

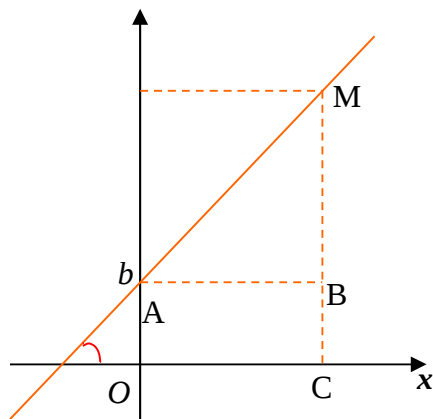
Tekislikda to'g'ri chiziq va uning tenglamalari

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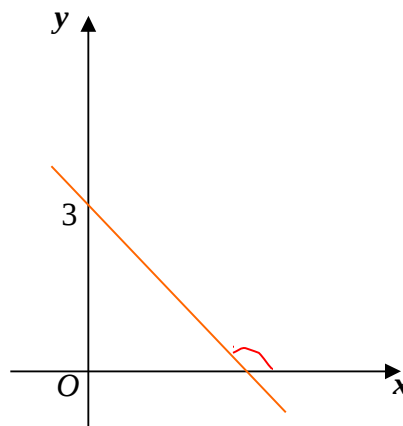
1. To'g'ri chiziqning burchak koeffitsiyentli tenglamasi.

$$y = kx + b \quad (1)$$

Bu yerda $k = \operatorname{tg} \alpha$, $b = OA$



1-chizma



2-chizma

2-misol. Ox o'qi bilan 125° burchak hosil qiluvchi va y o'qini nuqtada kesib o'tuvchi to'g'ri chiziqni yasang va uning tenglamasini yozing.

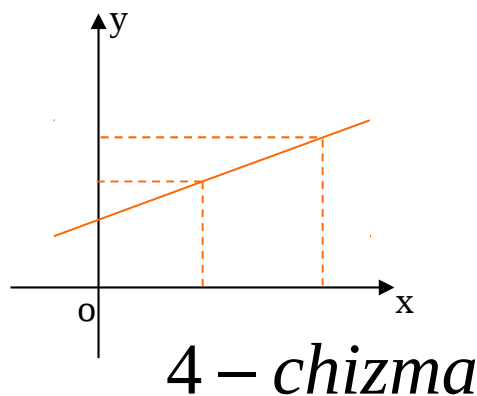
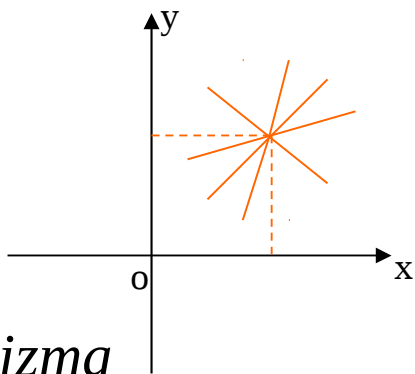
Yechish. Shartga ko'ra, to'g'ri chiziq OY o'qini $A(0; 3)$ nuqtada kesib o'tadi, demak $b=3$. Bu nuqtadan OX o'qiga parallel chiziq o'tkazamiz, hamda shu to'g'ri chiziq bilan 120° burchak hosil qiluvchi tomon, yasalishi kerak bo'lgan to'g'ri chiziq bo'ladi (1-chizma).

Endi shu to'g'ri chiziq tenglamasini yozamiz. Bu holda $\operatorname{tg} 120^\circ = -\sqrt{3}$, $b=3$ bo'lganligi uchun, $y = -\sqrt{3}x + 3$ to'g'ri chiziqning burchak koeffitsiyentli tenglamasi bo'ladi.

2) Berilgan bitta nuqtadan o'tuvchi to'g'ri chiziqlar dastasining tenglamasi. Berilgan ikki nuqtadan o'tuvchi to'g'ri chiziq tenglamasi.

a) Berilgan $A(x_1, y_1)$ bitta nuqtadan o'tuvchi to'g'ri chiziq tenglamasi.

$$y - y_1 = k(x - x_1) \quad (2)$$



b) Berilgan $A(x_1, y_1)$ $B(x_2, y_2)$ ikkita nuqtalardan o'tuvchi to'g'ri chiziq tenglamasi.

$$\frac{y - y_1}{y_2 - y_1} = \frac{x - x_1}{x_2 - x_1} \quad (3)$$

3-misol. Biror xil mahsulotdan 100 donasini ishlab chiqarishga 300 ming so'm xarajat qilinsin. 500 donasi uchun esa xarajat 1300 ming so'm bo'lsin. Xarajat funksiyasi chiziqli (to'g'ri chiziq) bo'lsa, shu mahsulotdan 400 dona ishlab chiqarish xarajatini toping.

