,3x - 7y + 9 = 0\ ,5x - 3y - 11 = 0$

tenglamalar bilan berilgan. Uchburchakning balandliklari kesishgan nuqtani toping.

5. To'rtburchak tomonlari

$x + 3y = 0,\ \ x - y = 0,\ \ \ x - y - 4 = 0,\ \ 3x + y - 12 = 0$

tenglamalar bilan berilgan. To'rtburchakning diagonallari tenglamasini tuzing.

6. To’g’ri chiziqlar orasidagi burchakni aniqlang.

$\begin{cases} 3x-4y-2z=0, \\ 2x+y-2z=0 \end{cases}$ va $\begin{cases} 4x+y-6z-2=0, \\ y-3z+2=0 \end{cases}$

7.Berilgan $(3,1,-2)$ nuqtadan va $\frac{x-4}{5}=\frac{y+3}{2}=\frac{z}{1}$ to’g’ri chiziqdan o’tuvchi tekislik tenglamasini tuzing.

8. Berilgan $A(4,-3,1)$ nuqtaning $x+2y-z-3=0$ tekislikdagi proeksiyasini toping.

9. Berilgan $\frac{x}{4}=\frac{y-4}{3}=\frac{z+1}{-2}$ to’g’ri chiziqning $x-y+3z+8=0$ tekislikdagi proeksiyasini toping.

10. $\frac{x-3}{2}=\frac{y+4}{1}=\frac{z-2}{-3}$ to’g’ri chiziqdan o’tuvchi va $\frac{x+5}{4}=\frac{y-2}{7}=\frac{z-1}{2}$ to’g’ri chiziqqa parallel tekislik tenglamasini tuzing.

11. Berilgan to’g’ri chiziq berilgan tekislikda yotadimi?

1) $\frac{x-1}{2}=\frac{y+3}{-1}=\frac{z+2}{5}$, $4x+3y-z+3=0$

2) $\frac{x-1}{4}=\frac{y}{7}=\frac{z-2}{3}$, $5x-8y-2z-1=0$

3) $\frac{x+2}{3}=\frac{y-5}{4}=\frac{z}{1}$, $3x-2y-z-1=0$

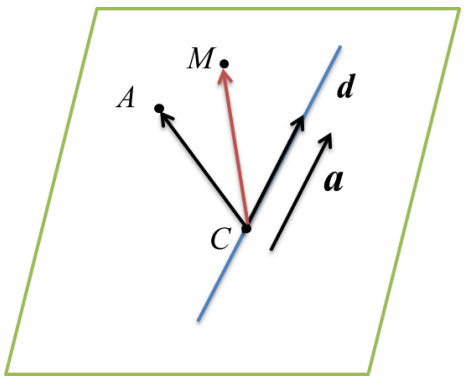
12. Berilgan to’g’ri chiziq va tekislik orasidagi burchakni toping.

1) $\frac{x-1}{2}=\frac{y+3}{-1}=\frac{z+2}{5}$, $4x+3y-z+3=0$

2) $\frac{x-1}{4}=\frac{y}{7}=\frac{z-2}{3}$, $5x-8y-2z-1=0$

3) $\frac{x+2}{3}=\frac{y-5}{4}=\frac{z}{1}$, $3x-2y-z-1=0$

1.([1], p68, 2.3.8.Ex) Berilgan $A(-1,1,2)$ nuqtadan va $d:\frac{x+2}{1}=\frac{y-3}{2}=\frac{z+1}{-1}$ to’g’ri chiziqdan o’tuvchi tekislik tenglamasini tuzing.



Echish: d to’g’ri chiziqdan $C(-2,3,-1)$ nuqtani olamiz.

$\vec{a}=\{1,2,-1\}$ - d to’g’ri chiziqni yo’naltiruvchi vektori.

$\overrightarrow{AC}=\{-1,2,-3\}$. Qidirilayotgan tekislik $\vec{a}$, $\overrightarrow{AC}$ vektorlarga

parallel va $A(-1,1,2)$ nuqtadan o'tadi: $\begin{vmatrix} x+1 & y-1 & z-2 \\ 1 & 2 & -1 \\ -1 & 2 & -3 \end{vmatrix} = 0 \Rightarrow x-y-z+4=0$

Javob: $x-y-z+4=0$

2.3.1.([1],p72) ΔABC uchburchakning A va B uchlari mos ravishda Ox hamda Oy o'qlarining $2x-y-2=0$ to'g'ri chiziq bilan kesishish nuqtalari bo'lib, $tg\hat{A}=\frac{1}{2}$, $tg\hat{B}=\frac{4}{3}$ bo'lsa, AC hamda BC tomonlar tenglamalarini tuzing.

