

**Mavzu:** Ikki to'g'ri chiziq orasidagi burchak. To'g'ri chiziqning parallellik va perpendikulyarlik alomatlari.

Nuqtadan to'g'ri chiziqgacha masofa

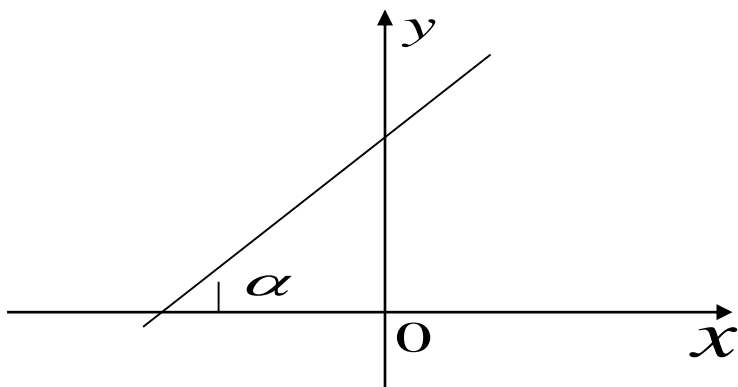
# R e j a :

- 1.To'g'ri chiziqning burchak koeffitsientli tenglamasi**
- 2.Ikki to'g'ri chiziq orasidagi burchak**
- 3.Ikki to'g'ri chiziqning parallellik hamda perpendikulyarlik sharti**
- 4.Berilgan nuqtadan o'tuvchi to'g'ri chiziqlar dastasining tenglamasi**

# 1.To'g'ri chiziqning burchak koeffitsientli tenglamasi

$y = kx + b$  tenglama to'g'ri chiziqning burchak koeffitsientli tenglamasi deyiladi. U ikki parametr **k** va **b** ga bog'liq. To'g'ri chiziqning tekislikdagi vaziyati shu parametrlar bilan to'liq aniqlanadi.

$$k = \operatorname{tg} \alpha$$



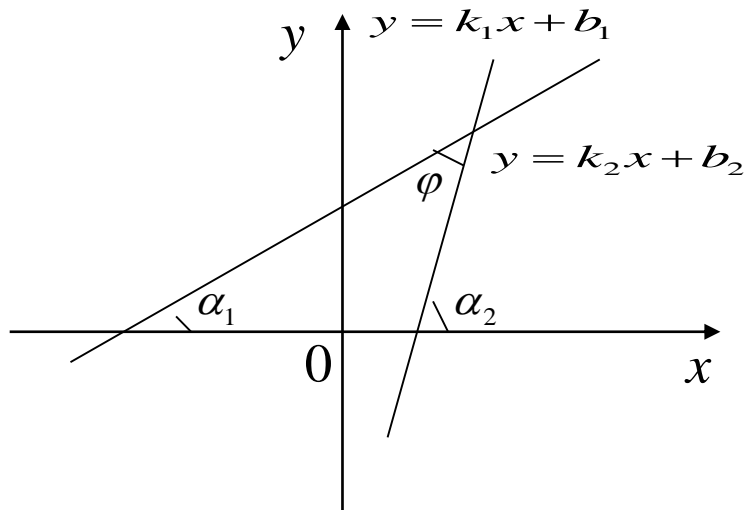
## 2. Ikki to'g'ri chiziq orasidagi burchak

Tekislikda ikki to'g'ri chiziq berilgan bo'lib, ularning burchak koeffitsientli tenglamalari

$$y = k_1x + b_1 \quad y = k_2x + b_2 \quad \text{bo'lsin. Bunda } k_1 = \operatorname{tg} \alpha_1 \quad k_2 = \operatorname{tg} \alpha_2$$

$$\operatorname{tg} \varphi = \operatorname{tg} (\alpha_1 - \alpha_2) = \frac{\operatorname{tg} \alpha_1 - \operatorname{tg} \alpha_2}{1 + \operatorname{tg} \alpha_1 \operatorname{tg} \alpha_2} \quad \operatorname{tg} \alpha_1 = k_1 \quad \operatorname{tg} \alpha_2 = k_2$$