Masala sharti bo'yicha $A(100, 300)$ va $B = (500, 1300)$ nuqtalar berilgan. $\frac{y - 300}{1300 - 300} = \frac{x - 100}{500 - 100}$, yoki $y = 2,5x + 50$ tenglik o'rinli bo'ladi.

Oxirgi tenglamadan $x = 400$ uchun, $y = 1050$ ekanligini topamiz.

Demak mahsulotdan 400 dona ishlab chiqarish uchun 1050 ming so'm xarajat qilinadi.

To'g'ri chiziqning umumiy tenglamasi va uning xususiy hollari

$$Ax + By + C = 0 \quad (4)$$

1) $A \neq 0$ $B \neq 0$ $C = 0$ bo'lsa, $O(0;0)$ to'g'ri chiziq koordinatlar boshidan o'tadi (5а-чизма);

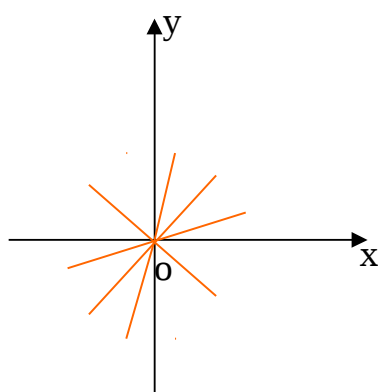
2) $A = 0, B \neq 0, C \neq 0$ bo'lsa, to'g'ri chiziq OX o'qiga parallel bo'ladi (5b-chizma);

3) $B = 0, A \neq 0, C \neq 0$ bo'lsa, to'g'ri chiziq OY o'qiga parallel bo'ladi (5c-chizma);

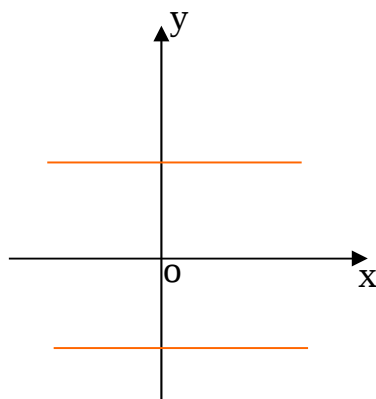
4) $A = 0, C = 0, B \neq 0$ bo'lsa, $y = 0$ bo'lib, OX o'qining tenglamasi bo'ladi;

5) $B = 0, C = 0, A \neq 0$ bo'lsa, $x = 0$ bo'lib, OY o'qining tenglamasi bo'ladi;

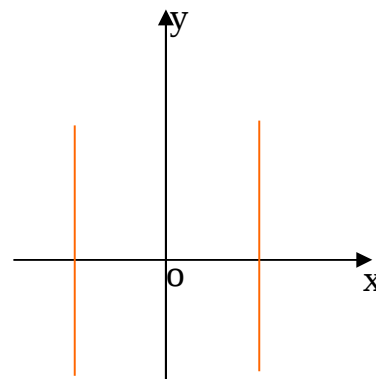
6) $A = 0, B = 0, C \neq 0$ bo'lsa, $C = 0$ bo'lib, unday bo'lishi mumkin emas.



