18-mavzu:

Misol. $y^2=4x$ parabolaning fokal radiusining uzunligi 26 ga teng bo`lgan nuqtani toping.

Yechish. Izlangan $N(x,y)$ nuqta uchun ta'rifga ko`ra $r=FN=26$, $2p=4$, $p=2$. $F(\frac{p}{2},0)$ $\Rightarrow$ $F(1,0)$, $26=\sqrt{(x-1)^2+y^2}=\sqrt{(x-1)^2+4x}$. Bundan $x^2+2x-675=0$, kvadrat tenglamani yechib, $x_1=25$, $x_2=-27$ ildizlarni topamiz. $x_2=-27$ ildiz chet ildiz, chunki $y^2=4x$ parabolaning hamma nuqtalarining absissasi musbat. $y^2=4\cdot 25=100$, $y_1=10$, $y_2=-10$ topamiz.

Shunday qilib izlangan nuqta ikkita ekan $N_1(25,10)$, $N_2(25,-10)$.

Misol. $y^2=9x$ parabolaning $N_0(1,-3)$ nuqtasiga o`tkazilgan urinma tenglamasini yozing.

Yechish. N_0 nuqta parabolada yotishidan foydalanib,

$$(-3)^2=2p\cdot 1 \Rightarrow 2p=9;\ p=\frac{9}{2}. \qquad (53.2)$$

formuladan foydalanib $y(-3)=\frac{9}{2}(x+1)$, ya'ni $3x+2y+3=0$ urnima tenglamasini yozamiz

Misol. $y=\frac{1}{2}x^2+2x+3$ parabola tenglamasini kanonik ko`rinishga keltiring va yangi koordinatalar boshining koordinatalarini toping.

Yechish. Berilgan tenglamani ushbu ko`rinishda yozamiz;

$$y=\frac{1}{2}(x+2)^2+1 \quad \text{yoki} \quad y-1=\frac{1}{2}(x+2)^2$$

Koordinatalar boshini

$$X=x'-2$$
$$Y=y'+1$$

Parallel ko`chirish yordamida $O\to O'(-2,1)$ nuqtaga ko`chiramiz. Yangi koordinatalar sistemasida parabola tenglamasi

$$Y'=\frac{1}{2}x'^2 \quad \text{yoki} \quad x'^2=2y'$$

kanonik ko`rinishga ega bo`ladi.

M i s o l. $r=\frac{25}{13-12\cos\varphi}$ chiziqning Dekart reperiga nisbatan kanonik tenglamasini yozing.

YE ch i sh. Berilgan tenglamani (56.2) $r=\frac{p}{1-e\cos\varphi}$ ko'rinishga keltirish uchun o'ng tomonining surat va maxrajini 13 ga bo'lamiz:

$$r=\frac{\frac{25}{13}}{1-\frac{12}{13}\cos\varphi}.$$

buni (56.2) bilan taqqoslasak, ko'ramizki, $e=\frac{12}{13}<1$, demak, egri chiziq ellipsdir. Uning kanonik tenglamasini yozamiz. Tenglamadan $p=\frac{25}{13}$, lekin $p=\frac{b^2}{a}$ edi, bundan $\frac{b^2}{a}=\frac{25}{13}$, $b^2=\frac{25}{13}a$; $e=\frac{c}{a}=\frac{12}{13}\Rightarrow c=\frac{12}{13}a$. b,a ning bu qiymatlarini $b^2=a^2-c^2$ tenglikka qo'ysak, $\frac{25}{13}\cdot a=a^2-\frac{144}{169}a^2$, bundan $\frac{25}{13}=\frac{25}{169}a$ yoki $a=13$, $b^2=\frac{25}{13}a=\frac{25}{13}\cdot 13=25$, $b=5$ berilgan ellipsning kanonik tenglamasi

$$\frac{x^2}{169}+\frac{y^2}{25}=1.$$