2.3.2.([1],p72)Tekislikda $4x-6y-3=0,\ 2x-3y+7=0$ to'g'ri chiziqlar parallel ekanligi ko'rsatilsin hamda bu to'g'ri chiziqlarga parallel va ulardan teng uzoqlikda joylashgan to'g'ri chiziq tenglamasi tuzilsin.

2.3.8.([1],p72) $x+5y+z=0, x-z+4=0$ tekisliklarning kesishish to'g'ri chizig'idan o'tuvchi hamda $x-4y-8z+12=0$ tekilik bilan $\frac{\pi}{6}$ burchak ostida kesishuvchi tekislik tenglamasini tuzing.

2.3.9.([1],p72) Berilgan $P(4,3,-2)$ nuqtadan $3x-y+5z+1=0$ tekislikkacha masofani toping.

2.3.11.([1],p72) $d:\begin{cases}3x+2y-z+5=0\\ x-y-z+1=0\end{cases}$ to'g'ri chiziqning koordinata tekisliklariga proeksiyalari tenglamalarini toping(x,y,z −fazoning ortogonal koordinatalari).

2.3.13.([1],p72) $A(1,-1,1), B(1,1,0), C(0,2,-1)$ nuqtalar berilgan (ortogonal koordinatalar). A nuqtadan BC to'g'ri chiziqqacha masofani toping.

2.3.15.([1],p72) $A(2,3,1)$ nuqtadan $\frac{x+1}{2}=\frac{y}{-1}=\frac{z-2}{3}$ to'g'ri chiziqqa perpendikulyar tushiring.

2.3.17.([1],p72) Berilgan $\frac{x+3}{2}=\frac{y-5}{3}=\frac{z}{1}$, $\frac{x+2}{8}=\frac{y-1}{7}=\frac{z-3}{1}$ to'g'ri chiziqlar orasidagi masofani toping va bu to'g'ri chiziqlarga umumiy perpendikulyar tenglamasini tuzing.

1([2]). Berilgan $(3,1,-2)$ nuqtadan va

$$\frac{x-4}{5}=\frac{y+3}{2}=\frac{z}{1}$$

to'g'ri chiziqdan o'tuvchi tekislik tenglamasini tuzing.

2([2]). $\frac{x-3}{2}=\frac{y+4}{1}=\frac{z-2}{-3}$ to'g'ri chiziqdan o'tuvchi va $\frac{x+5}{4}=\frac{y-2}{7}=\frac{z-1}{2}$ to'g'ri chiziqqa parallel tekislik tenglamasini tuzing.

3([2]). Berilgan $A(4,-3,1)$ nuqtadan $x+2y-z-3=0$ tekislikgacha bo'lgan masofani toping.

4([2]). Ushbu $\frac{x-7}{1}=\frac{y-3}{2}=\frac{z-9}{-1}$ va $\frac{x-3}{-7}=\frac{y-1}{2}=\frac{z-1}{3}$ to'g'ri chiziqlar orasidagi masofani toping.

5([2]). To'rtburchak tomonlari

$$x+3y=0,\ \ x-y=0,\ \ x-y-4=0,\ \ 3x+y-12=0$$

tenglamalar bilan berilgan. To'rtburchak burchaklari bissektrisalarining tenglamalarini tuzing.

6([2]). To'g'ri chiziq

$$\frac{x+1}{2}=\frac{y}{-1}=\frac{z-2}{3}$$

tenglama bilan berilgan bo'lsa,unga $A(4,0,-1)$ nuqtadan tushirilgan perpendikulyar tenglamasini tuzing.

7([2]). Tomonlari

$$18x+6y-17=0,\ \ 14x-7y+15=0,\ \ 5x+10y-9=0$$

tenglamalar bilan berilgan uchburchakning burchaklarini toping.

8([2]). To'rtburchak tomonlari

$$x+3y=0,\ \ x-y=0,\ \ \ x-y-4=0,\ \ 3x+y-12=0$$

tenglamalar bilan berilgan. To'rtburchakning diagonallari tenglamasini tuzing.

9([2]). Ushbu $\frac{x-7}{1}=\frac{y-3}{2}=\frac{z-9}{-1}$ va $\frac{x-3}{-7}=\frac{y-1}{2}=\frac{z-1}{3}$ to'g'ri chiziqlarga umumiy perpendikulyar bo'lgan to'g'ri chiziq tenglamasini tuzing.

3) $\frac{x-7}{5}=\frac{y-4}{1}=\frac{z-5}{4}$ va $3x-y+2z-5=0$