5a – chizma



5b – chizma

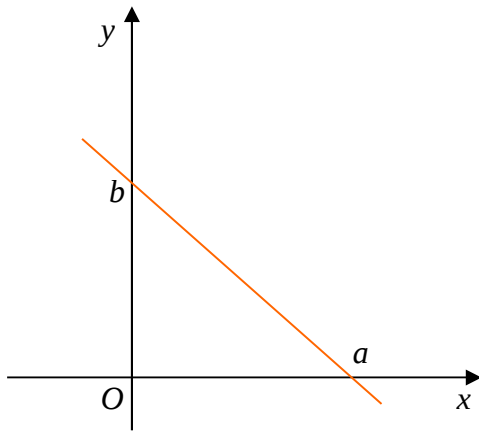


5c – chizma

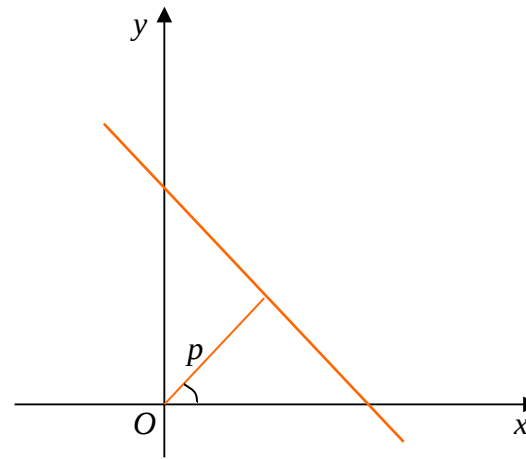
3-misol. $x - 2y + 6 = 0$ to'g'ri chiziq uchun k va b parametrlarni toping.
Yechish: $2y = x + 6$, $y = 1/2 \cdot x + 3$ bundan (2) tenglama bilan taqqoslab,
 $k = 1/2$, $b = 3$ ekanligini topamiz.

4) To'g'ri chiziqning kesmalarga nisbatan tenglamasi.

$$\frac{x}{a} + \frac{y}{b} = 1 \quad (5)$$



6- chizma.



7- chizma.

4-misol. $3x + 5y - 15 = 0$ to'g'ri chiziqning kesmalarga nisbatan tenglamasini yozing va uni yasang.

Yechish. $3x + 5y - 15 = 0$ to'g'ri chiziqning umumiy tenglamasini (5) ko'rinishdagi tenglamaga keltiramiz.

$$3x + 5y = 15, \quad \frac{3x}{15} + \frac{5y}{15} = 1 \quad \text{yoki} \quad \frac{x}{5} + \frac{y}{3} = 1$$

bu to'g'ri chiziqning kesmalarga nisbatan tenglamasi bo'ladi. Endi koordinat o'qlaridan mos ravishda 5 va 3 kesmalarni ajratib, ajratilgan kesmalar oxiridan yasalishi kerak bo'lgan to'g'ri chiziqni o'tkazamiz.

5). To'g'ri chiziqning normal tenglamasi.

$$x \cos \alpha + y \sin \alpha - p = 0 \quad (8)$$

$$M = \frac{1}{\pm \sqrt{A^2 + B^2}} \text{normallovchi ko'paytuvchini deyiladi.}$$

5-misol. Normalning uzunligi $p = 3$ va uning OX o'qi bilan hosil qilgan burchagi 30° bo'lsa, to'g'ri chiziqni yasang va uning tenglamasini yozing.

Yechish. Shartga ko'ra normalning OX o'qi bilan 30° burchak tashkil etadi. Bu burchakni yasaymiz va uning qo'zg'aluvchi tomoni normal to'g'ri chiziq bo'ladi. Shu to'g'ri chiziqda $p = 3$ kesma ajratib uning oxiridan unga perpendikulyar to'g'ri chiziq o'tkazamiz. Bu yasalishi kerak bo'lgan to'g'ri chiziq bo'ladi. Endi to'g'ri chiziqning tenglamasini yozamiz. Shartga ko'ra normalning uzunligi va uning OX o'qi bilan hosil qilgan burchagi berilgan, bu holda ma'lumki, to'g'ri

5-misol. (8) normal tenglamasini yozamiz. $p = 3$ $\alpha = 30^\circ$ bo'lganligi uchun
 $x \cos 30^\circ + y \sin 30^\circ - 3 = 0$ *ëku* $\sqrt{3}/2 \cdot x + 1/2 \cdot y - 3 = 0$
 Natijada $\sqrt{3}x + y - 6 = 0$ tenglama hosil bo'ladi.

6-misol. $4x - 3y - 5 = 0$ to'g'ri chiziqli tenglamasini normal tenglamaga keltirish.

Yechish. $M = \frac{1}{\sqrt{4^2 + 3^2}} = \frac{1}{5}$ $M = 1/5$ $4/5 \cdot x - 3/5 \cdot y - 1 = 0$

$$\left(\frac{4}{5}\right)^2 + \left(-\frac{3}{5}\right)^2 = \frac{16}{25} + \frac{9}{25} = \frac{25}{25} = 1 \quad (\sin^2 \alpha + \cos^2 \alpha = 1)$$