Bo'lishini e'tiborga olsak, unda  $\operatorname{tg} \varphi = \frac{k_1 - k_2}{1 + k_1 k_2}$



## 2. Ikki to'g'ri chiziq orasidagi burchak

$A_1x + B_1y + C_1 = 0$  va  $A_2x + B_2y + C_2 = 0$  tenglamalar bilan berilgan to'g'ri chiziqlar orasidagi  $\varphi$  burchak

$$\cos \varphi = \frac{A_1A_2 + B_1B_2}{\sqrt{A_1^2 + B_1^2} \cdot \sqrt{A_2^2 + B_2^2}}$$

formula bilan aniqlanadi.

### 3. Ikki to'g'ri chiziqning parallelizm hamda perpendikulyarlik sharti

Tekislikda ikki to'g'ri chiziq berilgan bo'lib, ularning burchak koeffitsientli tenglamalari bo'lsin.  $y = k_1x + b_1$   $y = k_2x + b_2$

Bu to'g'ri chiziqlar orasidagi burchakning tangensi bo'ladi.

$$\operatorname{tg} \varphi = \frac{k_1 - k_2}{1 + k_1 k_2}$$

Agar ikki to'g'ri chiziqlar orasidagi burchak  $\varphi = 0$  bo'lsa, bu

$$\frac{k_1 - k_2}{1 + k_1 k_2} = 0 \text{ bo'lib, unda } k_1 = k_2$$

to'g'ri chiziqlar o'zaro parallel bo'ladi yoki ustma-ust tushadi.

- Agar ikki to'g'ri chiziqlar orasidagi burchak
- $\varphi = \frac{\pi}{2}$  bo'lsa, bu to'g'ri chiziqlar o'zaro perpendikulyar bo'ladi

$$\frac{k_1 - k_2}{1 + k_1 k_2} = \operatorname{tg} \frac{\pi}{2} = \infty \quad \text{bo'lib, unda}$$

$$1 + k_1 k_2 = 0$$

$$\text{ya'ni } k_1 = -\frac{1}{k_2}$$



## Ikki to'g'ri chiziqning parallellik hamda perpendikulyarlik sharti

Parallellik sharti:

$$k_1 = k_2 \text{ yoki } \frac{A_1}{A_2} = \frac{B_1}{B_2} .$$

Perpendikulyarlik sharti:

$$k_2 = -\frac{1}{k_1} \text{ yoki}$$

$$A_1 A_2 + B_1 B_2 = 0 .$$

# Ikki to'g'ri chiziq orasidagi burchakni aniqlash

1-misol.  $x + 5y + 9 = 0$  va  $2x - 3y + 1 = 0$  to'g'ri chiziqlar orasidagi burchakni toping.

Echish. (2) formulaga ko'ra:

$$\cos \varphi = \frac{1 \cdot 2 + 5 \cdot (-3)}{\sqrt{1^2 + 5^2} \cdot \sqrt{2^2 + (-3)^2}} = \frac{2 - 15}{\sqrt{26}\sqrt{13}} = -\frac{\sqrt{2}}{2}$$

bo'ladi. Demak,  $\varphi = 135^\circ$ .

# Ikki to'g'ri chiziqning o'zaro joylashuvini aniqlash

$2x - 3y - 7 = 0$  va  $4x - 6y + 5 = 0$  to'g'ri chiziqlarning o'zaro parallelligi yoki perpendikulyarligini tekshiring.

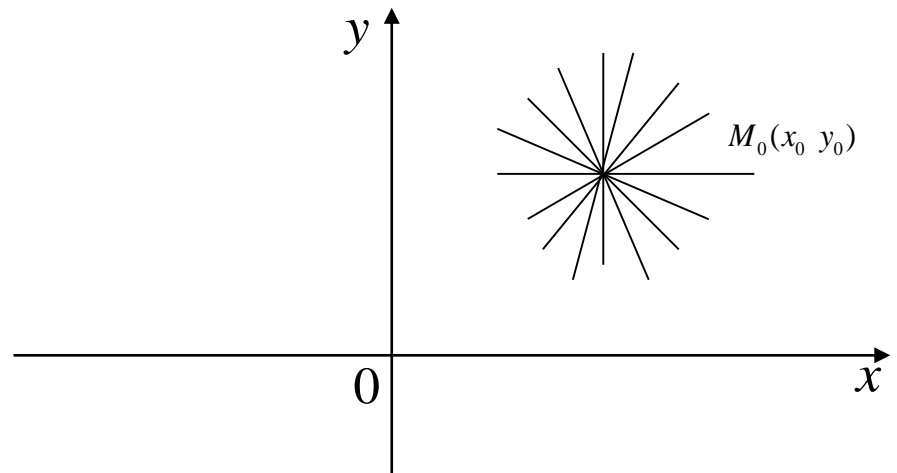
Echish. Bu erda  $A_1 = 2$ ,  $A_2 = 4$ ,  $B_1 = -3$ ,  $B_2 = -6$ .  $\frac{A_1}{A_2}$  va  $\frac{B_1}{B_2}$  nisbatlarni solishtiramiz:  $\frac{2}{4} = \frac{-3}{-6} \Rightarrow \frac{1}{2} = \frac{1}{2}$ . Demak, berilgan to'g'ri chiziqlar o'zaro parallel.

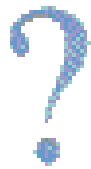
## 4. Berilgan nuqtadan o'tuvchi to'g'ri chiziqlar dastasining tenglamasi

Tekislikda  $M = (x_0, y_0)$  nuqta berilgan bo'lib. Ma'lumki, to'g'ri chiziqning burchak koeffitsientli tenglamasi  $y = kx + b$  ko'rinishda bo'lar edi. Aytaylik bu to'g'ri chiziq berilgan  $M_0(x_0, y_0)$  Nuqtadan o'tsin. Unda  $y_0 = kx_0 + b$  tengliklardan.

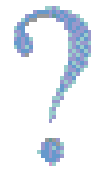
$$y - y_0 = k(x - x_0)$$

Bu formula berilgan nuqtadan o'tuvchi to'g'ri chiziqlar dastasining tenglamasi





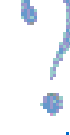
# Uyga vazifa:

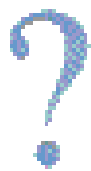


A,B, nuqtalarning koordinatalari berilgan bo`lsa, quyidagilar topilsin:

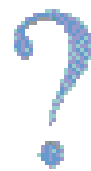
1) AB to`qri chiziqning kanonik tenglamasini

2) AB to`qri chiziq bilan OX o`qi orasidagi burchakni





# Uyga vazifa:



$3x + y - 4y = 0$  va  $2x - y + 1 = 0$  to'g'ri chiziqlarning kesishish nuqtasi orqali o'tib,  $x + y - 5 = 0$  to'g'ri chiziqqa perpendikulyar bo'lgan to'g'ri chiziq tenglamasini tuzing.

$x - 4y + 3 = 0$  va  $2x - y + 5 = 0$  to'g'ri chiziqlarning tekislikdagi o'zaro qanday joylashishini tekshiring.

$A(3;5)$  nuqtadan  $6x + 8y - 3 = 0$  to'g'ri chiziqqacha bo'lgan masofani toping.

$M(1;4)$  va  $N(3;-2)$  nuqtalardan o'tuvchi to'g'ri chiziqning burchak koeffitsientini toping va tenglamasini tuzing.

Burchak koeffitsienti  $k = -3$  bo'lgan va  $(-1;4)$  nuqtadan o'tuvchi to'g'ri chiziq tenglamasini tuzing.

**E'TIBORINGIZ**

**UCHUN**

**RAHMAT**

